INNOVATION IN COMPLEX SYSTEMS

An exploration in strategy, leadership and organization

Christer Vindeløv-Lidzélius

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Preamble

Dear Reader

In this preamble, I would like to give you an advance narrative summary of my thesis, its topic, its importance and how I went about it. This is because there is a strong emergent character in my work – I finish every chapter with emerging questions – and for some it might be too much to wait until the end to see the line. In fact, I had no closed theory nor a predetermined hypothesis to begin with, only an open question, a need to understand. Being trained in the social sciences, I knew that clarifying the question is as much a part of the research as providing answers. My curiosity, simply stated, is about the discourse and reality of innovation in business: why is something that seems so important to our daily life so poorly understood and so undefined in terms of implementation.

That innovation is a timely topic goes without saying. One can hardly find these days a description of a company, an annual report or a strategy document, without an explicit statement of the need for innovation, let alone one in which the need for innovation would be explicitly denied. We find a total commitment to innovation, a stated aspiration to take it further and further. The typical logic of justification is that companies that do not innovate – that do not offer new products and services to their clients – will sooner or later become obsolete and give the upper hand to their competitors. Although this a logic may not be entirely new in business, it is taken together nowadays under the single umbrella of the need for innovation, not only in business, but also in society as a whole and even in our personal lives.

In my role as a consultant for more than two decades I have witnessed and participated in the growing attention for innovation, not only in real terms, but also and above all in discourse. There seems to have grown an unstoppable desire for something "new". The ready-made reply to that desire invariably became "innovation". However, alongside the growing attention on innovation, there also grew a parallel awareness of how little we actually know about it, and even less about what to do to make it work. This stands in sharp contrast, for example, with another discourse that started at about the same time, namely Quality Management, for which there soon appeared a common language, a set of definitions and even concrete measurement tools. This is definitely not the case for innovation and I wanted to know more about this. I therefore formulated a concrete question, "How do organizations go about developing capacity for bringing about innovation in complex systems", and decided to approach it through a variety of methods, namely: 1) Literature research, 2) A quantitative survey of a relatively large group of stakeholders, 3) An action research process, 4) Two sets of in-depth interviews, and 5) A focus group study.

The first approach, literature research, explores the concept of innovation quite broadly, whereas the field work is narrower, situated around a specific company and a specific department in that company. The survey is less narrow and serves as basis of comparison for that company.

Given the multifaceted character of innovation, as well as the apparent multitude of understandings, it seemed reasonable to choose "complexity" and "social constructionism" as "world-views" on the subject. "Complexity" because it is obvious that the business world, including innovation, does not behave in a simple predictable way, both backward and forward, like in classical mechanics, but more in a non-linear or less predictable way, like in complex systems. But since it is probably a bit haphazard to simply transfer a concept from the natural sciences

to the social sciences, I decided also to search for a more or less parallel notion in the social sciences; this was "social constructionism". By looking at innovation through the lens of these two notions, it became clear that it could be conceived as a complex adaptive system in itself, nested within a larger complex adaptive system, and that we could actually propose a new definition of innovation that reflects the similarities between the two world-views.

The literature research is given in chapter 2. In chapter 3 I explain the methodology, arguing mainly for authenticity and transparency, or the social constructionist equivalents of validity and reliability. In chapter 4, I present and analyse the empirical findings, in simple descriptive terms and avoiding inferential statistics, because this was not our intention. In chapter 5, we bring the quantitative and qualitative data together and discuss them through parameters of more nuanced questions that had emerged along the way. In chapter 6, we come to conclusions, discuss our main findings (i.e., around a new form of R&D, around capacity building for innovation, around the current state of innovation, and around the conceptual integration of social constructionism, complexity and innovation), and try to bring them back to our original research question.

To clarify, I had one in-depth case study, and one could argue that its in-depth side was only focused on one department. In terms of findings and conclusions I cannot therefore speak on behalf of all organizations. However, many of the findings in the case study resonated well with those from the qauntitative study and were echoed in the literature review. As such, there is enough around the findings to allow for speaking more generally in the conclusions – hence my frequent use of the plural organizations, as opposed to organization.

The whole thesis has been deliberately written in the same style as the nature of the research itself, namely reflective and participatory, explorative, gradually unfolding, generating new questions along the way, and provoking assumptions and findings. The journey I embarked on was, indeed, not to prove or disprove a definite hypothesis, not to affirm or reject a closed theory, but to learn from doing and reflecting in a world I wanted to understand better, namely the world of innovation, and more particularly how strategies for innovation are developed and implemented, if at all. It has been a journey of reflective practice in which I learnt through simply doing, as hopefully you will too.

Christer Windeløv-Lidzélius

Summary

Background
Innovation is a multi-faceted term that has gained much prominence in our time. Much of perceived organizational survival and success in the marketplace is attributed to the capacity to innovate. While much research is indeed devoted to the subject of innovation, it remains difficult for organizations to make it work. This thesis concerns innovation in complex systems. The research question "How do organizations go about developing capacity for bringing about innovation in complex systems?" is unfolded in an exploratory way. Literature on the subject of innovation is researched, using complex systems theory and social constructionism, to generate emerging questions that are used as a backdrop to the empirical research. The methodological approach combines qualitative and quantitative research, with an emphasis on the former.
The empirical data-generating practices follow a similar explorative nature, with findings from the different empirical sources generating emergent views, reflections and questions that are brought forwards.
The case study follows the Research and Development Department of Telefónica Digital in Barcelona (part of Telefónica, S. A.) and its transition into a new entity called Telefónica Alpha.

Process
The research process began with an action research phase in which the researcher was contracted as a consultant by the Research and Development Department (PDI) of Telefónica Digital in Barcelona, working with them for around 18 months. This phase also included 13 interviews that were conducted with the management team. As a supplement, a quantitative research phase in which 103 subject-matter experts were invited to offer their perspectives on innovation, was also conducted.
As the PDI – indeed the whole division of Telefónica Digital – was dissolved and/or transformed approximately three years later, five interviews were conducted to offer insight into what had emerged instead and how a particular unit (Alpha) served as one answer to the question of how to bring about innovation in complex systems. Finally, the findings and emerging questions were brought into a focus group with five other subject-matter experts for further discussion, reflection and co-construction.

The empirical study led to an exploration of a relatively new phenomenon – a new form of "R&D" facility championed by the likes of Google, Facebook and others. Telefónica, S. A. started its own version of this (Alpha) not only as way to tap into perceived opportunities, but also as way to counter the appreciated challenges of today and those foreseen in the years to come.

Results
The main findings from the empirical and theoretical study can be grouped into four interlinked areas:

-   Findings around a new form of R&D
-   Findings around capacity building for innovation
-   Findings around the state of innovation
-   Findings around social constructionism, complexity and innovation.

A new form of R&D
The overall main finding was that this new R&D department was to a large extent the progression of strategy work on behalf of the company that concluded that today's volatile and fast-moving business environment needed a radical approach – at least to supplement other initiatives (like for instance more classical R&D and product and service development). As such one can think of it as part of a strategy-portfolio way of thinking (i.e. a company needing to move on several fronts at once) and a contemporary option-theory in which uncertainty about what will be the winning markets, products and services in the future is up in the air (i.e. we need to test several things – including things that are not necessarily within our scope today). Another way to look at it is that

this type of initiative is a departure from more classical risk-management towards uncertainty-opportunity-thinking. By unfolding beyond the scope and range of the business of the company one hopes to counter limitations in existing markets and reap the benefits of creating new markets.

Capacity building
A number of findings arose in the action-research phase, as the researcher helped the PDI develop its capacity for leadership and innovation. The rationale for developing this capacity in the first place can be understood as a way to generate distributed leadership (i.e. more individuals stepping up and taking charge beyond their functions), develop the team (i.e. make them work more and better together) and of course become better at generating ideas and making them come alive (or at least become adopted by the business units). On an overall level, it is clear that in a given social system, organizational development can happen by itself, but there is a massive dependency upon the systems the in which the system is nested. When a company at large undergoes changes and these are unclear and communication is poor, it negatively affects local capacity building (i.e. does their work really matter?). As such, initiatives like the one undertaken need to be mindful of wider system changes and receptive to individual uncertainties and needs, so as to generate collective progress.

The state of innovation
The quantitative research provided some clear indications round the subject of innovation in organizations. These findings were illuminated and contrasted with the case study and the focus group. What stands out is that the subject of innovation is a fairly recent one. It is a priority today for almost all organizations in the study, but clear strategies for innovation are not widely utilized or communicated. This is surprising given the prominence of the innovation in the public debate and the assumption it is vitally important for the future success of companies.

Social constructionism, complexity and innovation
This study shows that there are similarities, as well as differences, between complexity sciences and social constructionism. They have very different origins, but both reject a positivist view of the world.
When it comes to complexity thinking, this study shows that applying views and methods from the natural sciences to social systems should be done with caution. Yet done properly it may spark new types of insights – for instance around why plans often don't pan out as imagined, as well as suggesting how to understand the process from ideation to diffusion and adoption of innovations.
Social constructionism would suggest innovation as being both relational and meaning-making, that is, both dependent upon relationship as well creating new meaning and new (re)relations. A working definition that bridges social constructionism and complexity around innovation is proposed: "The emergence of new meaning in dissipating structures".

Conclusions
A theoretical analysis, supported by explorative qualitative and quantitative research, suggests that organizations develop the capacity to generate innovation in a multi-faceted way. Strategy, organization and leadership are all inter-related constructs that cannot be separated from the notion of innovation and how it unfolds in local realities. From a system perspective, local constructs are nested and embedded in larger systems, while dominant discourses around the value of innovation, what innovation is and how to best go about it frame local and provisional conceptions around innovation. Essentially, then, organizations face a choice between becoming better at utilizing resources to excel in innovation activities or trying to break new ground. While this choice calls for different orientations around leadership, organization and strategy, both options entail a number of methodological, theoretical and cultural challenges that require perceptual and conceptual changes on individual and group levels.
In the end, there are many answers to why an initiative becomes an innovation and why certain organizations are better at innovation than others. However, none are in themselves a guarantee for success when transferred to another organization and its reality, neither for future success. One image that can illustrate this enigma is that of a jigsaw puzzle. We seem to have many of the right pieces to the puzzle, and we might even have an idea of the

image itself. However, there is no how-to book on how and in what order to place the pieces; as soon as it is laid down, the other pieces and the image change – sometimes in ambiguous ways. Furthermore, while other players are working on their puzzles, ours may become obsolete or at least changed due to others' manoeuvres. Innovation is – it seems – an elusive promise of success and an imminent risk of being outdated.

Table of contents

List of tables

List of figures

1   Introduction

This chapter introduces the thesis. It covers:

- Background for the study
- Innovation
- The preconception and starting point of the author
- The empirical material
- The problem statement
- The purpose statement
- Research questions
- Overview of methodology
- Limitations of the study and approach
- Definition of key terminology
- Organization of dissertation.

1.1   Background to the study

Our world is experiencing massive changes on many levels: global, national, regional and local. The complexity of our business landscape seems to have increased dramatically over the last two decades and there no signs of relief. It is not only increasing competition and changing consumer preferences that bring about a need for more cost-effective solutions. Pressures come from shareholders for ever increasing profits, from policymakers on rules and regulations, and from people within the organizations on issues like salaries, ethics and meanings. Changes seem to come from everywhere, and their nature ranges from political interests to technological breakthroughs. In the midst of all of this, organizations are supposed to manoeuvre and thrive.

Organizations are a nexus in our understanding of the world and how we go about meeting challenges and delivering upon hopes. In 2014 The World Economic Forum released its *Global Risks 2014* report. On a ten-year view, 31 global risks with the potential to generate substantial destructive effects across industries and countries are outlined.[1] Here we find risks on climate mitigation and adaption, food crisis, profound political and social instability, and more. These risks are challenges that can scarcely be met by individual organizations, but the effect of how they are handled will be felt by them. The ability to manage change seems to be a key capability for the future.

To underline the uniqueness, unpredictability and speed of the changes facing today's organizations, Drucker (1969) coined the phrase "the age of discontinuity". However, not all change comes as a surprise. Indeed some changes are planned and take place within the capacity of the organization. For instance, decisions on strategies may be heavily influenced by external factors – and indeed the realized strategy may differ from the designed one – but essentially, they are ultimately decisions of choice.

Demands to be more accountable and improve governance have also grown over the last decades. Societal, environmental, political and cultural impacts are increasingly expected to be managed ethically by individual organizations, and we find organizations that want to excel here, regardless of whether they need to or not.

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[1] http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2014.pdf

One theory that deals with how organizations adapt to their environments and how they handle uncertainty is complexity theory. This theory considers organizations as combinations and collections of structures and strategies. Here the structures are dynamic webs of interactions. Behaviour is adaptive, as the collective as well as individuals transforms and self-organizes. Systems thinking, meanwhile, is about understanding how "the parts" effect "the whole". Ackoff (1972) observed that "a system is more than the sum of its parts; it is an inseparable whole". Together these new sciences can help us understand organizations, as well as strategy and leadership in new ways.

The shift from an industrial age to an information age marks a transition of value, from physical to intellectual resources. Already in 1967, in the book *The Effective Executive,* Drucker introduced the difference between the manual worker and the knowledge worker. According to him, the manual worker works with his/her hands and produces goods or services, while the knowledge worker works with his/her head and produces information, ideas and knowledge. The concept of the knowledge economy can thus be seen as an extension of the information age where knowledge is the key asset for progress and success. Here we also see the importance of the "inner life" of the organization, the organizing of knowledge to promote effective use of capabilities. These changes suggest new forms of organization, organizing and leadership are emerging. For instance, new technologies for connecting, communicating, sharing and collaborating have not only required a complete rethinking of how to organize, but also opened up new opportunities and ways of thinking.

An interesting aspect of all this is the response to these threats and opportunities: How are we going to realize our ambitions and hopes and how are we going to be proactive in relation to our global challenges as well as the more local ones? Often the answer one hears is: Innovation.

1.2   Innovation

Innovation seems to be the mantra of our time regardless of the problem. But what innovation is, how it comes about and how to be effective at it attracts numerous interpretations, theories and practices that obscure or enrich the field – depending upon one's preferences. The Cox Review (2005) offers a setup that connects creativity, design and innovation. "Creativity is the generation of new ideas – either a new way of looking at existing problems or the discovery of new opportunities. Innovation is the exploitation of new ideas. Design is what links creativity and innovation – it shapes the ideas so they become practical and attractive propositions for users and customers."

According to the *Harvard Business Review* (2003) there are two schools of thought when it comes to strategy in relation to value creation: The first suggests that the path lies in replacing the old-fashioned practice of gut instincts with strategy based on rigorous, quantitative analysis. The other one favours creativity and innovation. Another polarized approach in strategy development concerns using problem-based business improvement methods and strengths-based constructionist methods. These are stereotypically seen as seen as an either-or proposition, therefore accepting as a predicate assumption a field-limiting separatist paradigm (Cooperrider, Sorensen, Whitney & Yaeger, 2000).

According to Gergen (2009) social construction is both very elemental in that nothing has meaning unless people ascribe meaning to it, yet very multifaceted in its potential for elaborate layering of meaning. This study concerns innovation in complex systems. It is straightforward and basic in its application of social constructionism.

The search for new knowledge to help alleviate our organizational challenges as well as deliver upon our aspirations is calls for research concerning innovation. But given our challenges in agreeing upon what innovation actually is we are faced with a dilemma: How can we become better at something that we do not (fully) agree upon what is and cannot prescribe how to do? This an important conundrum to resolve.

Ackoff (1981) defined a dilemma as "a problem, which cannot be solved within the current world view". A dilemma and combinations of dilemmas demand and generate new ways of thinking about them and resolving them. Metaphors play a significant role in how we comprehend management and organizations (Morgan, 2006). In principle, one can use the same argument when it comes to our appreciation of our world in general. If metaphors guide and shape our thinking and subsequently our action, then it is important to understand and perhaps challenge these metaphors if we seek change. Most of our metaphors in organizational life today still stem from a mechanistic view of the world. Our views of the world impact our understanding of a given situation (for instance a leadership challenge, business opportunity etc.) and the assumptions that we make about the situation. Our understandings of the world then are a product of historical circumstances – relational circumstances – to make a connection with social constructionism. Innovation then can be seen as both a metaphor in its own right and as being dependent upon metaphors. Innovation can be a transformational tool for individual and systemic change, towards a more sustainable future and a higher quality of life. Because we understand many phenomena – such as innovation, strategy, leadership and organization – by examining them through various metaphors, we should also approach problems from more than one world-view or methodology. This implies that in order to better understand the research done and the interpretation of the findings, one needs to have at least a basic understanding of who is the person who has written this and what can be said of him or her.

1.3   Author's preconceptions and starting point

I have been occupied with innovation and complexity for more than a decade. One can say that my preoccupation with it was a result of my work with leadership, strategy and organizational development – as well as entrepreneurship and business development.

Already during my military service 25 years ago questions and interest concerning leadership and effectiveness had started to arise. During different assignments, some leaders and some groups performed better than others. How come?
Starting to work in business – even at a junior level – exposed me to different types of managers, ways of organizing work and, not least, reorganizations. It was also here that I had my first experiences with business competition. Going back to school and pursuing studies on project management, culminating a little more than half a decade later with an MBA, certainly increased my interest in and knowledge of these phenomena. During the mid-nineties, my first real exposure to complexity and innovation as subjects occurred.
Working (since 1998) as an entrepreneur within a variety of fields as well as a consultant in strategy and organizational development brought together all of the above-mentioned areas. Today I serve as Principal at a business and design school, fostering enterprising leadership, and on different boards, committees and think tanks. Ideas and questions around the nature of how our society and indeed organizations develop and create value are of very great interest to me.

Working with both my own organizations, or as an external advisor – helping others – has given me some strong experiences. Just the terminology alone (not even speaking of the allocation of resources and the application of them) is often localized in its understanding and use. Often there is also a lot of discrepancy within one organization, which creates misunderstanding, confusion and even inefficiency. The lack of "guarantees" when bringing about new strategies and reorganizations is also a source of challenges for the organization, and especially for management when it comes to justifying decisions and motivating people. Questions like "why is this the right way forward…", or "again, didn't we just…", or "isn't what we do good enough…".

A few key things I have learnt myself are worth mentioning because to some extent they frame my point of departure.

3

a. There is no proven universal solution or methodology in organizational and business development. This is why we often fail when just "adopting" a given truth from one context into another.
b. This also suggests that one can be successful – as a company, or a leader for that matter – in many different ways.
c. Solving problems often generates new ones and as such there is a need to be able to navigate in a complex environment – to continuously establish and nurture the organization (and its capabilities) and the business opportunities (including the markets).
d. One can perhaps say that it is our creativity that brings us into new kind of problems, but it is also our creativity that finds new thinking and new ways.

I find comfort in this.

1.4   The empirical material

The study consists of three parts: A quantitative study, a single-case study and a focus group.

The quantitative study took its starting point in a handful of networks that are oriented around questions of innovation, with the aim of understanding how these subject matter experts view and work with innovation. This helped to develop the qualitative study.

The single-case study was Telefónica, S.A. and particularly the R&D unit in Telefónica Digital in Barcelona. The study took as its starting point a unit that during course of the study essentially dissolved and transformed into something new.

The findings from the research were presented and discussed in a focus group.

1.5   The problem statement

How does innovation actually come about, why are some organizations more innovative than others, and how can organizations pursue effective strategies for making innovation happen?

This is sort of challenge that this thesis is concerned about. Regardless of whether one looks on a strategic, tactical or operational level, with the lens of "what's next" or "how do we improve or obtain success", often we start by looking at what does not work so well. In these cases, there is often a need to better understand the problem, indeed to identify the problem and agree upon it before one can start to find solutions. Often, even if we can agree on the problem (for instance – we don't sell enough), it may be more challenging to agree upon the reasons behind it (Cooperrider et al., 2000), as well what is the right course of action to remedy it. Reasons for this are often that we have different motives (on the negative side – no one wants to be wrong or to be blamed), as well as different interpretations (Gergen, 2009) of the events in question. All quality management initiatives can to a certain degree be considered to focus on problems (even though the intent is improvement of managerial performance at all levels) and subsequently run the risk of discarding what is going well and the ways in which it can be taken further.

When introducing strength-based approaches there is the risk of going from one end-point to another. There is a major risk (or at least a concern) that not only are important problems being overlooked, but also that the changing focus (because problem focus is what we are normally concerned with) will generate frustration

4

amongst people if it is not handled properly. According to Cooperrider et al. (2000) this argument is quite common and it is stated that strengths-based methods do not disregard problems, they just go about them differently, using a different perspective. This approach laid the foundation for my action-research work with Telefónica and the subsequent interviews.

1.6   The purpose statement

The title of the research is "Innovation in complex systems – an exploration in strategy, leadership and organization."

Its aspiration is that its findings and co-creations will support the development of a framework for designing, deploying and leading strategies for innovation, combining problem-based approaches with strength-based constructionist approaches. The project's purpose statement is as follows:

The purpose of the project is to obtain, develop and disseminate knowledge around innovation in complex systems by a combination of quantitative and qualitative studies, exploring it through strategy, leadership and organization.

1.7   Research questions

The main question is:

- How do organizations go about developing capacity for bringing about innovation in complex systems?

The supporting questions are:

- What are the theoretical connections between innovation and complex systems in a social constructionist framework?

- What characterizes innovative organizations?

- How do organizations develop and deploy innovation?

- What are the conditions, drivers, processes, structures, cultures and dynamics that generate and support effective development and deployment of innovation in complex systems?

1.8   Overview of methodology

The methodological choice has been essentially a qualitative one where inferential statistics have not been the objective. It has been explorative in its nature, utilizing a mixed-method approach (Jick, 1979) and utilizing different sources of data (Denzin 2006 and Rothbauer, 2008). Thematic analysis has been the main method for interpreting the data (Guest, 2012).

1.9   Limitations of the study and approach

The subject area of innovation is a large one, and adding the lenses of strategy, organization and leadership creates myriad possible combinations. As an example: between 1986 and 1996, 17,800 management journal articles were written about leadership alone.[2] As such there is a risk that much valuable literature research has not been discovered or consulted. When it comes to the quantitative study, which takes as a starting point a given number of associations or groups, there are also a huge number of organizations that have not been invited (or not seen, or not chosen to participate) to the study and one has to consider that including others would have yielded a different result.

In terms of the qualitative research a similar concern must be raised: choosing another case could have provided a very different result. Further, the length of the study does not account for long-term effects, value or challenges. Here, the methodology chosen and analyses conducted by the researcher must take these limitations into account.

1.10   Definition of key terminology

This study includes a number of terms of importance, several of which will be dealt with in more depth in the following chapters. As a starting point of reference her follow the researcher's more neutral definitions. This terminology will be explored and animated in more detail throughout the thesis.

- Innovation
The process of bringing something different and valuable successfully into being.

- Capacity
The particular ability/strength of a person or an organization to make something happen.

- Strategy
The formulated path for achieving an overall intention.

- Leadership
The recognition that difference, making a difference, would not happen without it.

- Organization
A coordinated format that exists for a reason.

- Complex systems
A whole consisting of interdependent components, the properties of whose behaviour emerge from the interactions of its parts and that cannot be predicted from the properties of the parts.

- Social constructionism
A world-view that says everything is constructed in relationships.

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[2] http://wiki.answers.com/Q/How_many_leadership_books_and_articles_are_in_print?#slide=2

1.11 Organization of the dissertation

The dissertation opens with a summary and a table of contents. Then, nine chapters follow in total, of which the last two are a reference list and the appendices. Here follows a short overview of them all.

Every chapter begins with a short description of the contents of the chapter and ends with a short summary.

Chapter 1 introduces and frames the study and introduces the research questions.

Chapter 2 includes the results of the literature review. Beginning with innovation as it is described in the literature, the study then moves on to complexity and finally social constructionism as ways of expanding our understanding of innovation.

Chapter 3 describes the methodology used.

Chapter 4 presents the empirical results. First the case of Telefónica is presented, followed by the results of the quantitative survey, the action research, the interviews and the focus group.

The different empirical data sets, desktop research and findings from the literature are brought together in chapter 5.

In chapter 6, the conclusion, the results from the literature review, quantitative and qualitative research, different analyses, concept development and different feedbacks are extrapolated and put into perspective. The chapter relates these findings to the research questionß. There is also a description of the study's contribution to the existing literature and its implications for research and practice. Finally, there are some reflections and suggestions for further research.

Since the thesis does not per se concerns how the findings have impacted the author, chapter 7 takes a more self-reflective orientation. What has the author learnt about conducting a thesis like this, what are his reflections on his own starting preconceptions, and where has this project led him to as of now?

In chapter 8 the references used are listed alphabetically. Particular reports used are also listed.

Chapter 9 contains the appendices, including the questionnaire and interview guide.

2   Literature review

2.1   Introduction to chapter 2

The purpose of this chapter is to provide a solid and ample description and analysis of the literature used in this study. The central area of this research concerns innovation, which is explored through a fairly broad approach to the topic and its related subjects. The thesis takes its starting point in complex systems. It explores different complexity theories and social constructionism to situate, nuance and amplify the understanding of innovation. At the end of the chapter, social constructionism, complexity theories and innovation are brought together to form a basis for the subsequent empirical analyses, discussions and conclusion.

The following areas will be covered:

- Methodology for literature research
- Innovation
- Social constructionism
- Complexity theory
- Summary
- Emerging questions.

The section on innovation is divided into three main parts: 1) What is innovation, 2) the business of innovation and 3) creating innovative organisations.

Literature on complex systems and social constructionism are reviewed independently before they are brought together with innovation. As such the theme of the thesis is placed firmly within a particular world-view that shapes the following chapters.

2.2   Methodology for literature research

Innovation is a popular theme, both within academic circles and in the business management literature. The number of publications that could feasibly be considered important is immense, and as such the present study has to be labelled "not exhaustive".

The literature research draws upon a number of sources, which can be categorized accordingly:

- Peer-reviewed academic articles
- Books and papers written by scholars
- Books and papers written by practitioners.

Further to this are statistics and reports produced by consulting companies, governmental agencies think tanks and so on. These documents are considered to provide important insights.

While academic writings may carry more validity and credibility as sources of knowledge for the production of a PhD, other sources are not necessarily wrong or unimportant. As such, although this thesis will place a larger emphasis on peer-reviewed articles and scholarly productions, it will also include other sources.

Articles and other materials have been found through the use of Tilburg University Library, as well as through other writers' references and suggestions from other researchers and the thesis supervisors.

Criticisms, or alternative views on a subject, have been incorporated directly into the study if deemed to be of importance for the study as a whole.

All sources used are collected at the end of the thesis in a reference list.

2.3   Innovation

This section of the literature review concerns in many aspects the central theme of the thesis: Innovation. Innovation is a widely debated subject that spurs immense amounts of research, thinking and practice. However, regardless of the amount of work that has gone into "figuring it out", there is still a long way to go.

Innovation is a key subject in the study and application of technology, engineering, sociology, economics, business, entrepreneurship and so on. Indeed, it permeates all parts of society. According to Berkhout et al. (2006) the real changes are now taking place in the so-called *innovation economy*, in which besides capital, labour and knowledge, creativity is the fourth principal factor of production.
Innovation therefore starts with the 'management of ideas'. Florida (2002) argues that creativity becomes the principal driving force behind economic growth.
Often innovation is considered an output of a process, but increasingly it is viewed as a process in itself. This process stretches from the identification of a need or the beginning of an idea until, over its transformation into something useful, its diffusion. As innovation is considered a driver of the economy it is of great importance and increased interest to policymakers. On an organizational level innovation is also of key importance given the imperative of staying competitive and generating growth. Innovation can again can be viewed as not only the output of certain processes but also the change in the processes themselves. Innovations are sometimes distinguished by the degree of change they demand or bring about: Incremental or radical, emergent or revolutionary.
An innovation is essentially something that is considered "new" and "valuable".

Our notions of innovation and the idea of innovation have changed over time. Many (e.g. Darsø, 2003) consider the concept of innovation to have the Austrian economist Joseph Schumpeter and his work in the 1930s as its father. However, innovation is not a new phenomenon and is arguably as old as mankind itself (Fagerberg et al., 2006).

Innovation can be defined as a new creation that generates economic value. Schumpeter's (1939 and 1942) perspective derived from an economical background and as such the value he spoke of was economical. Today it makes sense to take a broader perspective. Drucker (1985) points to social innovation as a significant value-creating process. Social innovation is based on social needs rather than technology.

There is no real formula for innovation (Darsø, 2003); however a language is emerging that makes it easier to understand and put words early innovation processes into words in ways that can help further them. But much can be done both strategically and organizationally, in terms of management – and not the least in connection with the development of workers' competencies. Here the introduction of complex systems (see 2.4), their language and their understanding of organizational life, novelty and change – though the lenses of four different orientations – will animate the topic of innovation, together with perspectives from a social constructionist standpoint (see 2.5).

The present section (2.3) is divided into three main subsections: 1) what is innovation, 2) the business of innovation and 3) creating innovative organizations. The first explores the history of the idea of innovation and

different forms of classifications and arrives at definitions. The second explores the purpose of innovation, the matter of change, leadership, globalization and new business models. The last explores the management of innovation, processes, creativity and culture. The section ends with a summary and some emerging questions.

2.3.1 What is innovation?

This subsection introduces the concept of innovation as it is discussed in the literature. First, there will be an outline of the historical developments that distinguish differences in the appreciation of the word and concept, as well as possible reasons and consequences for these developments. Then different categorizations of innovation and different models, and the development of the different models, are presented. How innovation is measured and differences in measurement methods will be explored followed by a discussion around definitions of innovation.

2.3.1.1 The history of the idea of innovation

> Our future progress and prosperity depend upon our ability to equal, if not surpass, other nations in the enlargement and advance of science, industry and commerce. To invention we must turn as one of the most powerful aids to the accomplishment of such a result. (McKinley, 2010[3])

One can easily imagine political leaders and business leaders alike today uttering this statement. However, it was said by the 25th president (1897–1901) of the United States of America, William McKinley. Often it is assumed that the term "innovation" is fairly new, but in reality its origins stretch way back into history. However, the meaning and usage of the term has changed dramatically over the course of time.

Today innovation[4] – understood as 1) a new idea, device or method, or 2) the act or process of introducing new ideas, devices, or methods – is primarily considered as something good. Of course, there are usages like "failed", "poor" or "bad" innovation but essentially it is a connotation to something desirable. But that has not always been the case. For instance, Edmund Burke characterized the French revolution as a "revolt of innovation":

> It is a revolt of innovation, and thereby the very elements of Society have been confounded and dissipated. (quoted in O'Gorman, 2004: 153)

It is primarily during the last century that our usage and association of the word as something positive as well as started to become more widely used. Generally, it is assumed to have a starting point with the work of Schumpeter (Schumpeter, 1939) on business cycles, but as we will see later in this chapter this is a misconception (Godin, 2011, 2014). According to Jill Leopore (Leopore, 2014) over time the usage of the word started to escape beyond expert circles in the 1990s, and gained omnipresence only after 9/11. She points out that between 2011 and 2014, *Time*, the *Times Magazine*, *The New Yorker*, *Forbes* and even *Better Homes and Gardens* published special "innovation" issues – the modern equivalents of what, a century ago, were known as "sketches of men of progress."

The following pages go through the conceptual understanding of the word innovation (European/Western centric perspective and classical division of history) from Classic Antiquity up until what is labelled the Fourth Industrial Revolution. The word "revolution" used to describe certain periods of time essentially denotes "abrupt and radical change" (Roe Smith et al., 2003; Mokyr, 2003 and Schwab, 2016). Although the idea of a

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[3] Note. The actual page for the quote is not accessible from the Google Book library.
[4] Merriam-Webster Online Dictionary

Fourth Industrial Revolution is still in its infancy it follows the thread pursued here, with an emphasis on technological innovation, augmented into society's other areas. What follows is very much an overview since after roughly the late 1940s studies on innovation and theories around innovation start to become far more numerous and extensive, as well as far more nuanced. Several theories and studies are discussed in other sections in this thesis.

Innovation and Classical Antiquity

Classical antiquity is a broad description of a historical period often considered to begin with the poems of Homer around 700 BC and ending with the end of the Roman Empire around 600 AD. Benoît Godin (2011) traces innovation as a concept back to this period. He further states that novelty was fairly regular and established at the time, in fields such as science and what today would be called "the arts". Innovation, however, was a different matter; it was a pejorative concept, and a consequence of the figurative usage of the Greek word καινοτομια (Godin, 2011).

The word καινοτομια (kainotomia) means "making new cuttings" or "cutting fresh into". It is derived from the word καινος (kainos, meaning new). It was through the philosophers and their political works on the permanence and transformation of constitutions and the conventional orders, that innovation gained the denotation of "introducing change into the established order" (Godin, 2011).[5]

We owe the root of the word innovation to the Latin language. According to the *Etymology Dictionary* it originates from the Latin *innovationem*, which is an agent noun of *innovare*. The same source also states that *innovare* dates back to 1540 and stems from the Latin *innovatus*, the past participle of *innovare*, meaning "to renew or change", from in – "into" – and novus – "new". The meaning "to make changes in something established" dates from the 1590s.

Here we can see that innovation has undergone a change in meaning from Roman times to today, when we view it more as a technical or economical concept. Innovation can thus be considered an action or process that makes something new again, and not necessarily introduces something (uniquely) new. Among the Roman philosophers and writers there aren't many occurrences of *innovare* or *innovatione* (meaning renewing – or a return to the past). But words like *renovare* (in the sense of renewing) as well as *novitas* (novelty) and *novare* (in the act of innovating), are more common (Godin, 2011).

To the ancient Greek philosophers, innovation meant 1) introducing novelty of any kind and 2) political or constitutional change. Similar usages of the ideas concerning innovation were frequent among Roman writers as well. The influence on Western political thought has been significant (Godin, 2011) and during the Renaissance Roman ideas were widely embraced (Skinner, 1978).

Innovation and the Middle Ages

The Middle Ages (or Medieval period) started after the fall of the Western Roman Empire in the fifth century and lasted until around the fifteenth century. No universally agreed upon ending date exists; depending on the perspective, the Ottoman capture of Constantinople in 1453, the Protestant Reformation of 1517 or Columbus's first journey to the Americas are all considered.

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[5] Examples would be Plato, *Republic*; *Laws*; Aristotle, *Politics*; and Polybius, *Histories*.

Even though the Western Roman Empire had collapsed, strong constructs from the Roman world survived through the Eastern, Byzantine Empire. Of course, writings and interactions with other cultures and people over the centuries also helped ideas to survive and spread. But Byzantium is special since it has a shared history with the Roman Empire.

A conventional view in studies on Byzantium is that it was a conformist and conservative society, impervious to innovation. This view prevails today, and suggests that innovation did not really happen or that it was not considered positive (Spanos, 2010). Spanos challenges that perspective and argues that the real question to ask oneself is not if there was a notion around innovation that existed, but rather if it is possible to study if they thought of innovation the way we do or not?

The *Oxford Dictionary of Byzantium* defines *kainotomia as* "innovation" in respect of political and social changes, but not positive ones. According to Spanos (2010, 2014), the Byzantines primarily used two words with regard to innovation: *kainotomia* and *neoterismos* (νεωτερισμός). The verb *Neoterizein* is different in its meaning to *kainotomein*; *kainotomein* is stated as *making* new (things), whereas *neoterizein* means *doing* new things (Νεωτερίζει· καιναπράτ- τει).

The studying of diverse sorts of sources shows that the Byzantines were not antagonistic to innovation as a principle. It may be that the idea that they were is more likely a flaw in modern scholarship, rather than a "truth" (Spanos, 2010, 2012).

Innovation and Early Modern Europe

This time period includes the Reformation, which started with the 95 theses published by Martin Luther on the 31st October 1517, and the Age of Enlightenment. The Reformation was intended to reform the Catholic Church and was rooted in a criticism of its system of indulgences. It sparked the way for a number of new traditions, including Lutheranism, Calvinism, Anglicanism and Anabaptism. The Enlightenment, or the Age of Reason, dominated the European world in the eighteenth century. This period saw numerous new ideas covering questions of theology, government and science. The central point was rationality, which went hand in hand with the ideas of the scientific method and reductionism. The scientific revolution (ca 1520–1750) together with the first industrial revolution laid the basis for an outburst of inventions (Roe Smith et al., 2003).

Despite the presence of inventors, inventions and advancements in a far range of areas, not least science and technology, the concept of innovation still did not resemble how we view it today. Men of the seventeenth century understood innovation as political (Godin, 2010b, 2012a and 2014) and as such followed a tradition of thought that originated during the Reformation: "Science is method while innovation is politics" (Godin, 2014: 6). Innovation, as an essentially political concept, was not a positive idea per se. For instance, the Italian diplomat and political theorist Niccolò Machiavelli in his book *The Prince* (1532) says that "The innovator makes enemies of all those who prospered under the old order, and only lukewarm support is forthcoming from those who would prosper under the new". He understood the innovator to be someone who changes the current (political) order, which is not necessarily something for ordinary men to engage in. Even for people like Francis Bacon who could see novelty everywhere, innovation was forbidden (Godin, 2014). Godin suggests that religion holds a special place in explaining the long pejorative meaning of innovation (2006) and another factor is politics (Godin, 2011). History has certainly shown that new ideas could be seen as a threat to authority, as we can see for instance in the treatment of Bruno and Galileo.

Innovation, the First Industrial Revolution and the French Revolution

The Industrial Revolution originated in Great Britain and is normally considered to have started around 1760. The period evolved into the Second Industrial Revolution sometime in the mid-1800s. Essentially it entailed a transition to new manufacturing processes, commonly understood as a move from hand production methods to

machines. However, the transition also saw new types of processes in areas such as iron production and chemical engineering. The period also saw a growing use of steam power and a more efficient use of waterpower. Here we also find the first examples of factories.

According to Roe Smith et al. (2003) the key aspect of the First Industrial Revolution was technology. Knowledge became easier to come about; may that be knowledge based on discovery or knowledge origination from an invention. Access to knowledge also paved the way for feedback as well as the building upon others' findings. It is though fair to say that knowledge discovery in this era was basically pragmatic, informal and empirical (ibid.). This means that the First Industrial Revolution and most technological developments that preceded it had little or no real scientific base (Mokyr, 2003). Thus it brought about iron industry without metallurgy, a power industry without thermodynamics, and chemical industry without chemistry. Things were known to work, but why they did so was rarely understood.

After the French Revolution, innovation began to take on a different meaning. Rather than being understood as a change in customs, it now came to be understood as novelty of any kind (Godin, 2011). In the nineteenth century the depiction of innovation changes from that of a vice into that of a virtue (Godin, 2014). Innovation goes from being a word to a concept (Godin, 2013a). Writers now begin to talk about innovation in terms of progress and they move from religion as its focus into many other fields, including science. However, the concept remains quite far from our present-day common view of innovation. Godin (2014) states that innovation in nineteenth-century science meant the application of the scientific method, and its understanding varied between different sciences. In medicine innovation meant essentially new scientific instruments and in education it concerned new practices and was still basically viewed negatively.

Innovation and the Second Industrial Revolution

The Second Industrial Revolution is normally considered to have taken place between 1870[6] and 1914 and was characterized by rapid industrialization. It was a period of expansion in the railroad (which had helped trigger the First Industrial Revolution) and telegraph and later the telephone, which together allowed the movement of people and ideas like never before in history. It saw the beginning of electrification and the combustion engine. Water and gas supplies and sewage systems became more widespread, enabled by advances in manufacturing and production. Mass production saw the light of day (Schwab, 2016) and it was a time when modern organizational methods for operate large-scale business came into being (Khurana, 2007). Furthermore, it was a time of accelerated inventive activity, encompassed the rise of corporate research laboratories, as measured by the surge of patents issued (Roe Smith et al., 2003).
According to Mokyr (2003) the Second Industrial Revolution was in many ways a continuation of the First, yet it diverged in a number of key aspects. He identifies three main ones. 1) It affected real wages and living standards, which changed dramatically from the beginning of the period to the end of the period. 2) It loosened the technological centre and leadership from Great Britain, giving it a more distributed locus. 3) It changed the relationship between knowledge (of nature) and technological practices. As such it changed the way technological change itself happens. This paved the way for future industrial revolutions.

According to Godin (2013a) innovation had until the Renaissance been a descriptive concept with different meanings. From the Renaissance to the eighteenth century it became linguistic concept to be used, without definition as such, against enemies. During the nineteenth century, the concept shifts to something positive as innovation became seen as "instrumental" to progress or utility. It paved the way for political, social and – later – economical goals (ibid.). For systematic discussions of innovation one has to look at the writings of social scientists, and it is here that innovation came to be theorized as creativity (Godin, 2011). The French sociologist Gabriel Tarde, who began to publish his ideas and theories in the 1890s, is considered by Godin (2012c) the first

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[6] There are several suggestions on when the First Industrial Revolution ended and the Second started and ended. Here, approximate years are offered.

14

theorist on innovation. Tarde distinguished theoretical invention (scientific discoveries) and practical invention (industrial inventions) at the turn of the century – similarly, anthropologists of the early twentieth century distinguish discovery from invention (Godin, 2014).

Innovation and the Third Industrial Revolution

The Third Industrial Revolution started in the 1960s (Schwab, 2016) and is sometimes called the computer or digital revolution. (The period between the Second and Third Industrial Revolutions should not be seen as empty. It is more that different scholars and thought leaders use different names for different periods, indeed use different categorization of periods of time all together.) It covers the development of semiconductors and mainframe computing in the 1960s, personal computing in the 1970s and the 1980s and of course the Internet in 1990s. It should be noted that there are many definitions and understandings of the Third Industrial Revolution. Rifkin's (2012) description, for example, overlaps quite a bit with what I refer to here as the Fourth Industrial Revolution. For the purpose of this thesis it makes sense, nevertheless, to mark a change between a Third and a Fourth Revolution due to societal and economic implications (see below) of new forms of technologies such as the computer, the cellular phone and the Internet that digital logic circuits had made possible.
The Third Industrial Revolution also marked what is often referred to as the Information Age (Castells, 1997) and later The Knowledge Economy (Drucker, 1969) – emphasized by Nonaka and Takeuchi (1995). In the Information Age mass production became mass customization. Where previously labour had served machines, now technology served workers (Humbert, 2007).

In the period beginning around World War I there was an explosion of innovation. Maurice Holland (Godin, 2009) brought about his research cycle in the 1920s, and of course there is the seminal icon that is Schumpeter. Schumpeter (1939) saw technological innovation as a motor for business cycles and innovation as a source of economic change (1942). He distinguishes between invention and innovation and says that invention is "an act of intellectual creativity" and "without importance to economic analysis" (1939: 85). Innovation is an economic decision – a firm applying an invention or adopting invention. Interestingly, technological innovation for Schumpeter was also the new combination of means of production to produce products (ibid.: 87). Although Schumpeter brought the concept into economic theory, according to Godin (2008) he provided few if any analyses of the process of innovation itself. He introduced the idea of the entrepreneur into the innovation process, but he did not study how it came about. Godin (2008) goes on to argue that it is to W. Rupert Maclaurin we owe the first systematic studies on technological innovation. Maclaurin brought the linear model into science and innovation studies in the 1940s and 1950s (Godin, 2008), building on and developing Schumpeter's ideas. He saw technological innovation as a process composed of several steps. Another influential, but neglected contributor was the sociologist William F. Ogburn, who pioneered ideas of three dimensions of technological innovation: origins, diffusion and effects (Godin, 2010a). A final important strand in the development of the idea of innovation came from R. K. Merton (1938, 1945) and his contributions to the sociology of science. Amongst other things Merton suggested (what today seems obvious, but at the time wasn't) that the themes and dynamics of scientific activity are affected by social and economic considerations.

After World War II, studies into innovation and our understanding of it increased. Today's dominant interpretation of innovation – "Innovation as use of technological invention, as opposed to invention itself" Godin (2010a: 41) – gradually emerged. After the 1950s innovation became an instrumental category as governments became convinced by technology as a source of economic progress (Godin, 2011) and by the 1960s–70s the number of relevant publications had exploded (Rogers, 1967). Since then journals, professional associations and organizational units within universities all focusing on innovation have been formed (Fagerberg and Verspagen, 2009).

Innovation and the Fourth Industrial Revolution

Whether or not it is correct to describe a Fourth Industrial Revolution can certainly be discussed. For the purpose of this thesis, however, it is assumed that present-day conditions have an effect on how we perceive innovation – not least what measures companies and organizations use to meet challenges and opportunities. (For instance, one can argue that the case study is a direct consequence of the emergence of these new technologies and business models.) Schwab (2016) sees this Fourth Industrial Revolution as beginning at the turn of the twenty-first century, and building upon the digital revolution. He suggests that it is coming about through a far more omnipresent and mobile Internet, smaller and cheaper sensors, artificial intelligence and machine learning. He goes on to include other inventions in areas such as gene sequencing, nano technology, renewables and quantum computing. What differentiates this revolution with previous ones are the fusion of the different technologies and their interaction throughout domains such as the digital, biological and physical. Brynjolfsson and McAfee (2014) have coined another term: the Second Machine Age. They see the world at an inflection point where the effects of digital technologies will manifest through automation and the unparalleled making of things.

There are many particular technologies that could be mentioned in this context, including advanced robotics, 3D printing, the Internet of (all) Things (IoT) and blockchains (a distributed ledger – a secure protocol where a network of computers collectively verifies a transaction before it is approved and recorded). But we also see the Fourth Industrial Revolution in different business models and consumer and producer interactions. The sharing economy opens up better ROI on using assets; the platform economy allows different relationships between people and the utilization of assets. The Fourth Industrial Revolution asks also fundamental questions like what is worth owning. Goodwin (2015) wrote: "Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world's largest accommodation provider, owns no real estate."

In terms of understanding innovation, it is too early to distinguish any significant changes from the previous period. There are, however, a few areas where we can envision new developments, whether increased trends or more new trends. Among them are social innovation (Mulgan, 2007) and social entrepreneurship (Bornstein, 2004), which Goldin (2012) believes to have appeared after the French Revolution and to have existed long before ideas of technological innovation (which are virtually omnipotent today). In short it shifts the focus from technological and commercial success to that of societal and social value creation.
Another important trend is that of open innovation and platforms (for instance Chesbrough 2003, 2005 and 2006), which essentially opens up and promote the idea of connectivity, sharing and sourcing from a distributed value chain. Finally, the theories around disruption (Christensen, 1997; Christensen and Bower, 1995; Christensen and Raynor, 2013) and dominant design (Utterback and Abernathy, 1975 and Utterback, 1996).
In a digitalized world, it can be argued that the cross-pollination of ideas is eased by their accessibility, which also speeds the diffusion and adoption of new ideas and innovations. Speed becomes a more volatile factor in terms of establishing and maintaining prominence in the marketplace.

2.3.1.2 Categorization of innovation

In trying to understand innovation and what brings it about, we need to divide innovation into categories (Edquist, 2001). Some accepted differentiations are niches, modular, architectural, incremental or radical (Afuah and Bahram, 1995). However, an overabundance of definitions for innovation types has resulted in vagueness in the way the terms "innovation" and "innovativeness" are operationalized and utilized in the new product development literature (Garcia and Calantone, 2001). The ambiguity of classification makes it impossible to compare various studies and has hindered the development of knowledge in these fields (Coccia, 2006).

Furthermore. in the economic literature on technical change we find different names to indicate the same type of technical change.

A clear taxonomy will help us distinguish what relates to what. Normally when thinking about innovation we think about outputs or outcomes: products. But outcomes/outputs – that is what an organization produces and offers – can also be intangible in the form of services (see figure 2.1). Innovation can also refer to the processes that bring products into being. Normally it is organizations that bring about innovations, but sometimes it can be individuals. Sometimes the innovation is genuinely new, sometimes it is more of a combination of existing components. To a large extent, what separates innovations from each other is the question of what is being produced and how that is done.
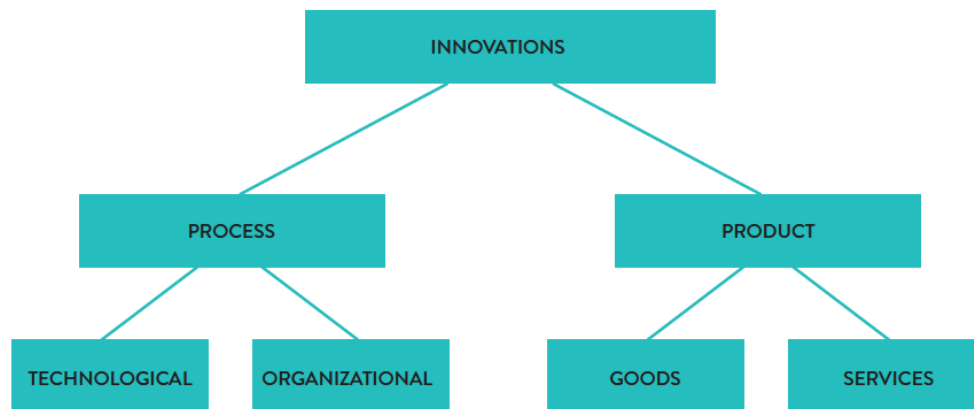
Figure 2.1 Taxonomy of innovation, Edquist (2001)

In this model only goods and technological processes are of a material or physical kind, whereas organizational processes and services are intangible. An important note is that for instance a product (good) can in the second round be part of a production/innovation process – say for instance a robot or a car and so on.
Another way to portray essentially the same taxonomy could like this:
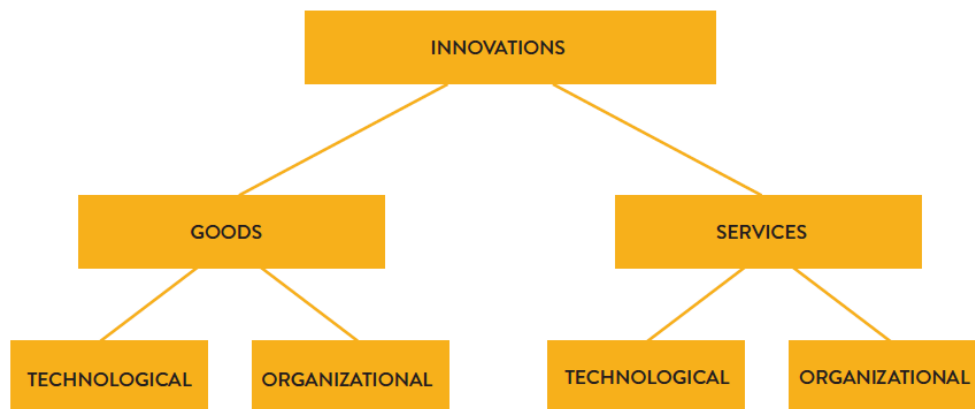
Figure 2.2 Taxonomy of innovation, Windeløv-Lidzélius (2016)

What separates this model from Edquist's is the notion of ends versus means. Here, innovations in processes lead to either more attractive goods[7] or services. Innovation holds little value in itself.

Depending on how one understands services and goods, one can also utilize the consequences of Pine and Gilmore's (1999) description of the "Experience Economy" and its consequences for innovation. They view experiences as different from services. Experiences are not exactly the same as services. Experience happens whenever a company intentionally uses services as the stage and goods as the props to engage an individual (ibid.). So even if it could be argued that we should have include here a subheadhing of "Experience innovation methods", it would not serve the purpose per se, since it is designed for products, services, events and so on with a focus on the user experience. To simplify, it will be discussed under "Service innovation methods" below.

Product and service innovation

The major separation between products and services is of course that products are physical while services are not. Products are thus things we can touch, whereas services cannot be to touched or seen. The effects of the services, however, often can be: for instance, operations within a hospital, service at bank and so on. Sometimes we define a service as a value that is produced and consumed at the same time (in reality this implies a co-creation of value since the provider is dependent upon the receiver and vice versa). There are also forms of combined service operations in which products play a key part. These can be, for instance, a limousine service as well as banking operations. Thanks to the introduction, spread and growth of technology platforms (often Internet-based) new forms of relationships and services are being developed and deployed at an increasing speed.

Product innovation methods

Different methodologies have established themselves in terms of product innovation. Perhaps the three most well-known are: Phase review, stage gate and product and cycle time excellence (PACE).
In Phase review, the product development cycle is divided into phases in which each phase is finalized and reviewed before moving into the next phase. A challenge with the model is that each phase is independent of the

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[7] From now on I will not use the word "good", but will resort to the more common expression "product" – and use "service" as a different category.

ones that come after and as such there is a low level of coordination, which can generate errors and undesired trade-offs.

The stage gate method is a synchronized product design process. It is based and run according to a scheduled life cycle from the creation of a concept to the market launch (Cooper, 2000). Each stage is signed-off after proper evaluation and a (re-)design of the next phase.

PACE is occupied chiefly with developing product development strategies (McGrath, 1996). It ensures a link and a fit between the overall strategy and the product strategy. Here the view of the customer is utilized in the whole product design process.

Service innovation methods

Although one can argue that we can deploy the same type of innovation methods for service innovations, these methods have primarily been developed with product development in mind (for instance software development). Given the different nature of the service as compared to the product more and more work goes into how to innovate services. Often these innovations arise from a combination of anthropological and ethnographical methods, as well as creative exercise.

Pine and Gilmore (1999) stated that the developed world was moving from a service-based to an experienced-based economy (Morgan, Elbe and Curiel, 2009). Such experiences were valued because they were unique, memorable and engaged the individual in a personal way.

Experience design (XD) is the practice of designing products, processes, services, events, Omni channel journeys, and environments that focus on the quality of the user experience and culturally relevant solutions.[8] It is a process for co-creation based on the idea of promoting the feelings one wants the customer or user to have. One can identify three major shifts (Morgan, Elbe and Curiel, 2009) that change this relationship:

- A shift of emphasis from the rational to the emotional aspects of consumer decision-making
- A transition from satisfying needs to fulfilling aspirations, desires and dreams
- A change in the role of the customer to an active participant rather than a passive consumer.

Process innovation methods

Regarding process innovation, it is not so much a question what the organization does as it is how it does it (Davenport, 1992). Process here is viewed as a set of "planned" or connected activities designed to convert inputs into defined outputs. Innovation here concerns a better way (or method) to make the desired output. As such it concerns all the activities that lead to customer value, may that be less stock, better purchases, fewer errors or faster production. Well-established methodologies are: total quality management (TQM), just-in-time (JIT), LEAN, supply chain management and enterprise resource planning (ERP).

TQM concerns introducing systems that avoid defects from happening. It seeks continuous improvement by all members of the organization and is credited for introducing standards such as ISO9000.

JIT was a method designed to ensure faster production and prevent stock piling up by ensuring the right material at the right time in the right quantity.

LEAN, or lean manufacturing, seeks to reduce waste across the organizations operations. Examples of waste could be overproduction, waiting time and so on: essentially everything that reduces value. In many ways, it is an integrated system since it encourages TQM, integrated supply chain and so on.

Supply chain management emphasizes the flow of materials and information across the entire value chain, from supplier to customer. Value is created by more integration with customers and suppliers.

ERP is a system normally rooted in a software solution that integrates all information into one system. The system supports other approaches – see above – and aim to reduce bottlenecks and waste, increase coordination and planning, and so on.

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[8] Experience design is not discussed more in detail in this thesis. It can be argued whether it is a method for service design or the same as service design, or if it is a unique category in itself.

19

Product, process and service innovation

Even though they have here been discussed independently, product, process and service innovations are often highly inter-dependent. Product innovation is often what receives headlines when innovation is being portrayed, but as Utterback (1996) has pointed out, process innovation becomes *increasingly* important relative to product development for the organization once the dominant design of the product has been established. In order to obtain competitive advantage over time, process innovation cannot be neglected. Once the dominant design is in place, eventually the amount of process innovation also goes down. The configuration of the process becomes more correct and fewer opportunities to innovate appear as the life cycle of the product nears its end.
In today's technological environment, digitalization is penetrating every corner of our society. An increasing number of services are now offered over the net. This change does not just mean we have exchanged an individual for an app or a digital service. It has also introduced entirely new services and interactions that would not have been possible otherwise. In that respect "innovations", as the applications and other artefacts, become the carrier and enabler of innovation in the second round. Just think about digital tools that are now in the hands of many people, allowing them to more easily and more cheaply develop innovations by themselves.
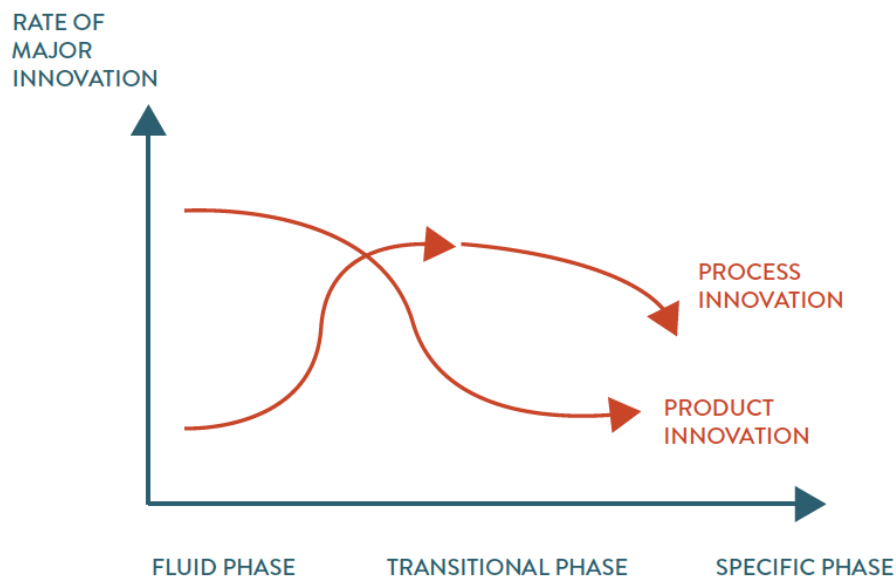
Figure 2.3 Product and process innovation model, Utterback (1996)

Radical and incremental innovation

Another way to distinguish between forms of innovation is whether or not they can be viewed as incremental or radical (Freeman et al., 1982). This speaks to the scope of the innovation and its magnitude. Radical speaks to major changes. The term "radical" often refers to the level of contribution made to the efficiency or revenue of the organization (MacLaughlin, 1999). Radical innovation can be so massive that it actually destroys existing market preferences, creating new standards and expectations and thus transforming the industry itself[9]

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[9] See below for a more thorough discussion of the concept of disruption.

(Christensen, 1997 and Utterback, 1996). Utterback (1996) provides the following definition of a discontinuous or radical innovation: "change that sweeps away much of a firm's existing investment in technical skills and knowledge, designs, production technique, plant and equipment".

Incremental innovation refers to smaller changes and alterations to products, services and processes. It can be seen as a way to decrease the risk of failure. It is normally easier to manage and less costly. At the same time, incremental innovation does not offer the same opportunity for large returns on investment as radical innovation. Radical innovation, on the other hand, is a high-risk game. Normally companies pursue a dual strategy, working on a set of radical innovations in tandem with incremental changes.

Other categorizations

Innovation has often been categorized as either radical, incremental, architectural, modular or niche, based on the effects it has on the competence, other products and investment decisions of the innovating entity (Afuah and Bahram, 1993).
Even though dividing innovations into radical and incremental can seem easy and effective, it is also a fairly simplistic approach and may cause problems due to different perceptions of the people either doing the division or understanding it afterwards. Abernathy and Clark (1985) came up with a grouping model consisting of four categories related to the impact of the innovation on the innovating firms' capabilities and knowledge of its technology and market. Dividing this model into four quadrants we can see market on the vertical dimension and technology on the horizontal (see figure 2.4).

NICHE CREATION	ARCHITECTURAL
REGULAR	REVOLUTIONARY

Figure 2.4 Innovation categories model, freely after Abernathy and Clark 1985

Tushmans and Anderson (1986) categorized innovations according to whether they are "competence destroying" or "competence enhancing" depending on what the innovation did to the knowledge base of the innovating entity.

A key aspect when categorizing innovation is for whom the innovation is intended. The taxonomy created by Booz, Allen and Hamilton (1982) is an extensively used frame that categorizes new products along two dimensions that mirror their level of newness to 1) the developing firm and 2) the marketplace that consumes or uses them. But innovation does not only affect the company and/or its customers – it also affects its suppliers. Afuah and Bahram (1995) suggest a model they call the hypercube of innovation, which stresses the value-adding chain of supplier of key components to complementary innovators.
According to Olson et al. (1995) product newness is a reflection of firm and marketplace experience. Their product innovation view suggests a four-level categorization: products new to the world, line extensions, products new to the organization but not the market, and product modifications.

In summary, the management of technologies uses the following taxonomies to classify product innovation. This list is taken from Garcia and Caltone (2002) as outlined in Coccia (2006):

- [Eight categories – reformulated, new parts, remerchandising, new improvements, new products, new users, new market, new customers (Johnson and Jones, 1957).

- Five categories – systematic, major, minor, incremental, unrecorded (Freeman, 1994).
- Tetra categorization – incremental, modular, architectural, radical (Henderson and Clark, 1990); niche creation, architectural, regular, revolutionary (Abernathy and Clark, 1985); incremental, evolutionary market, evolutionary technical, radical (Moriarty and Kosnik, 1990); incremental, market breakthrough, technological breakthrough, radical (Chandy and Tellis, 2000); incremental, architectural, fusion, breakthrough (Tidd, 1995; Tidd et al., 2001).
- Triadic categorization – low, moderate, high innovativeness (Kleinschmidt and Cooper, 1991); incremental, new generation, radically new (Wheelwright and Clark, 1992).
- Dichotomous categorization – discontinuous, continuous (Anderson and Tushman, 1990; Robertson, 1967); instrumental, ultimate (Grossman, 1970); variations, reorientation (Norman, 1971); true, adoption (Maidique and Zirger, 1984); original, reformulated (Yoon and Lilien, 1985); innovations, reinnovations (Rothwell and Gardiner, 1988); radical, routine (Meyers and Tucker, 1989); evolutionary, revolutionary (Utterback, 1996); sustaining, disruptive (Christensen, 1997); really new, incremental (Schmidt and Calantone, 1998; Song and Montoya-Weisse, 1998); breakthrough, incremental (Rice et al., 1998); radical, incremental (Balachandra and Friar, 1997; Freeman, 1994).]

Garcia and Calantone (2002) use macro-level versus micro-level, marketing versus technology perspectives and apply Boolean logic to identify three labels for innovations: radical, really new and incremental.

DEGREE OF INNOVATION

DISRUPTIVE

RADICAL

INCREMENTAL

PROCESS PRODUCT SERVICE
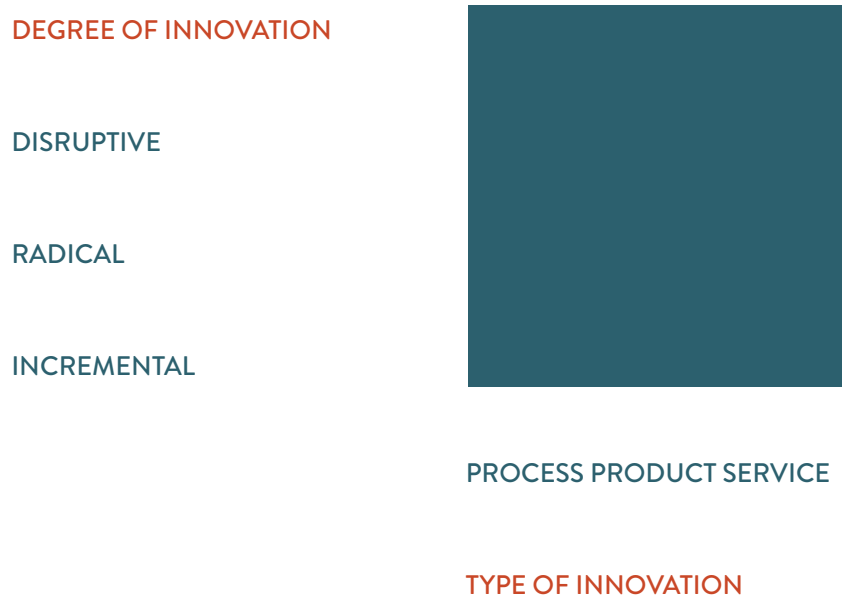
TYPE OF INNOVATION

Figure 2.5 Innovation "space": the type and degree of innovation model, freely after Tidd (2001)

The OECD uses a widely spread typology of innovation (table 2.1).

TYPE OF INNOVATION	DESCRIPTION
PRODUCT INNOVATION	A GOOD OR SERVICE THAT IS NEW OR SIGNIFICANTLY IMPROVED. THIS INCLUDES SIGNIFICANT IMPROVEMENTS IN TECHNICAL SPECIFICATIONS, COMPONENTS AND MATERIALS, SOFTWARE IN THE PRODUCT, USER FRIENDLINESS OR OTHER FUNCTIONAL CHARACTERISTICS.
PROCESS INNOVATION	A NEW OR SIGNIFICANTLY IMPROVED PRODUCTION OR DELIVERY METHOD. THIS INCLUDES SIGNIFICANT CHANGES IN TECHNIQUES, EQUIPMENT AND/OR SOFTWARE.
MARKETING INNOVATION	A NEW MARKETING METHOD INVOLVING SIGNIFICANT CHANGES IN PRODUCT DESIGN OR PACKAGING, PRODUCT PLACEMENT, PRODUCT PROMOTION OR PRICING.
ORGANIZATIONAL INNOVATION	A NEW ORGANIZATIONAL METHOD IN BUSINESS PRACTICES, WORKPLACE ORGANIZATION OR EXTERNAL RELATIONS.

Table 2.1 OECD typology of innovation, 2005, adapted from Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition.

As we can see there are certain overlaps with previous orientations; however, marketing is added to the mix.

There are more popularized categorizations of innovation as well. Perhaps the most well-known is the "Ten types of innovation by Doblin" (Keeley et al., 2013). I have included it here because it is a very pedagogical model, suggesting the different areas where innovation takes place when we are using the company as the unit of analysis. As such it helps us look beyond mere technological, product advancements.
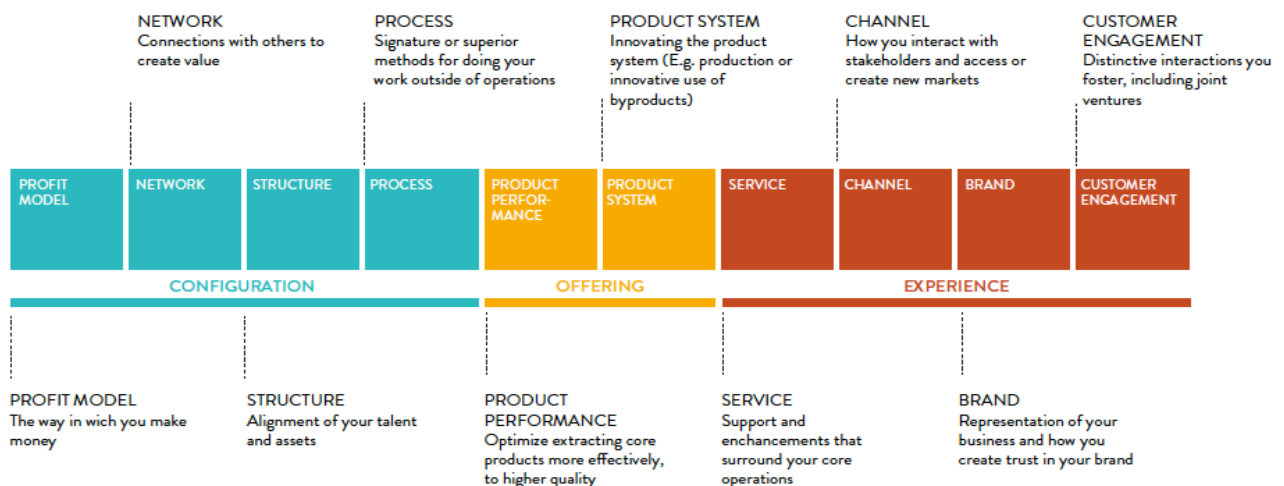
Figure 2.6 10 types of innovation, freely after Keely et al. (2013)

23

Disruption

In recent years, the concept and word "disruption" has gained much attention and popularity. The word in itself means something like "throw into disorder" and was coined in its current sense by Clayton Christensen in an article written with Joseph L. Bower in the *Harvard Business Review* in 1995, called "Disruptive Technologies: Catching the Wave". Christensen's book *The Innovator's Dilemma* (1997) became an instant success and has been followed up by several publications, for instance *The Innovator's Solution* (Christensen and Raynor, 2013). In short, his theory says that companies that act in a rational way to remain on top are vulnerable to smaller, faster and inventive companies that come up with new ways to serve customers in a less expensive way. In short: one can fail by doing the right thing, in the wrong situations.[10]

Christensen defines disruptive innovation as the process by which "technologically straightforward" services and products target the bottom end of an established market, then move their way up the chain until, eventually, they overtake the existing market leaders (Christensen, 1997).

Larry Downes and Paul F. Nunes conceptualized "Big Bang Disruption" (2013), which suggests that new solutions such as smartphones enable innovations that provide customers better solutions and lower costs. In another article (2014) they discuss the much talked-about acquisition of the service WhatsApp for $19 billion as a necessary response by established companies to challenges and opportunities entering the marketplace.

Christensen's theories have had a huge influence – see for instance Accenture's technology vision from 2014 (From Digital Disruption to Digital Disrupter).[11] But there have also been critical voices, amongst others Jill Leopore (2014), who questions his background material. She says that the theory can't be used to predict anything, but only functions as a label after something that is a stated fact. She states: "Transfixed by change, it's blind to continuity. It makes a very poor prophet."

2.3.1.3 Innovation models

When we speak about models of innovation we normally associate them with explanations of *how* innovation happens. As such, they rest upon a notion of what innovation is (as discussed earlier in this thesis). Some use the concept of "model" to discuss the organizational format from where innovation originates, for instance Freeman and Engel (2007) who talks about the corporate model and the entrepreneurship model. By far, though, most scholars – for instance Rothwell (1992, 1994) – view and explain innovation models in more generic terms as how companies structure their innovation processes over time, or at least how scholars interpret the processes that happens or sometimes how scholars (and practitioners) think it should be done.

According to Godin (2006), the linear model (or models) of innovation is one of the first conceptual frameworks developed for understanding the relationship between science, technology and economy. It did not arise from the mind of one individual. It developed over time in three steps. The first of these connected applied research to basic research, the second brought experimental development and the third supplemented this with production and diffusion. Sequential descriptions like invention to diffusion were introduced by economists from the late 1940s to the early 1950s (Godin, 2013).

While the large majority of early studies on innovation are clearly western, one can argue that the first main model of innovation was actually developed by the Soviet inventor and patent specialist, Genrich Altshuller (1926–1998). Altshuller began to work on the model, later to be called TRIZ (in English, "theory of the

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[10] http://www.nytimes.com/2012/11/04/business/a-capitalists-dilemma-whoever-becomes-president.html?pagewanted=all&module=Search&mabReward=relbias%3Aw&_r=0
[11] https://www.accenture.com/us-en/insight-from-digitally-disrupted-digital-disrupter

resolution of invention-related tasks"), in 1946, but his first article on it was not published until 1956. During his job, helping initiate invention proposals and preparing applications to the patent office, he recognized patterns amongst the proposals. He started to research for some generic rules that would explain the creation of new, inventive, patentable ideas.

After correlating thousands of patterns, he discovered that all industries utilized the same underlying inventive principles (Sheng and Kok-Soo, 2010). These principles could be generalized and applied regardless of industry. Based on his findings that a problem demands an inventive solution if there is an unsolved conflict in the sense that improving one parameter influences damagingly on another, Altshuller developed a contradiction matrix as an extension of the 40 conceptualized principles. In this matrix, the contradictory elements of a problem were catalogued according to a list of 39 factors that could impact on each other. After the patents analysis required for the creation of TRIZ, Altshuller identified five different levels of innovation (see table 2.2), together with the frequency with which they appear in the database of patent literature depicted – for instance by Vincent (2001) and Cortes Robles et al. (2009).

LEVEL	DESCRIPTION	ORIGIN OF KNOWLEDGE	% OF PATENT
1	APPARENT SOLUTION: SOLUTION BY METHODS WELL-KNOWN WITHIN SPECIALTY (SLIGHT CHANGES IN PARAMETERS)	A PERSON	32
2	SMALL IMPROVEMENT: INSIDE A PARADIGM: IMPROVEMENT OF AN EXISTING SYSTEM WITHOUT CHANGES IN FUNCTIONAL PRINCIPLE	A FIRM, A COMPANY	45
3	SUBSTANTIAL INVENTION INSIDE TECHNOLOGY: ESSENTIAL IMPROVEMENT OF EXISTING SYSTEM, CHANGES IN FUNCTIONAL PRINCIPLE	INSIDE AN INDUSTRIAL DOMAIN	18
4	INVENTION OUTSIDE PARADIGM: NEW GENERATION OF DESIGN USING SCIENCE NOT TECHNOLOGY	ALL INDUSTRIAL DOMAINS	4
5	DISCOVERY: MAJOR DISCOVERY AND NEW SCIENCE (ESSENTIAL CHANGES IN CIVILIZATION)	SET OF KNOWLEDGE	<1

Table 2.2 Five levels of innovation by Altshuller freely after Vincent 2001

Even though the five levels of innovation are not called an innovation model per se – since they comprise more a classification of inventions and the TRIZ is more of a problem-solving model –Altshuller's work helps us understand the background to the development of innovation models, and its relationship to technology and science.

One of the leading scholars on innovation process models is Roy Rothwell. The following models of innovation are by large influenced by his division of generations (Rothwell, 1992 and 1994). It is important to note that a shift from one generational model to another does not mean that the previous one is gone or that we have witnessed a progress necessarily. The models may be linked, used in parallel and so on. The transition from one generation to another has more to do with changing attitudes.

As stated previously the linear model of innovation is an early model that has developed over time. It is considered to be the first generation of (theory) models (Rothwell, 1994; Godin, 2006, 2013). In this model innovation is *pushed* through the different phases. Collins (2006) portrayed the process like a funnel, where an organization pours a number of ideas into the top and at the other end innovations come out. Two alternatives of the same process could be Godin (2006), and for a single product Savoiz and Sannemann (1999).

Figure 2.7 The linear technology push, loosely based on Godin (2006)

Figure 2.8 The linear technology push, loosely based on Savioz and Sannemann (1999)

This model was widely used from 1950 to the end of 1960s. During these years, companies sought scientific advances and building production capacity to achieve economic growth. One can say that the view of the customer (and the market) was simple: that what was being sold was also being bought. But the technology push model stresses scientific importance over later phases, which means it incorporates market information very late in the process and as such it is also a very criticized model (Fagerberg, 2005). As early as the 1960s the model had numerous opponents, primarily due to its linearity (Godin, 2006). However, the model has been by far the most influential one given its simplicity, and not least how official statistics have gathered data according to its three components (basic research, applied research and development).

2nd generation – The market pull model

The other linear model is the market pull model (Rothwell, 1994 and Collins, 2006). Here the market or the customer (i.e. the need or the want of society or a certain group in the market) is the stimulus for innovation. As such, the need is captured by an entrepreneur or a company, who (ideally) has accurately understood the specifications and is able to provide a desirable solution. The model came forth in the mid-1960s, where the growth in consumption power and increased competition altered market conditions.

26

| MARKET NEEDS | DEVELOPMENT | MANUFACTURING | SALES |

Figure 2.9 The market pull model, loosely based on Rothwell (1994)

Where both linear models received criticism due to them disregarding feedback and loops in-between the different stages, the market pull model has also been said to undermine the innovation process because it asks its customers what they want (Ulwick, 2002), in other words, the customer does not know that they want the innovation until it is revealed.

> [A search for the origins of the gasoline-powered motorcar reveals that it was not necessity that inspired its inventors to complete their task. The automobile was not developed in response to some grave international horse crisis or horse shortage. National leaders, influential thinkers, and editorial writers were not calling for the replacement of the horse, nor were ordinary citizens anxiously hoping that some inventors would soon fill a serious societal and personal need for motor transportation. In fact, during the first decade of existence, 1895–1905, the automobile was a toy, a plaything for those who could afford to buy one.] (Basalla, 1988: 198)

So, where both the push and pull model are linear, the theory behind them differ in the sense that in the first, the market is seen as receiver of R&D pursuit (a supply orientation of innovation) and the in the second, the market is the instigator for appropriate technology to be developed which then a "guaranteed" market is awaiting.

3rd generation – The coupling of R&D and Marketing

According to Rothwell (1992) the period from the 1970s to the early 1980s was characterized by high inflation and demand saturation. Rationalization, consolidation and a focus on costs become central to corporations' strategies. Technological innovation is here understood as coming from the combination or blending of technological possibilities and market needs. Opportunities are essentially created by coupling R&D and marketing, since innovation is seldom the output from either forces of technology push or forces of market pull. This model is still a step-by-step or sequential one, but now it contains feedback loops (Rothwell, 1992). Kline and Rosenberg's model – The Chain-Linked Model – (1986) is an example of a coupling model where the innovation process is divided into interdependent stages with feedback loops to previous stages. According to Berkhout et al. (2006), third-generation models can be seen as "open R&D models", emphasizing product and process innovation (technical), and neglecting organizational and market innovations (non-technical). As such, the company's new technological capabilities, rather than including solutions for institutional barriers and societal needs, tend to be the focus.
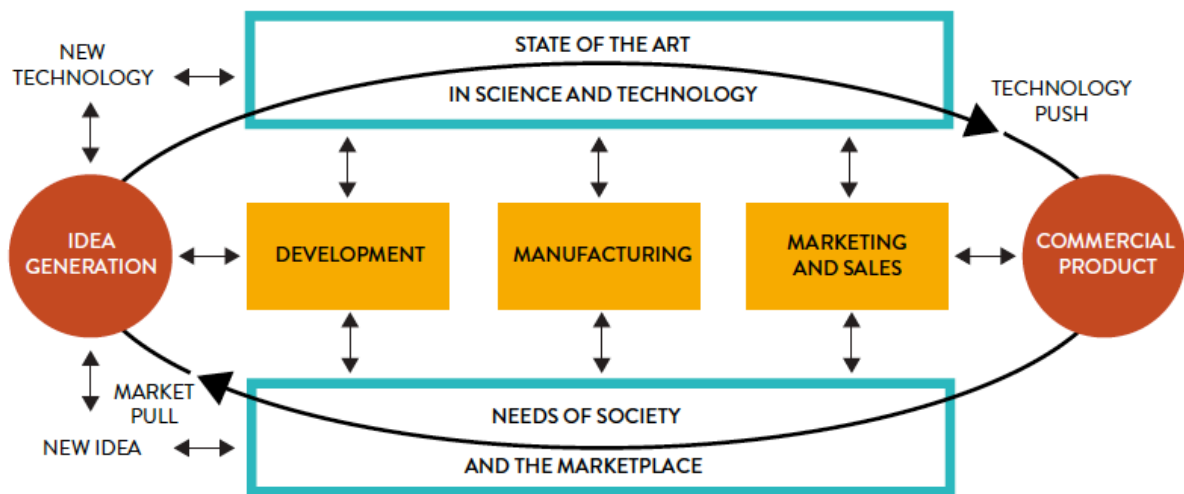
Figure 2.10 The coupling of R&D and Marketing model, loosely based on Rothwell (1992)

A very simplified version could be portrayed like this:
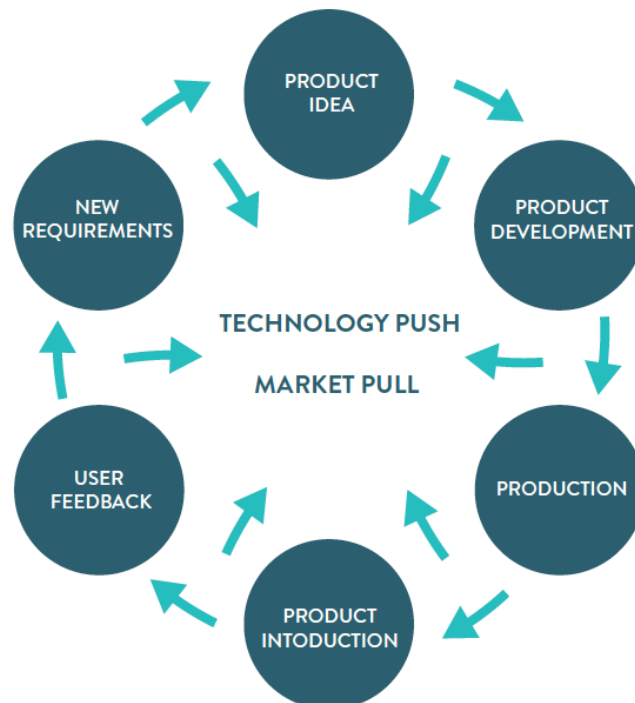
Figure 2.11 The coupling of R&D and Marketing model, Windeløv-Lidzélius (2016)

Rothwell (1992, 1994) states that the fourth generation marks the shift from viewing innovation as a predominately sequential process (where development moved from function to function) to viewing innovation as a parallel process. As such this process includes elements such as R&D, prototyping and development taking place at the same time. As the economy recovered, lessons from Japanese manufacturers found their way to western companies, emphasizing collaborations with suppliers and customers as well as better integration internally. According to Berkhout et al. (2006), the history of the development of innovation models is often divided into three generations, but there is a need for a fourth that encapsulates what is happening in today's open innovation networks. Fundamental changes in industry have generated a new commercial environment in which business processes cross traditional company boundaries and combine across industrial sectors (this notion is shared by many authors on innovation – see below). Berkhout et al. (2006) proposes a model that replaces the traditional "chain concept" with a circle of change. This is different from Rothwell's suggestion, but shares some characteristics with the 4th generation (for instance, that innovation is not a linear process and the need for cooperation) as well as the 5th generation (for instance, open innovation thinking).

NEW PRODUCT DEVELOPMENT PROCESS IN NISSAN

MARKETING

RESEARCH AND DEVELOPMENT

PRODUCT DEVELOPMENT

PRODUCTION ENGINEERING

PARTS MANUFACTURE (SUPPLIERS)

MANUFACTURE

JOINT GROUP MEETINGS (ENGINEERS/MANAGERS)

MARKETING   LAUNCH
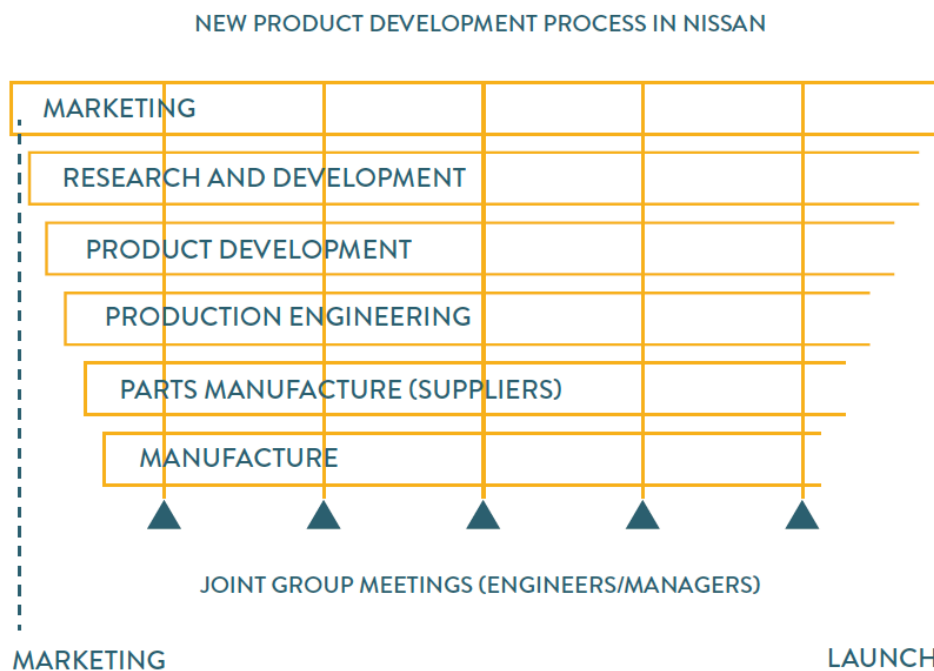
Figure 2.12 The integrated model, freely after Graves 1987

5th generation – The systems integration and networking model

According to Rothwell (1992) the 5th generation represents an idealized version of the integrated model whereby much stronger strategic integration drives innovation not only as a cross- functional process, but also as a multi-institutional networking process. As the 1990s unfolded new technology found its way into business processes to a larger extent, making them more automated. Networking processes, strategic partnership orientation and tighter integration were ways to ensure not only flexibility but also the need for speed in development. But while the fast and accelerated innovation process was a way to increase competitiveness, it also increased development

costs (Rothwell, 1994). Vertical relationships with customers and suppliers (e.g. involved in the development of new products and/or sharing of technical systems for usage) take many different forms, including alliances. Yet most radical feature of the 5th generation model is the increasing introduction of and reliance upon computers and electronic tools for innovation.

EXTERNAL INPUTS
societal needs
competitors
supplier
partnerships
distributors
customers
strategic alliances

MARKETING AND SALES

FINANCE

EXTERNAL INPUTS
competitors
suppliers
distributors
customers

ACCUMULATION OF

EXTERNAL INPUTS
competitors
suppliers
distributors
customers
university departments

ENGINEERING AND MANUFACTURING

RESEARCH AND DEVELOPMENT

EXTERNAL INPUTS
scientific and technological-developments
suppliers
customers
university -
departments

KNOWLEGDE OVER TIME

Figure 2.13 The systems integration and networking model, freely after Trott (2005)[12]

Below follows a wrap-up and model comparison based on Rothwell (1992, 1994). It should be pointed out that it seems like Rothwell's argumentation around innovation models begins from an offset in the general economy and market conditions, which then frames the corporate strategy, which in turn forms the innovation model.

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[12] As referred to in: Du Preez, N.D., Louw, L. and Essmann, H., 2006. An innovation process model for improving innovation capability. Journal of high technology management research, 2006, pp. 1–24.

	TIME PERIOD	MARKET CONDITIONS	CORPORATE STRATEGY	INNOVATION PROCESS
1G	1950s–mid 1960s	Period characterized by post-war recovery, the growth of new technology-based sectors and the technology-led regeneration of existing sectors. Introduction and rapid diffusion of major new product ranges. Demand exceeds production capacity.	Corporate strategic emphasis on R&D and on manufacturing build-up.	Technology push: Simple linear sequential process. Emphasis on R&D. The market is a receptacle for the fruits of R&D.
2G	Mid 1960s–early 1970s	Period of general prosperity.	Emphasis on corporate growth, both organic and acquired. Growing level of corporate diversification. Conglomerates formed through acquisition and merger. Capacity and demand more or less in balance. Growing strategic emphasis on marketing.	Need-pull: Simple linear sequential process. Emphasis on marketing. The market is the source of ideas for directing R&D. R&D has a reactive role.
3G	Mid 1970s–early 1980s	Period of high inflation and demand saturation. Supply capacity exceeds demand.	Strategies of consolidation and rationalization with emphasis on scale and experience curve benefits. Some de-diversification. Growing strategic concern with accountancy and financing issues (cost focus).	Coupling model: Sequential, but with feedback loops. Push or pull or push/pull combinations. R&D and marketing more in balance. Emphasis on integration at the R&D/marketing interface.

4G	Early 1980s– 1990	Period of economic recovery.	Concentration on core businesses and core technologies. Growing awareness of the strategic importance of emerging generic technologies with increased strategic emphasis on technological accumulation (technology strategy). Growing emphasis on manufacturing (manufacturing strategy). Growth in strategic alliances, strategic acquisitions and internationalization in ownership and production. Global strategies.	Integrated model: Parallel development with integrated development teams. Strong upstream supplier linkages. Close coupling with leading edge customers. Emphasis on integration between R&D and manufacturing (design for marketability). Horizontal collaboration (joint ventures etc.)
5G	1990s–	Major impact of new technologies. High rates of technological change. Intense competition.	Rapid product cycles with growing strategic emphasis on time-based strategies. Increased intra-firm and inter-firm integration (networking). Integrated technology and manufacturing strategies. Emphasis on flexibility and product diversity and quality. Continued emphasis on technological accumulation. Environmental issues of growing strategic concern.	Systems integration and networking model: Fully integrated parallel development. Use of expert systems and simulation modelling in R&D. Strong linkages with leading edge customers ('customer focus' at the forefront of strategy). Strategic integration with primary suppliers including co-development of new products and linked cad systems. Horizontal linkages: joint ventures; collaborative research groupings; collaborative marketing arrangements, etc. Emphasis on corporate flexibility and speed of development (time-based strategy). Increased focus on quality and other non-price factors.

Table 2.3 Typology of innovation models, based on Rothwell (1992, 1994)

While the classification of innovation models presented serves as a valuable framework for understanding the historical development, put into context it cannot claim complete, universal representation. This would demand that all organizations were affected in the same way by market conditions as well as that organizations by and large 1) have an innovation model and 2) it is a consequence of corporate strategy. Lastly, it seems the

classification applies more to large enterprises than to start-ups, say, where of course market conditions may define the playing field, but some rules of the game may be re-written.

As Rothwell shows (1992), in these models investments in innovation are increasingly linked to company strategy as well as to an increasing understanding of what drives innovation. There have been variations in the different models (for instance the addition of phases like "sales" to the 1st generation model) and different applications or structuring, for instance "Stage Gate Systems" (Davila et al., 2006) with its readiness criteria for moving between the different phases. Changes to industry have also created a need to develop the innovation model (for instance Berkhout et al., 2006; Chesbrough, 2003; Christensen and Raynor, 2003; Senge, 1994; von Hippel 1986, 2005 and 2007; Van der Ven et al., 2008; Poole et al., 2000 and Poole and Van der Ven, 2004). Gassmann (2006) makes a reference to Porter and Stern and states that external sources of knowledge and innovation have become increasingly relevant. Furthermore, externalization of innovation is not only adequate for incremental development activities as extended workbenches but also for sources of radical innovation. Chesbrough (2003) claims that open innovation is "the new imperative for creating and profiting from technology".

Open innovation is suggested as a new model by Chesbrough (2003) and expanded upon several times (for instance 2005 and 2006). Du Preez et al. suggest it at as the 6th generation innovation model (2006).[13] Trott and Hartmann (2009) argues that many may consider this paradigm to be little more than a repackaging of what has been presented over the last 40 years in innovation management literature. Furthermore, they argue that it has gained traction due to its simplicity (and retaining the linear notion of science to marketplace) and "and the partial deception which was created by describing something which is undoubtedly true in itself (the limitations of closed innovation principles), but false in conveying the wrong impression that firms today still follow these principles".
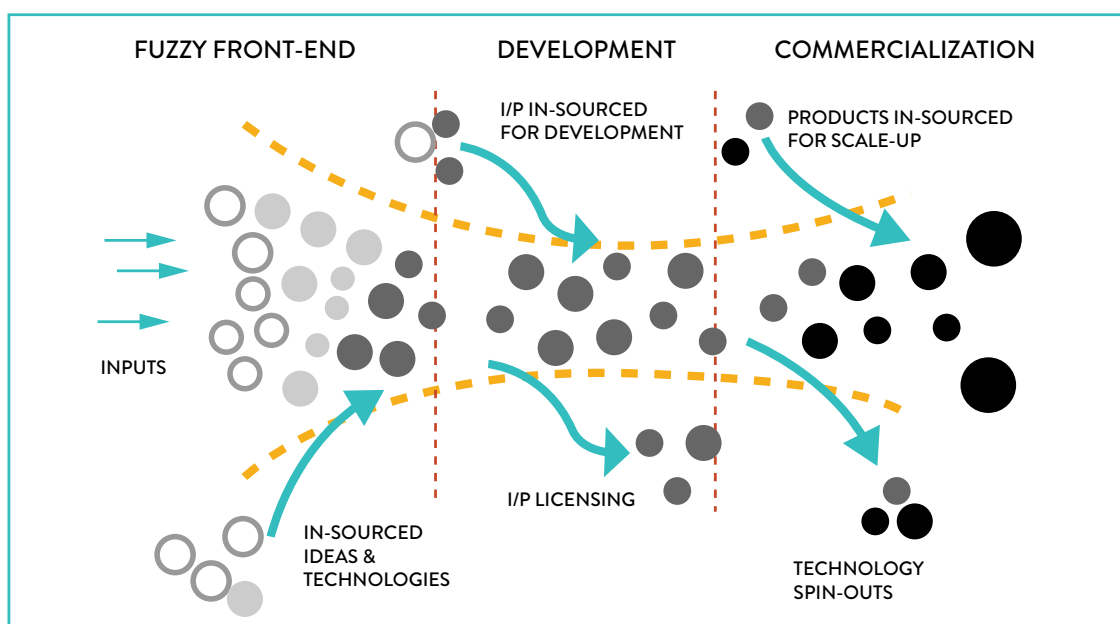
Figure 2.14 Open Innovation Model, freely after Chesbrough (2003)[14]

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[13] Note. They also suggest that there is a seventh generation model "Extended Innovation Network", which combines Open Innovation and network models.
[14] As referred to in: Du Preez, N.D., Louw, L. and Essmann, H., 2006. An innovation process model for improving innovation capability. Journal of high technology management research, 2006, pp. 1–24.

Another model that have gained attention is the User Innovation (von Hippel, 1986, 2005 and 2007), or User-driven innovation. Normally it refers to the users of an output of an organization, as opposed to the suppliers. That can intermediate users (user companies or organizations) or end-users or communities (for instance individual consumers). Where it has its obvious advantages in ensuring a more valuable output, it can also help build the company as such (Magee, 2008). It also holds challenges in terms of not really bringing forth radical innovation since customer may be inclined towards "me-too" solutions (Ulwick, 2002).

2.3.1.4 Measurement of innovation

Today one can hardly avoid being exposed to lists about innovation and innovativeness. These may be on a country level, whether that be the World Economic Report on Global Competitiveness[15] or *Bloomberg*'s report on the World's Most Innovative Economies[16] or perhaps the Global Innovation Index[17] (published by Cornell University, INSEAD and the World Intellectual Property Organization). They may also be on a company level, for instance *Forbes*' list of The World's Most Innovative Companies,[18] or The Fast Company list of The World's Most Innovative Companies,[19] or The Boston Consulting Group's[20] list On The Most Innovative Companies. Or they may even concern products and people: for instance, *Wired*'s list of The World's Most Innovate Objects,[21] or Fast Company's list of The Most Creative People in Business.[22]

Maybe the more relevant question concerns not the list per se, but how it is actually compiled. It is not the purpose of this thesis to make a full comparative analysis of how such lists differ in terms of methodology, but a few general comments should be made.

-   They look at different areas
    For instance, patents, high-tech intensity, productivity, researcher concentration, quality of scientific research institutions, university-industry collaboration in research and development, company spending on research and development and so on. The Global Innovation Index, for example, uses 79 indicators to rank 140 countries.

-   They use different methodologies
    For instance, *Forbes* uses a different model with their World's Most Innovative Companies list, using the wisdom of the crowd. Their method relies on investors' ability to identify firms they expect to be innovative now and in the future,[23] where the Boston Consulting Group conducts a survey of thousands of senior-level executives. Some more speculative lists essentially only rely upon an author/journalist/individual appreciation of "what or who is".

-   They have different standing
    Where the more established rankings and list, by actors such as the World Economic Forum, are more widely recognized and used for different purposes (for instance policy to advertisement), the less recognized are of more value to the individual company or person (or perhaps to the one making the list).

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[15] http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf
[16] https://www.bloomberg.com/news/articles/2017-01-17/sweden-gains-south-korea-reigns-as-world-s-most-innovative-economies
[17] http://www.wipo.int/econ_stat/en/economics/gii/
[18] https://www.forbes.com/innovative-companies/list/
[19] https://www.fastcompany.com/most-innovative-companies/2017
[20]https://www.bcgperspectives.com/content/interactive/innovation_growth_most_innovative_companies_interactive_guide/
[21] https://www.wired.com/2016/12/2016-innovative-objects/
[22] https://www.fastcompany.com/most-creative-people/2016
[23] Read more here: https://www.forbes.com/sites/innovatorsdna/2015/08/19/how-we-rank-the-worlds-most-innovative-companies-2015/#5aa0fbc55f8c

But why do we measure? One reason could be the EU. The EU states that research and innovation are crucial in bringing about a return to competitiveness for Europe and that the European Commission is committed to building a "stable economy for the future based on smart sustainable growth."[24] This is what the EU's growth and jobs strategy aims to do (i.e. Europe 2020).[25] The European Commission's "Indicator of Innovation Output"[26] "measures the extent to which ideas from innovative sectors are able to reach the market, providing better jobs and making Europe more competitive". The assumption is that composite indicators can be used to measure the impact of research and innovation policies. The proposed indicator is based on four components chosen for their policy relevance:

- Technological innovation as measured by patents.
- Employment in knowledge-intensive activities as a percentage of total employment.
- Competitiveness of knowledge-intensive goods and services. This is based on both the contribution of the trade balance of high-tech and medium-tech products to the total trade balance, and knowledge-intensive services as a share of the total services exports.
- Employment in fast-growing firms of innovative sectors.

These four components also represent some of the challenges with innovation measurements. What exactly is to be measured and what taxonomy is to be used?

Godin (2002) traces back governments' interest in innovation to the 1960s: the first worldwide survey on innovation was conducted in the late 1950s in Great Britain, and in 1962 Rogers (1962) created classifications to measure levels of or degrees if innovation and innovativeness. However, the OECD countries only started to do innovation surveys systematically from the 1980s. In 1993, twelve European countries conducted the first-ever coordinated survey of innovation activities.[27] It was based on the Oslo manual (*OECD Proposed Guideline for Collecting and Interpreting Technological Data*), which had been adopted by the OECD in 1992[28] (and is now in its third edition[29]).

The whole point of this methodical work was to develop output indicators. It would measure innovation by measuring the products, processes and services that arise from innovation activities, but as Godin (2002) shows it strayed from this objective to focus on activities. To this day this division creates uncertainty in the value of the measurements. National governments and the OECD ended up measuring innovation the way they measure R&D – in terms of input factors and activities (ibid.). But, since innovation also can be understood (and should be understood) as the degree to which it has impact, a comprehensive system would have to account for both input and output.

Godin (2002) points to three factors that explain the current practice of innovation as an activity rather than as an output:

- The reliance on the linear model by policy makers (i.e. focus on what comes out of basic research, not its effect)
- Control by governments of instruments for measuring (i.e. for instance expenditures for activities – not using data or databases developed elsewhere)

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[24] https://ec.europa.eu/jrc/en/research-topic/measuring-research-innovation
[25] http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf
[26] http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=output
[27] http://cordis.europa.eu/news/rcn/10048_en.html
[28] http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)26&docLanguage=En
[29] http://www.oecd.org/science/inno/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm

- Innovation is a fuzzy concept (i.e. defined either as an activity/process or as a product, being new to the firm or the world etc.).

Innovation is, as we have seen, a multifaceted word, a concept that has permeated our language and our world to the extent of now being a category in itself. Innovation has become an end in itself (Godin, 2011). But the value of innovation also relies upon it being something that can be understood, argued about and compared. Put differently, one can argue that innovation is what can be understood or measured.

2.3.1.5 Definitions of innovation

It has been shown throughout this chapter so far that defining innovation is not a simple task. According to Schein (1998), the definition of innovation is itself a major problem. He goes on to say that it is "itself a property of culture".

When going through the literature on the topic of innovation, one striking thing is the variety of meanings, interpretations and definitions that unfolds. Where one on the one hand can argue that the richness of descriptions speaks to the "living" and "evolving" value of the concept, one can on the other hand argue that since it is so hard to find an agreed upon definition the concept loses its real value.

A brief historical overview

The concept of innovation is of Greek origin from the fifth century – *kainotomina*. It derives from *kainos* (which means new) and meant originally 'cutting fresh into'. To Greek philosophers it meant two things: introducing novelty (of any kind) or introducing political or constitutional change (Godin, 2012). Innovation comes from the Latin *innovationem*, the noun of action deriving from *innovare*. The *Etymology Dictionary*[30] describes *innovare* as dating back to 1540 and the stemming from the Latin verb *innovates*, meaning "to renew or change". In the Middle Ages and after, innovation continued to mean novelty; it was not until the twentieth century that it started to obtain the meaning that we understand today (Godin, 2011). Godin (2008) suggests a genealogical history of innovation through the three concepts of "imitation", "invention" and "innovation". But the story of innovation is also the story of a concept that has been redeemed from its previous negative connotations to be one of almost exclusively positive connotations, starting with Schumpeter's study of business cycles (1939). Today innovation is regarded virtually as a panacea in politics, business and everyday life. However, there are voices that object to it – for instance Jill Leopore (2014), who claims that: "The idea of innovation is the idea of progress stripped of the aspirations of the Enlightenment, scrubbed clean of the horrors of the twentieth century, and relieved of its critics." But it is questionable if critics like her are criticizing the concept per se, or rather the undying devotion to it, which shies away from some of its social consequences.

Innovation and its synonyms

Innovation is used interchangably in literature and in everyday language with a number of other concepts and words. It is helpful to explore these in order to make distinctions and distinguish different understandings in the literature. The following words tend to come back when scanning and analysing definitions and explanations of innovation:

- Invention
- Creativity
- Novelty

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[30] http://www.etymonline.com/index.php?term=innovate

- Commercialization
- Success
- Change.

Many other words have also been used interchangeably with innovation over time. Some of the more common words to be found in texts from the twentieth century and onwards are as follows:

- New
- Newness
- Fashion
- Imitation
- Reformation
- Original
- Alternation
- Revolution
- Altering
- Introduce
- Endeavour
- Enterprise
- Disruption
- Transform.

As can be seen – in this by no means exhaustive list – two things stand out: All these words are primarily positively loaded, and they are different, although they orientate themselves in the same area so to speak. Given the research question, there is a need to find a common ground around what we mean when we speak of innovation.

Innovation and change

Griffin et al. (1993) say that innovation is to be characterized as a subset of an even broader construct of organizational change. Suddenly there is hint back to a much earlier meaning of innovation. However, this is not restricted to change. The authors go on to say that although organizational change can include innovation, much organizational change is not really innovation at all. They also note that innovation may not always be about creating something new, but also the adaption of pre-existing products and services.

Creativity, newness and innovation

Boden (1991) calls creativity the ability to come up with ideas or artefacts that are new, surprising and valuable. Griffin et al. (1993) define organizational creativity as the creation of a valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system. They see it as a subset of the broader domain of innovation.

Schumpeter (1934) defined innovation as consisting of any one of these phenomena:

- Introduction of a new good
- Introduction of a new method of production
- Opening of a new market
- Conquest of a new source of supply or raw materials or half-manufactured goods
- Implementation of a new form of organization.

This is a fairly broad orientation of innovation, essentially covering improvements in process and production. It does not say anything about the adoption or the impact or success of what is being introduced, but one cannot rule out that these were implicit in Schumpeter's thinking.

It is here quite clear that the departure from innovation as merely "change" to something to be explicitly theorized as creativity (i.e. the deliberate work of man's imagination) was now well underway (Godin, 2011). But what does creativity do? It emphasizes originality: inventing something new or doing something differently. Schumpeter's definition goes even further and assumes that innovation holds value – at least to the organization. Today social scientists place explicit emphasis on utility or usefulness. Innovation is theorized in terms of introducing or adopting some novelty into practice.

New and newness should also be addressed since one can discuss whether something is new to the world or just to the organization. Schein points out that defining what is "new" is problematic, and this leads to problems in defining innovation (Schein, 1998). He goes on to say that we must in the end define innovation ultimately by the perceptions of both members of the organization and those outsiders who interact with it. The ones outside are in a position to perceive the changes in question. If both groups – insiders and informed outsiders – think that something really is "new," then we are dealing with an innovation. He sees innovation "as itself a property of culture" (1998).

Invention and innovation

The division between invention and innovation has been recognized by many scholars (Van de Ven et al., 2008). Already for Schumpeter, "Innovation is possible without anything we should identify as invention and invention does not necessarily induce innovation". Invention is an act of intellectual creativity and "is without importance to economic analysis" (Schumpeter, 1939: 84–85), while "innovation is an economic decision". According to Senge (1990), a new idea has been invented when it is proven to work in a laboratory, but only when it can be replicated reliably on a meaningful scale at a practical cost can it be considered an innovation. As Van de Ven et al. (2008: 9) state: "Whereas invention is the creation of a new idea, innovation is more encompassing and includes the process of developing and implementing a new idea".
The *Collins Dictionary* puts it even more succinctly when comparing the two: "Invention means to create or devise something new" and "innovation means introduction of something new".

R&D and innovation

R&D is often associated with innovation, but it is not the same as it. OECD's "Frascati Manual" (2015: 28) states:

- R&D comprises creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.

- A set of common features identifies R&D activities that aim to achieve either specific or general objectives, even if these are carried out by different performers. For an activity to be an R&D activity, it must satisfy five core criteria. The activity must be:

  - Novel
  - Creative
  - Uncertain
  - Systematic
  - Transferable and/or reproducible.

38

Different definitions – an overview post World War II

From the notion of newness as successful (most often commercial) introduction and utility flow numerous different definitions:

- Maclaurin (1953) says that when an invention is introduced commercially as a new or improved product or process it becomes an innovation.

- Rogers (1983) defines innovation as an idea, practice or object that is perceived as new by an individual or another unit of adoption.

- Utterback and Abernathy (1975) say that a product innovation is a new technology or combination of technologies introduced commercially to meet a user or a market need.

- Drucker (1985) says it is the act that endows resources with a new capacity to create wealth.

- Van de Ven (1986) views innovation as the development and implementation of new ideas by people who over time engage in transactions with others within an institutional context.

- Tidd et al. (2005) claim that innovation is a process of turning opportunity into new ideas and of putting these into widely used practice.

- Baregheh et al. 2009 state that innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.

- Kumar (2013) says it is a viable offering that is new to a specific context and time, creating user and provider value.

In a survey of the literature on innovation, Edison et al. (2013) found over 40 definitions. They found the following to be the most complete:

> Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.

Although this may be a comprehensive definition it is not an easy one to remember.

Two more formal definitions of innovation are worth mentioning. The OECD (2005) definition and how it distinguishes product and proves innovation, and that of the United Kingdom Department of Trade and Industry (2007):

> A technological product innovation is the implementation/commercialization of a product with improved performance characteristics such as to deliver objectively new or improved services to the consumer. A technological process innovation is the implementation/adoption of new or significantly improved production or delivery methods. It may involve changes in equipment, human resources, working methods or a combination of these. (OECD, 2005)

Innovation is the successful exploitation of new ideas. (United Kingdom Department of Traded and Industry, 2007)

Again, the difference is striking. The OECD definition seems comprehensive but it does not take into account all categories of innovations discussed for example by Schumpeter (such as the opening of a new market, the conquest of a new source of supply of raw materials or semi-manufactured goods, or the reorganization of an industry).
The United Kingdom Department of Trade and Industry definition is very short and easy to remember, yet also open to numerous interpretations.

The word or concept of innovation has been defined, therfore, in many different ways. Broadly speaking these definitions fall into two categories, or a combination of these two: outcomes or processes

- The idea, product, service or practice
- The way something comes about, from idea to utilization.

An illustration of the challenge with definitions

Freeman and Engel (2007) state that "innovation refers to a process that begins with a novel idea and concludes with market introduction." Here, innovation is seen as a process that starts when an idea is formulated and stops when it has been brought into the market. This definition suggests that invention by itself is not innovation. What this definition does not include (at least it is questionable if this is implied by it) are the processes and events that precede a formulated idea and whether or not that idea is successful in the market place. Furthermore, the term "market" tends to imply commercialization, but today we often speak about other forms of innovation (for instance social innovation) that do not have a commercial orientation per se. Finally, this definition does not outline how "process" should be understood. Is it a linear process or is it more complex than that? Does process refer to *what* is happening (steps, events etc.) or more *how* certain things happen (fast, slow etc.)?

Thus the beauty of a short and concise definition may quickly be exchanged for confusion and uncertainty.

In sum

Thus innovation is not just invention, creativity, novelty, commercialization, success or change – it can encompass each and every one of these aspects as well as all of them together.

Coming down to a workable definition we end up with a few different points:

- Does innovation refer to a product or to an activity?
- Is it new to the world (or a given market) or to the firm?

I suggest the following working definition of innovation: *Innovation is the process of bringing something different and valuable successfully into being.* This may be a bit loose, but it does address the point of newness and utility without compromising the many different ways in which this can be done.

2.3.1.6 Summary of section 2.3.1

In this part of the thesis we have tried to answer the question "what is innovation" by considering it from different perspectives. A key finding is that it is an ill-defined and ambiguous concept that can mean many different things. Depending on the situation in which we discuss or describe innovation we quickly end up with different definitions and descriptions.

Innovation needs to be placed in categories to be properly understood. However, the literature is not consistent and is flooded by taxonomies, typologies and categorizations that make it virtually impossible to compare findings. Furthermore, in an ever more varied and specialized world the uniqueness of organizations and their work also spurs more local categorizations and taxonomies; for instance, toolkits supporting open innovation in e-government (Felfernig et al., 2004), or an intelligent design framework for service innovation (Tung et al., 2009).

The understanding of innovation has different sources even if today to a large extent we associate it with economy and technology. Following primarily the works of Benoît Godin we can trace the origin of innovation back to Ancient Greece and see how the word has changed meaning over the centuries. Godin (2012c) states that innovation has changed as a category over time: From religious, to political, to social to economic (technology). Innovation became a positive category from the mid-nineteenth century onward. Since the 1960s governments have legitimized it and technological (i.e. commercialized) innovation became the dominant discourse.

Ever since Schumpeter, scholars of innovation, in an effort to better understand how to manage the process of innovation, have tried to categorize innovations as a function of what they do to the skills, knowledge, investment strategies and existing products of the innovating entity (Afuah and Bahram, 1995). Furthermore, we can see a growing tendency to view innovation through the lens of what it does to the user or consumer (for instance social innovation etc.).

The understanding of how innovations come about has also changed and different models have been offered. A bit simplified we can say that the there are three dimensions of the innovation process: The origins of invention, its diffusion and its effects. The innovation models have changed over the years (Rothwell, 1992, 1994; Godin, 2006; Berkhout et al., 2006 etc.). But even though our understanding of innovation and innovation process have led to more advanced models, the linear model is still in use – despite much criticism. Godin (2006, 2013) attributes this in part to the model's simplicity. However, the statistics available in support of the linear model, or a lack of statistics for alternative models, may be even more responsible for delaying change to other innovation framework options.

This may be a result of the linear model being relatively simple to understand and to generate measurements around. Measurements around innovation became widely popular as governments began to pay attention to innovation; that is innovation as an indication of prosperity and growth. Today, there are numerous lists that measure everything from the most innovative countries to the most innovative organizations – even the most innovative individuals.

Given our appreciation of how they correspond with how well they can explain and support successful innovation efforts, there is a tendency for models of innovation to undergo changes too. An innovation model describes the conceptual framework for how ideas that solve a need is identified and developed into a solution that creates value and potentially growth. In short, an innovation model is a tool for dealing with change in an effective way.
This quotation from Peter F. Drücker can summarize the justification of innovation models:

Systematic innovation therefore consists in the purposeful and organised search for change, and in the systematic analysis of the opportunities such change might offer for economic or social innovation. (2007: 49)

Garcia and Cantalone (2001) state that it is important to consider both a marketing and technological perspective as well as macro-level and micro-level perspectives when identifying innovations.

Some organizations seem to be better than others at innovation. Christensen (1997), who gave birth to a very influential concept – disruption, suggests that successful organizations are capable of taking a wider perspective, acknowledging the prospect of disruptive technologies and then creating new products that meet the unexpected wants of customers.

Defining innovation is a daunting task because the literature offers so many different possibilities. For some innovation is essentially creativity; for others it is more about output than input; and for still others it is more about the process than the product. In sum, we can view innovation as incremental, emergent, radical or revolutionary. It also concerns value-creating changes in thinking, products, processes, or organizations. This leads to the suggested working definition of innovation as *The process of bringing something different and valuable successfully into being.*

2.3.2 The business of innovation

So far we have looked at what innovation is. We have investigated the origins of innovation as a word and as a concept (understood broadly), as well as how it plays into the idea of progress and prosperity. In this section innovation as a concept will be expanded. It will be discussed in connection to the larger concept of change. Furthermore, after the rationale for innovation has been established, the relationship between innovation and leadership will be addressed, as well as the relationship between innovation and globalization. The final section concerns new approaches and business models for innovation. It should be noted that there are inevitably some overlaps with other sections (for instance "What is innovation") as the subject is contextualized and many authors write about more than one thing.

2.3.2.1 The purpose of innovation

As we have seen in the previous part of the chapter, innovation has a long story and its meaning has changed over the centuries. Today we most often think of it in terms of technological change – indeed progress; that is an economical gain. However, it is worth addressing the purpose of innovation and connecting it more clearly with economic progress and imperatives for firms and organizations. But first a few words about alternative purposes.

Innovation may have other purposes than purely economic advancements. As we have seen in the previous section, it also serves and has served as a political concept (Godin, 2013a and Godin, 2014b). Innovation has been synonymous with something that is good, desirable and essentially right. Lepore (2014) talks about it as virtually blind faith, the panacea to all challenges. But when something is almost beyond critique (who would argue that we do not need innovation, or that is preferable not to be innovative?), it also something that we would like to be associated with. As such innovation also legitimizes (as OECD legitimized it decades ago) a position, a brand and an agenda. This will be discussed further in a different section of the thesis, but for now when innovation becomes a slogan (Godin, 2014b) it also detaches itself from being an indicator for progress. The purpose of innovation then become the creation of an image, more than real economical results or societal changes.

Looking at the world from a macro perspective, meeting the development needs of humankind requires economic growth (Kaplinsky et al., 2010). According to Beinhocker (2006) global wealth has risen exponentially since around 1750. This growth was more than anything due to technology (Humbert, 2007). Beinhocker (2006) with reference to the evolutionary economist Richard Nelson states that two types of technologies play a major role in economic growth. The first is physical technology, for instance steam machines. The other one is social technologies, ways of organizing people to do things. The development of new technologies of both kinds allowed for new ways of organizing production and economic activity. Technological progress and the restructuring of production led to a cumulative speeding-up of productivity development (Humbert, 2007).

It seems possible to discuss the development of the world through the lens of innovation. Revolutions have happened throughout history (Schwab, 2016). New technologies and novel ways of seeing the world have sparked deep changes in our economic system and social structures. However, it is also worth noting that the industrial revolutions have not been evenly spread across the world. For instance, the Second Industrial Revolution has yet to be experienced by 1.3 billion people around world (ibid.). Many people still lack, for instance, electricity. In terms of the Third Industrial Revolution, around half of the world's population still lacks access to the Internet. Indeed, the imperatives of both growth and distribution raise issues of technology and innovation (Kaplinsky, 2011). Uneven distribution has an impact on, for instance, poverty reduction. What has changed is not only the content and consequences of the revolutions but the speed at which they spread. For instance, the spindle from the first revolution took almost 120 years to spread outside Europe, whereas the Internet spread across the world in less than a decade (Schwab, 2016).

Innovation as an indicator and a driver of economic growth and progress is well established (for example, OECD, 1966 and 2005). In short: Technological progress and innovation determine productivity and subsequently the raise of growth (Kaplinsky, 2010). However, in spite of its obvious importance, innovation has not always got the scholarly attention it deserves (Fagerberg and Mowery, 2006). But in the same way as innovation plays a role on the macro level of our societies; it plays a key role for the firm. Numerous authors have established this, even though they tend to look at different facets of organizational success. The need for innovation in organizations is fundamental and imperative: Organizations should innovate in order to renew the value of their asset endowment (Schumpeter, 1950). It adds value and sustains competitive advantage (Baregheh et al. 2009). Innovation represents not only the opportunity to grow and survive but also the opportunity to significantly influence the direction of the industry (Davila et al., 2006). Businesses need to innovate to increase performance (McLaughlin, McLaughlin and Preziosi, 2004).

Baregheh's claim is echoed by Michael Porter (1998). Porter is regarded an expert on competitiveness and his Five Forces Framework was the definitive approach for decades. This theory hypothesizes that there are five forces that determine the competitive intensity and appeal of an industry. These forces include the threat of substitute products and/or services, the threat of recognized rivals and the threat of new entrants.

Obtaining a competitive advantage is not the same as sustaining it. Indeed, changes in the marketplace generate a dynamism that is impossible to guarantee. However, firms are not just victims to the marketplace; they can also influence it, as Davila et al. (2006) state.

A theory around how companies create a competitive advantage was suggested by Utterback and Abernathy in 1975. They introduced the concept of "dominant design" in which they suggested that the emergence of a dominant design is a major milestone in the evolution of an industry. It changes the fashion of how firms compete in an industry and, as such, the type of organizations that succeed and prevail. It wins the loyalty of the marketplace. When a new technology comes forth, often companies will introduce a number of different designs. In time, an architecture that gets accepted (often after a number of incremental innovations) as an industry standard may emerge. It does not need to be better than the alternative.

James Utterback defined three phases of innovation in the marketplace for any product and service (1996). He called these the Fluid, Transitional and Specific phases. When introducing a new product or a service to the market, we are in the Fluid phase, which is characterized by radical innovation and many different competing designs. At some point, there will often be consolidation around a dominant design, which will be adopted by all or by most actors. In the next phase – the Transitional phase – production innovation gives way to process innovation when the actors try to optimize the processes, to improve the quality and decrease the cost of their products and services. In the Specific phase the number of actors is decreased because some will not be able to compete. They will move into other products and services or cease to exist as the prevailing ones will focus on incremental changes to stay profitable.

After the last phase, the process essentially starts all over again as firms try to retain and develop their relationship with the market. As such innovation becomes a series of Utterback cycles, almost like an endless spiral or an S-curve.
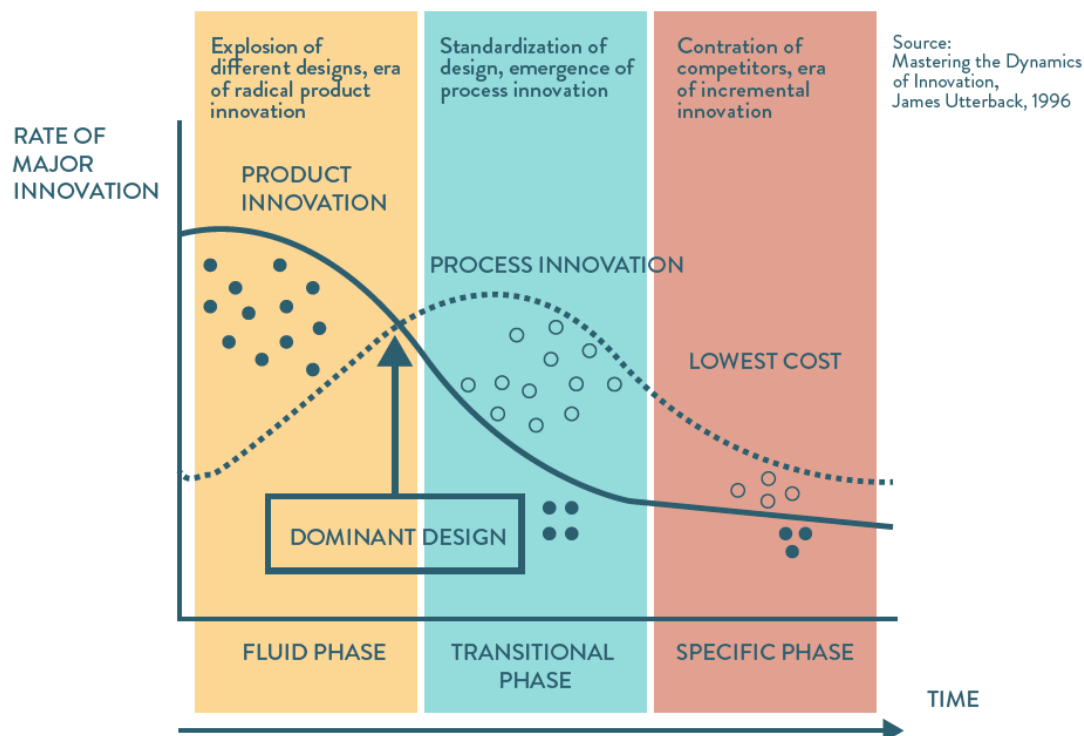
Figure 2.15 Mastering the Dynamics Innovation Model, freely after Utterback (1996)

As firms try to compete and bring innovations to life, they can choose where to compete. Said differently: they can choose where to spend their R&D money as they hope to capture returns and market shares. Kim and Mauborgne (2005) suggest that organizations should focus on "blue ocean" spaces in the marketplace that are free of competitors. This also indicates that defining a particular market can be seen as an innovative approach if not an innovation in itself. Clayton Christensen (1997) introduces the idea of disruptive innovation and explains why management practices that make companies industry leaders also make it tough for them to develop the kinds of disruptive technologies that start-ups may use to take over markets. Here lie several orientations on innovation. The market leader becomes the market leader based on some sort of innovation, or innovative approach to its business and the new entrant finds an underserved segment and essentially pursues a variation of the blue ocean strategy, and from here "disrupts" the market. As we can see, innovation, and how it is managed, is a key strategic issue, but the absence of a consensual definition is challenging. However, stating a purpose for innovation also helps define it – or at least makes it more "tangible" by contextualizing it.

44

In short, the purpose of innovation is increased or sustained profit and competitiveness, renewal and fitness. Fundamentally it is a sign of organizational and business vitality.

One's orientation on the purpose of innovation sets the frame for an understanding of innovation itself. And, vice versa, one's understanding of innovation fixes the orientation around its purpose.

2.3.2.2 On the matter of change

Drucker (1969) coined the phrase "the age of discontinuity" to underline the speed, uniqueness and unpredictability of the changes that face organizations. Although his book was published in 1969 many of the underlying forces of change that he identified are still transforming the economic landscape and creating our society. The sources of these changes are multifaceted and their impact is truly profound.

Drucker distinguished four major areas of discontinuity that underlie contemporary social and cultural reality. These are:

- The outburst of new technologies resulting in massive new industries
- The change to a world economy from an international one – an economy that currently lacks policy, theory and institutions
- A new socio-political reality of pluralistic institutions that poses drastic political, philosophical and spiritual challenges
- The new world of knowledge based on mass education and its implications in work, leisure and leadership.

Although there have been contributions to our understandings of these discontinuities, they remain valid as they are neither resolved (i.e. we have found the answer) nor gone.

Change can be understood as a verb or as a noun. As a verb, it mean to "make or become different" or as "take or use another instead of". As a noun, it refers to "an act or process through which something becomes different". Change is about difference, between what is or was, and what is or will be. As Drucker points to larger social-economical-technological forces shaping changes, they have consequences for organizations.

For organizations change can often begin with a change in strategy. That may be triggered by changing realities in the external world or within the organization itself. After setting new goals and allocating resources accordingly new structures, systems and procedures are introduced to support the new strategy. But history is full of examples of companies that have not survived because they have not adapted fast enough to changing conditions, which raises questions as to why.

The search for stability and certainty (which seems logic from an efficiency point of view) can lead organizations to adopt a mind-set that leaves them exposed for aggressive and innovative competitors (or entrants, following the idea of disruption as proposed by Christensen, 1997). According to Hartley (1994) this particular mind-set is comprised of:

- Conceit (companies believe in their own invincibility and are disdainful of their competitors)
- Conservatism (companies are managed by executives too far away from the market and too steeped in conventional wisdom, not seeing new opportunities)
- Complacency (companies are self-satisfied, content with the status quo and no longer eager for growth).

While these 3 Cs can be effective when the strategy of the company is suitable for market conditions, they do not encourage initiative and ingenuity. In today's market, it seems very few companies can allow themselves the luxury of adhering to the 3 Cs for very long at a time. This means that the job of management is to institute some sort of rationality, narrative and predictability out of the chaos and uncertainty that continuous change seems to create. The ability to manage change has been recognized by many, for instance Peters and Waterman (1982), as key to corporate success and competitive advantage.

Lewin introduced the "force field model" in 1951. This suggests that change is a state of imbalance between driving forces (pressure for change) and restraining forces (pressure against change). There have been other frameworks for studying change. One of these would be the "7S model" by Pascale (1991). This is a more holistic approach and is based on the premise that organizational effectiveness rests on the fit between strategy, structures, systems, style, skills, staff and shared values. A newer idea is that of "change readiness". This is derived from theories about organizations and organizational change (Lewin, 1951 and Senge, 1990). Readiness is considered important because the members of an organization work to sustain a situation that leaves them with a sense of security, control and identity (Argyris & Schön, 1995). Change readiness can be understood as the extent to which members of an organization are psychologically and behaviourally prepared to implement organizational changes (Weiner et al., 2008). In that sense, it is a two-dimensional phenomenon: whether the members are motivated *for* and whether they are capable *of* carrying through a planned organizational change. Organizational readiness is a common psychological state in which members of an organization feel committed to implementing an organizational change and experience a sense of reliability in their collective capacity to carry it through (Weiner, 2009).

The nature of change can certainly vary quite substantially. It can entail incremental changes as well as transformational ones. Where the first are often sustained, continuously experimenting with new ideas to improve performance, the latter are quite a different affair. Incremental changes often have only marginal consequences and rarely affect the underlying business models, or at least the philosophy of the organization. Transformational chances produce a restyled type of organization that has long-term consequences and often calls for changes in culture and structure. Tushman, Newman and Romanelli (1986) state that transformational change may be the response to three kinds of disruptions:

- Industry discontinuities
- Movements in the product life cycle
- Internal company dynamics.

History has taught us that the changes that affect the body of knowledge most profoundly do not as rule emerge from within its own domain (Drucker, 1992). To appreciate and acknowledge new knowledge or changes to it is a strategic imperative. Miyazaki (1994) proposes that developing new technological competence in a company is also a cumulative process. Knowledge and intellect grow exponentially when shared (Quinn et al., 1996). This means that accumulating knowledge is a key capacity that can be increased and the value of it increases as it is distributed and made communal.

Change in terms of organizations and firms is closely related to doing "new things". As such it is directly related to the concept of entrepreneurship (meaning moving resources from a less yielding area to a more yielding one). In Peters and Waterman's (1982) research eight common themes were responsible for the success of the chosen corporations – hereunder autonomy and entrepreneurship – fostering innovation and nurturing "champions". Innovation can be seen as the 'business of entrepreneurs' (Drucker, 1985). Collins (2001) found that companies that perform consistently do much better than those that do spectacularly one year and are feeble the next. As such entrepreneurship and innovation follow the notion of Drucker (1985) and can be seen as a discipline, indeed as a means to meet or instigate change. We may define innovation as a diagnostic discipline involving a systematic examination of changes occurring that may provide entrepreneurial opportunity. Drucker (ibid.) articulates systematic innovation as involving the examination of seven sources of innovative opportunity:

46

- The unexpected (success, failure, outside event)
- The incongruity between the way things actually are and the recognition of the way they should be.
- Innovation based on process need
- Surprise changes in industry or market structures (from activity of free market or government legislation)
- Demographic & sociographic changes (lifestyle changes)
- Changes in perception, mood and meaning
- New knowledge (both scientific and non-scientific).

Cavé (1994) suggests that the choice of organizational structure may involve a set of compromises between the major organizational types (the functional, the adhocracy and the professional bureaucracy), and the strategic forces driving the company (innovation, cost control and quality).

ORGANIZATIONAL DESIGN	DRIVING FORCES
FUNCTIONAL	COST CONTROL
ADHOCRACY	INNOVATION
PROFESSIONAL BUREAUCRACY	QUALITY

Table 2.5 Organizational Design Model, freely after Cavé (1994)

In terms of bringing about change, as innovation, Cavé and Peters and Waterman seem to be on the same page. When what is desired is innovation, a strict, rigid and procedure-oriented form of organization is less effective.

Godin (2010b) says that early writers on innovation during the sixteenth and seventeenth centuries saw change as the antithesis of religious orthodoxy and authority. Change or novelty, as such, had nothing to do with technology. Innovation used to be understood as change (Godin, 2011) and it was not until the twentieth century that innovation became theorized explicitly as creativity (ibid.). Godin suggest that in studying innovation, researchers turned to the concept of change – cultural change (anthropology), technological change (economics) and social change (sociology). Change thus becomes the marker of invention and invention becomes the marker of change.

In economics, it is not enough that something is new or change for the sake of change. The change, or what is new, must increase value of some kind. Schumpeter (1934) can be argued to indicate that innovation is essentially an effort by one or many to create economical profit through a qualitative change. But what type of value can be identified? On an overall level, it can be customer or user value, producer or supplier value, or societal value. The goal of invention is positive change, to make something or someone better. Invention and its introduction leads to increased productivity, which is the fundamental source of increasing wealth in an economy.

It is this focus on what represents value or potential for better resource productivity that drives research and the development of new and innovative ideas for new products, services and resources. Recognizing and seeking change is the catalyst that drives the entrepreneur and it is this drive for change that provides the opportunity for the new and different.

2.3.2.3 Leading innovation and innovation leadership tools

There is a growing interest in understanding and obtaining competence in leading innovation. We see it for instance in a fairly new role that is emerging in organizations: Chief Innovation Officer. This, more than anything, is a recognition of 1) that innovation is important and 2) that someone has to have it as a priority. The question on how to lead innovation inevitably depends on so many different factors and circumstances that it is fair to assume that there are myriad possible approaches. But it is worth discussing leadership in terms of change and also offer some possible insights into what tools are being utilized on behalf of the leader to pursue innovation.

A change process may be outlined as a cycle/circle where one moves from motivating change, to envisioning, to building coalitions, to managing the change to learning. Cummings and Huse (1989) identify three roles that successful leaders of change should undertake:

- Envisioning, which involves conveying a belief in a brighter future for the company
- Energizing, where the chief executive generates enthusiasm for the new ventures and communicates early successes to maintain that enthusiasm
- Enabling, where the leaders provide managerial, operational and financial resources for the changes.

Ridgeway and Wallace (1994) have developed the Potential Competency Model, which combines the leadership roles with the leadership qualities. The hexagon represents the six basic competencies, which themselves are contained in three broad domains.
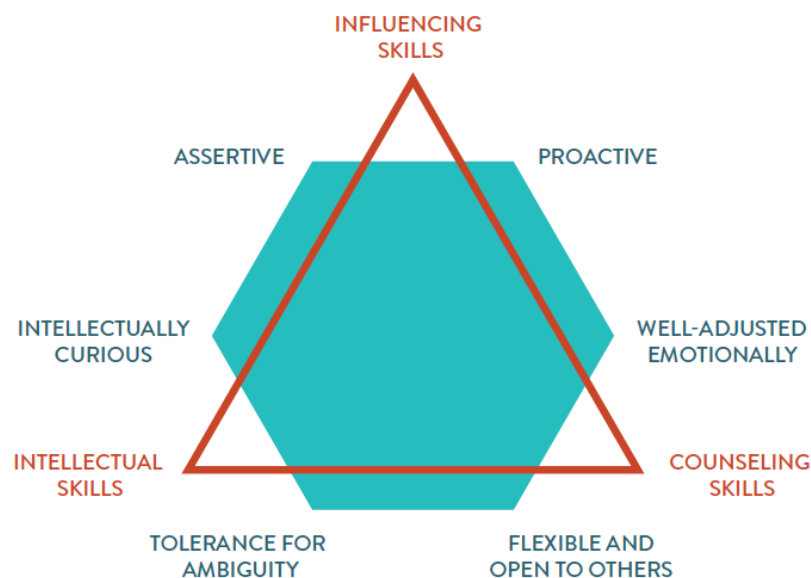
Figure 2.16 The Potential Competency Model, freely after Ridgeway and Wallace (1994)

Leading a change process requires both intellectual and emotional resources. It is partly about getting people on board but also about being continuously open to changes and adjustments. But what type of leadership is needed

48

when the leader does not have the answers, indeed when the answer or the best way forward is spread out amongst many different stakeholders or people within an organization? One possible answer is the facilitative leadership style.

Bens (2006) states that leaders who operate in today's networked world of projects and teams find themselves in a dynamic environment that didn't exist just a few decades ago. Today they are supposed to manage people with skillsets and expertise that are unfamiliar to them and over whom, in reality, they have little or no authority. But facilitation is not doing the same thing over and over again (Ghais, 2005). Indeed, every situation is more or less unique and calls for a different sensibility. It is not only about authenticity and confidence; it is also about being aware of the presence we bring into a room.

One of the challenges in terms of group processes is that there are many different ones. One of them is consensus. Consensus assumes that the group needs to make a decision or make recommendation as a full group (Ghais, 2005).

Of all the skill sets that support the shift from traditional management role to a more collaborative approach, none is more relevant than that of the role of the facilitator (ibid.). Of course the art of asking questions is not limited to the leader as facilitator, but is certainly imperative to the role. Questions catalyse insight, innovation and action. Engaging people's best thinking about complex issues without easy answers will be key to creating the futures we want rather than being forced to live with the futures we get (Vogt, Brown and Isaacs, 2003).

Management role			Staff role
Level I Directive style	Level II Consultative style	Level III Participative style	Level IV Delegative style
Management decides and then informs the staff	Management decides after consulting the staff	Staff recommends and acts after receiving approval	Staff decide and act (preapproval)
Appropriate situations			
Information is sensitive, staff lack skills or experience, or accountability can't be shared	Accountability can't be shared but management wishes input from staff	Staff ideas and active participation are desired, but risk is high or members lack experience to go it alone	Staff have the needed skills and can assume full accountability for outcomes
Effect			
Management control and accountability; staff are dependent	Management benefits from staff ideas; staff are more involved than at level I	Staff take initiative and implement outcomes; management and staff are interdependent	Staff take responsibility and are independent

Table 2.6 The Four-Level Empowerment Grid Model, freely after Bens (2006)

Bens (2006) states that any organization that deploy teams in order to generate innovation (and efficiency) need to be sensitive to the fact that those teams invariably need to be granted greater freedom to be creative and act independently. Kaplinksy (2011) describes the innovation cycle in a classic way but points to the importance of management (Tidd et al., 2005) as a crucial role throughout the development and application of knowledge in this cycle.
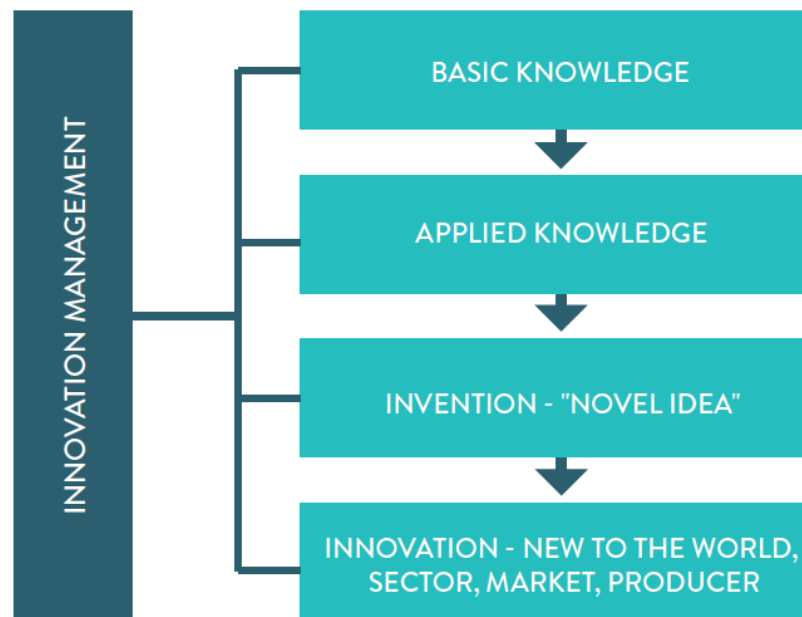
Figure 2.17 The innovation cycle Model, freely after Kaplinsky (2011)

As we can see the management of innovation processes can be viewed as a subset of managing change. The leadership roles and qualities require a change in our understanding about the nature of leadership. Leading change and innovation is not just about formulating plans and implementing them. There is a need to be enterprising and ensuring action on creativity. Given the increasing complexity of the tasks we face and the possibilities we envision, the focus for leadership has shifted, from leading creative individuals to leading creative groups (Hjort, Austrin and O'Donnell, 2010/2011). The post-industrial economy requires that the management component in leadership be toned down for the enlargement of the entrepreneurship component. Entrepreneurship, like leadership, is not primarily economic acts, but creative acts that enable creativity (that creates also economic opportunities). Entrepreneurship and innovation have a common focal point in creativity, but getting creativity out of people is not so easy as we have often been trained in a different way. Adriansen (2010) sees creativity as a step towards innovation and states that creative thinking and critically is not at odds with each other. The challenge then is that in our school system we are already trained and rewarded for our criticality. As Adriansen says (ibid.: 82) "… the cultural norms in academia is not cultivating creativity".

Innovation is hard to distinguish from entrepreneurship. As Drucker (1985) points out, innovation *is* the business of entrepreneurs. As such entrepreneurs and entrepreneurship are also critical for large, established companies and not just start-ups and growing companies. Entrepreneurship also stands for renewal and improvement. But it is not enough that the leader displays entrepreneurial qualities or is an entrepreneur per se. Today, it is very much about bringing entrepreneurship and subsequently innovation out of the co-workers. For this thesis, it is important to look at examples of what methodologies and tools are considered helpful when working with innovation today.

There are many methodologies and tools that are often mentioned and used in relation to innovation – for instance Design Thinking, Waterfall, Stage Gate and so on. Many of these – and more – are the subject of the quantitative research where they are discussed in more detail (see chapter 4). Some other methodologies and

50

tools are not so explicitly considered pure innovation methodologies and tools, but deserve to be mentioned as they have been utilized in the action-research part of this research. They are argued to be helpful in our complex and networked world, where individual qualities are often called for, and where collective qualities are what are needed. Here there is a greater need for togetherness and meaning as well and what is indispensable are new tools to create commitment and engagement.

A number of new methodologies have gained ground in the last couple of decades – such as Open Space Technology (Owen, 2008), Graphic Facilitation pioneered by David Sibbet and the Grove Consultants (Sibbet, 2009), The Art of Hosting[31] pioneered by Toke Møller and other practitioners (Scordialou, 2005), and the World Café developed by Juanita Brown and David Isaacs (2005).

What is interesting with all these methodologies is that they are in essence based on conversations about building relationships that shape new worlds. As a case in point, the World Café is about "shaping our futures through conversations that matter". In the foreword to *The World Café* (ibid.), Margaret Wheatley outlines some elements that underpin the process:

- Belief that everybody has the capacity to work together
- Diversity, and how to do it well is necessary to get an accurate picture of any problem
- Invitation is key, rooted in the notion that everyone is needed
- Listening
- Movement generates new perspectives and connectedness
- Good questions open up new insights and understandings
- Energy, from playfulness and laughter, as we relish being together.

Together, all these methodologies can be considered participatory, co-creational and facilitated processes. Buur and Larsen (2010) states that in co-design it seems to be widely understood that innovation is a planned, goal-oriented activity that can be propelled through well-facilitated events in which conversations aim at consensus on new product and service ideas. They suggest that crossing the intentions can create new insights and that innovation can be considered the emergence of new meaning – in often conflictual conversations. Buur and Matthews (2008) outline a proposal for an integrated approach to user-driven innovation that aims to overcome some of the practical organizational difficulties encountered when applying user-centred development practices in industry. There is a need to focus not only on questions like "How do we translate participants contributions into innovative products?" but also on questions like "What resistance to user involvement will we encounter in the organization?" and questions around "How to utilize different groups and departments in the organization without usurping their sense of control and expertise?"

Buur and Mitchell (2011) present a set of techniques – and an overview – for modelling business in rich, tangible formats. These formats have proven extraordinarily successful in initiating conversations on how to innovate business in cross-disciplinary and cross-functional groups of participants. Examples of such techniques are "Value Network Mapping", using tangible material as well as "Picture Cards" to compare business relations. In addition, numerous other techniques and methodologies can be used: for instance, Lego Serious Play (Roos and Victor, 1998) and Osterwalder's "Business Model Canvas" (Osterwalder and Pigneur, 2010).

The key question is of course: Do these methodologies or tools really work? And if so, does any one work better than others? Can we outline in which situations which tools are more suited than others? Often these tools can help us engage in different ways that may generate new and original thinking. In Buur and Mitchell's study (2011), the models and techniques researched kept the participants busy and allowed them to be less stressed by the need for verbal articulation. Buur and Sitorus (2007) suggest that ethnography can provoke perceptions of design. It allows them to rethink and reframe their understandings of problems and solutions. Moving beyond text material allows us to understand that insights are not bullet points, nor necessarily the result of logical reasoning. However, there is a need to 'prove' that these concepts of tangible modelling actual have merit for industry, that is do they deliver results Buur and Mitchell (2011).

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[31] There are much written about the art of hosting here: http://artofhosting.ning.com/u

51

2.3.2.4 Globalization and innovation

Friedman (2006) states that the first era of globalization lasted from 1492 when Columbus set sail and opened up trade between the New World and the Old World, until around 1800. The second era of globalization lasted from around 1800 to 2000. This period was interrupted by the great Depression and the two World Wars. Where the first era was much about countries, the second era was more about the multinational corporation. In globalization 3.0 it will be about individuals. Individuals now have the power and possibility to collaborate and compete on a global scale. Furthermore, in this new era it is not only European and American corporations that are driving change – now other countries, regions and companies are entering the stage and shaping its course in a profound way.
Another defining characteristics of this development – strikingly different compared with previous periods – is the speed and breadth at which it is taking hold.

John le Carré once wrote, "The desk is a dangerous place from which to view the world" (quoted in Boyer, 2004). However, most leaders and managers are locked behind a desk, insulated by layers of organizational structures and filled up calendars (Boyer, 2004).

Christensen (1997) points out three predicaments for businesses:

- Leading companies listen to their best customers. But these companies are the last to adopt new and disruptive innovations and technologies.
- Leading companies measure the size and growth of markets to understand customers better. But disruptive innovations are unpredictable, and evade detection through traditional measurements.
- Leading companies focus on highest returns and large markets. But disruptive innovations are counter-intuitive: they start small and translate into lower profit margins in the early stage.

According to Adler (2007), the twenty-first century presents society with challenges that will determine the future of humanity as well as the future of the planet. She goes on to call for wisdom as a response. The study of wisdom in scholarly management tradition is still very new.

Less privileged parts of the world are not just recipients of the west. They are more and more recognized as areas of opportunity for innovation and growth. There is a huge market potential for a new class of consumers. The "bottom-of-the-pyramid" markets represent significant challenges, but also important growth opportunities (Webb et al., 2009). Prahalad and Hammond (2002) and Prahalad (2006) point out that there are something in the region of 4 billion living at incomes below £2,000pa. Three points are made to indicate the potential:

- Although incomes are low, many of these people are active consumers of goods and services
- Many of the products, which the poor consume, make intensive use of radical new technologies (as opposed to what is often highlighted in literature)
- These poor consumers represent a market of growing significance and provide the potential for highly profitable production.

As we moved from a production paradigm characterized by mass-production (or Fordism) to a leaner, just-in-time production system we experienced a new innovation challenge (Kaplinksy et al., 2010). Increased flexibility and diversity was accompanied by smaller inventories and producing to order as opposed to forecasting. All in all, the change saved money. However, the innovation challenge now is rapid production cycles and production innovations.
There are good reasons to assume that technological changes originating in the south will become a major driver of innovation in the twenty-first century (Kaplinsky, 2011). But it is not just about excess production resources

in the north, pushing products to the south. Essentially the less privileged also have the capacity to take part in the innovation process. In terms of innovation, demand has been under-recognized in economic theory (Kaplinsky, 2011). The global proportion of R&D occurring in low-income countries rose between 1970 and 2000 from 2 percent to 20 percent but that is not same as saying it translates into innovations that meet the needs of low-income consumers (Kaplinsky et al., 2010). And it is innovation, not R&D per se, that really drives possibilities for poverty reduction.

In terms of entrepreneurial activities, in developing countries we must think differently about success (Webb et al., 2009). The dominant view is that entrepreneurial activities allow firms to create wealth. In developing countries that is also true, but there are other considerations such as social gains and reputational gains that must be considered in conjunction with financial gains.

Kaplinsky (2007) pushes for a shift in strategy and subsequently policy from industrial development to one of innovation in all sectors for low-income countries. The focus on innovation capabilities opens up the challenge of moving beyond improvements in infrastructure and getting producers in low-income countries into global value chains. The focus on innovation provides the capacity to learn, to operate on a continuously expanding global frontier. Porter and Kramer (2011) argue for the concept of "shared value" as a way to reinvent capitalism and unleash a wave of innovation and growth. Here the focus is on the connection between economic and societal progress. The ways that companies can create shared value opportunities are:

-   By reconceiving markets and products
-   By redefining productivity in the value chain
-   By enabling local cluster development.

Innovation and technological change play an important role in poverty reduction through their contribution to growth, their use of factories for production, their environmental spill overs, the social relations associated with production and the characteristics of the products which they produce Kaplinksy (2011). New business models, they must not disrupt local cultures and lifestyles. What is needed is an effective combination of local and global knowledge (Prahalad and Hart, 2002).

2.3.2.5 New business models and approaches for innovation

As we saw in the previous section, a redefined understanding of progress – as a combination of the economic and the societal – can trigger innovation opportunities. Another area where we see innovation taking a hold is public sector innovation. What distinguishes public sector innovation from "innovation" is that it is new ideas that create value for society (Bason, 2010 and Mulgan, 2007). Here much attention is given to building capacity for innovation and co-creation. Co-creation is a term first used by Prahalad and Ramaswamy (2004) to characterize a creational process where new solutions are designed with people and not for them. Co-creation is not just about finding solutions that deliver better services or generate indented outcomes. It is about enabling public organizations to innovate and generate new value for less (Bason, 2010).

However, where the bottom line in business is essentially profit, how can that be understood in public policy and when it comes to public sector innovation? Bason (2010) describes four public sector bottom lines: Productivity, service experience, results and democracy. Yunus (2007) states that if we describe our existing companies as profit-maximizing business, the new businesses might be called social businesses. Entrepreneurs will set up social business, not to achieve personal gain but to pursue specific social goals.

Drucker (1985) pointed out that there are many drivers for organizations to become more innovative. These include:

-   The bargain power of suppliers

53

- The bargain power of customers
- The threat of new entrants into the market
- Link to organizations values and strategy
- Competitive rivalry within the sector.

Changes in industry and market, as well as internal organizational changes, challenge the status quo and demand that firms change and innovate. But while this often leads to a drive towards integration and consolidation, there are other approaches as well. The open innovation paradigm, as suggested by Chesbrough (2006), can be understood as the antithesis of the vertical integration model. In the vertical integration model, internal R&D activities lead to internally developed products that are then distributed by the firm. Open innovation processes combine internal and external ideas into new types of architectures and systems.
While the contours of the new model of innovation remain obscure, it is clear that any adequate understanding will require a more externally focused perspective, involving the actions of multiple actors in a far more distributed innovation environment (ibid.).

A new approach to developing custom products is to see customers as innovators (Thomke and von Hippel, 2002). A lot of companies ask their customers what they want – and what they would like to see in new products and services – but they go about it the wrong way (Ulwick, 2002). Thomke and von Hippel (2002) suggest developing a user-friendly toolkit and essentially ask companies to be adaptable to what comes out of it. Developing a user-friendly toolkit and increasing the flexibility of the production process – as well as being careful in selecting the first users or customers, developing the toolkit continuously – and adapting the business practices accordingly may be a good prescription. Yet it does not tell you where the value will migrate or how to capture it (ibid.). That is of course crucial to the real value of the approach. Ulwick (2002), suggests an outcome-based methodology. Although his approach follows very clear steps, it seems to be more valuable when the objective of the input is very clear – for instance "decrease obesity" or something similar. Thomke and von Hippel (2002) are more open to the fact that there may be outcomes that we do not know we wanted – indeed that may be the whole purpose of allowing users into the development process.

Some managers acknowledge that parts of business are more art than science. However, they often see this as problem and not an opportunity. Austin and Devin (2004) point out four characteristics of artful work that can help managers of knowledge workers:

- Emergent yet reliable process
- Iterative, not sequential, process shape
- Openness to uncertainty
- Failure as a step to valuable innovation.

Hjort (2005) says that entrepreneurship cannot be instigated through the strategies described in best-selling management books on the bookshelves of airport lounges. In reality there is no prescription for how to create opportunities out of occasions and create actualities out of opportunities. But there are many good examples that can serve as inspiration.

2.3.2.6 Summary of section 2.3.2

The closing decades of the twentieth century have been characterized as a period of disruption and discontinuity in which the structure and meaning of economy, polity and society radically altered. Innovation can be seen as absolutely essential to business vitality, profitability and competitiveness. Given our understanding of business today, it seems virtually impossible not to think of innovation as a central and crucial part of it.

It is important not to underestimate the systemic changes that technological breakthroughs offer. Their speed, scale and scope is remarkable in terms of development and diffusion (just think of where companies like Google were 20 years ago, or Airbnb, Uber etc. were 5–10 years ago). The idea of returns to scale is both astonishing and challenging depending on one's perspective (Christensen, 1997 and Schwab, 2016), since digitalization means automation and thus much smaller (tending towards zero) marginal costs. This makes it quite possible that businesses in the future will require fewer workers. The question of whether such innovations will generate new type of jobs is still up in the air, and may require reconsidering the idea of work and so on.

Godin (2002, 2008) has shown that innovation became important to policy-makers as they started to view it as vital for economic growth and competitiveness. Innovation can be seen as a subset of change and as such there are certain insights from managing change that are transferable to leading innovation, although of course particular knowledge and expertise is needed. Changes can be a consequence of innovation – indeed it can be argued that without change there is no real innovation. Likewise changes in the market and within the organization can be drivers of innovation. But where success for an organization can sometimes be seen as a consuqeunce of sheer luck, over time that is hardly the case. It is the result of disciplined effort (Drucker, 1985) or, in the words of Jim Collins (2001), "Greatness is not a function of circumstance. Greatness, it turns out, is largely a matter of conscious choice, and discipline."

Having established the importance and necessity for an organization to be innovative within its sector comes the hard part – being innovative.

2.3.3 Creating innovative organizations

As we have seen, innovation is key to organizational survival, competitiveness and wealth creation. Following this, how to become innovative becomes a critical capability for the organization. Five strands are discussed below: Innovation management, innovation processes, creativity and ideation, organizational culture, and creating space for innovation.

2.3.3.1 Innovation management

According to Aasen and Johannessen (2009), recent literature on innovation management brings into focus three particular areas of management responsibility: *organization*, *competition* and *value realization*. Organization concerns the identification of organizational characteristics for promoting company innovativeness and innovation management. Competition concerns competitive conditions (see for instance Grant, 1991 and Teece, Pisano and Shuen, 1997) as a way to understand decisions that are seen as being of strategic importance, implying that managers can choose a strategic orientation towards innovation, depending on available resources and the competitive context. Value realization refers to factors that have an impact on the outcome of innovation processes.

Whereas this whole thesis can be said to address these areas, this section takes a closer look at how innovative organizations are created. Here a notion of innovation management is important. Innovation management can be seen as a difference in the form, quality or state over time of the management activities in an organization, where change represents a novel or unprecedented departure from the past (Van de Ven, 1986; Hargrave and Van de Ven 2006 and Van de Ven and Poole, 1995: 512). Birkinshaw et al. (2008) define management innovation as the invention and implementation of a management practice, process, structure or technique that is new to the state of the art and is intended to further an organization's goals. Hamel (2006) says that management innovation

changes how managers do what they do, and in a large organization the only way to change how managers work is to reinvent the processes that govern that work.

Aasen and Johannessen (2009) suggest that innovation management involves participative actions intended to influence emerging patterns of themes, in support of the collective movement towards a desirable future situation. The orientation defined by Birkenshaw et al. suggests the introduction of novelty in an established organization and subsequently a particular form of organizational change. The one by Aasen and Johannessen, although there are similarities, is different in nature. Here innovation is "communicative interaction", leading to the experience of evolving patterns of themes.
Van de Ven et al. (1999) argue that managers at different hierarchical levels are involved in the management of innovation and despite the general view that managers have a uniform, common viewpoint, managing innovation does involve diversity and conflict.

There is a challenge in finding common ground around what exactly is being (or is to be) innovated, but Birkinshaw et al. (2008) suggest two levels of analysis: The more abstract management of ideas (for instance scientific management, TQM and the learning organization) and the more operational level (management practices, management processes, management techniques and organizational structures). According to Aasen and Johannessen (2009) the obvious challenge is to create an environment of perpetual innovation, where everyone is committed to excellence, resulting in growth and sustained competitive advantage. Furthermore, the main challenge seems to be the simultaneous handling of demands on profitability, necessary for short survival, and innovation, essential for long-term viability (Tidd et al., 2005 and Aasen and Johannessen, 2009).

2.3.3.2 Innovation processes

Rothwell (1992) sees the innovation process as that by which innovation is commercialized. As such one could say that a model of innovation is a model of an innovation process, or processes. The different innovation models presented so far in this thesis have all been explanations, interpretations or idealized pictures of how innovation comes about. Kusiak (2007), however, presents a generic innovation process, applied by different types of capitalist (Nambisan and Sawhney, 2007). Even though the model (process) takes an offset in the process of innovation intermediates (invention-, innovation- and venture capitalists), it can be seen as a potential framework for how executives go about innovation within (or outside) their companies. Furthermore, it could be argued that Kusiak's generic innovation process (2007) is a way to present an innovation model across five basic activities, without paying much attention to the complexities involved.
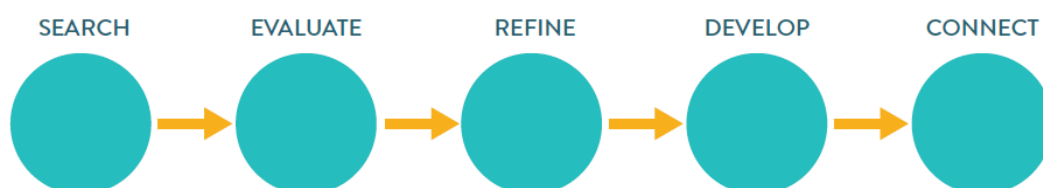
Figure 2.18 The Generic Innovation Process Model, freely after Kusiac (2007)

Essentially the process resembles the notion of Stage-Gate Models presented earlier and in its simplified presentation it seems very linear. However, since it is not descriptive it says very little about how each phase comes about. In the search phase, for example, ideas can appear through everything from brainstorming, customer feedback and so on. Ideas are then evaluated to decide upon fitness and if they are selected they will be refined and developed according to company strategy and other needs.

Often present is an underlying idea of controllability, of mangers able to control processes of innovation (Aasen and Johannessen, 2009), that is rooted in the notion that many companies actually do survive and renew over time (Tidd et al., 2005). However, innovation processes are essentially complex and uncertain (Tidd, 2001). Van de Ven et al. (2008), with a reference to Dooley and Van de Ven (1999), describe how divergence and convergence are core processes underlying most theories of organizational change and development. They echo what March (1991) described as exploration (of new opportunities) and exploitation (of old certainties). Austin and Darsøe's (2009) work around closure in the innovation process can be viewed as a deeper investigation of that point in which the cyclical behaviour shifts from one behaviour to another. Takeuchi and Nonaka (1986) point to three changes in the product development process: 1) a more adaptive management style due to lack of linearity in projects, 2) a new type of learning harnessing accumulated knowledge from all across the organization and its boundaries and 3) a new mission or a new view on the product development where it is not only a generator for future revenue but also a catalyst for organizational change. As Van de Ven et al. (2008: 66) state, "If an innovation is to have a chance to succeed, traditional notions of managerial control may need to be relaxed somewhat. It is not that such letting go will ensure success, merely that it may be a necessary condition."

There is no real formula for innovation (Darsø, 2003). However, a language is emerging that makes it easier to understand and describe early innovation processes in a way that can help to further them. Schön (1986) and Morgan (1997) both suggest that managers will benefit from using a greater diversity of models, by using them as metaphors or lenses by which to obtain new knowledge and identify new opportunities. One example of this is the suggestion to compare the innovation process with undertaking a journey (Van de Ven et al., 2008, Austin and Darsøe, 2009).[32] To some extent one can see the similarities and inspiration from religion, folklore and so on – just think of Odysseus or Buddha. This may also draw on the imaginary archetype of the "hero's" journey portrayed in movies (Campbell, 1993). Often such a journey begins with a call (the task, the longing, the need etc.). A group is summoned that brings together a diverse number of skills, expertise and experiences – often trust, respect and commitment amongst the team members needs to be created. The team encounters problems that need to overcome in order to reach its end. The process includes framing and a reframing of the problem, including challenging own knowledge and assumptions, learning along the way. Process as a journey of discovery and giving away the old for finding a home for new through transformational learning can also be seen in associated areas – for instance Otto Scharmer's Theory U (Scharmer, 2009).

2.3.3.3 Creativity and ideation

Innovate or fall behind: the comparative imperative for virtually all businesses today is that simple (Leonard and Strauss, 1997). But if the business climate is to innovate or die, why do so many companies seem to be choosing the latter option (Amabile, 1998)?

The Merriam-Webster online dictionary defines creativity as "the ability to make new things or think of new ideas".[33] Tamm (1987) says creativity means, "creative thinking",[34] meaning to bring something out of nothing.

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[32] Many innovation experts and consultants' companies have used the analogy of a journey; for instance John Kao (Jaming, Innovation Nation etc.), David Sibbet and the Grove Consultants, Kaospilot etc.

[33] http://www.merriam-webster.com/dictionary/creativity

[34] I have translated Maare Tamm's definition from Swedish, "skapande tänkande", published in *Psykologi* (1993), page 93.

Boden (1991) says that if we are to take the dictionary definition of creativity seriously (to bring something into being or form out of nothing) creativity seems to be not only unintelligible, but also impossible. She states that creativity is the ability to come up with ideas or artefacts that are new, surprising and valuable. Csíkszentmihályi (1997) sees creativity as a process by which a symbolic domain in the culture is changed. Griffin et al. (1993) define organizational creativity as the creation of a valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system.

Research on creativity has been carried out most frequently in the natural sciences, to a lesser extent in the arts and humanities, and to only a very slight extent in the professional domains like management (Simon, 1986). Theories of creativity have focused on a variety of aspects. The dominant factors are usually identified as "the four Ps" – process, product, person and place (Rhodes, 1961). Richard Ogle (2008) points to a series of important advances that have occurred over the last decades in the philosophy of the mind and the empirical brain/mind science that together open up a new way of understanding breakthrough creativity. These are: the recognition that the mind extends beyond the brain, a renewed interest in the mind's imaginative faculties and the analogical qualities that underlie them, and the emergence of a new science of networks. In a summary of scientific research into creativity, Michael Mumford suggested: "Over the course of the last decade, however, we seem to have reached a general agreement that creativity involves the production of novel, useful products" (2003: 110).

Although Simon (1986) does not understand the distinction others make between innovation and creativity, most scholars do not consider them as the same. Griffin et al. (1993) frame the definition of organizational creativity as a subset of the broader domain of innovation. Innovation is characterized as a subset of an even broader construct of organizational change. Although organizational change can include innovation, much organizational change is not innovation. Creativity without innovation is certainly plausible, whereas the other way around – innovation without creativity – seems more improbable. Edward De Bono sees creativity as essential to humanity and says we owe our success as a species to it (1971). Creativity is concerned with bringing about new ideas and updating old ones, but also escaping from old ones. Continuity is the reason for the survival of most ideas, not a repeated assessment of their value.

The simplest way to find a definition of creativity is to observe when people apply the term "creative" to some human act. Acts are considered to be creative when they produce something that is novel and that is thought to be interesting or to have social value (Simon, 1986).

Psychologists have long believed that creativity results from the formation of a large number of associations in the mind, followed by the selection of associations that may be particularly interesting and useful Amabile et al. (2002).

Tamm (1987) divides the creative process into four phases: 1) a phase of preparation when an idea is formed, 2) a second phase (incubation) when the idea matures, 3) a third phase when the creative problem finds its solution through a sudden insight (an "aha" moment) and 4) a fourth phase (verification) when the creative product is presented and "assessed" by the public. She states that the four-phase description must be considered a simplification of a much more complicated process.

Simon (1986) says that expertise is the prerequisite to creativity. "Accidental" discoveries are exceedingly common in the history of science (take for instance Becquerels's discovery of radioactivity or Fleming's of penicillin). While other scientists could have made such discoveries, they could not have been made by just anyone. As Tamm (1987) says: "Thousands of people have seen an apple fall from a tree, but it required a mighty thinker – Newton – to discover the principle (law) of gravity from such an occurrence". In reference to Sutton (2002), creativity isn't about wild talent as much as it is about productivity. Creativity draws crucially on our ordinary abilities. Noticing, remembering, seeing, hearing, understanding language and recognizing analogies: all these talents are important (Boden, 1991).

Human creativity is something of a mystery, not to say a paradox. One new idea may be creative, while another is merely new (Boden, 1991). If by creativity we mean an idea or action that is new and valuable, then we cannot simply accept a person's own account as the criterion for its existence. Therefore, creativity does not happen

inside people's heads, but in the interaction between a person's thoughts and a sociocultural context. It is a systemic rather than an individual phenomenon (Csíkszentmihályi, 1997). Griffin et al. (1993) state that individual creativity is a function of antecedent conditions, cognitive styles and abilities, personality, motivational factors, and knowledge. These individual factors are influenced by and influence social and contextual factors. But as Boden (1991) says, maybe there is more to creativity than expertise and commitment; inborn factors may also play a role.

In terms of understanding whether or not something is creative, March's (1976) notion of choice in organizations is helpful. He says that we find it natural to base an interpretation of human choice behaviour on a presumption of the pre-existence of a human purpose. This reflects a strong tendency to believe that a useful interpretation of human behaviour involves defining a set of objectives that 1) are prior attributes of the system, and 2) make the observed behaviour in some sense intelligent vis-à-vis those objectives.

According to Simon (1986) the creative processes are problem-solving processes. Schön (1986) says that problems are not given: human beings construct them in their attempts to make sense of complex and troubling situations.

Effective problem-solving rests on knowledge, including the kind of knowledge that permits the expert to grasp situations intuitively and rapidly (Simon, 1986). But intuition is no mysterious talent. It is the direct by-product of training and experience that has been stored as knowledge.

There is another unspoken truth about creativity: it isn't so much about original creation as it is about using old ideas in new ways, places and combinations (Sutton, 2002). Richard Ogle (2008) argues that creative breakthroughs come about when individuals and groups access new idea-spaces and exploit the principles that govern them. According to Johansson (2004), when placing oneself at the intersection of different areas, disciplines or cultures you can combine existing concepts into a large number of extraordinary ideas. This points back to a suggestion by Leonard and Strauss (1997) on how to avoid dying, because, rightly harnessed, the energy released by the intersection of different thought process will propel innovation.

According to Boden (1991), creativity can happen in three main ways. While the first involves making unfamiliar combinations of familiar ideas, the second involves exploring conceptual spaces and the third the transformation of conceptual spaces in people's minds. Conceptual spaces should be understood as structured styles of thought. They come normally from one's own culture but are sometimes borrowed from others. As such, they are already here and are not made by one individual mind.

> These spaces – manifested in in forms as various as myths, business models, scientific paradigms, social conventions, practices, institutions, and even computer chips – are rich with embedded intelligence that we have progressively offloaded into our physical, social and cultural environment for the sake of simplifying the burden on our own minds of rendering the world intelligible. *Sometimes the space of ideas thinks for us.* (Ogle, 2008: 2)

According to Amabile (1998) managerial practices affect creativity. They fall into six general categories: challenge, freedom, resources, work-group features, supervisory encouragement, and organizational support.

In terms of management of creativity, however, management is the discipline that depends most for its satisfactory achievement on influencing the accomplishments of others (Simon, 1986). As such, the peculiar characteristic of managerial creativity is that we must assess it not by the personal accomplishment of managers, but by the achievements of those organizations for which they are responsible (Simon, 1986). As Sutton (2002) points out, the only thing that is more important than optimism is the capacity to pull the plug on a bad idea. However, not everyone is equally smitten by the devotion to creativity. Ted Levitt (1963) takes aim at creativity being superior to conformity and argues that creativity as it is commonly defined – the ability to come with brilliant novel ideas – can actually be destructive to business. According to Levitt putting innovation in the hands of "creative types, is the worst thing a company can do. These people disdain much of what companies and

organizations are all about – mundane realities of organizational life – and designed to do – by their very nature promote order and routine. They are as such inhospitable environments for innovation."

Nonaka and Takeuchi (1995), who examined several successful Japanese companies, similarly saw creativity and knowledge creation as important to the success of organizations. Yet as stated earlier, creativity does not necessarily flourish in organizational settings. Amabile (1998) points out that creativity gets killed much more often that it gets supported. The problem is not that managers smother creativity intentionally – the business needs for coordination and control can inadvertently undermine employees' ability to put existing ideas together in new and useful ways.

Leonard and Strauss (1997) say that the manager who is successful at fostering innovation has figured out how to get different approaches to grate against one another in a productive process they call "creative abrasion". Managing differences effectively is imperative because today's complex products demand the integration of expertise of individuals who do not innately understand one another.

Amabile et al. (2002) says that time pressures have a hampering effect on creativity because we need get to immersed in the problem or challenge. Csíkszentmihályi named this mental state "flow". Flow, also known as "the zone", is the mental state of operation in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement and enjoyment in the process of the activity. The best way to avoid undue time pressure is to articulate goals at all levels of the organization that are realistic and carefully planned, avoiding the optimism bias that plagues a lot of corporate planning (Amabile et al., 2002).

Amabile (1998) points towards intrinsic motivation as the most potent lever a manager can use to boost creativity and their company's future success. Extrinsic motivation comes from outside the individual. It does not prevent people from being creative, but in many situations it doesn't boost their creativity either.

Levitt (1963) says ideation is relatively abundant; it is implementation that is scarcer. Ideas are useless unless used. The proof of their value is their implementation. Sutton (2002) says that in order to find a few ideas that work, you need to try a lot that don't, and if you want to fill your company with great ideas, fill it with great people.

Some innovations spring from a flash of genius, but most result from a conscious, purposeful search for opportunities (Drucker, 1998). This process requires diligence, persistence and commitment. According to Simon (1986) the traits in management and business that seem to characterize unusual creative companies are:

- Sensitivity to opportunity and the ability to marshal fluid resources to initiate new programs of activity
- Attention to strategic planning, to understanding relevant future trends and opportunities and developments, and to the setting of long-term goals
- A openness to adventure, even with risks of failure.

2.3.3.4 Organizational culture

Speaking about organizations and organizational conduct and performance tends to involve also the notion of culture. Sometimes this is encountered as "what separates one organization from another", sometimes more in terms of what makes something successful (i.e. it is thanks to the culture) or sometimes why something is not succeeding (i.e. the culture is broken or dysfunctional). Cummings and Worley (2005) state that the topic of organizational culture has become extremely important to American companies in the past 10 years. Interest in the subject has spawned a number of best-selling books such as *In Search of Excellence* by Peters and Waterman, 1982), *Built to Last* by Collins and Porras (1994) and *Good to Great* by Collins (2001), to mention a few. Nevertheless, Watkins (2013) says that "while there is universal agreement that (1) it exists, and (2) that it plays a crucial role in shaping behaviour in organizations, there is little consensus on what organizational culture actually is, never mind how it influences behaviour and whether it is something leaders can change".

In this part of the thesis culture will be examined in relation to innovation. "Culture as an enabler of innovation" and "culture as a hindrance to innovation" will be discussed.

According to the online business dictionary,[35] organizational culture is the "values and behaviours that contribute to the unique social and psychological environment of an organization".

Schein defines culture as:

> A pattern of shared basic assumptions learned by a given group as it solved its problems of external adaption and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (2010: 18)

Schein (2009, 2010) makes a distinction between espoused values and underlying beliefs. Underlying beliefs may or may not be conscious to the organization and may or may not be consistent with its espoused values. It is not uncommon that espoused values do not truthfully reflect the culture of an organization. For instance, an organization may embrace the idea of risk-taking, but mistakes are not celebrated, rewarded and perhaps even sanctioned against (i.e. by being given less trust, freedom and opportunity when a new idea or project arises). According to Schein it is often difficult to go beneath the artificial level of espoused values to uncover the beliefs and assumptions that lie below (and which are sometimes unconscious to the organization itself).
If these assumptions – that make up the culture – are essentially learnt responses of external adaption and internal integration, then it makes sense that certain cultural assumptions survive: it is basically because they have proven effective.

Culture, according to Schein (2010), can be said to start with an originating event – for instance an originator bringing a group of people together for some purpose. People's individual assumptions, values and behaviours eventually start to develop into a shared mission as they start to understand each other. Yukl (1994) points out that one of the most important elements of culture in new organizations is the set of beliefs about the distinctive competence of the organization that differentiate it from other organizations, that is why the products and services are superior or unique. Furthermore, the culture in a young, successful, organization is likely to be very strong because it is key to its success.

It is probably fair to say that the interest in organizational culture comes from its assumed link to organizational performance. Conceptually it is not difficult to identify the contribution innovation can make to competitiveness (Tidd, 2001). Cummings and Worley say that a "well-conceived and well-managed organizational culture, closely linked to an effective business strategy, can mean the difference between success and failure in today's demanding environments" (2005: 482). Furthermore, they state that evidence suggest that corporate culture can affect organizational performance. If culture is seen as key to performance it is not a far-fetched idea to consider culture to be of importance to innovation. According to Aasen and Johannessen (2009) the obvious challenge is to create an environment of perpetual innovation, where everyone is committed to excellence, resulting in growth and sustained competitive advantage. Yukl (1994) consider changing culture as one "indirect" effect of leaders' decisions and actions (e.g. by strengthening values such as concerns for quality and continuous improvement, concerns for teamwork and cooperation, and loyalty to the organization). The difficulty is that organizations are by their nature and often by design oriented towards stabilizing and routinizing work (Schein, 1988). Also, not everyone considers culture as "something that you fix". Rather, cultural change is what you get when you put new processes or structures in place to tackle business challenges (Lorsch and McTague, 2016). One challenge in researching the relationship between innovation and culture is the multitude of cultural variables under investigation. This has led to a fragmented concept of culture for innovation, and its inclusion into management theory has still not happened (Büschgens, Bausch and Balkin, 2013).

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[35] http://www.businessdictionary.com/definition/organizational-culture.html. Accessed 02.06.2016.

Many of the findings by Collins and Porras (1994) from 18 companies point towards cultural traits and behaviours as among the distinguishing factors for their continuing success. In particular, the installation of a core ideology (values and purpose as principles for guiding decisions and inspiring people) stands out in terms of culture. A similar orientation is suggested by Hock (1999), and Laloux (2014: 33) states that "company culture is king". In certain (very successful) companies, culture comes before strategy and end execution. In this type of company CEOs view promoting culture and shared values as their primary task.

Collins continued this research in *Good to Great* (2001), and focused on how to turn companies from being "good" to "great". Again, culture comes out as a main difference between those that make it and those that don't. Here the focus on discipline – a disciplined culture – is key.
Collins put a great deal of responsibility for success on a particular form of leadership, which he calls level 5 leadership. This leadership has certain characteristics – such as a focus on whom before what, an ability to confront brutal facts about the organization, and building a hedgehog concept (the intersection of what we dream about, what we are best at and our financial engine, establishing a culture of discipline and technological acceleration).
Bennis and Nanus (1985) performed a five-year study of dynamic, innovative leaders, including 60 top leaders from the corporate sector and 30 from the public sector.[36] Even though there was a great diversity among the leaders, the interview protocols revealed insights about the nature of effective transformational leadership:

- Developing a vision
- Developing commitment and trust
- Facilitating organizational learning.

Schein also puts a lot of emphasis on leadership. He argues that:

> 1) leaders as entrepreneurs are the main architects of culture, 2) after culture is formed it influences what kind of leadership is possible, and 3) if elements of the culture become dysfunctional, leadership can and must do something to speed up culture change.
> (Schein, 2010: xi)

From a leadership perspective it is relevant to examine what facilitates and limits innovations, or how organizations best organize to bring about innovation (Van De Ven, 1986). Given the above arguments, culture could be considered an enabler of or a hindrance to innovation. According to Yukl (1994) with reference to Schein a major function of culture is helping us understand the environment and determining how to respond to it. To some extent it can be said that culture shapes how the organization actually "sees" and "interprets" its situation. Managers of innovative organizations are most likely to implement a developmental culture that emphasizes an external and a flexibility orientation (Büschgens, Bausch and Balkin, 2013). In short: culture affects the effectiveness of the innovation tools used (Davila, Epstein and Shelton, 2006).

Schein (1988) hypothesizes that in order to be innovative an organizational culture must assume:

- That the world is changeable and can be managed
- That humans are by nature proactive problem solvers,
- That truth is pragmatically arrived at
- That the appropriate time horizon is the near future
- That time units should be geared to the kind of innovation being considered
- That human nature is neutral or good and is, in any case, perfectible
- That human relationships are based on individualism and the valuing of diversity

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[36] Also referred to in Yukl (1994).

- That decision making is collegial/participative
- That diverse sub-cultures are an asset to be encouraged, but that sub-cultures have to be connected to the parent culture.

Cameron and Quinn (2006) argues that innovation happens in dynamic, entrepreneurial and creative places. People stick their necks out and take risks. The leaders are considered to be innovators and risk takers. The glue that holds the organization together is commitment to experimentation and innovation. According to Davila, Epstein and Shelton (2006) it must embrace balance and disequilibria. A balanced culture permits the peace that creativity and value creation need. At the same time, only challenges and surprises move the company forward. This suggests the presence of paradoxes such as risk-taking and conservatism at the same time, as well as discipline and surprise, and so on.

Moving one step away from culture to take a closer look at the individual, Amabile (1998) states that a high degree of inner motivation brings forth far more creative solutions and as such it must be assumed that higher levels of autonomy stimulate inner motivation and lead to higher degrees of innovative behaviour. Kanter (1998) concurs, saying that flexibility and autonomy are important for members of the organization to engage in creative problem solving.

A different approach to innovation and culture is offered by Fonseca (2002). Here the classical orientation on innovation (Schein, 1988, 2009 and 2010 and Peters and Waterman, 1982) as a somewhat planned process, and culture as something that leadership had to identify and manage in order to secure a desired organizational behaviour, is rejected. Likewise, the orientation of Kanter (1998) and Van de Ven (1998), in which innovation is a political and uncertain process yet nevertheless subject to contextual conditions that can be managed, is rejected. Instead, innovation is considered to be a new patterning of our experiences of being together, as new meaning emerges from ordinary, everyday work conversations. It uses the idea of complex responsive process as proposed by Stacey and others.[37]

2.3.3.5 Creating space for innovation

Aasen and Johannessen (2009) state that industrial leaders encourage innovation based on expectations of improved business performance. Nevertheless, they say, such processes are more often than not met with opposition, possibly because the development and adoption of novelty also involves risk. Thompson and Purdy (2009[38]) point out that to fully understand curricular innovation, one must consider the context into which an innovation is introduced, the tactics actors use to support or resist the innovation, and how these actors interact over time. In short: a good idea is not enough (Van de Ven, 1986 and Thompson and Purdy, 2009).

While one can argue that creating space for innovation falls under the work of innovation management, one also has to recognize that (organizational) culture and individual inclination will highly influence the space that is possible to manage. What can be seen is that creating space is not only something that happens within organizations; it also increasingly happens between organizations (Powell and Grodal, 2006).

Pfeffer (1992) states that organizations (particularly large ones) are like governments in that they are fundamentally political entities. He refers to the political scientist Norton Long, who wrote: "People will readily admit that governments are organizations. The converse – that organizations are governments – is equally true but rarely considered" (Long, 1962: 110). Mintzberg (1985) considers politics in organizations to constitute one among a number of systems of influence. Others are the systems of authority, ideology and expertise – all of which are considered to be legitimate in some sense. He sees behaviour termed political as neither formally authorized, widely accepted, nor officially certified. As a result, political behaviour is typically diverse and

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[37] See further ahead in the thesis where complex responsive processes are dealt with in more detail.
[38] Although their work concerns education, it is not too far fetched to utilize the same findings in this thesis.

conflictive, often pitting individuals or groups against formal authority, accepted ideology and/or certified expertise, or else against each other. What views that come to dominate and set the course could be described and attributed to the notion of power.

Power is the secret of success (Salanick and Pfeffer, 1977). It may difficult to fully define it, but it is easy recognizable – the ability of those who possess it to bring about the outcome they want. However, there is a challenging aspect to power concerning organizational performance. According Salanick and Pfeffer (1977) this is that the way power is used and develops always results in sub-optimization. Increasing one's own power, decreasing the power of others or merely maintaining one's position are all different positions. Aasen and Johannessen (2009) argue that communicative interaction can be seen as joint patterning processes of power and identity, influenced by everybody involved, although certain individuals always have a larger say.

Another way to create space for innovation is to stretch the space outside the boundaries of the classical notion of the organization. As we saw in the outline of the different innovation models an orientation towards networks has grown in importance. According to Powell and Grodal (2006) this contributes significantly to the innovative capabilities of firms by exposing them to novel sources of ideas, enabling fast access to resources and enhancing the transfer of knowledge. Furthermore, formal collaborations may allow for the division of innovative labour to accomplish goals that are not possible otherwise, such as mutual learning and increased patenting. Dhanaraj and Parkhe (2006) state that innovation networks can often be viewed as loosely coupled systems between autonomous firms. Orchestration comprises knowledge mobility, innovation appropriability and network stability. Cooke et al. (1997) advocate for a strengthening of regional level capacities for promoting both systemic learning and interactive innovation.

Political aspects are not only an internal affair for organizations. Hislop et al. (2000) examine the highly political nature of innovation appropriation processes and conclude that knowledge and networks have a dual character. On the one hand, they could provide access to relevant knowledge and artefacts. One the other they could also be used as political tools in support of particular interests.

Borum and Christiansen (1993) move away from the political perspective and see higher value in the network perspective where the pre-existing end emerging relations between individuals govern processes. If problems arise they attribute this to the absence of motivated, resource- and information-controlling actors or insufficient strength of relations between actors.

Mintzberg (1985) points out that where the dysfunctions of politics are fairly recognized in terms of divisiveness and costs, the functional role is less often considered. It can correct deficiencies and dysfunctions in systems of influence, providing certain forms of flexibility – as well as ease the path for the execution of decisions, promote necessary organizational changes, allow all sides of an issue to be fully debated and act as way to promote the strongest individuals to power. Hislop et al. (2000) suggests that when examining the decision-making processes at early stages, where the character of change is still open to negotiation, reveals the political nature of networking and knowledge utilization practices undertaken by the various interest groups. This reveals how power and politics shape a wide range of issues such as the framework within the scope of change discussed, general issues of agenda formation, the type of people involved in (and excluded from) decision-making processes, the value attached to particular bodies of knowledge, and the way meaning is managed to justify the decisions made. When making decisions Pfeffer (1992) points out that the decision-making process in itself changes nothing. We need to know something about implementation science. Second, when the decision is made we cannot know if it is good or bad. It is through results that we can view and assess its quality. And thirdly we almost always spend more time living with the consequences of decisions made than we do in making them.

In terms of decision-making, March and Olesen (1976a) pointed out as early as 1976 that even if organizational participants are problem-solvers and decision-makers, they find themselves in a more complex, less stable and less understood world than in the past – they are placed in a world over which they have only modest control. Organizational choice often involves a curious paradox. The process is both surprising and not surprising. Beliefs and preferences appear to be the results of behaviour as much as they are the determinants of it.

According to Borum and Christiansen (1993) three perspectives on implementation can be derived from the literature: administrative, political and network perspectives. These reflect different assumptions about the nature and control of implementation processes. Where the imposed formal structure did not govern the process, nor the political configuration in any real sense, the network analysis went beyond the structural language of the interpretations offered by the other two, to placed in focus actors and their construction of the organization.

Organizational intelligence, like individual intelligence, is built upon two fundamental processes (March and Olesen, 1976b). The first of these is rational calculation, by which expectations about future consequences are used to choose among existing alternatives. The second is learning from experience. Through learning, feedback from previous experiences is used to choose among present alternatives.
Learning represents a strategic element in any innovative process (Dhanaraj and Parkhe, 2006; Senge, 1990 and many others). But, learning to improve under ambiguity is not so easy because there are not necessarily shared views of what events that happened, why they happened and whether they are good or bad (March and Olesen, 1976b).

Where innovation may be seen as a continuous process within the organization, it is still often organized in projects (Darsø 2003, Austin and Darsø, 2009, Van de Ven, 2008 and many others). As such the people involved are by definition part of temporary groups. Meyerson et al. (1996) investigate swift trust and temporary groups. Temporary groups turn traditional notions of organizations upside down. They often work on tasks with a high degree of complexity, yet they lack the formal structures that facilitate the work. They know little about other people's skills, expertise and so on. In short trust is less about relating than doing. Both Meyerson et al. (1996) as well as Mønsted[39] (2006) comes to similar conclusion where trust is a necessity as well as practical approach (strategy) for handling uncertainties generated by a complex system invented to perform a complex interdependent task using the specialized skills of relative strangers. Given those complexities, unless one trusts quickly, one may never trust at all.

2.3.3.6 Summary of section 2.3.3

As seen in previous sections, the interest in innovation is massive. Austin and Darsøe (2009) see the legacy of the industrial revolution – efficiency – now being shifted to innovation for value creation. Here, one can sometime come get the impression that is it the answer to everything; a panacea as Godin (2010a) put it.
Creating innovative organizations are not a straight line. Managing innovation has a number of challenges associated to it, but balancing the act of profitability and the need for renewal seems to be the hardest part. Even if there is no formula for innovation that fit everyone, new ideas often emerge when we cannot make things fit into existing systems or into the categories we have available to us (Darsø, 2003). Achieving innovation is difficult, because it takes place when different ideas, perceptions, and ways of processing and judging information collide (Leonard and Strauss, 1997). That means the collaboration between actors who sees the world in very different ways is necessary. However, the disagreement and argument that inevitably arises often ends up in conflicts rather than creative tensions.
Knowledge, conceptualized in terms of tacitness and explicitness, is an important factor in determining whether member so networks can effectively share information and skills (Powell and Grodal, 2006). Another challenge is the development of capacity to increase the flow of information between participants and be open to new entrants.
Leonard and Strauss (1997) says that companies with strong cultures can indeed be very creative, but within predictable boundaries (for instance say, clever marketing or imaginative engineering). Strong cultures can be very homogeny, which makes for efficient functioning and limited approaches to problems or opportunities.

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[39] That is more focused on the borders of the formal organization, than inter-organizational collaborations.

So even if space can be created for innovation both within the organization, as well as outside the domain of organization, networks as well as knowledge cannot be separated from issues of power and politics.

Creativity is the complex product of a person's behaviour in a given situation Griffin et al. (1993). The situation is characterized in terms of the contextual and social influences that either facilitate or inhibit creative accomplishment. The person is influenced by various antecedent conditions, and he or she brings to bear both cognitive abilities and non-cognitive traits or predispositions.
The complex mosaic of individual, group and organizational characteristics creates the context – the creative situation – within which individual and group behaviours are played out.
As such, it is a need for our ability to re-describe our existing procedural skills on successive representational levels, so that we can transform them in different ways (Boden 1991). According to Schön (1986), problem setting matters when trying to understand what is supposed to be solved (or innovated if one prefers).
Conflicting frames are not problems. Each story constructs its view of reality through a complementary process of naming and framing.
March (1976) points out that there are dangers in imitation, coercion, and rationalization. Values develop through experience. The evaluation of social experiments needs not to be in terms of the degree to which they have fulfilled our *a priori* expectations. Rather, we can examine what they did in terms of what we now believe to be important.
Furthermore, it is our presumptions that inhibit the serendipitous discovery of new criteria.

A newly introduced product or service is labelled a "successful innovation" only after it has been proven in market. Certainly, market failures of products/services or their improvements are much more common than commercial successes, which is a significant drawback (Kusiak 2007).
As Simon (1986) says: "Chance, in the words of Pasteur, favours the prepared mind". It seems expertise and commitment are the major characteristics to look for when preparing the way for innovation. Amateurs are not a major source of the world's most important innovations. Leonard and Strauss (1997) state that if you want an innovative organization, you need to hire, work with and promote people who make you feel uncomfortable. You need to understand your own preferences so that you can complement your weaknesses and exploit your strengths. Rightly harnessed, the energy released by the intersection of different thought processes will propel innovation.

2.3.4   Emerging questions following section 2.3

After reading a substantial number of articles and books on the topic of innovation, one is struck by a number of things:

- Mass
  Books, articles (academic and non-academic), blog posts, videos, lectures, courses and programmes. It seems to be no end to it. The question is, of course: How come? Why is there a seemingly unlimited appetite for new publications? The answer may be obvious – that we lack answers and we desire answers – but still; why is it then so seemingly hard to find answers? Maybe the challenge is really that since every situation is unique, there is in reality little transferable value in findings. Or, is the actual industry around research and publication, together with the political idea around growth and progress, in play as well?

- Pluralism
  It is surprising that that there is not a fully agreed upon definition of what innovation is. Although the disagreement has been pointed out by many authors, few have pointed to the equally valid point that there is also a fair amount of agreement. Looking at the definitions most in use today there is a general agreement that creativity and innovation are not the same, that innovation refers to both a process and

an outcome, and that innovation is perceived as more valuable than the existing options. Questions that arise are: How wide can we stretch the scope and range of innovation before it loses its value? What are the benefits of keeping it so open and interpretable as opposed to keep it limited and defined?

- Excellence
  Today, really no one disputes innovation as a way to stay competitive and bring life into organizations. To a large extent this may answer the first emerging question above, but it also suggests that up until now it has not been possible to make a general formula for innovation. There seems to be simply no guarantee. At the same time there seem to be a number of indications (like culture, systems, etc.). Yet although we have all of this research, data and knowledge – indeed, indicators – why is it so hard to assemble these findings into a coherent whole that delivers the results we desire?

Here, then, we look into complex systems to better understand the context for innovations, so as not only to gain a deeper understanding of why it is hard finding a "formula" and fully "get it", but also to find new perspectives on how to explain it.

2.4   Complex systems

> …the point about complexity is that it is useful – it helps us to understand the things we are trying to understand. (Byrne, 1998)

In the last section, we explored the idea and utilization of innovation, as well as related subjects, through the existing literature. This thesis concerns innovation in complex systems, and as such it is important to discuss what complex systems are. Theories concerning complex systems and innovation are researched through the literature in order to provide a deepened theoretical framework for the study.

The field of complex systems is today applied in all classical disciplines of science, including engineering and management (Bar-Yam, 2002). Complexity can be viewed as a tool, a lens, for understanding. It is in some ways a new science that echoes a new sensibility about the world around us. The roots of complexity as a science can be found in the studies of chaos.
Complex systems, as a field of science, can be viewed as a discipline that is occupied with how parts of a system interrelate and form relationships, resulting in (joint) behaviours of the system and how it interacts with its surroundings (Bar-Yam, 2002).

With the birth of the scientific revolution (Bernard, 1976) at the end of the Renaissance period our notion of society and nature started to be transformed.The mechanical ideas and principles that were discovered came to direct not only the views of science, but also our understandings of virtually all facets of life in the west. This view of reality assumes a clear link between cause and effect, that the universe is orderly and follows laws (that it is essentially a big, complicated machine), as well as that it is possible to understand things by taking them apart and studying their constituent parts (reductionism). With new discoveries we designed machines that seemed to reinforce the idea of the universe as a machine, a clock, and with that same predictability and determinism. This understanding started to define work and knowledge in order to suit this world-view (Wheatley, 1992).

New discoveries in physics at the start of the twentieth century contested and contradicted classical physics. Newtonian mechanics were overtaken by quantum mechanics (Bohr, Einstein, Heisenberg, Schrödinger etc.) and by Einstein's theory of relativity. A new world was in the making.
The rise of computing power, an increasing interest in irregular phenomena (such as the spread of epidemics, random changes in weather, the metabolism of cells, changing populations of insects and birds, etc.) and the

emergence of a new style of geometrical mathematics (non-Euclidean structures of fractal geometry) – paved the way for chaos and chaos theory to became everyday words (Sardar and Abrams, 2004).

2.4.1 Chaos theory

In ancient Greek culture, where the first explanations of the universe emerged, the hymns of Orpheus were significant for introducing the term "Chaos".[40] Later Greek philosophers reinforced the view that chaos portrays the shapeless and endless emptiness from which the Universe is created (Theodossiou et al., 2012). The Merriam-Webster dictionary defines chaos as "complete confusion and disorder: a state in which behaviour and events are not controlled by anything" and "the state of the universe before there was any order and before stars and planets were formed".

Chaos theory is an area of study in mathematics, with applications and representations into a number of other disciplines such as sociology and physics. It has its roots in the work of the French mathematician (amongst other things) Henri Poincaré and his discoveries in the 1880s around the three-body problem,[41] where he found that there can be orbits which are not periodic (non-periodic), without either incessantly increasing or approaching a fixed point (Diacu and Holmes, 1996).

Chaos theory started to be recognized as such after the 1950s when scientists realized and accepted that the existing theoretical system (linear theory) could not explain what was being observed in certain experiments. What really fuelled this development was the computer. Now the time-consuming repetition of calculations could be done far more efficiently. Edward Lorenz, who worked on weather predictions, virtually stumbled upon one major insight: that tiny changes in initial conditions can have large effects on the outcome over time. In effect that means, as a general rule, that even thorough atmospheric modelling cannot produce precise long-term weather forecasts (Lorenz, 1963).
Normally when trying to predict how phenomena will develop in nature depends upon what is called negative feedback. An example could be the thermostat that reacts when the temperature has become too low and then turns itself off again when the temperature is once more above the indicated level. Using positive feedback to describe the world, mechanisms that amplify a tendency rather than prevent it, became possible with increasing computer power. Biologist Robert May was one of the first to develop such a model as a consequence after experimenting on his model for the development of fish populations (May, and Oster, 1973).
In 1967 Benoît Mandelbrot published an article called "How Long is the Coast of Britain? Statistical and Self-Similarity and Fractional Dimension" (Mandelbrot, 1967 and Gleick, 1987) in which he proved that the length of coastline alters with the scale of the measuring instrument. Furthermore, on all scales it resembles itself and is infinite in length for an infinitesimally small measuring device.

The Belgian chemist Ilya Prigogine was the first to introduce the idea of dissipative systems and self-organization and to demonstrate that conditions that give birth to structures are "far from equilibrium". Irreversible processes are in fact the source of order (Prigogine, 1984).
In 1975 the mathematicians Tien Yien Li and James York proved in their article "Period Three Implies Chaos" that it was not possible to set up a system that would repeat itself in a period three oscillation without generating chaos. Li and York are credited with coining the term "chaos" (Sardar and Abrams, 2004). In 1987 James Gleick with his book *Chaos: Making a New Science* (Gleick, 1987) introduced chaos theory to the public.

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[40] Note. A full presentation and explanation of all related concepts of Chaos theory is not possible in this thesis. A few strands and concepts are presented, as they are important for the research as such.
[41] The problem of finding the general solution to the motion of more than two orbiting bodies in the solar system (Ref. Wikipedia).

The theory of chaos was summarized by Edward Lorenz as follows: "Chaos: When the present determines the future, but the approximate present does not approximately determine the future" (quoted in Danforth, 2013). In short, one can say that chaos theory studies the behaviour of dynamical systems that are highly sensitive to initial conditions.

2.4.2 Systems

According to the Merriam-Webster dictionary a system is a whole: a set of interacting or interdependent components forming an integrated whole.[42] Any entity that changes with time is called a system (Sardar and Abrams, 2004). Examples of systems are for instance the human body, a flu moving through the country, a school, and the population of penguins in the Antarctic and so on. A deterministic system is one that can be predictable, is stable and completely knowable (for instance a grandfather clock). The difference between linear and nonlinear systems is that in the first one the variables are simple and directly correlated. In the latter one, the relationships include more powers than one, which means that the output of a nonlinear system does not correspond directly in a proportional way to the input.

In a periodic system, a variable repeats exactly its past behaviour after a fixed interval of time. Aperiodic behaviour happens when no variable affecting the state of the system undergoes a completely regular repetition of values – visualize the flow of water as it goes down a sink. Chaos can be said to be the occurrence of aperiodic, apparently random events in a deterministic system (Sardar and Abrams, 2004). This can be contrasted with Kellert's characterization of chaos theory as "the qualitative study of unstable aperiodic behaviour in deterministic nonlinear systems" (Kellert, 1993: 2).

A system can be closed or open – delineated by temporal and spatial boundaries – and subsequently more or less influenced by its surroundings. As such a system can be defined with respect to how it functions, its structure, its purpose and how it changes over time.

In terms of systems, system theory and systems thinking are important developments. Systems theory is the science that has the comparative study of systems as its object (Stichweh, 2011). That means that it is an interdisciplinary study, which seeks to expose general principles that can be applied widely, regardless of the type of system. According to Capra (1996) it was Bertalanffy's concepts of an open system and the General Systems Theory that established systems thinking as a major scientific movement. Likewise, the concept of Bertalanffy was used by Luhman in social systems theory (Luhmann, 1996). Understanding how things that are considered systems affect and influence each other as part of a whole, is a process called "systems thinking" (Capra, 1996). In contrast with the scientific reductionism of Descartes, it suggests viewing systems holistically. Senge (1990) describes systems thinking as a discipline that integrates four other disciplines (personal mastery, mental models, building shared vision and team learning) in what he refers to as the "learning organization". Systems thinking can be viewed as a way to solve problems, by looking at them as part of a larger system, instead of concentrating and acting upon a specific phenomenon.

2.4.3 Complexity theory

After the 1970s, scientists took the exploration of chaos deeper into everyday situations. In several disciplines, the concept "the edge of chaos" started to draw more notice. The outlines of a new science – complexity – was emerging (Sardar and Abrams, 2004). This was also reflected in book publications, for instance Roger Lewin's Complexity, Life at the Edge of Chaos (1992) and M. Mitchell Waldrop's Complexity: The Emerging Science at the Edge of Order and Chaos (1993).

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[42] http://www.merriam-webster.com/dictionary/system

Complexity can be viewed as a combination of order and disorder (i.e. the edge of chaos and order).
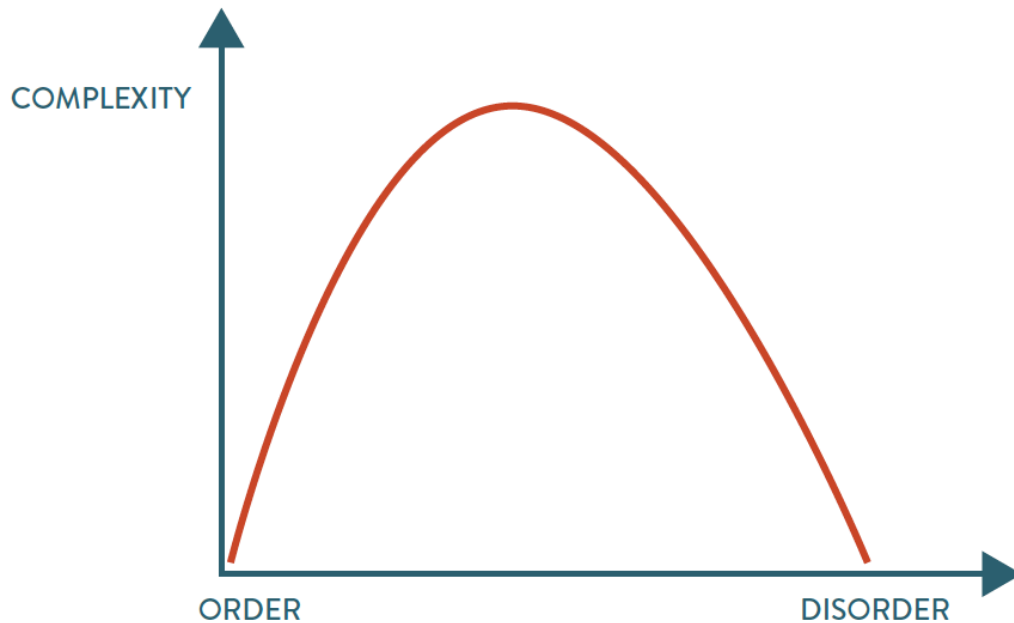
Figure 2.19 Complexity as a mixture of order and disorder, after Huberman and Hogg (1986)

Defining complexity is not a small task. Even amongst scientists there is not agreement about its definition (Johnson, 2009). According to Johnson it can be viewed as "the study of the phenomena which emerge from a collection of interacting objects" (Johnson, 2009: 3). A similar approach can be found in Arthur, who says that what is common to every study on the topic of complexity are systems; systems with numerous parts reacting or adapting to patterns these parts generate (Arthur, 1999). Simon (1981) proposed defining complex systems as those that are "made up of a large number of parts that have many interactions". Others, however, doubt that there even can be a unified theory of complex systems (Horgan, 1995). Mikulecky (2003[43]) claims that complexity is the consequence of the Newtonian Paradigm to be generic and credits Robert Rosen, a Canadian biologist, with the following definition:

> Complexity is the property of a real world system that is manifest in the inability of any one formalism being adequate to capture all its properties. It requires that we find distinctly different ways of interacting with systems. Distinctly different in the sense that when we make successful models, the formal systems needed to describe each distinct aspect are NOT derivable from each other. (Mikulecky, 2003)

The matter of understanding complexity, studying complexity or using complexity challenges the extent to which understanding in one domain can be transferred to another. For instance: can complexity in innovation be regarded as the same as complexity in complexity theory? Bar-Yam (1997) states that:

- Complex = consisting of interconnected or interwoven parts/not easy to understand or analyse, and

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[43] It is difficult to find a credible source when the writing was published, but 2003 seems to be credited mostly in other sources.

- Complexity = the amount of information needed to describe it.

The beauty of these definitions is that they are transferable amongst different domains. On the other hand, they may offer practical challenges of "measurement", "quantification" and "predictability" when they are applied to social systems. What information would be needed to portray the relationship between a leader and her peers? The challenge is that in order to fathom the performance of a complex system, it is not enough to understand the performance of the parts but rather how they jointly act to make up the performance of the whole. Yet the whole cannot be described without describing the different parts and each part must be described in relation to other parts – that's why complex systems are hard to grasp (Bar-Yam, 1997).

According to Chu (2011) the notion of systems is commonly used in the sciences and usually refers to a distinct part of the world, to some extent separated from the rest. As the concept of complexity is often linked to the concept of system, complex systems are thus just the same except that they are complex rather than "not complex" (Chu, 2011).

2.4.4   Complex systems

According to the *Business Dictionary*[44] a complex system is one:

> Consisting of many diverse and autonomous but interrelated and interdependent components or parts linked through many (dense) interconnections. Complex systems cannot be described by a single rule and their characteristics are not reducible to one level of description. They exhibit properties that emerge from the interaction of their parts and which cannot be predicted from the properties of the parts.

One can see that our understanding or definition of complexity depends upon our understanding of systems, or even the system in question. The relationships between parts result in the collective behaviour(s) of a system, which interact and create relationships with their environment (Bar-Yam, 2002). The number of relationships and the nature of these relationships will be different compared to those outside the system. This also naturally positions views of complexity and simplicity as being relative and changeable over time. Ladyman, Lambert and Wiesner (2012:27) suggest that "A complex system is an ensemble of many elements which are interacting in a disordered way, resulting in robust organisation and memory".[45] Simon writes (1962: 467–468):

> Roughly, by a complex system I mean one made up of a large number of parts that interact in a nonsimple way. In such systems, the whole is more than the sum of the parts, not in an ultimate, metaphysical sense, but in the important pragmatic sense that, given the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the properties of the whole.

Warren (1948) suggests two positions: disorganized complexity and organized complexity. While the first is a consequence of a given system having a massive number of parts (like a gas container with millions of gas molecules) that can be seem to behave randomly, the properties of the whole system can be understood (for instance by using statistical models). In the second, the correlation between the parts establishes properties not carried by individual parts and as such properties of the system may be viewed as emergent. An example of the latter may be a city, which Jacobs (1961) described as "organized complexity", – the dynamic inter-relationships of systems, of processes, of self-organization.

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[44] http://www.businessdictionary.com/definition/complex-system.html
[45] http://philsci-archive.pitt.edu/9044/4/LLWultimate.pdf

Chaotic systems are not the same as complex systems. Chaos does not need to be seen as the non-appearance of order (disorder) as such, but rather as exceptionally complicated information (Hayles, 1991). The long-term behaviour of chaotic systems can be hard to foresee even though they are deterministic. Complex (systems) are non-deterministic and can't be predicted (Prigogine, 1997). While complex behaviour concerns how a huge number of very complicated and dynamic sets of relationships can create simple behavioural patterns, chaotic behaviour is the consequence of a relatively tiny number of non-linear interactions (Cilliers, 1998). Both chaotic and complex systems are sensitive to initial conditions but while chaotic systems do not rely upon their history for their present behaviour, complex systems do. They have a history. This means that time cannot be ignored when analysing a complex system (Cilliers, 1998).

Another necessary distinction is that between complex systems and complicated systems (Cilliers, 1998 and Snowden, 2007). If a system contains a very large number of parts but can (although it may be difficult) be fully described in terms of the individual parts – and as such the system as a whole – then it can be said to be complicated. An example might be a computer. In a system that is complex, the whole can't be fully understood by examining its parts. The interactions between the constituents in the system and the system and its environment do not provide a full understanding.

Ladyman, Lambert and Wiesner (2012) state that there is no concise definition of a complex system. They offer the following quotations (except number 9) from a special issue of *Science* on "Complex Systems", featuring many key figures in the field (April 2nd, 1999).

1. "To us, complexity means that we have structure with variations." (p. 87)
2. "In one characterization, a complex system is one whose evolution is very sensitive to initial conditions or to small perturbations, one in which the number of independent interacting components is large, or one in which there are multiple pathways by which the system can evolve. Analytical descriptions of such systems typically require nonlinear differential equations. A second characterization is more informal; that is, the system is 'complicated' by some subjective judgment and is not amenable to exact description, analytical or otherwise." (p. 89)
3. "In a general sense, the adjective 'complex' describes a system or component that by design or function or both is difficult to understand and verify. ... complexity is determined by such factors as the number of components and the intricacy of the interfaces between them, the number and intricacy of conditional branches, the degree of nesting, and the types of data structures." (p. 92)
4. "Complexity theory indicates that large populations of units can self-organize into aggregations that generate pattern, store information, and engage in collective decision-making." (p. 99)
5. "Complexity in natural landform patterns is a manifestation of two key characteristics. Natural patterns form from processes that are nonlinear, those that modify the properties of the environment in which they operate or that are strongly coupled; and natural patterns form in systems that are open, driven from equilibrium by the exchange of energy, momentum, material, or information across their boundaries." (p. 102)
6. "A complex system is literally one in which there are multiple interactions between many different components." (p. 105)
7. "Common to all studies on complexity are systems with multiple elements adapting or reacting to the pattern these elements create." (p. 107)
8. "In recent years the scientific community has coined the rubric 'complex system' to describe phenomena, structure, aggregates, organisms, or problems that share some common theme: (i) They are inherently complicated or intricate ...; (ii) they are rarely completely deterministic; (iii) mathematical models of the system are usually complex and involve non-linear, ill-posed, or chaotic behaviour; (iv) the systems are predisposed to unexpected outcomes (so-called emergent behaviour)." (p. 410)
9. "Complexity starts when causality breaks down" (p. 12)

Cilliers (1998) suggests a description of the characteristics of complex systems, which can be used to explain a given phenomenon.

1. Complex systems consist of a large number of elements.
2. In complex systems, its constituting elements interact dynamically.
3. The behaviour of the system is not determined by the exact amount of interactions associated with specific elements.
4. The interactions are non-linear.
5. The interactions usually have a fairly short range, that is information is received primarily from immediate neighbours.
6. There are loops in the interactions. The effect of any activity can feed back – positively or negatively (the technical term is recurrency).
7. Complex systems are usually open systems, that is they interact with their environment.
8. Complex systems operate under conditions far from equilibrium. There needs to be a constant flow of energy to maintain the organization of the system. Equilibrium is another word for death.
9. Complex systems have a history. Not only do they evolve through time, their past is co-responsible for their present behaviour.
10. Each element in the system is ignorant of the behaviour of the system as a whole; it responds only to information that is available to it locally.

Expanding on two of the points mentioned by Cilliers above:

No. 5: It is not so that long-range interaction is impossible, but practical limitations normally stand in the way. This does not, however, prevent wide-ranging influence – it is just covered in a few steps. A consequence of this is that the influence gets modified. It can be improved, repressed or changed in many ways.

No. 7: It may be difficult to describe the border of a complex system. The implication is that the border is often not considered a feature of the system. More so is the purpose of the system of the description of the system, which in effect means that it is often influenced by the position of the observer. This process is called framing.

As we have seen one can divide systems in different ways, depending on the purpose of the division. Complex systems can be contrasted with simple, complicated and chaotic ones (see for instance Snowden and Boone, 2007). However, there may also be a slightly different perspective from which the world is either complex or simple (Mickulecky, 2003) and where in reality natural systems are always complex – simple is just a construction made by man in order to grasp the world.

2.4.5 Complex adaptive systems

Complex Adaptive Systems (CAS) represent particular cases of complex systems. In its present usage, the term was created at the Santa Fe Institute[46] and is sometimes referred to as "Complexity Science". However, Walter Buckley (a system-oriented social thinker) had already introduced it in 1968 in his article "Society as a complex adaptive system", in which he gave it similar connotations as to how it is understood today. He deliberately developed the expression to challenge a closed view of systems.
Complexity should be understood as associated with the sophisticated intertwining or inter-connectivity of elements within a system and between a system and its context, and in this sense it is notable that Murray Gell-Mann (1995/1996) traces its etymology back to the Latin root "plexus", meaning "braided" or "entwined". From here "complexus" is derived, that is braided together.

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[46] http://www.santafe.edu

Complex Adaptive Systems are a combination of the phenomena (systems) one is trying to understand and the systems hosting them. According to CAS, the main principle is that there are certain features (general principles) that run all the actions within a system (Holland, 1993, 1996, 1999 and Gell-Mann, 1995).

> Many of our most troubling long-range problems – trade balances, sustainability, AIDS, genetic defects, mental health, computer viruses – centre on certain systems of extraordinary complexity. The systems that host these problems – economies, ecologies, immune systems, embryos, nervous systems, computer networks – appear to be as diverse as the problems. Despite appearances, however, the systems do share significant characteristics, so much so that we group them under a single classification at the Santa Fe Institute, calling them complex adaptive systems (CAS). This is more than terminology. It signals our intuition that there are general principles that govern all CAS behaviour, principles that point to ways of solving the attendant problems. Much of our work is aimed at turning this intuition into fact. (Holland, 1993: 1)

These systems are complex in the sense that they are dissimilar and made up of a multitude of connected components (agents). The key to understand the system lies in understanding the aggregated behaviour of the agents, the consequence of the sum of interactions. Since these aggregated behaviours are non-linear, we cannot understand them from understanding one or a few behaviours. Since the agents are diverse, if one is removed the system needs to reorganize, which implies changes. The consequence is the same if the systems context changes. In that sense, the system is adaptive; it can change and learn from experience. Another aspect relates to what guides the internal agent's behaviour. Gell-Mann (1995) calls this a "schema" and Holland (1993) an "internal model". It can be thought of as number of rules – conscious or unconscious – that make it possible to "anticipate" the results of an agent's actions.

As CAS are dynamic, they can change, evolve and adapt with their environment as it undergoes change. A consequence here is that the system is not separated as such from its environment, but it is closely linked. This means that change in one place or level must be viewed as a co-evolution in conjunction with the other inter-related systems – not as a separate thing.

Holland (2006) offers a further list of properties that can help to understand and control CAS:

1. CAS exhibit lever points – points where a simple intervention causes a lasting, directed effect. For example, vaccines cause lasting, desirable changes in an immune system.
2. CAS has a hierarchical organization of boundaries enclosing boundaries, with signals that are attuned to those boundaries. Without boundaries, there cannot be individual histories, and without individual histories selection for fitness is not possible.
3. CAS seem to evolve in an open-ended fashion, wherein an initially simple system exhibit increasing diversity of interaction and signalling.

The most common definition of a complex adaptive system, based on the work of John Holland (1992), is "a dynamic network of agents acting in parallel, constantly reacting to what the other agents are doing, which in turn influences behaviour and the network as a whole". Another way of describing it would be a way of thinking about and analysing things that appreciates complexity, patterns and interrelationships rather than fixes on linearity and cause and effect. It should be noted though that there are several definitions and descriptions, although they tend to share some common characteristics (see, for example, Maturana and Varela, 1992; Svyantek & DeShon, 1993; Gell-Mann, 1994; Holland, 1995; Kauffman, 1995 and 2008; Cilliers, 1998; Weick 1998; Olson & Eoyongi, 2001).

Complex adaptive system models represent a genuinely new way of simplifying the complex. They are characterized by four key elements: agents with schemata, self-organizing networks sustained by importing energy, co-evolution to the edge of chaos, and systems evolution based on recombination (Anderson, 1999).

CAS comprise the following characteristics (Health Foundation, 2010):

- A large number of elements which interact dynamically
- All elements in the system are affected by other systems (CAS and others) that interact with the CAS and in turn affects those systems
- A constant flow of energy to maintain the organization of the system
- Non-linear interactions where small changes can generate large effects
- Openness, which can make it difficult to define system boundaries
- A history whereby the past helps to shape present behaviour
- Elements in the system are not aware of the behaviour of the system as a whole and respond only to what is available or known locally.

The properties of CAS are (Health Foundation, 2010):

- Emergence. The agents in the system interact in apparently random ways but from all of these interactions patterns emerge, which ultimately inform and change the behaviour of the agents and the system itself.
- Self-organizing. Complex adaptive systems do not have a hierarchy of command. They constantly reorganize themselves to find the best fit with the environment.
- Co-evolution. Systems are part of a broader environment so as the environment changes, systems change to ensure best fit. This in turn influences the wider environment, and creates a constant cycle of change as the system develops to adapt to the environment and the environment changes as a result of system alterations.
- Connectivity. How agents in a system connect and relate to one another is critical to the system's survival and so the relationships between the agents are usually seen as more important than the agents themselves in complex adaptive systems thinking.
- Nested systems. Most systems are embedded within other systems.
- Simple rules. Complex adaptive systems are not complicated and are often governed by simple principles.
- Iteration. Small changes within a system can build like a snowball, leading to larger change.
- Sub-optimal. Complex adaptive systems do not have to be perfect and some suggest that any energy used on being much better than alternatives is wasted energy.
- Requisite variety. Complex adaptive systems thinking suggests the greater the variety within the system, the stronger it is, and the more likely it is able to create new possibilities and co-evolve.
- Edge of chaos. Complex adaptive theory suggests that the most productive state for a system is the "edge of chaos" where there is maximum variety and creativity.

To clarify, despite all the CAS that have been investigated, there still lack general theories and models that can suggest how to identify or develop leverage points, or the mechanisms for making the boundaries or open-ended evolution.

2.4.6   Summary of section 2.4

The impact of the Newtonian view of the world cannot really be overstated. It has infiltrated and illuminated everything from our educational system to our views of organization and management – even our language, our ways of thinking and our culture at large. Reductionism, the practice in which things are taken apart and examined individually so that we might understand and predict the whole has prevailed to a large extent into the present day. Even though scientists have started to abandon that worldview, many people still view the world in a mechanistic way. Indeed many metaphors still live on in our everyday language (for instance: "what drives his behaviour", "we need to fuel the creativity" etc.).

During the last century, a new science paved the way for a new understanding of the world. This is a world of chaos and complexity, of emergence, and of dynamic, self-organizing systems.
The science of complexity has its roots in chaos theory. As the development of the different ideas and concepts was taken deeper into everyday situations a new notion – the edge of chaos – took hold. Complex systems do not have a universal definition, but one way to conceptualize them is to examine their behaviour. If it is hard to explain, it is a complex system. Normally, for a system to be labelled complex, it needs to have numerous parts (or components) that have the capacity for structured interactions, which result in emergent phenomena. Ladyman and Lambert (2012) suggest five features: 1) an ensemble of many elements, 2) interactions (in the sense of exchange), 3) disorder (parts), 4) robust order (overall patterns and structures are preserved) and 5) memory.

Ordering systems according to their complexity may be helpful, but this depends on the purpose of the ordering. In some sciences, it is helpful (and possible) to offer very precise meanings and definitions, whereas in others the interpretations will always be more contextual and rooted in tradition – and not easy to translate. One of the most fundamental understandings of the difference between the old paradigm and the new is offered by Mikulecky:

> Complex systems and simple systems are disjoint categories that encompass all of nature. The world therefore divides naturally into those things that are simple and those things that are complex. The real world is made up of complex things. Therefore, the world of simple mechanisms is a fictitious world created by science or, more specifically, by physics as the hard version of science. This is the world of the reductionist. It is modelled by the Newtonian Paradigm and simply needs sufficient experimentation to make it known to us. Those experiments involve reducing the system to its parts and then studying those parts in a context formulated according to dynamics. (2003)

In this section, we have explored the concept of complex systems. We have looked at the history of the science of complex systems and investigated how they can be understood and what are their different characteristics. Today we use the words chaos and complexity broadly in our everyday life. As our worldview shifted from the Newtonian, it is hardly surprising that an approach used in the natural sciences would emerge in the social would (Wheatley, 1992).

2.4.7 Emerging questions following section 2.4

Complexity, complex systems, complex adaptive system – this is a new science that has spread its wings and permeated virtually all parts of society. After reviewing the literature on the subject, a number of questions emerge:

- There seems to be little doubt about the progress made in understanding our world given the advancements in physical science, but are these findings are transferable to social systems?

- Perhaps more accurately: What do these advancements help us to better understand when it comes to our social and cultural world's?

- Since the thesis concerns innovation in complex systems, questions on how innovation can be advanced by a world-view dominated by this new science are also relevant. Indeed, a question like "What is innovation seen through the lens of complexity?" seems to be relevant as well.

Given that complexity offers new insights into our world, it is also helpful to supplement – if not contrast – it with a world-view that takes its cue from a "social" world-view: social constructionism.

2.5 Social constructionism

Social constructionism is a theory of our world – how our world comes about. Even if it is not confined to one academic tradition it is more common in sociology, psychology and communication theory. As a theory of knowledge, it is oriented towards how human beings jointly construct the understandings and meanings that make up "shared" assumptions about reality. In this section, social constructionism will be explored and presented in depth, as well as criticism on social constructionism. A particular emphasis will be given to my own reflections around its relationships and meanings.

2.5.1 What is social constructionism?

It is a fair assumption that people have throughout the ages thought about questions like: where have they come, what is the world in which they live, and where will they go after they die. Questions around what constitutes a good life, the right way to behave in certain situations and what is valuable remain of great importance today. Obviously, we can't know exactly what our ancestors thought, but artefacts from some cultures and civilizations allow for interpretation. We know that for the ancient Greeks, such questions were debated and even if there were dominant world-views, these developed and changed. For instance, Aristotle's resolution of Plato's idea of the real nature of things as everlasting and fixed with the world as we observe and experience, being endlessly and permanently changing, in the book *Metaphysics* (*History of Western Philosophy*, chapter 19). This fusion affected western tradition for centuries to follow.

In Europe in the sixteenth and seventeenth centuries a new age came about, normally called "The Enlightenment". The church was no longer in a position to monopolize explanations or exercise authority about the world. This allowed new ideas to take form and multiply. Science came to be synonymous with the purpose

77

of the idea of objectivity. From a philosophical perspective, one can identify a belief that reality exists autonomously from the mind and that continuous observations and experimentation will guide us towards a better explanation of it. In short this is a belief in a world "out there" that we can get to know and control.

One can distinguish two major epistemological traditions. On one hand, there is the idea that knowledge is a consequence of phenomena in "the real world". That means that knowledge is derived from events in the natural world and is ultimately subject to the laws that govern the same events. Philosophers like Mills, Locke and Hume would adhere to such a position. The other position suggests that knowledge is not so much about "the real world" but more about how the distinctive process in the data is treated by human beings. Descartes, Spinoza and Kant would be proponents of this position. Here it is assumed that human beings have given propensities to take in, interpret and categorize data. As such it is these propensities that are of essence when viewing knowledge. Gergen (1982) calls these two positions exogenic and endogenic perspectives.

Social constructionism is not defined by a single book or a single school of philosophy (Gergen, 2009) but it is fair to say that the book *The Social Construction of Reality* by Peter L. Berger and Thomas Luckmann (1965) was an important milestone in forming this strand in our understanding and view of the world. Berger and Luckmann suggest that all knowledge comes from and is sustained by communal exchanges. As our world, its manifestatios and our knowledge of them are negotiated (i.e. sense and meaning are generated) they easily become viewed as objective realities. Over time these become even more fixed since new generations are presented with the results as givens, and are not invited to the negotiations nor have them described as "in progress".

Gergen and Gergen define social constructionism as "the creation of meaning through our collaborative activities" (2004: 7). Ian Hacking (2009) points out that social constructionism does not only concern our relation to things, but also our beliefs about the very things in question. Intuitively the concept that some things would not have existed if we as human beings had not created it seems fair enough. Money, roads, books, as well as sports, cultural artefacts and even identities like being a European are constructs rooted in specific societies. They could all have been different, given a different society and history. But ideas like "human beings", "universe" and "physics" are more difficult to accept as constructs of our making, rather than existing regardless of us. One can say that social constructionism proposes that there are alternative versions to people's current realities and how they have come about. Social constructionist inquiry is principally concerned with explicating the process by which people come to describe, explain or otherwise account for the world (including themselves) in which they live. More important than the question "Is it true?", is "Is it useful?".

Another concept is related to social constructionism: social constructivism. Whereas people like Gergen, Shotter and Hoskins may be considered part of the former tradition, people like Maturana, Valera and Piaget come under the latter. Constructionism pays attention to the social interactions, what emerges between people, the relationships and the language, while constructivism turns its attention towards what is inside the individual, the internal cognitive processes. Despite these different positions there is also much that unites them, and as McNamee writes (2004) they can be viewed as similar, given their focus on meaning-making processes that help people to "predict and control" their lives in relationships with others.

Social constructionism implies relativism (or realism if you prefer) with regard to essentially everything. There are no universal "truths", only local ones. This is both a challenge and strength. It does not put forth a claim on "what is", but directs our attention to "how we speak about it". One the side, if "what is" is not a given, nor necessarily something that can be uncovered, at least not be agreed upon, then change is possible by the same means as we created our constructs in the first instance. We can use our language to see things differently, to understand things in new ways and to carve out new paths. Of course, this requires people to be open to and affected by others and the otherness around them, generating the "shared moments" that are needed to understand enough to collaborate effectively (Shotter, 2009).

2.5.2   Criticism

Obviously, ideas like those suggested by social constructionism do not stand unchallenged. One argument is that it does not sufficiently take into account the biological impact on culture and conduct. On the classical axis of nurture versus nature, social construction would be located on the nurture end. A social constructionist's response would be that the axis itself and its two categories are social constructions and as such it makes little sense to place social construtionism one end. Indeed, it is argued that constructionism can potentially enrich and augment those processes (social, material and biological) that form our subjectivities instead of just limiting itself to a study of the results of such processes (Nightingale and Cromby, 2002). Another critique is that people adopt a social constructionist position and utilize its arguments due to its possibly emancipating premise (Hacking, 2009). We can make things (and/or our understanding of them) into what we would like them to be, rather than accepting and working with them as they are given their nature, because they are a result of our social conventions. But constructionism is not in the business of judging on what is real or not, nor claiming that all values are equal or that anything goes (Gergen, 2009). It is more that a constructionist perspective does not necessarily view one set of values as superior to another.

2.5.3   Relationships and meaning

Two central concepts in social constructionism are relationships and meaning. These concepts are inter-connected. As McNamee and Gergen state (1999), since meaning-making is a relational activity, one can argue that relationships are a meaning-making activity.

A point about relationships or relations is that we have them, we create them, we lose them and so on, but we do not *do* them. A relationship is not like love, which can be used as a verb. It is a description of something, something linked together. Using the concept of "relating" or "relate" does not really capture the full essence of relationships. To relate indicates a connection, an understanding, something shared. One definition of a relationship is the way in which two or more concepts, objects, or people are connected, or the state of being connected. As such it comes about as a result of something.

Gergen (2009: 6) argues explicitly that: "The ways in which we describe the world are outcomes of our relationships". Here lies the possibility but also the challenge offered by social constructionism and its root in relationships. If our worlds are indeed constructed by our relationships, then it follows that by changing our relationships, we can change our worlds. If a relationship is the *way* in which something is connected, the nature of this *way* (what it is, what it consists of and contains) is central to understanding how to change it. But this *way* is also a social construction. In the social constructionist tradition, we see the world in different ways, and so to the relationships we are part of. It is not certain that two people in a relationship see, understand, act and value that relationship in the same way. Indeed, we ourselves do not necessarily see it the same way from one moment to another. As Gergen states (2000: 83), "Increasingly we emerge as the possessors of many voices". Thus the dynamic interchange of views, attitudes and actions of a given relationship becomes the key. In fact, this can be argued to be the nature of the relationship. Changing views, attitudes and actions will change the relationship.

For social constructionists, language is used by people to do things together (Gergen and Gergen, 2004). Gergen quotes J. Hillis Miller from his *The Critic as Host*: "Language is not an instrument or a tool in man's hands, a submissive means of thinking. Language rather thinks man and his 'world'" (2000: 106).
What may seem like a contradiction between the two positions can also be understood as compatibility. Language functions as a vessel and a container for our reason and imagination. We see the world through our language. We grab it through our grasping of it. Our limitations in language limit our ability to do things together, our ability to relate, or our relationships as such.

Consider the Ghandi quote "Be the change" and its suggestion as to the source for changing the world. Following a social constructionist stance this means adapting our language to support a new view, new attitudes and new actions.

Einstein's remark that "we can't solve problems by using the same kind of thinking we used when we created them" points to the value of expanding our minds, inviting other perspectives and exploring new ways. It means "understanding our understand-ings" (Gergen and Gergen, 2004).

It can be argued, therefore, that changing the language will affect the views, attitudes and actions that *are* the relationship, and thus change the relationship itself. Since changing the relationship changes our world, it may be viewed as a creative force, something in the making, if not an actual verb.

When it comes to meaning and philosophy's pre-occupation with it, it seems to be the notion that there must be a fundamental property that represents meaning that causes the trouble. But what if this were not so? What if there is no fundamental property that holds or provides meaning? Maybe there are only different processes and the contexts and relationships between them? Going through the "Orienting principles" from the Taos Institute[47] one can see that only two of the principles do not contain the word meaning. But questions of what is meaning, how can it be understood, where does it come from and so on might be worth examining a bit closer. To some extent it may seem like an impossible to task to write something meaningful of meaning. Wittgenstein was once asked "What does mean mean?" To which he responded: "The real question is what does mean mean mean?"[48]

One way to examine this problem is to start with the opposite of meaning – what is without meaning? There are two potential situations in which something may come out as without meaning. The first refers to when one is exposed to something that one does not understand, something that does not make sense, and is thus perceived to lack value. One example may be religious artefacts in a foreign environment: consider the encounter between Norse mythology (or the Asa belief) and Christianity and how they viewed each other's symbols and sacred things. The other situation is clearly related but contains a different connotation: One understands what one is being exposed to but deems it to have no value or importance. An example may be the man on the verge of dying of thirst in the desert who finds a book.

From these examples, we can deduct that meaning (as opposed to non-meaning) is something that requires understanding. Furthermore, it implies some sort of importance (or value). However, both of these qualities – "understanding" and "importance" – come from somewhere. "What this world means to us is different" (Gergen, 2009). Understanding and importance (and subsequently meaning) need a context; they need to stand in relation to something. Thus the relationship between meaning and its context (to be understood broadly) is imperative. Leading back to the Wittgenstein remark, in order to understand the question asked by the student, one needs to understand the context in which it is asked.

Social constructionism tells us that social relationships define our world(s). Relationships – perhaps to be understood as "a condition of being connected" or maybe "a generated positive quality that generates a feeling of connectedness" – define our perception of importance and understanding. As we have seen, meaning makes no (or has no) meaning outside the realm of our understanding. When Gergen (2009) points out that meanings are transformed over time, he indicates that meanings change. They change since they are rooted in and defined by social relationships, and by the very changes in social relationships. Social relationships are changed through actions and conversations. Actions can be viewed as a form of "conversation" since they provide something that will be interpreted – that is they contains a message. Conversely, that a conversation is an action is evident in the sense that it requires effort and energy. From this we can learn that relationships and conversations go hand in hand. "The manner of engagement – the way we develop a relationship with another person – influences the

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[47] http://www.taosinstitute.net/Websites/taos/Images/ResourcesNewsletters/Taos%20News-%20Jan%2016%202008.pdf
[48] I have not been able to find the original source for this story and as it may very well be an urban myth, but I have kept it since it captures the spirit of the argument and I don't think Wittgenstein would mind.

kind and quality of conversations that we can have with each other. Likewise, the conversations we begin to have with each other will influence the kind and quality of our relationships" (Anderson, 2012). Meaning is therefore also an act of "meaning-making". We construct, de-construct and co-construct meaning.

This leads to a fundamental question: Why? From systems thinking we could argue that the connectedness of relationships implies that one change will have implications and lead to changes in the whole system. Thus small "disruptions" in the system of relationships affect "all" the relationships, and this requires the person to take part in creating the new reality. Even passive non-action from the individual's side will create a new reality since a new position will still be formed and will still be subject to others' new perceptions and interpretations. A new negotiated reality will emerge. This happens all the time. But it should not be understood that we are only a consequence of others' actions; indeed we also initiate actions. We might do this as a response to a change and input, and it may not put the relationship in equilibrium, either as it used to be or as the different parties want. This then generates new reactions.

To illuminate the discussion, we can look at a related concept to meaning, "meaningful". We ask ourselves: What is meaningful? Again, we can turn to its opposite – meaningless. This is something that lacks meaning, something that has no sense, or something that makes no sense. Quickly one recognizes the lack of purpose in these descriptions: "There is no meaning in this, it has no purpose". From this it may be understood that our actions, our reactions and our negotiations seem to have a direction. Often this response come intuitively. It is not necessarily something about which we contemplate, make a plan and act. We simply just respond. Here again we see our "automated responses" as a consequence of something ingrained in us, which again is ingrained in the relationships we are part of. Even so, the automated intuitive response, or the contemplated and calculated one, seems to have a direction and a purpose, or else it is meaningless. Thus, we can suggest that meaning also indicates purpose.

This lead to a possible description of meaning along four dimensions:

- Comprehension – The constructed knowledge as the point of reference
- Setting – The perception and interpretation of a given situation
- Investment – The power vested into making this meaningful
- Purpose – The intended value to be generated.

> Everything can be taken from a man but the last of the human freedoms – to choose one's attitude in any given set of circumstances, to choose one's own way. (Frankl, 1963: 104)

Indeed, even if our social relationships define the parameters of how we discover meaning, these parameters seem to offer a multitude of possibilities for us to find "our own".

2.5.4   Summary of section 2.5

In conclusion we can say that social constructionism is a direction within the psychological tradition and a theory of knowledge within the sociological tradition. Its core premise is that the reality is a social construction, which stresses its dependence on conditional aspects of our social selves. Our language and the way we communicate about the world are in particular what construct the world. It is through communication and our interactions with others – the relationships given, created, maintained and developed – that we form our understandings, define value and generate meaning. Another way to say this would be rewrite Descartes' famous dictum as "I am linked therefore I am" (Gergen, 2009: 400). Or perhaps: "We communicate, therefore we are" (Gergen, 2009: 160). As such, our selves become a tale in the making.

The same argument could be made when it comes to the concepts of organizations, strategy, leadership and innovation. These are also social constructs steeped in traditions and in local cultures, carrying out relationships

and gaining their significance from their social utility. As such they can be viewed as complex, cultural, psychological and social by-products as well as objects and manifestations, constructed in contextual-dependent ways. Using Gergen's notion of "the real, the rational and the good" (2009) as a lens for viewing these constructs and aspects of them offers one way to understand why certain decisions are made and not the least discrepancy between the intentions of these decisions with the realized results of the decisions.

2.5.6 Emerging questions following section 2.5

Learning about social constructionism is an equally difficult and mind-blowing endeavour as learning about the complexity sciences. Both traditions offer a world-view that is a stark departure from our classical one. However, both traditions are also demanding in that they do not offer a prescription, or even the promise that we will eventually "figure it out". They seem to be more invitations to continuous exploration and discovery. A few questions that have emerged are:

- Reality
  Whereas the question of whether the world is just a social construction or essentially a physical entity that allows for social interpretations seems to be intriguing but of less practical value for this thesis, the question around what social constructionism can help us understand when it comes to innovation, organizational life and market dynamics is of value. But what will be the implication if the world is not "a thing" but essentially a phenomenon, a construction of the mind?

- Change
  Social constructionism offers a possible answer to how change occurs. It takes place through interactions and alterations in language – generating new understanding, meaning and relating in new ways. But why is it so difficult to find common ground, to obtain agreement and, not least, develop the new?

- Relations
  As relations and ways of relating are at the core of change and development in social constructionism, how do we go about creating relations that are fruitful? Is it possible – from a management perspective – to design and plan for new and more productive ways of relating? Or is that just imagination and our claim to self-deceit as we do not want to live with the consequence of the alternative: that we can't predict and control things?

- Meaning
  Meaning seems to be the new currency of our organizational worlds, but how is created? Can it be designed? Or curated so it can emerge? Furthermore, can it be manipulated and subject to power exercises?

With this in mind, we now look at the intersection of innovation, complex systems and social constructionism.

2.6 Innovation, complex systems and social constructionism

Where we previously have addressed innovation, complexity theory and social constructionism in relative isolation from each other, now it is time to bring them together. First, the connection between social constructionism and complexity theory is explored. Then, innovation and complex systems are looked at from four different orientations. Finally, social constructionism and innovation are explored together and discussed.

2.6.1 Complexity and innovation

A more recent field of interest in innovation studies is innovation and complex systems. According to Andriani (2011) the number of scholarly works that directly apply complexity to innovation is relatively small, although complexity theory provides conceptual tools by which to understand the world of innovation. Andriani (2011) groups the works into the following categories: 1) those that focus on self-organization and emergent properties and 2) those that focus on networks.
The first is a departure from models that are based on the idea of balance (equilibrium), gradualism and reductionism. The second is a departure in its focus from the firm and its boundary as the main subject of the innovation process.

The next sections address innovation from four different orientations, all of which, it could be argued, make claims on the nature of novelty, change and value creation – as well as fitting both of Adrianis' categories.[49]
The four orientations are: Complex Adaptive Systems, Systems thinking, Complex Responsive Process and The Cynefin Model.

2.6.1.1 Systems thinking and innovation

Systems thinking can broadly be seen as an orientation for understanding what can be considered to be part of a given system influence each other, as well as how systems influence other systems – as part of an even larger system. An example from nature could be an eco-system where biological entities interact with each other as well as with elements such as water, air and so on. When it comes to innovation and organizational studies, systems are considered to consist of people, structures, processes and so on. Jackson (2000, 2010) shows that there is not just one prefixed theory that describes systems thinking, but that the field is developing and that there are many variations of the theory. According to Skyttner (2006), a systems thinking approach includes several "theories":

- Interdependence of objects and their attributes – independent elements can never constitute a system
- Holism – emergent properties not possible to detect by analysis should be possible to define by a holistic approach
- Goal seeking – systemic interaction must result in some goal or final state
- Inputs and outputs – in a closed system inputs are determined once and constant; in an open system, additional inputs are admitted from the environment
- Transformation of inputs into outputs – this is the process by which the goals are obtained
- Entropy – the amount of disorder or randomness present in any system
- Regulation – a method of feedback is necessary for the system to operate predictably

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[49] It should be noted that complexity theories have been applied in quite a number of fields within management. For illustrative purposes, some literature is referenced and described to provide a more comprehensive idea of the field. Also, much that is written is not necessarily empirical. Much is more the result of opinions and analyses of the individual authors.

- Hierarchy – complex wholes are made up of smaller subsystems
- Differentiation – specialized units perform specialized functions
- Equifinality – alternative ways of attaining the same objectives (convergence)
- Multifinality – attaining alternative objectives from the same inputs (divergence).

The systems thinking literature assumes that the concept of a system is useful in management and organizational research (Luoma et al. 2011). Peter Senge (1990) presents five disciplines that together encompass the art and practice of the learning organization:

- Personal mastery
- Mental models
- Shared vision
- Team learning
- Systems thinking.

be the fifth discipline of organizational learning. To some extent Senge considers systems thinking to surpass the other four disciplines, but all are seen as essential components that work together. Others who begin with systems theory as a way of understanding organizations are Argyris and Schön (1995). Jackson (2010) has put forth critique on many of the variations of systems thinking – for instance the fifth discipline theory, living systems theory, autopoesis, complexity theory[50] and postmodern thinking. He sees them as responses to the "failure of the traditional approaches when confronted with extreme complexity" and argues for a pluralist orientation in critical systems thinking. As such it is acknowledged that all systems theories have their strengths and weaknesses in given situations, but appropriately attuned they could address the complexity of managerial problem situations. Furthermore, "a diversity of theory and methods could be seen to herald not a crisis but increased competence and effectiveness". However, systems thinking has not been immune to a broader critique (Stacey et al., 2000 and Mowles et al., 2010). Most management literature is underpinned by systems thinking (Mowles et al., 2010) and together with scientific management is the dominant discourse of the management of human organizations (Stacey et al., 2000: 56). Jackson (2003: 125) says that this view is no real challenge to systems thinking, it just "simply follows a path already well-trodden by system theorists". Zhu (2007) follows the same line as Jackson, suggesting that systems should be viewed as "a dynamic web of the tensions, reciprocalities and transformations between various aspects of organizational life, each differentiated from and connected with, depending upon and affecting, each other" (Zhu, 2007: 460). Luoma et al. (2011) argue that systems thinking and the theory of complex responsive processes (i.e. the theory of Stacey et al.) are complementary perspectives.

Galanakis (2006) claims that systems thinking can be used to make sense of the innovation process and he points towards the "systems of innovation" approach (Edquist, 1997). A system of innovation (SI) can be defined as "all important economic, social, political, organizational, and other factors that influence the development, diffusion, and use of innovations" (ibid.: 14). This means that the SI approach is about the determinants of innovations, not about their consequences (in terms of growth, quantity of employment) (Edquist, 2001). While this may appear to undermine its position as being related to systems thinking (i.e. – not focused on outcomes or goals), that is a misunderstanding since the goal is innovation, even though it is not specified what type of innovation.

According to Kapsali (2011) systems thinking methods in innovation project management provide the flexibility to manage innovativeness, complexity and uncertainty in innovation projects more successfully. Much of the research on the organization of project management has separated formulating strategy from execution (Artto et al., 2004). This division between strategic decision-makers and project managers generates two different managerial systems: one formal, used to comply with external demands, and one informal based on the intuition of the project managers and the group dynamics within the projects (Jaafari, 2001). A systems thinking approach is synthetic and integrative (Pourdehnad, 2007). Through it, we can gain understanding of individual and

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[50] That is some authors see complexity theory as part of systems thinking and vice versa.

collective behaviours that cannot be gained by analysis alone. As such, systems thinking is the right conceptual frame within which to pursue this kind of conditional managerial design in both practice and theory (Kapsali, 2011).

The systems thinking framework accepts the social as equal to the technical. It also accepts uncertainty and complexity as part of the management of the tasks, planning and control (Saad, et al., 2002).

2.6.1.2   Complex adaptive systems and innovation

As we have seen, the concepts of chaos and self-organization have evolved from the physical sciences, whereas the idea of complex adaptive systems (CAS) has its roots in the biological sciences (Gell-Mann, 1994). The first managerial applications of complexity theory were proposed by Maturana and Varela's work on autopoiesis (Dooley 1997). The theory of autopoiesis suggests that structural change occurs through self-renewal – replication, copy and reproduction (Maturana & Varela, 1992).

A CAS is both self-organizing and learning. Examples of CAS include social systems, ecologies, economies, cultures, politics, technologies, traffic, weather and so on. (Dooley 1997). As such we are all part of multiple CAS. A key point here is that principles such as emergence, co-evolution and self-organization are what separates CAS from other forms of multi-agent systems.

CAS has been used to examine organizations and leaders in a number of fields, including: education (Mason, 2008; McQuillan, 2008), environmental science (Olsson et al., 2004) and health care (Fraser and Greenhalgh, 2001; Plsek and Greenhalgh, 2001; Plsek and Wilson, 2001 and Wilson and Holt, 2001).

Organization theory has historically borrowed from a number of parent disciplines (Anderson, 1999). The complexity of organizations is such that organizational studies scholars have searched for metaphors and models to help describe and explain the complex social phenomena observed in organizations (Weick, 1998; Lamberg and Parvinen, 2003). According to Reeves et al. (2016) companies are not like biological species or living systems (for example, Wheatley and Kellner-Rogers, 1998), but they are identical in one important aspect – both are Complex Adaptive Systems. This means that principles that generate robustness in nature are directly transferable to business.

In a complex adaptive system order is emergent rather than predestined. Emergence comes from the actions and reaction of what agents in a dynamic network do. Things cannot be undone, so history is irrevocable. Since we cannot know what the reactions will be, the future is often unpredictable (Holland, 1995). Organization theory has treated complexity as a structural variable that characterizes both organizations and their environment (Anderson, 1999).

The science of complexity raises questions around the strategy process (Stacey, 1995). Here the questions revolve around 1) system properties that make them capable of transformation and renewal, 2) intention versus emergence, considering the possibility to determine the long-term outcome of a changeable system and 3) free choice versus determinism in which the question is whether agents are actually free to choose strategy and its outcomes or are their choices determined by the system itself?

When stakeholders demand the new, only those that are internally and spontaneously changeable – those operating at the edge – will survive selection by competition (Stacey, 1995). It is far more difficult to keep an organization in this state than to allow it to move into stability or instability. As Kauffman (1995) contends, complexity itself triggers self-organization, or what he calls "order for free". Complexity can also be understood on different levels. For instance, Frenken (2005) suggests that technology is a complex system *par excellence* since technologies are complex systems made out of many interacting parts, and it is a collective process in which

agents are engaged in a process of mutual learning. Some see similarities between the world of technology and the biological world in terms of evolutionary rules that govern origin, expansion, metabolism and the decay of biological and technological ecosystems (for instance Kauffman, 1995, 2008). The world of technology is full of self-organizing dynamics and emergent properties. Complexity theory provides the language and an overarching framework with which to make sense of such organic development.

Two fundamental dynamical properties from the science of complexity should in general apply to organizations in some way (Stacey, 1995): 1) bounded instability and 2) spontaneous, self-organization and emergent order. Jacobs (1969) speaks about the generative power of diversity as the source of innovation clustering. Here it could be argued that bounded instability (or strange attractors) is rooted in the differences between people and phenomena. Likewise, emergence – where local events and interactions amongst "agents" can cascade and reshape the entire system – is based upon the positive feedback loop between the density of constraints. This new system then influences and shapes the agents and their interactions – which again results in further changes in a continuously evolving process. A CAS can be seen as being nested in a larger business system, which again is nested in larger social systems and so on.

Reeves et al. (2016) suggest six principles that can help make CAS in business robust, derived from studies on features that distinguish dynamic systems that persist from those that collapse (or decline):

- Maintain heterogeneity of people, idea and endeavours
- Sustain a modular structure
- Preserve redundancy amongst components
- Expect surprise, but reduce uncertainty
- Create feedback loops and adaptive mechanisms
- Foster trust and reciprocity in the (their) business ecosystem.

The first three are structural and concern the design of systems. They are generally seen in nature. The other three are more managerial. Their main features have been recognized in a widespread diversity of managed systems.

Two interesting questions then emerge: Can CAS be used to explain innovation, and is innovation a CAS? Innovation, management and complexity have been addressed by a number of authors. Frenken (2005), for example, discusses three families of complexity models of technological innovation: fitness landscape models, network models and percolation models. The systems of innovation approach has recently received considerable attention as a promising conceptual framework for advancing our understanding of the innovation process in the economy (Fischer, 2001[51]). Earlier approaches often focused more narrowly on R&D – often by analysing input with outputs from the system (for instance the OECD approach on technological change and innovation).

The world of innovation is characterized by nonlinear dynamics; emergent properties, discontinuities and self-organizing patterns that once established become the platform for further disruptions.

Larger organizations fulfil the criteria for being a CAS, smaller organizations less so. However, when we look at the full network even a small organization is nested within, the complexity increases quite dramatically.

Innovation as a phenomenon – from the inception of a process to its successful adoption – can be explained by using the properties for a CAS. Indeed, it can be argued to be a CAS in the same way as other social phenomena in that includes many different agents, it adapts and it is difficult to predict what it will lead to.

Understanding CAS may also help us to improve our capacity for innovation, although it is difficult to do so within our classical ways of working and aptitude for control and planning. The science of complexity demonstrates that for a system to be innovative, creative and changeable it must be driven far from equilibrium where it can make use of disorder, irregularity and difference as essential elements in the process of change

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[51] It should be noted that in this article the main departure is from the firm to the region, that is the system. In this chapter the system approach is considered more generally.

(Stacey, 1995). But this makes it difficult to plan, monitor and adjust since at a certain distance from equilibrium the links between cause and effect disappear. This is because positive feedback enables a system to intensify many small changes into globally different behaviour patterns. A consequence of this is that the nature of change in a CAS is not automatically a consistent pattern of change. It may be slow or fast, it may be resisted or encouraged, and so on.

In sum we can say that in terms of organizations CAS offer interesting opportunities for new understandings of organizational work, such as innovation. They can help explain phenomena such as change and renewal, just as well as novelty, creativity and innovation. But as we have seen, complexity theory has developed along a very interdisciplinary path and as Anderson (1999) points out, in the end it may be so that organization theory contributes as much as it borrows to the development of insight into the behaviour of complex systems.

Margaret J. Wheatley (1992) "The literature on organizational innovation is rich in lessons...describes processes that are also prevalent in the natural universe. Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries. Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren't there before."

Wheatley points at a first glance more towards the creation and inception of ideas, but in reality, she also suggests how an innovation develops from an idea to delivering value to its users.

2.6.1.3 Complex responsive processes and innovation

The theory of complex responsive processes (CRP) has gained popularity in the last two decades. Ralph Stacey and his colleagues (Stacey, 2007; Stacey, 2011 and Stacey et al., 2000) developed the theory in opposition to systems thinking. Where systems thinking on a basic level considers that the idea of a system is valuable when it comes to management and organizational research and development, Stacey and others do not. Their central proposition is that it is not possible to develop, structure and work on an organization-wide level as such.

Systems theory underpins most management literature (Mowles et al., 2010). That means that theories of organizational change support the idea that change can be "wholesale, linear and predictable". Even though Jackson (2000) says that there is not one systems theory, but many variations of it, Mowles et al. (2008 and 2010) respond that they share common characteristics. They see organizations as an "idealized whole" (i.e. that there are borders where something is inside and something is outside) consisting of parts. Since these parts stand in a direct causal relationship with the whole, working on the whole can affect the parts and vice versa. This indicates that whole organizational change is possible.
Mowles et al. (2008) state that systems thinking developed into system dynamics and beyond to incorporate theories of emergence and complexity as described by Kauffman (1995), Holland (1999) and Jackson (2000a). The unexpected (Senge, 1990) and mistakes (Weick and Sutcliffe, 2001) can be seen as information generated from positive and negative feedback (Argyris, 1982; Senge, 1990 and Schön, 1983). Information is thus seen as an opportunity (Mowles et al., 2010) to improve the systemic model.

Rooted in (CAS), others have furthered this thinking accordingly (Mowles et al., 2008 and Mowles, 2010). Wheatley (1994 and Wheatley and Myron-Kellner Rogers, 1998) states that members of organizations should operate according to simple rules, which will warrant creativity and improve results through the power of complexity. This thinking comes from the notion that organizations are like (or at least could and should operate like) natural living systems, which emerge and grow according to simple rules in their environment. The thinking that follows is that if one could identify (either find or develop) these rules organizational change would be easier.

Griffin (2002) has put forth an extensive critique of this thinking. Here complex and paradoxical phenomena are drawn into a systemic understanding of organizing which then decreases the complexity of the phenomena in question.

According to Stacey et al. (2000) there are different notions of teleology (or causality) when it comes to the notion of novelty and change within organizational development. On the one hand, there is natural law teleology (scientific management), where change is caused by natural laws; and on the other hand there is formative teleology (systems thinking), where certain qualities in combination lead to a certain variety of expressions (like the acorn becomes the oak). Both could be considered as rationalist teleologies (where change is a result of human choice and action). Ideas are born in the minds of people (i.e. managers) and then promoted into the organization. Following the thinking of Stacey et al. (2000), this causality does not allow free will for anyone in the organization beyond the manager and participation means to participate in maintaining the organization. Stacey et al. (2000) argue for a teleology that is transformative, where novelty is understood to emerge in human interaction. This is what they call their theory of complex responsive processes of relating (CRP).

CRP rejects any separation of subjective and objective understandings of human action and draws attention to the innately paradoxical and transformative nature of everyday experience (Stacey et al., 2000 and Stacey, 2007). As such it claims to offer a more radical understanding of the relationship between human action (and subsequently organizational life) and complexity theories. The theory emphasizes power relations, communicative interaction and the unprompted and improvisational nature of human action (Mowles et al., 2008).
Stacey et al. take a more absolute stance than the teleology of systems thinking to state that global patterns emerge only as a consequence of local actors (or agents) interacting. Everything these local agents do (even if that is nothing) has an effect on the emerging patterns over time. The effects do not go in the other direction (i.e. no one is control of the turn of events). At the same time, even though patterns of relating lean in a certain direction, the precise global patterns that emerge are unpredictable. The global patterns are paradoxical in that they are formed by local agents and at the same time form the local agents. As such they both constrain and enable what is possible for local agents to do.

CRP draws upon the theories of the American pragmatists – primarily George Herbert Mead and his theory of language and mind – and the social theories of Norbert Elias, focusing on the relationship between power, behaviour, emotion and knowledge.

Mead (1934) contended that the self is not so much a substance as a process. In this process, the conversation of gestures has been internalized within an organic form. People are then engaged in constant repetitions of gestures and responses with others, forming an ever-evolving emerging social pattern. This becomes a constant process of negotiation and adjustment – shaping the intentions and communication of the other (the generalized other) – in which the meaning of the gesture cannot be understood without/outside the context of the response.

> A single individual does not simply "have" an intention. Rather the intention an individual express has emerged in the conversational interaction with others. Intention and choice are not lonely acts but themes organized by and organizing relationships at the same time. (Stacey, 2007: 281)

As such, CRP offers as a different way to understand what happens between people. This retrospective sense-making process can be argued to stand in contrast to the idea that it is possible to design solutions in advance of action (Mowles et al., 2010).

Norbert Elias (1939/1991, 1939/2000), like Weber (Elwell, 2013),[52] tries to bridge the gap between micro- and macro-sociology, by fixing on how structural and individual personalities interact with one another in social change.

According to Elias, personality and social structure are closely interrelated. When social structure changes, so does the individual personality structure, which causes further change in the social structure. People only exist in interdependent relationships, oriented by both nature and nurture. Individuals define themselves and their world, as well as orient their thought and actions through these interdependencies (figurations). The individual and the society are therefore indivisible, part of a single whole, impossible to understand in terms of individual singularities. According to Elias, our relations with others are conditioned by power relationships. We act within a web of other people's intentions and we cannot forecast what the outcome will be. As such, Elias argues against the tendency to reduce processes to states, to separate actor and activity, structures and process, agency and structure, objects and relationships.

Both Mead and Elias see human nature as social and our sense of self as arising through social interactions. These interactions are iterative and reflective. Change is the result of interdependent actions – informed by past actions (i.e. not simple causality). It is not planned, nor is it foreseeable. We make sense of our world through reflection and reflexivity.

Stacey sees consciousness as arising in the communicative interaction between humans (following the traces of Mead and Elias). In our vocal gestures or actions to another, we evoke our own responses. Our acting is not isolated; it is formed by the other as well as our appreciation of that other and action. It follows that consciousness, knowing and mind are social processes in which meaning emerges in the social act of gesturing and responding (Mowles et al., 2008). Furthermore, gesturing cannot be seen independently from responding (Stacey, 2001, 2007b).

In order to produce change, managers can make gestures towards a desired future for the organization, which will trigger responses in the different actors through local interactions. These local interactions will decide if the desire (for instance a new strategy) will actually be turned into practice. This change cannot be planned as such, since so much is happening at local levels that will shape the course of events – as well as events from outside the conversation.

Working with ambiguity and complexity is not easy for people steeped in linear thinking (Mowles et al., 2008). As a consequence of the thinking of Stacey and his colleagues Aasen and Johannessen (2009) approach the management of innovation as a communicative process (2009) and Buur and Larsen (2010) suggest a new way of understanding innovation as the emergence of new meaning in conversations.

Where Stacey and others claim their positions and approaches to be radical departures and rejections of systems thinking, others don't (Jackson 2000 and Zhu 2007). Furthermore, some see them as compatible (Luoma, Hämäläinen and Saarinen 2011). Regardless of how different CRP or not may be, it has undoubtedly gained a lot of traction and popularity amongst scholars and practitioners alike. Examples of the utilization of the theory can be found in organizational and leadership writings (Simpson 2007, Aragón 2012), health practice (Mowles et al., 2010), NGO work (Mowles et al 2008), leadership development evaluations (Jarvis et al 2013), analysis church leaders' narratives (Simpson 2012), understanding of ERP usage (Christensen et al., 2012) and more.

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[52] Elias's "civilization process" can considered to share aspects Weber's concept of rationalization, having similar origins in the changing character of interactions between social structure and individual personality.

2.6.1.4 Cynefin and innovation

Cynefin is a framework for helping leaders make decisions. *Cynefin*, pronounced ku-*nev*-in, is a Welsh word that signifies the multiple factors in our environment and our experience that influence us in ways we can never understand (Snowden and Boone, 2007). More specifically, the Cynefin framework helps leaders determine the prevailing context so that they can make suitable choices.

According to David J. Snowden the development of the Cynefin framework has its roots in his work on understanding how informal networks and supporting technologies allow greater connectivity and more rapid association of unexpected ideas and capabilities than formal systems (Snowden, 2012). It draws on ideas and theories from the knowledge management complexity sciences, and has starting point in the distinction of what is known, knowable and unknown. To all intents and purposes knowledge management started around 1995 with the popularization of the SECI model (Snowden, 2002). SECI focuses on the movement of knowledge between tacit and explicit states through the four processes of socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995; Nonaka and Konno, 1998). Snowden (2002) refers to Stacey (2001) and points out that not everyone considers knowledge a "thing" or a "system" but more of a process of relating. This is a departure from a Kantian world-view (or epistemology) where knowledge is something absolute, awaiting discovery. Snowden (2002) considers knowledge both a thing and a flow.

The Cynefin framework provides a structure in which to discuss different forms of uncertainty from the deep uncertainty through the growth of knowledge as we learn about the world to stochastic behaviours and randomness (French 2015). The framework also offers a further perspective on the relationship between scenario thinking and decision analysis in supporting decision-makers (French 2013).

Snowden and Boone (2007) believe the time has come to broaden the traditional approach to leadership and decision-making and form a new perspective based on complexity science. The Cynefin framework allows leaders to sort the issues they are facing into five contexts defined by the nature of the relationship between cause and effect. Four of these – simple, complicated, complex, and chaotic – require leaders to diagnose situations and to act in contextually appropriate ways. The fifth – disorder – applies when it is not clear which of the other four contexts is predominant.
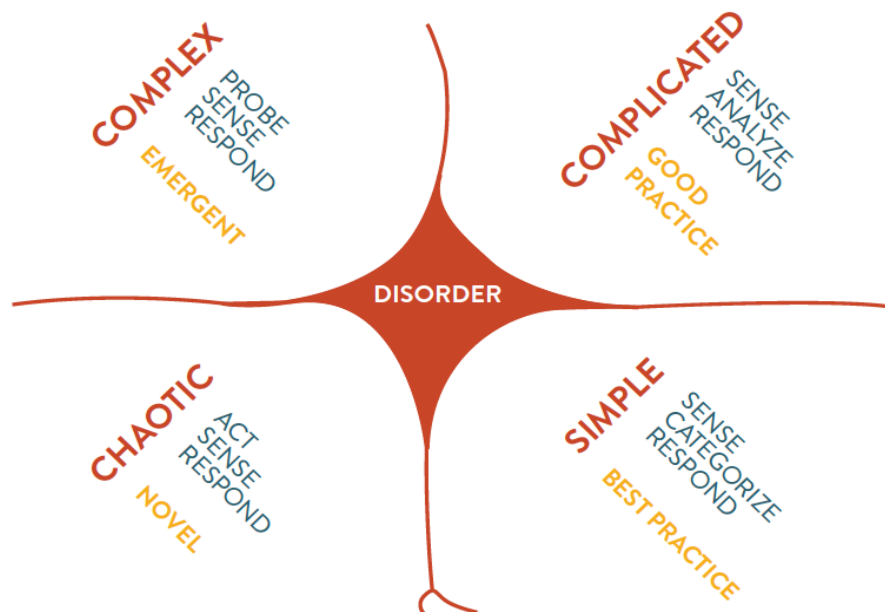
Figure 2.20 The Cynefin Framework Model, freely after Snowden (2007)

Cynefin has been used in a range of contexts to support decision-making and strategy development in dynamic and challenging situations (Gorze-Mitka and Okreglicka, 2014). It has also been used (and suggested) in other areas such as health promotion (van Beurden et al., 2013), information services (McLeod and Childs, 2013) and statistics and decision analysis (French, 2013).

While the Cynefin framework can help organizations understand their context it may also be helpful in understanding and organizing for innovation. Innovation is, as we have seen, not a simple, straightforward process. It requires a departure from business as normal to pursuing something new, something different and something valuable. The Cynefin model suggests how one can go about it; how to act and respond when leaving the known.

Where the Cynefin framework can easily come out as a categorization framework it is more than that. Certainly, it offers a lot of value as an aid to categorization, but even more so it is a dynamic sense-making framework. Sense-making should be understood as the complex process by which people make sense of the situation in which they find themselves. When categorizing, say, a company in one of the given domains, often it is not emphasized that the position is not static or single – in other words, positions change and at the same time a complex entity may be in more than one position at the same time depending on the enforced boundaries of interpretation (for instance the competitive market may be complex, but the internal situation could be labelled complicated). Because the framework is contextual, how people perceive and interpret the world becomes the key to utilizing it.

There is a difference between some theorists' orientations on systems thinking and Cynefin. System thinkers orientate themselves towards an ideal future and then develop strategies for how to get there from the present. Cynefin, as rooted in complexity, focuses on the present, identifying what can be changed and then taking small steps in a positive direction without assuming a final destination. Snowden and Boone (2007) are less convinced than many other thinkers that human complex systems can be easily modelled from those found in nature. They point to some distinct differences between people and animals:

- People can have several identities
- People make decisions based on past patterns of success and failure, rather than on logical, definable rules
- People can, in certain circumstances, purposefully change the systems in which they operate to equilibrium states (think of a Six Sigma project) in order to create predictable outcomes.

As such, leaders who want to utilize and apply the principles of complexity need to go about it differently than just merely assuming a one-to-one relationship between natural and human created systems. One can argue that this is precisely what complexity theory teaches us: we cannot assume the same result from one system to another.

2.6.2   Complexity and social constructionism

As we have seen, complexity theory offers a number of directions, interpretations and subsequent implications. The case in point for this thesis concerns phenomena (strategy, leadership, organization and innovation) in social systems. Here complexity can be understood not only as the governing reality under which these phenomena play out, but also how the phenomena themselves can be understood (for instance by comparing the phenomena with characteristics of the complex systems, or by viewing as a complex system – see more in chapter 6). In this light, it may be helpful to investigate a social constructionist approach to complexity, and to what extent it makes sense to consider how these two theories go together.

While complexity allows many different interpretations of its scope and range, there is an established discourse (Tsoukas and Hatch, 2001) in which the Santa Fe Institute plays a pivotal role. Here, a realist ontology and a search for common principles in a wide range of systems are embraced (for instance, Buckley 1968, Holland 1993). Applying complexity to social systems (for instance Wheatley 1992 and Wheatley and Kellner-Rogers 1996) is not without its challenges. Jackson (2003 and 2009) states that it is a questionable, theoretically uncertain approach. Others try to find a different approach. Cilliers (1998) brings postmodernism together with complexity theory and Stacey suggests seeing complexity theory differently by using its concepts in the service of the interpretive paradigm (Stacey et al., 2000 and Stacey, 2003).

Social constructionism and complexity theory have very different origins as we have seen. The way they view the world also differs. However, there are also important similarities. Social constructionism can be viewed as a meta-theory since it offers a theory about other theories. The same can be said about complexity theory. Both theories discard a Newtonian world-view: a positivist approach to time and space, and the absence of an active connection between the parts and the whole (or the subject and object if you prefer). However, rejecting the same paradigm does not make them one and the same (Boulton et al., 2015). Prigogine (2001) states:

> There is a large difference between the behaviour of inert systems and the behaviour in living systems [where the past contributes to the formation of the future]. In living systems, even very simple ones, the behaviour at a given time is partly determined by memory and partly by the anticipation of the future. In this sense, the future contributes to the past. (quoted in Boulton et al, 2015: 108)

Complexity theory concerns systems, their properties and their history, how the parts interact and the role of their behaviour. Social constructionism concerns the nature of human capability to understand experience (for instance Gergen, 1985 and Stacey, 2011) and assumes a local, context-dependence view of reality.

There is clearly an intuitive sense of connection between the two theories in how words are used and portrayed. An example from Wheatley proves the point:

> In the quantum world, relationships are not just interesting; to many physicists, they are *all* there is to reality. (Wheatley, 1992: 32)

Wheatley also refers to Capra, who quotes the physicist Henry Stapp:

> An elementary particle is not an independently existing unanalysable entity. It is, in essence, a set of relationships that reach outward to other things. (quoted in Capra 1991: 139)

As we can see, the idea of relationships seems to transcend the different traditions and backgrounds between social constructionism and complex systems. However, there are important distinctions (as we have discussed earlier) between the ontological and epistemological assumptions behind the two theories. Linking social constructionism and complexity theory is interesting for this thesis even if, as Jackson points out (2009), complex systems run the risk of their ideas being eroded when they are extended into the social domain.

2.6.3   Innovation, complexity and social constructionism

A social constructionist approach towards innovation offers some new, interesting perspectives. The outline of social constructionism presented in section 2.5 would suggest we view innovation as a social construction. However, just saying this may not be very helpful per se. It would suggest that innovation should be addressed in alternative ways on several accounts, such as explaining it and how to study it. It would offer new perspectives

on how to empirically recognize it – both in terms of outcomes and as processes – as well as how to go about it methodologically.

Social constructionism argues for pluralism, and this would also apply to its approach to research on innovation. It would imply the existence of different interpretations, ideological positions and world-views. It would suggest that conversations and social processes would play a pivotal role, and that the researcher should engage in qualitative fieldwork.

Since its earliest days, innovation has been seen as producing change (Godin, 2011). It is also considered to generate effects in the social sphere – sometimes on a societal level, sometimes on an organizational level and sometimes on an individual level. Innovation is also seen as deliberate, not just something that happens by chance. According to Godin (2011: 36) "discourses on innovation have become performative: they produce innovation in the sense that they encourage people to innovate and then reward them. Discourses on innovation create the world of innovation."

Fonseca suggests that innovation comes from conversations "characterized by critical levels of redundant diversity" (2002: 91) and it is a potential in all communicative action, not a choice or a function.
Quentin Skinner has regularly posited that words are markers of our social understanding of the world, and that the emergence of new words is a marker of changes in society's values (Skinner, 1988). Innovation may not be a new word, but its spread and application certainly implies a change throughout the decades.

Bringing a few different facets of complexity and social constructionism together, innovation could be understood as the emergence of new meaning in dissipative structures.

Structure can be understood as a "supporting framework" or an "organizing whole" (Fonseca, 2002). It indicates how something is composed. Prigogine (1984 and 1997) talks about dissipative structures where dissipative means "breaking up" or "dispersing". Emergence (Holland, 1992, 1993, 1996 and 1999) means "the process of coming into existence or prominence".

2.6.4   Summary of section 2.6

As seen in this chapter, finding common ground is not so easy. The four lenses on innovation present some differences, but also similarities. Indeed, even if some scholars disagree some see ways of bridging these disagreements. While there seems to be agreement on the characteristics of a CAS, and that CAS are an adequate way to understand the world (or at least those parts of the world that fulfil the criteria of a CAS), the utilization of CAS to understand social systems seems far less agreed upon. Stacey and Snowden are more sceptical about applying CAS wholesale when it comes to social (man-made) systems, whereas Reeves and others are more in favour of such approaches.

Another disagreement concerns whether the future should be "designed" and whether one can affect systems as a whole (i.e. top-down when it comes to organizations) in pursuit of a desired, future state. Unfortunately, scholars from different camps don't fully agree here, either. System thinkers such as Senge and Jackson, for instance, certainly maintain the possibility (not a guarantee) of a "designed" system change, but this has been rejected by Stacey and others.
According to Luoma et al. (2011), CRP "illuminates many of the micro behavioural, local interaction and creativity-related organizational phenomena whereas the systems perspective is useful for other purposes". System thinking can support research in several ways by suggesting different levels of analysis and synthesis for different problems, as well as theories and methods (Kapsali, 2011). There are some areas where system thinking and complexity theories share beliefs and approaches:

- Reductionism (the belief that everything can be reduced to individual parts)
- Determinism (the misbelief of complete control)
- Analysis (breaking down systems to its smallest parts to obtain understanding)
- Cause and effect logic (closed boundaries, linear thinking and absence of circular feedback loops).

Businesses today face a different reality to that of the past. Environments are often tougher, more ambiguous and more malleable (Reeves et al., 2012, 2015 and 2016). Technological innovation has increased the pace and effect of change. The diffusion rate of products – that is from invention to saturation – has intensified dramatically. As a consequence, companies move through their life cycles twice as fast as 30 years ago. This requires them to adapt much faster than before, since their products, services and business models become outdated more quickly. Another development is the growth in interconnectedness. Activities are linked across the world, often in particular ecosystems that foster interdependencies between participants. But where connections generate vitality in the economy they also increase the risk of shock events cascading through the system (Reeves et al., 2016).

The Cynefin framework offers a way to articulate the reality of an organization or particular events within or without the organization. Principles from CAS help us to determine what is the nature of the phenomenon in question and, if it fits the criteria, how one can work with it. Systems thinking can help us to look and understand social phenomena both within organizations, as well as what's outside the organization and the interaction between the organization and its context. Complex responsive processes focus more on what actually happens in the particular, local interactions that help shape the course of events.

Utilizing a social constructionist approach and viewing innovation as something that comes about in the interaction between people, articulates a new meaning. Bringing different facets of complexity and social constructionism together, innovation may be understood as *the emergence of new meaning in dissipative structures.*

2.6.5   Emerging questions following section 2.6

Many interesting questions can be explored in the cross-section of social constructionism, complexity and innovation.

A social constructionist perspective is based on assumptions of epistemology, ontology and ideology; the same goes for complexity theories. In terms of innovation there are a few points that offer interesting aspects to explore more in-depth. For example, how can we view, understand and act upon:

- The aspects of the new
- The aspects of value
- The aspects of social acceptance?

All three areas are key in terms of current discourse around innovation. But how would they be explained within social constructionism and complexity – and is that compatible?

2.7   Summary of chapter 2

Global wealth has risen exponentially since around 1750 (Beinhocker, 2006). This growth was more than anything due to technology (Humbert, 2007). The development of new technology allowed for new ways of organizing production and economic activity. Technological progress and the restructuring of production led to an acceleration in productivity development (Humbert, 2007). It seems possible to discuss the development of the world through the lenses of innovation. According to Schwab (2016) revolutions have happened throughout history; new technologies and novel ways of seeing the world have sparked deep changes in our economic system and social structures.

Innovation offers a perspective on these changes, and a reason for it to happen. Since Schumpeter (1939 and 1942), the notion of creative destruction has served to explain innovation and value creation. The understanding of innovation has different sources even if today we associate it to a large extent with economy and technology. Godin (2013b) shows that the linear model of innovation has two origins. One is management and economics, focusing on the origins of invention. The other is anthropology, which suggested it as a solution to the controversy around the role of invention and its diffusion as a matter of cultural change. Over time the two traditions have joined and certain approaches have favoured orientations towards invention, whereas other have favoured orientations toward diffusion. Today we can see that when we talk about innovation, diffusion (what the sociologist calls adoption and the economist commercialization) is often what is favoured over R&D (Godin, 2013b). Innovation is thus seen as the diffusion of invention. To that end one can also view a third dimension of the innovation process, its effects.

Innovation can have many different nomenclatures. The more established ones viewing it as incremental, emergent, radical or revolutionary. Likewise, it concerns value-creating changes in thinking and doing, products and processes, on an individual, organizational or societal level.

Innovation is today a non-controversial practice, an institutionalized ordering and structuralizing principle of thought and action. Innovation crystallizes into a single word a whole semantic field or cluster of other concepts and ideas: change, novelty, invention, creativity, originality and usefulness (Godin, 2011).

Complexity theories offer fascinating new perspectives on how innovation can be understood and acted upon. In this thesis these are represented by complexity responsive processes, Cynefin, systems thinking and complex adaptive systems.

The author suggests two different working definition of innovation which the author would argue essentially mean the same thing. It is more a matter of perspective.

> 1. The process of bringing something different and valuable, successfully into being.
> 2. The emergence of new meaning in dissipative structures.

Rakesh Khurana (2007) refers to the social transformation of the American Business Schools and the unfulfilled promised of management as a profession. He argues that business schools have essentially given up on the idea of professionalism and have retreated to a position as suppliers of a product, the MBA, with students to be understood as consumers. Those higher ideals – professional and moral – that used to inspire and guide business schools have been replaced by a paradigm in which managers are simply agents of shareholders, obliged only by the reason of share profits.

Considering innovation and how we have come to understand it, a parallel to Khurana's book is interesting. Our understandings of things change over time. Just as the idea and concept of innovation has changed over the centuries, so has management – and in a much shorter time. While innovation today seems to be the de facto

answer to all problems and challenges, this was not always the case. Indeed, as shown by Godin (2012a and 2012b) and others, innovation as a word was not even always considered something positive.

It seems like the growing importance of economic growth and technological progress (as a vehicle for economic growth) has positioned innovation as the theory of change par excellence. The attention given to the idea is therefore understandable. But what does it mean that the meaning of the word has not just changed, but become so stretched it can be argued to mean almost anything, be applied almost anywhere and be argued by almost anyone?

On the one hand, one can say that the value of the word has been lost (i.e. that it can mean so many things, means it means nothing). Yet on the other hand one can say that has become communal (i.e. given its spread no one can claim ownership). Where the first pole certainly points to problems in the prominence we attach to it, it is also remarkable that we actually do assign so much importance to it when there is so much disagreement about it. Perhaps it has become a buzzword, a slogan, a political statement, without any substance; but to say so would not only diminish the word but also the people who are using it. If that is the case there must be other reasons for its use.

As the word has become communal, owned by none and everyone, it has come to represent something entirely different. When they say innovation today, most people have a rudimentary idea of what is being talked about, meant and intended. The context (in the conversation, text, etc.) offers a point of reference for a value judgment on the topic of innovation, but even just saying the word people get a hint of this (at least in the western world). Even if there is not detailed agreement on a definition, it seems like there is a general agreement about what it "is". Rather than being an empiricist object of research it becomes a conceptual value, which is negotiated over and over again.

As Khurana (2007) shows, in the late nineteenth century the emerging managerial class sought social status to equal the wealth and power they had amassed. They started working with major universities to launch graduate business education programmes, matching those for medicine and law. This meant codifying the knowledge that was assumed relevant for practitioners and standards of conduct. Following Drucker's dictum that "innovation is what entrepreneurs do", similar challenges as faced business educators decades ago still face not just academics, but also innovation practitioners today. If innovation is what is being done – what is it and how is it being done?

The challenge is of course to avoid innovation being *only* a slogan or *only* something one cannot disagree with. I remember a meeting around 10 years with a defector from East Germany who had lived in Norway for many years. In our talk, we eventually came to the subject of change and innovation. His response was that innovation was essentially a fear of the present, of stability and permanence. This is interesting given how much emphasis we place on people being afraid of and resisting change. It is a different perspective.

A few years ago, I joined Angela Merkel's 2nd International German Forum,[53] which revolved around the topic of innovation and how we innovate. In the concluding debate the innovation expert John Kao[54] pointed out that innovation was still a very young subject. He used the analogy of seeing only the first 10 minutes of a film. As such maybe it is understandable that we encounter disagreement and challenges: we simply do not know enough yet.

Another aspect is the connection to Khurana's notion of the desire of the emerging managerial class: the desire for recognition. Few medals are handed out to those who follow well-trodden paths. In order to obtain cultural and social recognition innovation needs to be innovated. This adds to the multitude of definitions and

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[53] https://webgate.ec.europa.eu/socialinnovationeurope/en/magazine/governance/articles-reports/2nd-international-german-forum

[54] https://en.wikipedia.org/wiki/John_Kao

approaches. A more positive side is that our local gestures (Elias, 1939/2000) and our negotiated reality (Gergen, 2000, 2009) calls for locally, created and agreed upon realities. As they are massaged or clashed against other realities and truths, they change.

The question then becomes, what is effective? Here it seems that this is a paradox. On the one hand, we need to be more precise and exclusive in our orientation on the subject of innovation. On the other hand, the generality of innovation allows for a much broader and wider exploration, investigation and application, which may open new doors we did not even knew existed.

2.8   Emerging questions following chapter 2

After going through a fair amount of literature and bringing innovation, social constructionism and complexity together, a number of questions arise around the research question.

- Is it true that organizations are deeply rooted in their own world-view and accept, reject and act accordingly upon ideas and suggestions that aim to promote innovations? And if so, how can one open up and expand one's own world-view? What methodologies are effective in the pursuit of "change"?

- Complexity is accepted (if maybe not understood) as a defining characteristic of the organizational landscape, but strategies, leadership and organization also seem to depend upon tradition. It seems organizations are not just a seamless, instant consequence of changes in the landscape. They resist, take time to adjust and in fact try to affect their own systems – making the system fit the organization so to speak. Does this "friction" and "adaption-lag" not only define success, but also represent the space for improvement, learning and creativity?

- Is innovation still mainly performed as a top-down process following the main ideas and propositions from the strategic planning school? Is it the case that the smaller the organization and the more fluent and nimble the strategy process, the less fixed and rigorous it is? Does the same apply to innovation strategy – is it designed or more emergent (consciously or unconsciously)?

- Is leadership for innovation formally situated on the top management level? Is it the case that the larger the organization, the further away from innovation activities the top-management function; whereas in smaller organizations or start-ups, innovation is the primary activity? In that case, what is good innovation leadership?

- Does innovation in large organizations tend to be organized in special departments – for instance R&D or a special innovation unit – whereas in start-ups or smaller companies it is more widely distributed and assumed? Are there particular ways of organizing that make more sense today, or are at least more fashionable?

- Do organizations have a limited and less developed view of the notion of innovation (what it is, how it is developed etc.)? This goes for the innovation process, models, and methodologies alike. In large organizations, it is difficult to reap the benefits of innovation endeavours because of the lack knowledge and proper clarity (why it should be done and what it is) and rigor. In smaller organizations does the absence of structure and clarity (more how and who rather than why and what) prevent full returns?

- As the thesis concerns complexity – complex adaptive systems – what do these tell us about innovation itself? Innovation – viewed from the inception of an idea, encompassing its surroundings, to its

dissemination and effect – seems possible to describe from a complexity perspective, but what would something like that really look like?

- Social constructionism offers an interesting starting point for viewing innovation. If it is more a question of language and world-views which can be addressed in frameworks like appreciative inquiry, what would be an approach for innovation and an innovation process?

3 Methodology

3.1 Introduction to chapter 3

The purpose of this chapter is to provide a description of the methodology used in the research, a rationale for the choice of the methodology and an account of its application. The following areas will be covered:

- Note on the starting point of the research and methodology
- Note on the relationship between the case and the researcher
- Overview of the research design and methodology
- Overview of the research process
- The research process explained
- Theory of science
- Research design and methodology
- Data collection
- Summary
- Emerging questions.

3.2 Note on the starting point of the research and methodology

How do we go about studying innovation and innovation processes in organizations? Or even more precisely: How do we go about studying the research question (i.e. *how do organizations go about developing capacity to bring about innovation in complex systems*)?

There are a number of possible ways to go about the actual investigation. Darsø (2001) argues for the advantages of a prospective method compared to state-of-the-art, retrospective methods. While she makes a good point regarding the risk of retrospective biases, the obvious challenges are provided by the question of "when is innovation really happening", or even a part of this, say, "when do ideas come forth"?

Audiotapes and videotapes are still the most authentic data we can produce from a real-life situation. However, it makes a difference whether the person who is going to analyse the data was present or not. Research with a high degree of reliability should include a description of some of the steps, aiming at making the researcher's inferences transparent to others (Darsø, 2001). In relation to science and research the essential point is that the "voices" of subjects other than the researcher are also heard (ibid.).

For this thesis, it was decided that:

a) It would include a fairly thorough literature review
b) It would be exploratory
c) It would be oriented round praxis and reflection.

The reasons for this were a combination of:

a) The interest of the researcher (i.e. wanting to learn much more about the subjects)
b) The assumption that not much knowledge could be found that would directly answer the research question

c) The case study (Telefónica) that was available at the time of enrolling on the PhD programme, which demanded an action research part.

As such the research was set to consist of a quantitative research part and a qualitative research part, and it would make use of the preconceptions and reflections of the researcher

3.3   Note on the relationship between the case and the researcher

Although the researcher had never worked before at Telefónica, he was contracted to work for them between 2013 and 2014 on a consultancy basis in the form of action research. This work was the starting point for this thesis' fieldwork. After the contracted work was completed and as the thesis progressed the researcher maintained a relatively close relationship with some of the individuals involved in the work (primarily the leader of the unit and later the founder and leader of Alpha).

As such the start of the relationship can be seen as a combination of a client-consultant relationship (Schein, 1986, 1988, 1999, 2009 and 2013) and that of an interviewee-researcher (Kvale and Brinkmann, 2015) following the social constructionist approach (McNamee, 2010 and McNamee and Hoskins, 2012). After 2014 the relationship did not extend beyond that of Telefónica being the case for the PhD, however this included interviews and further random talks and advice on my behalf.

3.4   Overview of the research design and methodology

Below follows an overview of the research design and methodology.

Research question	How do organizations go about developing capacity to bring about innovation in complex systems?
Purpose of research	Explore new territory, test existing theory and co-construct insights and emerging questions.
Research design	A grounded theory approach Mixed methods – quantitative and qualitative Case study research – single case holistic design Expert interviews and co-creation Thematic analysis and data conversion.
Units of analysis	Lenses (issues, matters, questions) that emerged through the research process.
Case criteria (Qualitative)	Big company. Technology rooted, product and service development.
Case criteria (Quantitative)	Subject-matter experts (SMEs). Part of relevant networks. Expressed interest in questions around innovation. Representing an organization.
Data collection	Online survey Qualitative and semi-structures interviews Workshops Focus group Secondary sources.
Form of reasoning	Inductive – some abductive and deductive processes.
Theory of science	Social constructionism Complexity theory.
Form of analysis	Segmenting and cross-referencing of online responses Condensation and categorization of meaning, narrative structuring, meaning interpretation and ad hoc methods.

Table 3.1 Overview of the research design and methodology

3.5   Overview of the research process

Below follows a timeline of the research process and a description.

2012	
Q4	Started the application process for the PhD at Tao/Tilburg
2013	
Q1	Contract with Telefónica in place
Q2	Acceptance onto the PhD programme
Q3	First round of interviews with Telefónica
Q4	Reconfiguration of research question and strategy
2014	
Q1	Social constructionism course done
Q2	Quantitative research done
Q3	Analysis of quantitative research done
Q4	First draft and outline of chapter on innovation
2015	
Q1	Chapter on complex systems, begun
Q2	Chapter on social constructionism, begun
Q3	Chapter on innovation, begun
Q4	Chapter on methodology, begun
2016	
Q1	Bringing together of innovation, complexity and social constructionism
Q2	Chapter on methodology, revisited
Q3	Reconfiguration of the thesis outline, structure and content
Q4	Finalization of methodology chapter and case review
2017	
Q1	Final interviews with Telefónica conducted and analysed
Q2	Discussion chapter written
Q3	Conclusion chapter written and 1st submission of thesis
Q4	Editing structure of the thesis
2018	
Q1	Editing structure and content of the thesis and new submission

Table 3.2 Overview of the research process

Of course, this is a simplification and generalization of the process. It has been a spiral type of process in which new findings have led onwards but also back to better understandings of the previous findings and positions.

3.6   The research process explained

The research process did not follow a straight line. It can even be argued that it began in a somewhat unorthodox fashion. Because the consultancy work was already on its way the research question was developed in the same time period. As indicated, it was not fully decided at the time that the work with Telefónica would become the case study for this thesis. This was something that crystallized as the PhD work became clear.

The literature review needed to be relatively extensive to take into account the different aspects of the subject matter (innovation). The subject offers – even when contextualizing it in complex systems – many discourses, which required a discussion of their inter-relationship. The initial findings here served as a backdrop, a platform for developing the qualitative and quantitative research.

There is much written about the subject as such, but little that responds to the actual research question. The next step was to unfold the research question and its supporting questions by conducting a more quantitative research study. A survey was developed and posted in different online forums, inviting different subject matter experts (SMEs). It also helped to unpack the work done at Telefónica.

The organization chosen represented in a good way the challenges and opportunities of innovation (see chapter 4 and chapter 5). This was also echoed in the researcher's own experiences and from his experiences in working with Telefónica. The combination of changing customer preferences, technology and the competitive landscape offered a very interesting opportunity to investigate much deeper and to discuss from a complexity and social constructionist perspective.

Using a single case offers some challenges, as well as some opportunities, which will be discussed later on this chapter. It will be argued that local findings have a value even if they can't be extrapolated and generalized universally.

The qualitative study was organized around a total of 18 interviews: three with the leaders of Alpha, 13 with the leadership of the former R&D unit (PDI), one with another leader of innovation at the company (he was also one of the 13) and one with a former employee with much insight into Telefónica (he was also the one who helped out with the consultancy work). The interviews were supplemented with public records such as annual reports and newspaper articles.

The preliminary findings from quantitative and qualitative research were explored and extrapolated in a focus group, consisting of five other SMEs and the researcher.

The different findings from the qualitative research were contrasted and compared with the quantitative research and the literature review. Eight parameters that were developed during the research to develop the research question even further were used in a conversion phase to discuss the different findings.

Finally, in the conclusion, the findings were turned directly towards the research question and mirrored against the researcher's own experiences and reflections.

The researcher worked very much with emerging questions and views throughout the process as opposed to hypotheses. This is reflected in the thesis as well, offering an exploratory orientation to the work.

3.7   Theory of science

This thesis takes its starting point in social constructionism. Social constructionism is often portrayed and discussed as a departure from positivism. There are positions in between – for instance Cupchik (2001) suggests "constructivist realism" as an alternative ontology that accommodates positivism and constructivism and the methods that they subtend. Here, the third position discussed is critical realism, which places itself in-between the two more radical positions.

A natural consequence of the scientific revolution was of course the attempt to define science and its characteristics. The French philosopher Auguste Comte published in 1830s and 1840s a number of texts in which established an epistemological perspective of positivism where it was presented as an ideal for the sciences. In these he stated that the sciences should focus on what was observable and noticeable – hence the positive characteristics of the phenomena in question. What was not observable – for instance reasons why things where appearing as they were – was not to be considered (Fuglsang and Olesen, 2004). Positivism of course spilled over into the social sciences and as such established a view where the paradigms of the natural sciences became the ideal and foundation for understanding, research and method. Positivism suggests that the goal for the social sciences is to produce cause and effect – regularities – concerning human behaviour that can be universally generalized (Kvale, 2005).

A social constructionist perspective is quite different to the stance of positivism in the sense that it claims that reality – or more accurately, our experience, understanding and appreciation of reality – is socially constructed (Gergen, 2005; McNamee, 2010). According to Guba and Lincoln (2005), positivism's "naive realism" holds that reality is both "real" and "apprehendable", whereas social constructionism argues that meaning is generated by groups and people in relationships.
Language and our relations, and how they are used and developed, create our reality. This implies that change is possible through changes in language and relationships. This means that social and societal phenomena are not fixed and unchangeable but are generated over the course of history. Most constructionists agree that there can exist a physical world, a world of objects and phenomena outside the social world. Social constructionism does not make any claims on reality (Gergen, 2005; McNamee, 2010). In terms of epistemology – what we can know – knowledge in social constructionism is the result of a relational process and must then be relational. The ontological stance is that our relation to our world defines it. We can't presume a world existing outside our relations, nor can we rule it out, but it makes no sense to view or relate to it in a special manner.

Critical realism places itself as somewhere between positivism and social constructionism. It started to be popularized by Bashkar in the 1970s. He suggests a realist philosophy and that societal relationships exist independently of the researcher and are changeable (Bashkar, 1993; Fuglsang and Olesen, 2004). However, there is no direct access to an external reality and a number of phenomena such as politics and economics play into the scientific process (Buch-Hansen and Nielsen, 2005). What is of importance to critical realists is describing and understanding structures and mechanisms that manifest phenomena (Buch-Hansen and Nielsen, 2005). All knowledge is produced in social contexts and is based on existing knowledge. Thus, all knowledge is created and can contain error phenomena (Buch-Hansen and Nielsen, 2005). Critical realism can be argued to find its own ontological and epistemological position – with an objective ontology and a subjective epistemology – with science offering a way to gain more or less valid knowledge about our reality (Van de Ven, 2007).

	Positivism	Critical realism	Social constructionism
Ontology	Realism	Critical realism	Relativism
Epistemology	Objectivism: The results are true	Modified objectivism: The results may be true	Subjectivism: The results are created
Research method	Primarily quantitative	Both quantitative and qualitative	Primarily qualitative
Form of reasoning	Deduction	Abduction	Induction

Table 3.3 Overview of theories of science

Järvensivu and Törnroos (2010) suggest that the differences in the forms of reasoning can be described as follows:
- Deduction means moving from theory to empiricism
- Abduction means an interaction between theory and empiricism
- Induction means moving from empiricism to theory.

In this thesis, the main form of reasoning has been induction. However, both deduction and abduction have been used in different areas of the research. For instance, in connection with analysis and case description development abduction best describes the process, and in connection with the quantitative research deduction best describes the process.

3.8   Research design and methodology

Research design is a logical plan for getting from initial set of questions to be answered to set of conclusions (Yin, 2003/2009). It contains research questions, unit of analysis, the collection of data, analysis of data and criteria for interpretation of the data.
The methodology utilized in this thesis combines qualitative and quantitative approaches. The quantitative approach – at least in theory – should be better equipped to identify more substantial and more generable patterns and trends than the qualitative approach. The qualitative approach is better positioned to go deeper, and find details and local qualities.
To cater for deficiencies in the approaches and increase the reliability of the data collected triangulation in methods and data has been applied where possible.

3.8.1   Problem formulation

Even though the core of the research question – *How do organizations go about developing capacity to bring about innovation in complex systems?* – was formulated at the beginning of the research, it underwent a number of developments and was refined over the course of the study. Finding a focus in real world research can sometimes be a lengthy affair. Booth et al. (1995) state that this focus can come from a mixture of three sources: a gap in the existing research, a real-world problem and the researcher's own interests. The research question in this thesis stems from all three.

3.8.2 Social constructionism and methodology

When it comes to social construction and methodology we find ourselves in a less rigid and conventional realm. According to McNamee (2010) and McNamee and Hosking (2012) there is no such thing as a relational constructionist method.
When it comes to traditional research, from a constructionist stance traditional research (i.e. the scientific method) is viewed as one discursive option for conducting research, but it is not the only one (McNamee, 2010).

Gergen and Gergen (2004: 7) define social constructionism as "the creation of meaning through our collaborative activities". This implies that meaning is not only communal and local, but also created. As such it challenges pre-conceptions of methodology as somewhat value-neutral and somewhat universal. It also suggests that people have alternatives not only to understand what reality is, but also how "reality" is created. This also goes for one's own "truth". One can then argue that the main concern is not the understandings (the truths) in themselves, but more the assumptions, values and the process and by which we come to our understandings.

Van de Ven (2007) argues that different scientific paradigms and methodologies are not in contention with each other, more they are supplementary. Furthermore, pluralism in the findings should not be discarded as noise, errors or outliers if the researcher is not searching for consensus, convergence and agreement on reliability and replication. He promotes the notion that the world and its problems hold varying conflicting aspects.

Relational[55] constructionism is a meta-theory or discourse of (human) science (McNamee and Hosking, 2012). Hosking (2011) portrays relational constructionism as a number of considerations (or understandings) that are practical, and that supposes research to be a participatory relational process that co-constructs worlds of communication and (social) engagement. Methods are then considered as a form of practice (McNamee and Hosking, 2012). The relational – the relationship – as the core principal construct provides an orientation that includes essentially all human activities. It implies that one could use virtually any method, even if, for instance, it might be considered part of a different tradition (for instance statistics, surveys etc.).

From a social constructionist perspective, methodology would be seen as the result of a certain number of relational processes. These relational processes have given birth to a number of values, understandings and traditions, which again have resulted in particular methods. These methods are valid and often preferable within these traditions. However, as there is more than one tradition, more than one world-view, there may be other equally valid methods. One method may create one set of "data", another one may create a different kind of "data". The practice of the method in question is then key for the constructionist orientation.

The research is a process. However, more than just revealing a truth it is a creational process – an understanding, a world-view, findings that are in the making. Since this is a co-active process it holds the possibility of change for the researcher as well as the participants. In short one can say that such research does not find knowledge – it creates knowledge.

3.8.3 Grounded theory

The main consideration is to choose a methodology that is helpful towards the research question and the purpose of the thesis. Given the research question and the aspiration of the thesis (to come up with a model for leading innovation and a framework for developing innovation strategies) a grounded theory approach has been chosen. Grounded theory was developed by B. G. Glaser and A. Strauss in the 1960s (Glaser and Strauss, 1967).

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[55] It is interesting that some authors use the word "relational" in connection with constructionism, whereas at the same time they seem to avoid the idea of constructionism as anything but relational.

The theory has been furthered since then (for instance Strauss and Corbin, 1990; Glaser, 1992; Seldén, 2001). It is a social science approach in which the starting point for the researcher is to stay as open as possible when it comes to the data used in the study, allowing findings such as patterns and processes to emerge. As such it is more of an inductive methodology as opposed to a deductive methodology in which there is no real (at least ideally) preconceived notion of what the data is supposed to show, prove or disprove. The method has also been exposed to critique (for instance Seldén, 2005) for its lack of inner consistency. In the present thesis, grounded theory is used as an overall approach to the conduct of research. There is a starting point and some sort of assumptions on behalf of the researcher and there is an idea of what the thesis should offer – but the researcher remains open to the findings and does not try to fit those in with his own world-view. The actual outcome of the thesis can point in many different directions.

3.8.4   Mixed methods

This thesis has used a mixed methods research. Mixed methods can be conceptualized from epistemological debates between advocates of quantitative methods and those of qualitative methods (Pluye and Hong, 2013). When research questions would benefit from a mixed methods approach, researchers need to make careful choices about integrating procedures (Fetters et al., 2013). Using mixed methods research integrates at least one qualitative method and one quantitative method (Pluye and Hong, 2013). According to Fetters et al. (2013) several gains can come from integrating the two forms of data. For instance: Quantitative data can be used to help generate the qualitative sample or explain findings from the qualitative data and qualitative data can be used to assess the validity of quantitative findings.

A normal classification of mixed methods (Fetters et al., 2013; Pluye and Hong, 2013) describes three types of research design where each represents one type of integration of quantitative and qualitative methods:

- Sequential exploratory design: qualitative findings inform the quantitative method, then quantitative results are mobilized to confirm or generalize qualitative findings
- Sequential explanatory design: quantitative results inform the qualitative method, then qualitative findings are mobilized to interpret or explain quantitative results
- Convergent design: quantitative and qualitative methods are complementary during data collection or data analysis or both.

This thesis primarily used convergent design where they converge for the analysis, and to some extent sequential explanatory design in terms of preparing for the interviews. Regarding the integration of qualitative and quantitative data at the interpretation and reporting level, Fetters et al. (2013) describes three different approaches:

- Integration through narrative (through a series of reports)
- Integration through data transformation (one type of data is converted into the other)
- Integration through joint displays (using a visual mean).

This thesis used the second approach, integration through data transformation. By developing a coding scheme and conducting a thematic analysis, frequencies let themes emerge from the corpus.

3.8.5 Single case design

The goal of this research is to obtain knowledge about how organizations go about making innovation happen. First, we need to ask the question: What is the nature of the problem? Second, we need to ask: Through which methodology can this kind of problem be examined? Following the argument of Darsø (2001), the complexity of the problem justifies the approach of a case study.

A case study is not a methodological choice, but a choice of object to be studied (Stake, 1994). As a form of research, a case study is defined by its interest in individual cases, not by the methods of inquiry used. In a case study framework, both qualitative and quantitative data are collected to build a comprehensive understanding of a case, the focus of the study (Yin, 2003). As a research strategy, the case study focuses on understanding the dynamics present within a single setting (Eisenhardt, 1989). According to Yin (2003) case studies are preferred as research strategies when "how" or "why" questions are being posed, the investigator has little control over events and/or when the focus is on contemporary phenomena within some real-life context. Case studies offer – in addition to the fetch the dynamics a play – a multidimensional perspective on the context (Järvensivu and Törnroos, Eisenhardt, 1989). As such it is more the understanding of the case than the generalization beyond it that is the focus of single case study design.

The criteria for selecting the case study approach are that the research problem involves complexity, real-time events and processes that are not easily distinguishable from their context and that must be consequently be studied in real-life (Yin, 1994). It can include qualitative as well as quantitative data.

Yin (1994: 20) lists five components that are important for the case study design:

1. The questions
2. The propositions
3. The unit of analysis
4. The logic linking data to propositions
5. Criteria for interpreting the findings.

Generally, multiple-case studies are preferred over a single-case study, for these offer more robust analytical conclusions (Yin, 2009). It increases external validity. However, here only one case has been chosen. It is of course fair to say that more cases increase the chance of making general statements that hold value, but this can come at the expense of more robust local observations, reflections and conclusions. The complexity of the research question in itself suggests that by going deeper into one case, more value is generated, instead of going broader and perhaps not as deep. Since the case study in question represents a new (unique) case that has not been well researched, and since the research question focuses on a topic that is not very well documented, there is a rationale for choosing a single case study.

According to Stake (1994: 244) the main responsibilities of the qualitative case researcher are:

1. Bounding the case, conceptualizing the object of study
2. Selecting phenomena, themes or issues – that is, the research questions – to emphasize
3. Seeking patterns of data to develop issues
4. Triangulating key observations and bases for interpretation
5. Selecting alternative interpretations to pursue
6. Developing assertions or generalizations about the case.

While a single case may be a poor representation for furthering of grand theory, it can help us refine a discourse by showing something that contradicts it. The purpose of a case study is not to represent the world, but to represent the case.

The research methodology chosen is a single holistic case design. The methodology is multiple since the empirical material is collected using more than one method and it is not embedded since the study takes on the case in its totality.

The choice to conduct a quantitative survey with SMEs, a case-study with two different main units of analysis (i.e. first the PDI then the Alpha) conducting both action research and interviews, then a focus group with experts – all of these demanded quite extensive and time-consuming work in terms of identification, research, interviews, analyses, descriptions, feedback and re-writes. However, the approach has granted the opportunity to combine a fair amount of data to find patterns, both similarities and differences.
As the analyses show there are literal as well as theoretical replications between the case study and the quantitative survey.

According to Yin (1994: 27), "This role of theory development, prior to the conduct of any data collection is one point of difference between case studies and related methods such as ethnography." As such the ethnographer is closer to a "grounded theory" approach as described by Glaser and Strauss in (1967). This inquiry, however, has not linked pre-set propositions to empirical data per se. Rather than operate with pre-fixed hypotheses, this inquiry has followed the notion of generating emerging questions to guide its exploration and learning.

3.8.6   Source selection, validity and methodology

According to Yin, internal validity is key for data analysis in case studies that are explanatory or casual, but not for descriptive or exploratory studies (Yin, 1994: 33). This is because when dealing with complex problems some inferences and explanation will be attempted, but casual relationships will hardly be the outcome (Darsø, 2001).

3.8.7   Triangulation

The term triangulation is used in many ways in both qualitative and qualitative research (Creswell, 2009), but is generally understood to be a way of validating findings, especially in mixed methods research. It has been outlined by many as one of the defining or crucial methods for achieving quality and validity in case studies (Eisenhardt, 1989; Kvale, 1996; Patton, 1999; Yin, 2009).

According to Patton (1999) the term triangulation is taken from land surveying. He goes on to say that "the logic of triangulation is based on the premise that no single method ever adequately solves the problem of rival explanations. Because each method reveals different aspects of empirical reality, multiple methods of data collection and analysis provide more grist for the research mill" (1999: 1,192). Another way to put this is that as the data required derives from different sources, methodological triangulation will ensure construct validity.

Triangulation has generally been considered the process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation (Stake, 1994). However, acknowledging that no observations or interpretations are perfectly repeatable, triangulation serves also to clarify meaning by identifying different ways the phenomenon is being seen (Flick, 1992). As such it is a way of bringing forward multiple perspectives and meta-interpretations (ibid.).

In the present research triangulation can be seen to have taken place on several levels:

- Triangulation between the interviewees
- Triangulation between the (action) researcher and the participants (i.e. interviewees)
- Triangulation between peers (i.e. the co-consultant/interviewer).

Furthermore, in terms of methodology, theory and perspectives the following can also be argued:

- Triangulation between action research, questionnaire and interviews
- Triangulation between the different theoretical approaches and their connection to the case-study
- Triangulation between the researcher's journal and notes, the participants' perspectives given in the interviews and comments upon reports etc., and public data and reports.

The present thesis pursues a wealth of multiple perspectives. This wealth is the hallmark of the relational constructionist approach to research and the study uses a triangulation of data, methods and researcher perspectives in order to create "thick textured descriptions" (McNamee and Hosking, 2012: 47).

3.8.8 Choice of sources

The prime sources for the data for this thesis have been the interviews. Other sources of data have also been used, both to heighten the quality of the data generated through the interviews, and to augment and animate them. Some of these have been public stated records and home pages, but presentations and internal records have also been used. It should also be stated that some of these sources have merely informed the researcher in his work – in the action research phase, in the interviews and in the analysis phase – rather than been explicitly used and argued in this thesis.

3.8.9 Validity, reliability and generalizability

According to Yin (2009), research is valid when the researcher investigates and measures what he has sat out to investigate and measure. With this follows a notion of what is appropriate in terms of data, practises and tools. "Whether the research question is valid for the desired outcome, the choice of methodology is appropriate for answering the research question, the design is valid for the methodology, the sampling and data analysis is appropriate, and finally the results and conclusions are valid for the sample and context" (Leung, 2015). As such there is a demand for consistency between decisions made, data obtained and interpreted, and conclusions made.

According to Leung (2015), "reliability in quantitative research refers to the exact replicability of the processes and results. However, in qualitative research with diverse paradigms, such a definition of reliability is challenging and epistemologically counter-intuitive." Yin (2009) states that it means that two different researchers with the same type of data and the same type of theoretical perspective would conclude the same things regarding their case studies. This leads to the demand for consistency to ensure reliability.

Certainly, generalizability when it comes to qualitative studies and particular single case studies can be discussed. Yin (2009) states that it is important to keep in mind what is being considered when talking about generalizations. As stated by Yin (1994: 31), "the method of generalization is 'analytical generalization', in which a previously developed theory is used as a template with which to compare the empirical results of the case study." Most, if not all, qualitative research studies are premeditated to investigate a certain topic or occurrence

in a certain populace or ethnic faction, of a fixated area in a specific milieu; as such the generalizability of such qualitative research findings is usually not expected (Leung, 2015).

Kvale and Brinkmann (2008) offer a checklist for verifying the validity, reliability and generalizability of findings:

- Validity
  Can you check the truth of the statements? E.g. number of employees in organization, number of customers etc.

- Reliability
  Are there any internal contradictions? Did you include the same question twice expressed in different ways to check the truthfulness of the responses?

- Generalizability
  How do the answers agree with broader research and other interview answers?

Even if we can't claim theories on the basis of single cases it is not true that they hold no value outside the particular. Leung (2015:326) points out that "with rising trend of knowledge synthesis from qualitative research via meta-synthesis, meta-narrative or meta-ethnography, evaluation of generalizability becomes pertinent".

Another way to look at this is to consider how we understand what has been obtained. Following Darsø's (2001) suggestion, we can contrast the positivist (functional, modernist) and naturalistic research paradigms: internal validity versus credibility, and reliability versus dependability. In a study like this that applies multiple perspectives, she argues for applying both. Internal validity is not central to descriptive or exploratory studies (Yin, 1994: 33). Credibility, she argues, is obtained by the length of the study (prolonged engagement), the triangulation and a reflexive journal.[56]

Validity therefore sits with the ethics and practice of the researcher. To what extent is he or she skilled to conduct the inquiry? Validity can also be discussed in terms of who is involved in the inquiry and in what way, whether that be the interviewees or co-researchers or even the focus group. Finally, it is the readers of the thesis and the usability or value of the thesis. This could for instance be the case study itself.

In this thesis, the reports from the workshop were commented upon by participants. The co-consultant helped the researcher obtain different perspectives by conducting interviews as well as by reflecting on the process and outcomes of the workshops and interviews. The findings from the different enquiries and emerging questions were discussed in the focus group. This almost circular learning journey offered opportunities for constant comparison and reflection on multiple perspectives in the study.
McNamee and Hoskins (2012) says that a relational orientation when it comes to research doesn't fix explicit methods. It is as they say: "more about ow we practice any particular 'method', or, more generally, how we 'do' our inquiry" (2012: 45). Here a view towards a social constructionist stance has been the guiding star.

3.8.10   Transparency and authenticity

Several (naturalistic) investigators have preferred to use different terminology to distance themselves from the positivist paradigm. Guba (1981) suggests four criteria that should be used by qualitative researchers in pursuit of

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[56] The reflexive journal has been the researcher's own way to reflect upon his learnings and findings. It also helped in terms of reliability as well as dependability of accounts of events and their understanding over the years.

trustworthiness, which have become widely accepted (Shenton, 2004). Guba's suggestions correspond to the criteria employed by positivist researchers:

- Credibility (in preference to internal validity)
- Transferability (in preference to external validity/generalizability)
- Dependability (in preference to reliability)
- Conformability (in preference to objectivity).

Credibility refers to the "truth" of the findings through the use of different sources of data (mixed methods approach). Transferability of the findings is achieved through the use of thick descriptions. Dependability asks that the findings be consistent and can be repeated. Conformability concerns the degree of neutrality, being mindful of the researcher's identity.

The authenticity criteria for constructivist research seem to be more relevant than other criteria when it comes to trustworthiness (Morrow, 2005). In terms of authenticity criteria Morrow (2005) points to the criteria developed by Guba and Lincoln (1989). These authenticity criteria include:

- Fairness, which demands that different constructions be solicited and honoured
- Ontological authenticity, where participants' individual constructions are improved, matured, expanded and elaborated
- Educative authenticity, which requires that participants' understandings of and appreciation for the constructions of others be enhanced
- Catalytic authenticity that speaks to the extent to which action is stimulated
- Tactical authenticity concerns about whether the researcher empowered stakeholders to take action.

In terms of transparency, this research has strived to leave nothing out in terms of epistemological, ontological and methodological considerations and decisions.

As this thesis seeks trustworthiness and claims "situational uniqueness" we strive for "thick descriptions" in the hope that these actions will lead to transferability and are context relevant (Guba, 1981). Here, the development of thick descriptions of the context allows us to make judgments about fittingness with other possible contexts. Through the action research phase and the interviews, combined with the thesis itself, the participants have gained from the research and grown. Thus, authenticity can be argued.

3.8.11 Strategy and methodology for the analysis

The research started in 2013 with a consultancy assignment, with the client providing an introduction to the organization in question. In addition, the researcher and his fellow consultant gathered data from websites, presentations and public records. The empirical work was supplemented with theories around innovation, strategy, organization and leadership. This provided the backbone of the case presentation around Telefónica overall and that of the unit with which the researcher started in 2013. Much of the data for the case description that was created in 2016 and that essentially became the focal point of the research was provided by the client – mainly because not very much has been written about it yet. This suggested that research on similar set-ups was needed to contrast and illuminate it. Websites and articles in popular media such as Fast Company and others provided much of the data used.

A thematic analysis was conducted to examine more closely the interviews so that they could be compared and contrasted within a more collected view. In summary, the process for the analysis was as follows:

- The interviews were listened to and the transcripts read through to orient the researcher and obtain an overall impression.
- The research question "How do organizations go about developing capacity to bring about innovation in complex systems?" provided the point of reference and starting point for developing codes and later themes.
- Codes where written in the margin of the transcribed interviews so as to identify key words, images, concepts and reflections. Coding is an iterative and explicit process (Boyatiz, 1998) and as such this stage developed with the unfolding of the data analysis.
- The codes were validated by re-reading the data and checking for consistency.
- The themes, and subsequent sub-themes, were identified from the codes. They came about from conversation topics and vocabulary used in the interviews.
- In the consolidation stage the name of each theme was finalized – described and illustrated with a few "quotations"[57] from the transcribed text in order to help communicate its meaning.

A small note here is required on the responses and frequency around them. The number of responses (i.e. or mentions of certain topics or themes) was not calculated because the number of responses does not constitute value per se. It only demonstrates counted responses, which is not the point of qualitative research. Furthermore, given the relatively small number of interviews, it makes more sense to look at them as a "collective whole", whereby they create an image and an understanding of the case together.

A few corrections were made to the participant's statements were made when the grammar became so poor it hampered the actual reading of it or when the sentence required so much context to be understood. In these cases small adjustments were made, but with respect to the meaning. When the sentences were too long and complicated they have been offered as fragments instead.

Based on the discussion, argumentation and emerging questions around innovation certain parameters (i.e. questions) were used to conduct the main discussion in chapter 5 (see also 3.8.14).

In terms of how to understand the interviews the following outline by Kvale and Brinkmann (2008) was used:

- Linguistical analysis
  Looking at the linguistics and grammar.

- Conversation analysis
  Treating the interview as a conversation.

- Narrative analysis
  Treating the interview as a story.

- Discourse analysis
  Try to evaluate the truth of the responses.

- Deconstruction
  Taking the interview apart and putting together again.

Analysis of the interviews ended up a combination of conversational and narrative analysis. It made little sense to go with linguistical analysis as the language used was not the first language for more than one of the interviewees.

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[57] Since neither the interviewer nor the interviewee are native English speakers, some freedom has been taken with the exact wording to make it grammatically correct and easier to read – but with respect to the interviewee's actual intention and meaning.

Likewise, following the approach of social constructionism, the statements made by the interviewees are treated as "truths". A case for deconstruction analysis can be argued as the stories that were offered differed to some extent – but more as a mental process for generating meaning for the researcher rather than a writing exercise.

Since it was very much an exploratory work to be conducted with the client, the presentation did take into account subjects around

3.8.12   Condensation, coding and interpretation

Thematic analysis is a generic approach to data analysis that enables data sources to be analysed in terms of principal concepts or themes (Fox, 2004). The themes were developed by the researcher to enable the data to be reduced to key ideas. Given that qualitative work is inherently interpretive research, the biases, values and judgments of the researchers need to be explicitly acknowledged so that they are taken into account in the data presentation (Creswell, 2009). Following the advice of Kvale and Brinkmann (2008), colour coding was used in the thematic analysis.

Following Kvale (1996) and Kvale and Brinkmann (2008), condensation, coding and interpretation have been pursued in the analysis (i.e. the findings in chapter 4) as well as in the main discussion (i.e. the conversion phase in chapter 5).

- Meaning coding
  Adding tags or keywords to text segments that represent the main themes of the interviews.

- Meaning condensation
  Summarizing larger sentences into short, simple sentences.

- Meaning interpretation
  Adding more details, background and context to specific parts of the interview.

The data material (the interviews as well as the notes and reports from the workshops, and the reflexive journal) has been read and contemplated several times. First the general sense of "what stand out from the material" was described. In the second and third rounds, notes where added to identify themes and categories that could be connected to the notion of innovation and more specifically the research question. After the third round, meaning started to emerge through comparison of the different interviews and other data – both in terms of similarities but also in terms of where they differed. The coding was done manually.

In this research open coding was used to reduce the data to a number of specific themes describing the phenomena in question (i.e. the research question, supplementing questions and lenses outlined). Coding can also be seen to reduce complexity and diversity in the data (Kvale, 1996), while on the positive side it helps clarify and sharpen understanding of the phenomena in question. At the same time, one has to careful not to impose one's own understandings and desires at the expense of the voices providing the data.

In terms of condensation, there has been a need to shorten and summarize the data available. This goes for the interviews conducted and the more formal data available. Both in terms of the case description as well as in the analyses phase this has been attempted so that the meaning of what was intended comes out in an authentic and clear way.

The interpretation, on the other hand, has expanded the material, whereas the condensation and coding processes have shortened it.

3.8.13 Lenses for the analysis in the convergence phase

One challenge in utilizing several sources of empirical data comes when they are brought together. This is not just a matter of comparing, but also a matter of bringing them together to create a bigger "whole".

As this exploratory research is rooted in grounded theory (Glaser and Strauss, 1967; Strauss and Corbin, 1990; Glaser, 1992; Seldén, 2001) using a mixed methods approach (Fetters et al., 2013; Pluye and Hong, 2013), and makes use of convergent design for the analysis, there is a need to choose how to bring these approaches together. Here the choices have been made in line with a constructionist approach (McNamee, 2004; McNamee, 2010) to make it context relevant, in particular securing authenticity (Morrow, 2005; Guba and Lincoln, 1989) and transferability (Guba, 1981).

This inquiry has been orientated around innovation – and more specifically aimed at: "*How do organizations go about developing capacity to bring about innovation in complex systems?* It has been pursued in an exploratory way. Throughout the research this question, and the supportive questions, has been sharpened and nuanced, giving birth to new, supplementary, ones. This has helped formulate a set of "lenses" that are developed in the form of questions.

The literature review showed a number of aspects (here turned into lenses) that are important when trying to understand innovation, in very much the same way as the quantitative and qualitative work – and not the least my own experiences in the field of innovation. There is a need to create a common view of innovation when working with it (lens 1), we need to understand what is to come out of it (lens 2) and we need to have an understanding of how this is done (lens 3). Innovation in organizational life and work can be seen as subsets of questions around vitality, competitiveness, change and renewal. These questions are normally addressed through the overarching themes of leadership (lens 4), organization (lens 5) and strategy (lens 6). These overarching themes become natural lenses when trying to understand and work with innovation. As seen, innovation is a multifaceted phenomena and this thesis offers an approach to it understanding it through complexity theory (lens 7) and social constructionism (lens 8).

While each set of empirical data is described and discussed individually, when bringing them all together these questions develop the accumulated and collective findings.
For this phase, in line with the research question, the purpose is to map, describe and discuss the following emerging lenses (formulated as questions):

1) Notion of innovation
   What is the notion of innovation in terms of scope and range within the organization and how does that relate to theory?

2) Success
   What does success look like and how is that articulated, both on an overall and a more local level?

3) Frameworks, methods and tools
   What does the analysis tell us about which frameworks, methods and tools are used to bring forth innovation and to what extent are they considered effective?

4) Notions of leadership
   What can be said about notions of leadership in terms of innovation when it comes to role, style and distribution?

5) Notions of organization

What can the analysis tell us about notions of organization in terms of innovation when it comes to autonomy, identity and ways of working?

6) Notions of strategy
What can the analysis tell us about notions of strategy when it comes to innovation when it comes to deliberateness, framing and execution?

7) Complexity theory and innovation
How can complexity theory be used to explain innovation?

8) Social constructionism and innovation
How can social constructionism be used to explain innovation?

3.9   Data collection

In this section, the methodology around data collection is outlined. It falls into four parts: The action research work with Telefónica, the quantitative survey, the interviews and the focus group work.

3.9.1   Description of the qualitative research – action research

This section presents the consultancy work with Telefónica. First the background for the collaboration is given. Then, the aim of the work is outlined, and in the following sections the process design is discussed. Finally, notions on feedback, debrief and co-creation are presented.

3.9.1.1 Methodological considerations

Working as consultant (i.e. action research) with a client and utilizing the work and findings for a thesis requires a presentation of the role of the consultant, the nature of the work of the consultant and the methodological considerations.

The starting point here is the work by Edgar Schein on process consultation (1969, 1987, 1999), on helping (2009) and on how to ask questions (2013). Schein's argument is that essentially the whole purpose of the consultant is to try to be helpful. He distinguishes three different roles the consultant can take (1987 and 1999):

- The Expert. Here the consultant has the answers and tells the client what to do.
- The Doctor–Patient Model. Here the consultant will diagnose the client's problems and then tell (or recommend) the client what to do (sometimes also administrating the cure or solution).
- The Process Consultant. Here the consultant is there to help the client learn how to correctly identify and understand (diagnose) their own problems and design appropriate interventions.

Another crucial aspect of Schein's orientation is to keep the emphasis on not on what the client does, but how they do it. Essentially this shifts power from the consultant to the client and is argued to be more likely to result in the sort of long-term sustainable change desired by the client.

The role of the process consultant is not necessarily restricted to listening and asking powerful questions. The consultant can for instance perfectly well design the actual process a group is going through without taking responsibility for the content away from the client.

The orientation for the consultancy work done with Telefónica was rooted in appreciative inquiry (Bushe, 2011 and 2013; Cooperrider and Srivastva, 1987; Cooperrider, Barrett and Srivastva, 1995; Cooperrider et al., 2000; Cooperrider and Whitney, 2001). Appreciative inquiry is a methodology for organizational change and development. It is essentially a positive theory of change, which means that it begins in making change happen by building upon strengths. It is about finding and creating and focusing on what gives life to systems rather than staring blindly at problems to overcome. Appreciative inquiry is based on the idea that organizations are socially constructed. As such their design and ways of working are only limited by our imagination and the agreements people make with each other (Bushe, 2013).

When working with an appreciative inquiry approach, one often follows the 4D model. The model describes four phases that take place after the topic (i.e. affirmative topic) is chosen. This topic is the focus for the inquiry and is often worded in aspirational and inspiring language. The four different phases or stages are:

1. Discover
2. Dream
3. Design
4. Deliver (or destiny).

This model calls for a collective discovery process whose first step (1) turns towards observations to identify the best of what is. The second step (2) encourages aspiration and imagination to identify ideals of what might be. The third step (3) asks for collaborative dialogue and choice to achieve consent about what should be. Finally, the fourth step (4) is about collective experimentation to discover what can be.

In 2001, Cooperrider and Whitney outlined five basic principles of appreciative inquiry:

- The constructionist principle. Human knowledge and organizational destiny are interwoven.
- The principle of simultaneity. Inquiry and change are not truly separate moments, but are simultaneous.
- The poetic principle. An organization's story is constantly being co-authored.
- The anticipatory principle. The infinite human resource we have for generating constructive organizational change is our collective imagination and discourse about the future.
- The positive principle. Building and sustaining momentum for change requires large amounts of positive affect and social bonding.

Afterwards more principles have been suggested but these have been most widely accepted and applied as the central theory-base of change for appreciative inquiry.

It is questionable to what extent Schein would describe his methodological approach as a social constructionist one. On the other hand, the more fundamental aspects of his philosophy and the ten principles he outlines in his book *Process Consultation Revisited* (1999) does not suggest anything that would counter such an approach as such. On the contrary, they seem to supplement each other in a positive way.

As the cooperation with the client was oriented towards research (see 3.9.1.2) the work was also described in terms of action research (McNiff and Whitehead, 2011). Action research originates from Lewin (1946: 35), who characterized it as "comparative research on the conditions and effects of various forms of social action and research leading to social action". He (ibid) goes on to say that it is using a process of "a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action". Reason and Bradbury (2001) claim that action research is a family of approaches to inquiry that are participative, grounded in

experience and action-oriented. Reason and Bradbury say that it is concerned with developing practical knowledge of human behaviour.

Action research can be argued to mean that one is actively involved in a situation of change and at the same time conducting research. One aspect of this type of research is that it may change – the focus, form, and results evolve – along with the process of research itself (McNiff and Whitehead, 2008). Action research can be seen as a move from being an observer of social phenomena to being a co-creator of knowledge and, as such, of social phenomena.

Bradbury and Reason (2001: 454) outline eight choice-points and questions for quality in action research. Is the action research:

- Explicit in developing a praxis of relational-participation?
- Guided by reflexive concern for practical outcomes?
- Inclusive of a plurality of knowing?
  - Ensuring conceptual-theoretical integrity?
  - Embracing ways of knowing beyond the intellect?
  - Intentionally choosing appropriate research methods?
- Worthy of the term significant?
- Moving towards a new and enduring infrastructure?

It is worth noting that in this context, infrastructure points towards behaviour or, more explicitly, new behaviours that can begin to alter institutional patterns of behaviour.

What makes action research unique is the set of principles that guide the research. Winter (1989) outlines six key principles for action research:

1) Reflexive critique
An account of a situation, such as notes, transcripts or official documents, will make implicit claims to be authoritative, that is it implies that it is factual and true. Truth in a social setting, however, is relative to the teller. The principle of reflective critique ensures people reflect on issues and processes and make explicit the interpretations, biases, assumptions and concerns upon which judgments are made. In this way, practical accounts can give rise to theoretical considerations.

2) Dialectical critique
Reality, particularly social reality, is consensually validated, which is to say it is shared through language. Phenomena are conceptualized in dialogue; therefore, a dialectical critique is required to understand the set of relationships both between the phenomenon and its context, and between the elements constituting the phenomenon. The key elements to focus on are those elements that are unstable, or in opposition to one another. These are the ones that are most likely to create changes.

3) Collaborative resource
Participants in an action research project are co-researchers. The principle of collaborative resource presupposes that each person's ideas are equally significant as potential resources for creating interpretive categories of analysis, negotiated among the participants. It strives to avoid the skewing of credibility stemming from the prior status of an idea-holder. It especially makes possible the insights gleaned from noting the contradictions both between many viewpoints and within a single viewpoint

4) Risk
The process of change potentially threatens previously established ways of doing things, thus creating anxiety among the practitioners. One of the more prominent fears comes from the risk to ego stemming from open

discussion of one's interpretations, ideas and judgments. Initiators of action research will use this principle to allay others' fears and invite participation by pointing out that they, too, will be subject to the same process, and that whatever the outcome, learning will take place.

5) Plural structure
The nature of the research embodies a multiplicity of views, commentaries and critiques, leading to multiple possible actions and interpretations. This plural structure of inquiry requires a plural text for reporting. This means that many accounts will be made explicit, with commentaries on their contradictions and a range of options for action presented. A report, therefore, acts as a support for ongoing discussion among collaborators, rather than a final conclusion of fact.

6) Theory, practice, transformation
For action researchers, theory informs practice and practice refines theory, in a continual transformation. In any setting, people's actions are based on implicitly held assumptions, theories and hypotheses, and with every observed result, theoretical knowledge is enhanced. Theory and practice are intertwined aspects of a single change process. It is up to the researchers to make explicit the theoretical justifications for the actions, and to question the bases of those justifications. The ensuing practical applications that follow are subjected to further analysis, in a transformative cycle that continuously alternates in emphasis between theory and practice.

As can be seen here, the connection with social constructionism thinking is clear. There is also a connection to reflective praxis as discussed by Schön (1983) and others.

According to Schön (1983) reflective practice is "the ability to reflect on an action so as to engage in a process of continuous learning". One can argue that the thinking behind it lies in the conviction that experience in itself does not automatically lead to learning, better practice or growth. What is argued for is deliberate reflection. A key aspect here is to look at situations, experiences and so on critically. This means looking behind actions and events by discovering and examining the values and "theories" that inform and frame them. A person who reflects on his or her practice is not just looking back on past actions and events, but is taking a conscious look at his or her emotions, experiences, actions and responses, and adding that information to his or her existing knowledge base to reach a higher level of understanding (Paterson and Chapman, 2013).

For Schön (1983), professional growth begins when a person starts to view things through a critical lens, by doubting his or her actions. He distinguishes between two modes of reflection: Reflection in action and reflection on action.
Reflection in action can be described as the ability of a practitioner to "think on his or her feet". Within any given moment, when faced with a professional issue, a practitioner usually connects with their feelings, emotions and prior experiences to attend to the situation directly.
Reflection on action is the idea that following the experience a practitioner analyses their reaction to the situation and explores the reasons around, and the consequences of, their actions. It brings into action Schön's notions of "responding to problematic situations, problem framing, problem solving, and the priority of practical knowledge over abstract theory".

To wrap up: the starting point for the action research is that the researcher has worked as reflective practitioner in the role of a process consultant aiming to establish a helping relationship to help realize the clients' agenda as defined by them. This was done within the framework of action research following an appreciative inquiry methodology.

3.9.1.2 Background

In late 2012 the researcher decided to apply for a PhD and inquired into the Taos/Tilburg set-up. Early in 2013 he began to prepare in terms of which research question he wanted to explore and also which cases studies could serve the question well. At the same time he was hired by Telefónica to help its R&D department (Telefónica I+D, particularly PDI) under the leadership of Pablo Rodríguez. This work could be seen as a preparation for the lengthier work to follow, as part of its aim was to identify "future areas for development".

The work at Telefónica I+D in Barcelona was essentially involved with increasing the innovation capacity of the leadership team of the Telefónica PDI. The contract (see appendix 9.3) would run for 1.5 years and the process was designed and led by me, with the support of Richard Ruiz de Querol. As part of the consideration around the work, it had been discussed whether an article should be produced about the work that was done so as to help Telefónica learn from the process. While this article idea was eventually dropped (due to changes later described in in chapter 4), an agreement was made that the findings from the work with the leadership team could serve as part of the research for the researcher's PhD if that would be considered applicable and helpful.

3.9.1.3 Purpose

The purpose with the collaboration was to increase the innovation capacity of the leadership team of the Telefónica PDI R&D.

In the contract it is stated that: "The intention of the collaboration is to help Telefónica I+D to formulate strategy and develop leadership capabilities".

Furthermore, the desired outcome was oriented towards:

- Developing and formulating a purpose and supportive principles
- Identify a direction and a strategy formulation
- Re-think the unit, feasibly the scope and range of its work
- An understanding of the organizational culture and strategies for development
- A more effective leadership practice.

3.9.1.4 Design of the process

The first sessions that were held with the client can be divided into three steps:

1. Get to know each other. Find out if this can work or not
2. Discussing a rudimentary proposition made by the researcher on how to work together rooted in the ideas and needs stated by the client in the first meeting/session
3. After changes and amendments to the proposition a contract was signed and a more detailed run through of the coming session followed.

The process was designed in several steps. Initially it was the client who expressed concerns, needs and aspirations not only about his work and role, but more so about the status of his organization. This was inquired into until the consultant and the client reached an assumed mutual understanding. The client asked for advice about how to proceed and was offered advice on how a process could be designed and what it would look like. After a general agreement was reached it was decided that the consultant would write up a proposal for

collaboration, building upon the work that had been done. This was sent over to the client who reviewed it and after a phone conference and some minor changes, both parties signed it.

The collaboration was to take place within the framework of a programme where the client would receive help with reaching certain outcomes. The programme would last for 1.5 years and would involve around six workshops, together with debriefs, interviews and feedback sessions. The structure of the programme followed a simple routine where first there was a talk with the client to ensure the planned programme fitted the situation, then a full-day workshop, followed by a written report from the consultant and a debrief (co-learning) between the client and the consultant.

The participants in the workshops would essentially consist of the identified (top) management people of the R&D (I+D) organization (i.e. PDI). A few changes were to be expected from time to time, but nothing to be concerned about at this stage (see chapter 4 for more on this). The number was assumed to be 15–20 people. The debriefs and preparatory talks were always done with the leader of the department and sometimes also with his next in command.

In addition to the workshops, a number of interviews were planned, both to support the actual process and to provide info for an article and/or a thesis.

The workshops always took place at Telefónica's office in Barcelona, whereas the preparations and debriefs sometime took place in restaurants or at home with the client.

The set-up of the programme followed a fairly simple logic. A common understanding and foundation had to be created before one could move onto other areas:

1. Foundation. Purpose and principles in place. Scope and range of the units' work.
2. Opportunities and challenges for strategy/direction.
3. Decision framework. Exploring directions. Opportunities and challenges.
4. Organization and structure.
5. Brand. Product and services. Telefónica the client/enabler/provider.
6. Leadership conversations. The next practice.

The programme followed essentially the action research model suggested by Susman and Evered (1978):

1. Diagnosing. Identifying or defining a problem.
2. Action planning. Considering alternative courses of action.
3. Taking action. Selecting a course of action.
4. Evaluating. Studying the consequences of an action.
5. Specifying learning. Identifying general findings.

The six individual workshops can also be argued to have followed this model *in general*. However, the appreciative inquiry methodology shifted the focus from problems to strengths as a way of framing the work. So, a more precise description would be to argue that each workshop followed the steps in 4D model (discover, dream, design and deliver).
Different tools, techniques and exercises were applied throughout the programme to ensure excitement, interaction, creative tension and dialogue.

The methodology would be rooted in appreciative inquiry as opposed to more positivistic or therapeutic approaches.

121

3.9.1.5 Participants

The people who participated in almost all the sessions are listed in table 3.4. At every occasion, a few others also joined. The reason was based on the clients need to a) make the process and development more inclusive and b) to some extent include particular competencies. In general, each session was co-created by 15–20 people apart from the researcher.

Name	Location	Role	Reports to
Pablo Rodriguez	Barcelona	Head of unit	Carlos Domingo
Konstantina Papagiannaki	Barcelona	Scientific	Pablo Rodriguez
Nuria Oliver	Barcelona	Scientific	Pablo Rodriguez
Oriol Lloret	Barcelona	Early innovation	Pablo Rodriguez
Susan Jurado	Barcelona	Innovation process	Oriol Lloret
Maria de Olano	Barcelona	Innovation process	Oriol Lloret
Laura Linares	Madrid	Human resources	Pablo Rodriguez
Xavi Capellades	Barcelona	New products	Pablo Rodriguez
Juan Carlos Valverde	London	Products	Pablo Rodriguez
Ariane Van de Ven	Barcelona	Trends	Pablo Rodriguez
Pere Obrador	Madrid	Open innovation	Pablo Rodriguez
Lars Stalling	Barcelona	Design	Pablo Rodriguez
Enrique García Illera	Barcelona	Big data	Pablo Rodriguez
Ramón Sangüesa	Barcelona	External advisor	Oriol Lloret

Table 3.4 Overview of the leadership team at PDI

3.9.1.6 Design of workshops

The different workshops were intended to be interactive and aimed at generating shared understanding, focus and actions. Every session started with a check-in to generate presence and connection with the other participants and the day's work. At the end of the session there was a check-out in which each participant stated what had been valuable for him or her, or what he or she would take with him or her.

In terms of the actual design of each intervention/session a general framework was used to create clarity around the session. It is called "I do art", and stands for:

- Intention
- Desired outcome
- Agenda
- Roles and responsibilities
- Time.

For instance, workshop/session/intervention no. 3 was designed as follows:

- Intention

- o The intention with today's session is to secure the common ground, explore its meaning and align it with future work.
- Desired outcome
  - o A formulated shared purpose
  - o A formulated set of shared principles
  - o Understanding and commitment to the future process
  - o Better understanding of positive relationships and present potential.
- Agenda
  - o Start-up – checking and "I do art"
  - o Update on the business and organization
  - o Recap of last meeting
  - o Session on purpose
  - o Session on principles
  - o Session positive relationships and present potential.
- Roles and responsibility
  - o You (participants) are responsible for the content and we (facilitators) are responsible for the process.
- Time
  - o 0900–1600.

Each session was organized around a set of pre-defined questions that would steer the conversations. Examples of questions for this workshop were:

- Why do we exist?
- What is the background for our unit?
- What are the expectations around our unit?
- What is our mandate?
- What do we believe in?
- What is important in our conduct?
- What is seen as good?
- What working processes works well at PDI?
- What working processes could work well in the future according to our principles to meet our purpose?

Often the design was such that work and conversations was done in smaller groups and then there were a plenary sharing process that allowed for alignment and progress.

Before each workshop there was a clarification of expectations with the client and after each workshop a report was written that was then shared among the participants.

3.9.1.7 Feedback, de-brief and co-creation

After each workshop, the consultants wrote a report[58] based on the notes taken. The report comprised both the plan for the day and a summary of what had happened, as well as a presentation of the findings on behalf of the participants and the consultants. The report was then distributed to all the participants. They were asked to comment, correct and make additions. After these adjustments it was distributed again.

The reports followed more or less the same type of structure. They started with the background – placing the workshop in the broader scheme of the work to be done. They articulated when the workshop had taken place,

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[58] The five reports are referenced as "Windeløv-Lidzélius and Ruiz de Querol, 2013", numbered a to e.

who was there and what the intention and agenda was. They offered a few general notes on the reception of it by the participants, but emphasized the key results and outcomes. Action points were singled out. Updates on the business and organization were captured and re-told in the reports. Theories introduced by the facilitators – for instance Schein on culture – were recapped, together with the exercises used. Pictures taken and models made were often included both to aid memory and because they often summarized a process or an outcome.

An example of a report can be found in appendix 9.4.

The reports also served as a starting point for the debrief with the leader of the organization. They offered first a way to remember what had happened and what had come out of the workshop. The client could then supplement this with what had happened in the organization after the workshop – on both a macro (companywide changes) and a micro level (for the group as well as the individuals involved in the programme). The consultants asked to deepen the reflection of the client as well as heighten the knowledge on behalf of the consultant. After this a review of the plan for the coming workshop was conducted – always with the results of some changes.

When the workshop started a joint process to recollect the work done so far was done. Particular emphasis was given to what had changed since the last time. Here the report served as a common starting point. Often the report offered an opportunity to again inquire into the findings and comments. As such it can be viewed as a new co-creational process in which a shared reality is developed and expanded. In a general way this process followed the reflective cycle proposed by Gibbs (1988), with the exception that since so many people were participating it was not possible to go deep at each step with each individual. The focus of the intervention was kept on their work as a leadership group.
It should be noted that many different techniques, tools and exercises were used in these sessions, among them Flaherty's (1999) definition of coaching and particularly asking questions and listening so as to "enable the self-generating and self-correcting capacities of the group".

A concrete example of a technique used is called "check-in". This can be performed in a variety of ways. Often the group stands in a circle and the leader of the workshop asks people to check in either by answer questions like "home come it is important for me to be here today" or "what need to happen for this to be a good day". Essentially it is way to gain focus, presence and commitment. Sometimes it is also good to express expectations. Then, normally, there is a "check-out" at the end of the day. This can be done by expressing "what one has taken away from the day" – sometimes done only by stating one word that represents the experience.

Since two consultants were involved there was also an opportunity to share the experience. This was done to adjust the individual experience of what happened, how to interpret it and how to proceed. This debrief always happened immediately after the workshop. It normally followed the reflective cycle, proposed by Gibbs (1988) as a way to structure the debriefing and facilitate reflection.

DESCRIPTION
WHAT HAPPENED?

FEELINGS
WHAT WERE YOU
THINKING AND FEELING?

EVALUATION
WHAT WAS GOOD AND
BAD ABOUT THE EXPERIENCE?

ANALYSIS
WHAT SENSE CAN YOU
MAKE OF THE SITUATION?

ANALYSIS
WHAT ELSE COULD YOU
HAVE DONE?

ACTION PLAN
IF IT AROSE AGAIN
WHAT DO YOU DO?
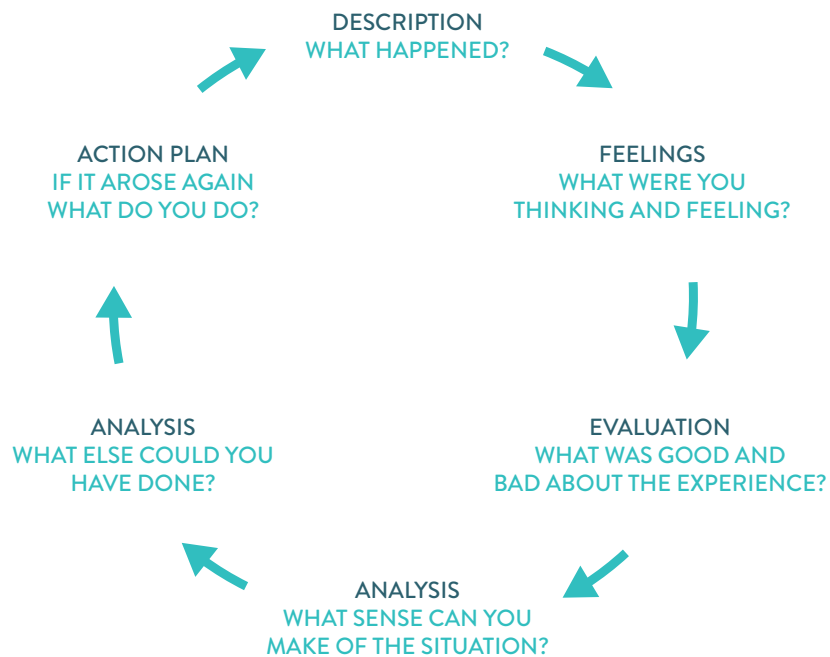
Figure 3.1 The Reflective Cycle Model, after Gibbs (1988)

3.9.2 Description of the quantitative research

This section concerns the aim, design and execution of the quantitative work. Essentially it concerns the survey conducted with SMEs to develop the understanding of innovation and test some considerations from the consultancy work and findings with Telefónica.

3.9.2.1 Methodological considerations

There are numerous surveys conducted in the field of innovation and associated areas. Some are more "scientific" whereas others less so. Given that innovation is seen as key to the productivity and prosperity of nations, regions, municipalities and organizations alike, the surveys conducted also vary in their purpose and form. Examples are:

- GE Global Innovation Survey[59] on perceptions of 3,000 top executives from across the world about public opinion and the business climate regarding innovation and technological change.
- PricewaterhouseCoopers' Unleashing the Power of Innovation report.[60]

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[59] http://www.ge.com/stories/innovation-barometer.
[60] http://www.pwccn.com/home/eng/unleash_innovation_2013.html.

- European Bank for Reconstruction and Development's management, organization and innovation and survey.[61]
- OECD innovation surveys[62] developed to increase our knowledge about innovation in firms beyond what was already covered by R&D surveys, patent data or bibliometric indicators.
- US Department of Commerce Business R&D and innovation survey.[63]
- Statistics Denmark survey[64] on innovation statistics.

On top of these one can easily find with an online search an abundance of others – everything from questions like "best innovations" to "qualities for successful innovation leaders" to "most innovative companies"[65] and so on. In terms of the survey developed for this thesis, the findings from other surveys have been valuable for:

1. Outlining what others deem relevant and interesting within the field of innovation
2. Offering insights into specific data around my research question, serving as a secondary source of findings
3. Providing input and examples on the design of the researcher's own survey (see below for a list on which sources that were used).

This research project poses some interesting challenges when it comes to collecting data. In a wide sense, there are a number of sources for obtaining data on a general level, but far fewer when it comes to the specific research question explored in this thesis. Quantitative methodologies are normally used to determine the relationship between an independent variable and a dependent (or outcome) variable within a specific population (Hopkins, 2008). According to Haraldsen (1999[66]) surveys are used for a number of purposes. Asking people questions is the essence of the survey approach (McDaniel and Gates, 1996). When wanting to explore an area in which it is difficult to set a clear or defined problem formulation or hypothesis, or to have a very clear idea on how to analyse it, then exploring research design can be used (Selnes, 1994[67]). Surveys are controlled conversations, both in terms of words and formulations of sentences (Haraldsen, 1999). This puts a focus on developing logical flow charts that take into account disposition and structure. As such they were considered by the researcher so as to conduct a wide and fairly open exploration of how people appreciate the question and the areas associated with it, but at the same time to provide a single thread and logical development throughout the survey (see appendix 9.1 for the actual design and questions asked).

A generic set-up for a research process follows a number of steps[68] (McDaniel and Gates, 1996: 37):

- Problem/opportunity identification and formulation
- Creation of the research design
- Choice of method of research
- Selection of the sampling procedure
- Collection of the data
- Analysis of the data
- Writing and presentation of the report
- Follow-up.

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[61] http://www.ebrd.com/downloads/research/economics/moiquest.pdf.

[62] http://www.oecd.org/sti/inno/oecdinnovationmicrodataproject.htm.

[63] https://bhs.econ.census.gov/bhs/brdis/index.html.

[64] http://www.dst.dk/en/Statistik/dokumentation/declarations/innovation-statistics.

[65] http://www.forbes.com/fdc/welcome_mjx.shtml; http://www.fastcompany.com/section/most-innovative-companies-2015.

[66] The book is in Norwegian.

[67] The book is in Norwegian.

[68] Although the book in question concerns marketing research, the process is essentially the same.

McDaniel and Gates (1996) refer to Anthony Miles, vice-president of the Boston Consulting group, who states three questions to be asked in the first stage (problem/opportunity identification and formulation):

- Why is the information being sought?
- Does this information already exist?
- Can the question really be answered?

Haraldsen (1999) suggests that the two most important questions in a survey concern "who" we are going to ask and "how" the questions should be posed.

A question that often is discussed is that of representation. To what extent does this group represent the population in question, that is the population one wants to say something about? Quantitative research is designed either as descriptive or experimental. Descriptive studies determine correlation among variables, and experimental studies determine causality. Samples for descriptive studies require many samples whereas experimental studies require fewer because randomness in the experimental design can reduce the potential for bias stemming from a small sample size (Hopkins, 2008). According to Haraldsen (1999) the question of sample size is the wrong question, because every sample size is in one way or another representative. The problem concerns more *who* does this sample represent, and this is not controlled by the number of respondents. The number of respondents only affects how sure we can be about the conclusions we draw from the sample group of whom they represent. The decision about how many we need is a secondary question and follows the decision on how we will select a sample that represents those who we wish to say something about.

3.9.2.2 Aim

The aim of the survey was to invite a fair number of SMEs, and investigate their experiences and views on their organizations to see if a pattern could be distinguished around the research question. The idea was not to find an all-encompassing system, but more to see if there are similarities and differences within a diverse group of organizations about how they strategize for innovations.

3.9.2.3 Questionnaire design

Even though the quantitative research was exploratory in nature a number of guiding orientations arose from the theme of the thesis as well as the outcomes of other innovation surveys.

The surveys used as inspiration and guidance for the design of the survey were:

- Survey of innovation,[69] aimed at Canadian businesses. This questionnaire was designed by the Science, Innovation and Electronic Information Division of Statistics Canada in collaboration with a number of institutions in Canada.
- The Community Innovation Surveys[70] are a series of surveys executed by national statistical offices throughout the European Union and in Norway and Iceland. These harmonized surveys are designed to give information on the innovativeness of different sectors and regions.
- European Bank for Reconstruction and Development's Management, organization and innovation survey.[71] This collects data from the manufacturing sectors in selected EBRD countries of operation, Germany and India.

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[69] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4218.
[70] http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_Page.
[71] http://www.ebrd.com/downloads/research/economics/moiquest.pdf.

- Survey of Innovation and Business Strategy,[72] 2012 by Statistics Canada for the Investment, Science and Technology Division (ISTD). Its aim is to provide useful statistical information on strategic decisions, innovation activities and operational tactics used by Canadian enterprises.
- US Department of Commerce 2009 Business and R&D and innovation survey,[73] conducted by the US Census Bureau and the National Science Foundation.
- Facilitating Open Innovation – Landscape and Feasibility Study,[74] composed by Pera on behalf of JISC (Joint Information Systems Committee).
- GE Global Innovation Survey (see description above).
- PricewaterhouseCoopers' Unleashing the Power of Innovation report.
- European Bank for Reconstruction and Development's management, organization and innovation and survey.
- OECD innovation surveys(see description above).

Particular inspirations concerned segmentation, the formulation of questions, survey length and the use of primarily close-ended questions requiring quantitative and/or choice selection responses. In the end a few questions were open-ended, which allowed the respondent to answer undirected. Close-ended questions offer the opportunity to summarize and quantify the results. These can then be analysed with the aim of finding variation, deviation and normality as well as finding connections between certain variables. The qualitative answers (open-ended) are suitable for classification and coding using, for instance, thematic analysis and related sense-making analyses.

The starting point for the present survey was that innovation was defined as something that is new and generates value to the organization and/or its markets. It is seen as both a process and as an outcome.

Jack Hamilton (1998[75]) makes a number of suggestions for developing a questionnaire (some may seem obvious, but that does not make them less important):

1. The questions must be comprehensible.
   a. The words used must be known and normal for the respondents in question
   b. Every question must be clear to avoid misinterpretations
   c. Only ask about one thing at a time
   d. The questions should be short and non-complicated
   e. A question should promote clarity by avoiding double negative expressions (for instance, "would you not rather use a shampoo that does not include medicine?").

2. The questions must be formulated so that we obtain true and correct answers.
   a. Helping the respondent remember – for instance by avoiding questions like "how many patents does your company file per year?" and instead, for instance use intervals.
   b. It is important to help the respondents focus on the "problem" and formulate their answer. Avoid questions like "what kind of taste did the whiskey have?" and instead, for instance, use a list with suggestions.
   c. Avoiding leading questions is key.
   d. Use indirect approaches when the questions point towards answers where the respondents may come out with attitudes or actions that are considered socially or culturally unacceptable. For instance, will make them admit to perceived "weaknesses" (fear of flying), irrational behaviour

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[72] http://www23.statcan.gc.ca/imdb-bmdi/instrument/5171_Q1_V2-eng.pdf.
[73] http://www.nsf.gov/statistics/srvyindustry/about/brdis/surveys/srvybrdis_2009_short.pdf.
[74]
file:///Users/cgu/Documents/Phd,%20development%20&%20inspiration/Survey/Open%20Innovation%20Survey.webarchive.
[75] The book is in Norwegian.

or attitudes (I never brush my teeth), things that can damage prestige or status (never read books), embarrassment (fear, jealousy etc.) or politeness (do not want to criticize).

The number of questions in the survey was finally set at 21 (with an extra a few on contact data if the respondent wanted to obtain the results later on).

Note: A test launch of the survey was conducted with 10 selected people to see if the survey worked and if it made sense (structure, content etc.). The main feedback from this was that it was too long and too complex. Here, tough choices had to made. Around 50 per cent of the questions were dropped (leaving it at 21). Now, the questionnaire was far more framed and tight.

Note: The decision to cut it was the right one, but the researcher is in no doubt that certain aspects of the data have been lost as a consequence. For instance, the survey now leans towards development and implementation is slightly overshadowed.

See appendix 9.5 for the invitation letter to potential respondents. See appendix 9.1 for the questionnaire.

3.9.2.4 Platform

The service used to obtain the data from respondent was SurveyMonkey (www.surveymonkey.com). This is an internet based service that offers a digital way for people to answer the questionnaire, some tools for analysing the aggregated and individual data, and certain options for the survey conductor for managing the survey.

3.9.2.5 Timeframe

The survey was made public on 5th October 2014 and was closed on 3rd November 2014.

3.9.2.6 Online forums
In order to get make contact with subject experts who (ideally) also came from outside the researcher's normal spheres, the survey was posted in online forums. The forums were identified by asking a few experts for suggestions (two practitioners and two professors), as well as further forums identified by the researcher himself. The main connection between them is their devotion to the subject of the research – innovation. The survey was sent to the contact persons from each forums, with the request that it be published only once (often the researcher was given permission to publish directly). It was published on the online platforms of:

- Directors' Institute (Denmark/Scandinavia)
- Forum d'Avignon (France/Europe)
- Front End of Innovation (Global)
- Harvard Business Review (Germany)
- Horizon 20/20 (Europe)
- Innovation Excellence (Global)
- Innovation Management (Global)
- Innovation People Experts (Global)
- Kaospilot (Global, in principle)
- Network by Gerald Hartmann (Global)

- VL grupperne (Danish).

Note: By posting the invitation only once on the platform, the obvious risk is that many people will not see it. Being a member on an online forum and not receiving a direct invitation may leave doubt as to whether or not this survey important to support.

Note: In two of the groups (Kaospilot and VL) people would know who the researcher was and in *Harvard Business Review* an article by the researcher was published a few weeks before the survey. It was thus expected that the number of respondents from these groups would be far larger. This later proved right.

Note: Some individuals are of course members of more than one forum. Since the researcher was most connected to certain forums (see above) there was the bias/risk that even if a respondent was part of more than one forum, he or she would respond from the point of view of the forum with which they mostly associate the researcher.

3.9.2.7 Number of respondents

The objective was to obtain 100 unique respondents. The survey was closed when the number had reached 103.

3.9.2.8 Categorization of responses from the quantitative research

After the data had been collected they were segmented based on a number of criteria (see chapter 4) such as size of the company and so on. The data were broadly interpreted and reflected upon against the literature research and findings from the qualitative research (see chapter 5).

3.9.2.9 Analysis

The analyses are divided into two parts: see sections 4.3.1 and 4.3.2. Section 4.3.2 presents the weighted average responses of all respondents of all in graphs and tables, and offers a general analysis and discussion of the collected data.

From question 11 a cross-reference is made with respect to the organizational position of the respondent (i.e. executive and CEO/president level), the size of the organization (i.e. 100 million and upwards), the age of the organization (i.e. established less than ten years ago) and the type or organization (i.e. private companies as well public agencies or companies). These segmentation points were singled out because it is assumed that a) those on a senior level in an organization should be better positioned to offer overview and insight, b) the size of the organization is comparable to that of the case study, c) there may be a significant difference between younger and older organizations and d) there may be a significant difference between public and private organizations. Aside from public organizations, the other segmentations also represent a fair number of respondents.

Section 4.3.2 presents the weighted average response of all respondents against those who specifically work within telecommunications (four responses) or with Telefónica (one response). This is of course a far from representative number of respondents, but it nevertheless provides some interesting discussion points that at least leave us with a picture, albeit a very local one.

One final note: There are virtually hundreds of potential analyses, but these represent what stood out as most important to the researcher after having conducted many analyses on the collected data.

3.9.2.10 Development of the case towards the qualitative research

This process was useful on several levels:

1. It helped the researcher gain a better understanding of what is the view on the research topics in the networks in which the researcher is involved
2. It helped accentuate and reflect upon the literature review
3. It helped the framing of the action research (consultancy work) with the client
4. It informed the development of the qualitative interviews in the second round.

3.9.3   Description of the qualitative research – interviews

This section describes the interviews. It will focus on the design and execution of the two sets of interviews that took place between 2013–2017.

3.9.3.1 Methodological considerations

The study design was a mixed methods approach utilizing primarily qualitative methods augmented through the use of quantitative methods. Quantitative methods have long been utilized in academic research, and qualitative methods have become increasingly utilized in social sciences research, which frequently uses interviews and surveys to elicit open-ended responses that then need a rigorously applied sense-making process such as thematic analysis (Boyatzis, 1998).
While one can broadly argue that quantitative research has the advantage of being less time consuming in its data collection, the challenge is that when applied in the social sciences it runs the risk of not offering enough data for a deep understanding of the phenomena in question. Broadly speaking, qualitative research can be argued to have quite the opposite advantages and challenges. By selecting a few cases from a potentially larger segment, however, one challenge and limitation is that the qualitative study is not necessarily representative of the population of interest (McDaniel and Gates, 1996).

The research question – *How does organizations develop and implement strategies, leadership and ways of organizing to bring about innovation in complex systems?* – offered a number of possible ways to go about the actual qualitative study. Research design is explored when the problem formulation is unclear or rough (Selnes, 1994). Such roughness suggests that one is unwilling to establish clear hypotheses because they leave little room for development. It is useful when facing a phenomenon you want to know more about but have no clear idea of how to analyse it. An example could be a new market. As such it seems like a suitable approach to the research question.

Historically, the term "in-depth interview" has implied a relatively unstructured one-on-one interview. In this case the interviewer is thoroughly trained in the skill of probing and eliciting detailed answers to each question. The direction of the interview is directed by the responses of the interviewee (McDaniel and Gates, 1996). During the interviews conducted for this study, it became clear that many events that impacted the actual object of research needed to be placed in some sort of chronological order so as to help the researcher. For this reason, in two interviews (and in only part of those interviews), inspiration was taken from the timeline interview

(Adriansen, 2012), allowing the interviewee to map out different events and offer an explanation for them. While it functioned as a tool for creating sense, it also served as a tool to help understand the story told more deeply.

One challenge was offered by having an intimate relationship to the subject matter and a fair of knowledge of the company in question (given the time during which the researcher followed and worked with the company), as well as a personal relationship with at least two of the interviewees: Can one stay "objective" or at least maintain perspective? To be an insider in relation to one's interviewees gives the advantage of a shared history and a close knowledge of the context, and these benefits outnumber the disadvantages (Adriansen and Møller Madsen, 2009). However, being in that type of relationship – both with the subject matter and the organization – makes it difficult to contest hegemonic discourses and tacit values and ideas (ibid.). To counter this, the researcher followed the recommendations of Adriansen and Møller Madsen (2009) by:

- Pursuing "you know" answers
- Being aware of the shifting roles during the interview
- Acknowledging that some people may be too close for the interviewer/interviewee relationship
- Taking a step back to obtain an overview and to question taken-for-granted knowledge.

3.9.3.2 Preparation for data collection

The interviews happened in two different time periods and their nature varied (see 3.9.3.4 for a more elaborate description of the process). The first round of interviews was conducted by the researchers' consultant colleague because the client required that they be done in 2013. The second round of the formal interviews (several additional informal conversations took place between 2014 and 2016) took place in January 2017 and was conducted by the researcher. These interviews were conducted in two ways: Either in the form of a physical meeting or by responding in writing to questions stated by the researcher.[76]

Following the advice of Yin (2009), attention was given to expressions, results and subjects that seemed to stand out. This meant being open and trying to be sensitive to areas where perhaps something goes beyond was expected. As such it was important to stay as open as possible in the conversation, avoiding "putting words in the mouth" of the interviewee. Rather, it was important to allow the interviewees' words to stand as cleanly as possible (i.e. using the words of the interviewee rather than the interviewers). In practical terms this meant that the questions were more open-ended. For instance, "What has been your thinking around recruitment", instead of "How come you hired an HR person before technical staff"? Or, instead of starting with postulates like "Academic literature states that a culture of innovation requires diversity and autonomy – how have you gone about this?", it was more important to start with generative questions like "What does an slogan like culture of innovation mean to you"? From here one can then go deeper with follow-up questions like "How does this resonate with the organizational set-up you had three years ago" or "What is needed to nurture such thing"?

A few challenging circumstances for the interviews needed to be catered for. In the first round of interviews the interviewer was not the same person as the researcher. As such the researcher had a different access to the data collected. Although he could listen to the recordings, much of the atmosphere, body language and so on was not directly accessible. However, this particular situation offered two advantages: The interviewer had two PhDs so he was familiar with how to do interviews. He had also worked for the company for 20 years and had an intimate relationship with it. On the more challenging side, the interviewer was not familiar with social constructionism or appreciative inquiry in a deep way. As a way to counter this, the researcher prepared background documents for the interviewer and the interviewees explaining the theory and methodology. The interviewer and the researcher were also required to conduct preparatory discussions of the scenarios in which the conversations

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[76] NB: There was a need to explain and develop a few things from the interviews afterwards. That was done by mail.

might unfold, as well as conduct thorough debriefs. These debriefs were not only a matter of "explaining" the recorded results but also the feelings and "sense-making" of the interviewer, as well as of the researcher.

For the second round of interviews the challenging aspect was that the questions asked could not be exactly the same as those in the first interview round. The main reason for this was that the insight of people into the company and their relationship to the research question was very different. As such it would not make sense to ask the same questions of everyone. This was countered by a) preparing the sessions by checking with the interviewee on where he could offer data and insight, b) using the researcher's experience to situate the questions so they make sense to the interviewee and the thesis and c) in the analysis interpreting the data in a way that gives space to the multiple of voices on the questions at hand.

Kvale and Brinkmann's (2008) tips on how to go about a qualitative interview were used as a guide by the researcher (and the consultant in the first round) in the interview process:

- Decide on an order of questions that easily flows one to the next
- Try to use language that is easy to understand and relevant to the interviewee
- Avoid leading questions
- Try to stop the interviewee using qualifiers
- Add a few control questions into the interview for validation
- Avoid small talk during the interview
- Listen, listen, listen.

3.9.3.3 Selection of interviewees

The interviewees were selected by the client (i.e. the leader of the unit), together with the researcher. In the first round of thirteen (2013) they were all part of the management group as defined by the client. They had different expertise and areas of responsibility – everything from scientists to HR.
By the time of the second round (2017) the leader of the unit had created a new set-up (Alpha), which was now the focus point. He and two of his colleagues (the two who were first recruited to Alpha) were interviewed. They were also part of the new leadership team.
The second-in-command from the management group of the PDI had in 2017 taken over the old unit (but it had been massively changed – see chapter 4) and he was also interviewed. Finally, the consultant who worked with the researcher in 2013–2014 in the action research phase and who conducted the interviews in the first round (2013) was interviewed to provide background and context around Telefónica and the particular set-ups the interviewees were part of.

The main reason the same people from 2013 was not interviewed again was that since they had changed job functions they could not really provide data and insight into the research question.

See appendix 9.6 for the first group of interviewees and appendix 9.7 for the second group of interviewees.

3.9.3.4 Interviews and interview guide

The qualitative interview is an essential tool in relation to many research projects (Kvale, 1996) and the explorative orientation of the research (Selnes, 1994) can help limit the consequences of the researcher's assumptions and preoccupations (Eisenhardt, 1989). This means that questions like "Talk me through the notion of innovation at the company" or "Describe to me what made this possible" underpin the ideal not having

hypotheses when doing the research. Following Kvale (1996), the following seven steps of the interview investigation were conducted:

1. Thematizing
   Formulate the purpose of an investigation and describe the concept of the topic to be investigated before the interviews start. The why and what of the investigation should be clarified before the question of how – the method – is posed.

2. Designing
   Plan the design of the study, taking into consideration all seven stages of the investigation, before the interviewing starts. Study design is undertaken with regards to obtaining the intended knowledge and taking into account the moral implications of the study.

3. Interviewing
   Conduct the interviews based on an interview guide and with a reflective approach to the knowledge sought and the interpersonal relation of the interview situations.

4. Transcribing
   Prepare the interview material for analysis, which commonly includes a transcription from oral speech to written text.

5. Analysing
   Decide, on the basis of the purpose and topic of the investigation, and on the nature of the interview material, which methods of analysis are appropriate for the interviews.

6. Verifying
   Ascertain the generalizability, reliability and validity of the interview findings. Reliability refers to how consistent the results are, and validity means whether an interview study investigates what is intended to be investigated.

7. Reporting
   Communicate the findings of the study and the methods applied in a form that lives up to scientific criteria, takes the ethical aspects of the investigation into consideration and results in a readable product.

Following the advice of Kvale and Brinkmann (2008) the interviews can be defined as semi-structured. Some interview questions were fully determined, whereas others were not be fixed at all. The researcher had leeway in asking follow-up questions. This is the ideal compromise: it gives a structure to the interview, but also gives flexibility (ibid.).
In terms of this thesis the theme is the research question and the reporting is the thesis.

Interviews part 1
During the third quarter of 2013, thirteen interviews were conducted with the leadership team. These interviews were rooted in a social constructionist approach (Gergen, 2009; McNamee and Hoskins, 2012), and based on a framework (see appendix 9.8 for more details) developed with an orientation to a) support the development of the team and its capacity to make innovation happen according to the contract made, and b) generate knowledge that could be useful in the thesis. Even though one could argue that there were two different objectives at play, they were not mutually exclusive and the social constructionist approach allowed the interviews to be something more than a mere collection of data. The inquiry and conversations had as their objective to "look towards a future with new possibilities" (Gergen 2009; McNamee and Hoskins, 2012).
One important facet of this work was that it was not the writer of this thesis who conducted these interviews. The reason for this is that they were to happen at a time when it was not possible for the researcher to conduct

them. As a consequence the interviews were designed so as to be conducted by Richard Ruiz de Querol. Since he holds two PhDs[77] he was well positioned to conduct semi-structured interviews in a social constructionist framework.

The work followed a simple procedure. The framework developed was discussed and explored by Richard Ruiz de Querol and the researcher to ensure anchoring, understanding and further development. Not least among the considerations was the fact that we also were doing consultancy work and how that would impact the nature and outcome of the interviews. Then Richard Ruiz de Querol conducted the interviews, being transparent and co-creational in his approach, and recording the conversations. Afterwards both researchers went through the interviews and discussed what stood out, generating a shared understanding. The outcome and reflections on the process and outcome were shared and developed with the client in order to make to the succeeding process better (i.e. relevant and precise). In addition, the outcome also allowed for a sharpening of the research question and research strategy, as well as paved the way for a quantitative research and a more nuanced orientation of the literature research on innovation.

Interviews part 2

During Q2–Q3 2016, the final decision to go with Telefónica was made. This had been brought into question because after the first round of interviews and the finalization of the consulting contract, large internal changes at Telefónica resulted in much uncertainty around the future of the unit and even Telefónica Digital (see chapter 4 for more info.) Eventually these changes led to the setting up of a new unit called Telefónica Alpha, together with some other organizational set-ups. In order to maintain focus on the research question, Alpha became the centre of attention in this phase. Here the key points to understand were why it had been established, how it had come to be and how it operates, and to distinguish it from the previous set-up and other organizational set-ups (see seection 4.2 for on this).

After conducting research on other units like Alpha, which helped the researcher understand what questions were important, the actual interviews took place in early January 2017. The three main persons from Alpha were interviewed, together with the person who had taken over the old unit (PDI, which morphed into something new) and Richard Quiz de Querol to provide a more historical and contextual view of Telefónica.

Only three people were interviewed from Alpha because it was still a very new and relatively small unit. It thus made little sense to bring more people on board given the research question. Further, only one interview was made with the old unit because the changes at Telefónica meant that that unit had changed dramatically and was substantially smaller; only one person from the old set-up was left. However, that interview was important because it offered a discussion on current innovation strategy at large at Telefónica and how Alpha and this unit complement each other.

The interviews were semi-structured with open-ended questions, which allowed for indirect answers, as well as a free flow of conversation in which the interviewee and the interviewer both shared their views and experiences. The first questions were primarily aimed at presenting the interviewee and his or her connection and history within the company and unit. However, these questions differed depending on whether they took place in the first or second round of interviews. Those from 2017 differed slightly more between the interviewees than those from 2013. This was because the interviewees in 2017 had very different jobs, functions and tenures in the company. As such the particularism of their work in relation to the whole was more important than more general things like "What is a great innovation for you".

Kvale and Brinkmann (2008) offer the following advice for good interviews:

- Establish a rapport
- Treat interviewees with respect
- Think about your appearance
- Think about body language

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[77] From MIT and Open University of Catalonia 1993.

- Maintain firm eye contact
- Don't invade their space.

As such a good presentation was one in which the researcher stated clearly the purpose of the interview, assured confidentiality, and invited the interviewee into the conversation with questions like "Is there anything you would like to know more about before we start" or "How does this subject resonate with you". It is important to be prepared and show that one is an active listener, able to ask deeper questions about what has been said, maintain calmness, look at the other person – but also to respect what is being said, not accuse them of lying and so on.

3.9.4 Description of the qualitative research – focus group

In order to heighten understanding of the data collected a focus group was conducted to discuss the findings of the thesis. This took place in March 2017.

3.9.4.1 Methodological considerations

Gill et al. (2008) describe a focus group as a group discussion on a specific subject organized for research purposes. A focus group can be said to be a form of group interview (Kitzinger, 1995; Brinkmann and Kvale, 2015). While there can be many forms of group interviews, focus groups exploit the communication between research participants in order to generate data (Kitzinger, 1995). What distinguishes focus groups is a non-directive style of interviewing that promotes different points of view (Brinkmann and Kvale, 2015). Gill et al. (2008) go one step further and say that the format is used to bring forth information on communal views, and the meanings behind those vies. As such focus groups can be said to be aimed particularly at interactions between the participants, where they talk directly to each other, ask questions, exchange opinions and reflect upon each other's experiences.

Focus groups include a moderator or an interviewer who introduces the topic and facilitates the exchanges among the selected individuals (Freeman, 2006; Brinkmann and Kvale, 2015). According to Yin (2008), the moderator's job is to encourage all the group's members to share their opinions but with minimum, if any, direction (Yin, 2008). As such Yin's perspective can be said to approach Schein's (1986, 1988, 1999, 2009 and 2013) position on process consultation in terms of how to facilitate the dynamics of a group.

The starting point is the research purpose and objective. From here the group is put together, the structure is designed and its flow develops. Focus groups are well suited to exploratory studies in a new field (Brinkmann and Kvale, 2015). Gill et al. (2008) view the focus group as a standalone method for research relating to group norms, meanings and processes, and suggest that it is useful:

- In a multi-method design, to explore a topic or collect group language or narratives to be used in later stages
- To clarify, extend, qualify or challenge data collected through other methods
- To feedback results to research participants.

In this research, it has been used for point two: To clarify, extend, qualify or challenge data collected through other methods

3.9.4.2 Identification and selection of the participants

What makes such groups "focused" is that they have had some mutual experience or appear to share some mutual views (Yin, 2008). A number of matters need to be considered when choosing the participants. Here are the criteria used by the researcher:

- To what extent can they be said to have knowledge of the subject or question at hand?
- To what extent do they represent different views, experiences and knowledge?
- To what extent are they able to be open, to share and to contribute?

Groups have or find their own dynamics and it requires skill to manage these. One has to consider questions of dominance so that one or two do not take over the discussions (Yin, 2008) and thus limit others' opportunity to contribute and offer alternative views.

For this focus group, six people were invited to participate in a three-hour session in Aarhus in Denmark. The participants were chosen by the researcher and invited by email and phone.
The participants were:

- A professor in strategy (who has written books on innovation)
- A management consultant on technological innovation
- A process consultant on innovation culture and processes
- A chief innovation officer
- A chief innovation officer
- A director of corporate brand development.

See appendix 9.9 for more information on the participants.

3.9.4.3 Preparation for data collection (the workshop)

The participants were asked to take part in a focus group that would complete the field work of the researchers' inquiry into how organizations develop and implement strategies, leadership and ways of organizing to bring about innovation in complex systems.

A two-page summary of the thesis (see appendix 9.10) was sent to the participants prior to the focus group. The document presented the case study (Telefónica), the research strategy and some of the emerging questions and findings. The paper was adamant about not presenting a universal theory or unquestionable findings. This was also important since some of the participants knew the researcher and they might have been reluctant to question the findings if they were seen to be important to the quality of the researcher's work.

The actual room where the focus group met and worked was set up in such a way that it would provide focus but at the same time a relaxing atmosphere.

3.9.4.4 Process – intention, set-up and approach

The orientation was yet again exploratory (Selnes, 1994; Brinkmann and Kvale, 2015), but now with the preliminary findings from the interviews and the survey in mind. The social constructionist approach (McNamee, 2004; McNamee, 2010) was influenced by the appreciative approach (Cooperrider and Srivastva, 1987; Cooperrider, Barrett and Srivastva, 1995; Cooperrider and Whitney, 2001).

The parameters (see 3.8.14) were slightly altered, but as little as possible, to fit the focus group. They were formulated as follows:

1) What is your notion of innovation and how do you experience the notion of innovation in your work with different organizations?

2) What does success look like and how is that articulated, both on an overall and a more local level?

3) What is your opinion of effective frameworks, methods and tools that are used to bring forth innovation, and are there certain frameworks etc. you see often being used that you consider ineffective?

4) What can be said about notions of leadership in terms of innovation when it comes to role, style and distribution?

5) How do organizations organize themselves in order to bring forth innovation and how could that be understood in terms of autonomy, identity and ways of working?

6) What types of strategies do organizations pursue and how are they developed when it comes to innovation, and how can they be understood when it comes to questions of deliberateness, framing and execution?

7) How can complexity theory be used to explain innovation?

8) How can social constructionism be used to explain innovation?

The set-up for the focus group followed a quite simple structure where people were welcomed and introduced to the workshop, the researcher, the intention of the gathering and the outline. It followed a simple I DO ART technique (see appendix 9.11). The participants were asked to present themselves and share a short story about innovation.

In general, each question was addressed in order and approximately 15–20 minutes were spent on each. However, it was a flowing conversation that also took different turns. At the end of the session the moderator (the researcher) briefly summed up the interview and offered some reflections on what had been brought up as well as some meta-reflections on the process.

The group interview was recorded and later transcribed. Again, the common steps in interview analysis (Kvale and Brinkmann (2015) and suggestions for thematic analysis (Fox, 2004) were followed.

3.9.4.5 Considerations concerning outcome

According to Brinkmann and Kvale (2015) the use of case studies in the social sciences has often been criticized by more traditional researchers. With reference to Flyvbjerg they go on to address this critique, which they largely attribute to misunderstandings, and point out that single case studies can also be valuable if done well. Furthermore (ibid.): "Analytical generalization rests on rich contextual descriptions and includes the researcher's argumentation for the transferability of the interview findings to other subjects and situations, as well as reader's generalizations from a report". These contextual descriptions find an echo in the relational constructionist argument for "thick textured description(s)" (McNamee and Hosking, 2012: 47).

What comes out of a focus group of course depending greatly on the researcher, the questions, the process, the facilitation and the participants. Changes in any of these factors will (probably) change the outcome. The researcher must at least be open to this possibility. That said, the value of the data generated from this process is also crucial. It is the lived experience and expertise of six individuals who have debated questions that have been close to their professional life for years. Their views and contributions help in examining and understanding the findings from the case study in an informed way.

3.10 Telefónica review

As the case study focuses on a particular company it is important to describe it in a fair and nuanced way. This will help to contextualize some of the decisions, ways of thinking and ways of working as the particular study unfolds.

In general, the method has been desktop research – consulting websites, audit reports (Audit report, 2016) and a number of online media articles. The articles were needed because many of the changes that took place in 2013–2016 are not really described anywhere else, beside internal papers.

The description of the company is presented in section 4.2. For a further deep-dive into the business area and so on please see appendix 9.2.

3.11 Summary of chapter 3

The premise of the research

The purpose of the research was to explore new territory around the question: "How do organizations go about developing capacity to bring about innovation in complex systems?"
This question opens up a number of further questions that need to be accounted for:

- Would Telefónica – and indeed organizations in general – be viewed as complex systems?
- If innovation in itself is argued to be a complex system – effectively making it a complex system within a larger complex system – how can it then be researched?

Chapters 5 and 6 feature longer descriptions of organizations as complex systems. In short, the number of possible connections and interactions among different actors in a system like an organization calls for it to be labelled a complex system. Logically then, the larger the organization, the more complex it becomes. As such, Telefónica is considered a complex system.

As seen in chapter 2 regarding the criteria that characterize a complex system, it is possible to describe innovation according to complex systems theories, as well as to view it as a complex system in its own right. Theory would argue that social systems are not lived in isolation, but that they consist of smaller systems and are part of larger systems. Given the uncertainty that follows the premise of a complex system, a complex system within a complex system essentially increases the complexity. That means that the uncertainty about what is being studied increases. On the other hand, if the study offers many views (for instance a quantitative study, own experiences, interviews, focus group, workshops etc.) on the same subject or question, the probability for providing something valuable increases.

Social constructionism as described in section 3.8.2 points to the relational and co-creational view of knowledge: knowledge is not found, it is created in relationships. This provides an answer to the question of how one complex system can research another. It essentially argues that the world being researched is not fixed, it changes all the time. And the researcher and the research itself affect the system in question, as well as being affected by the system. The interaction creates the findings.

The methodology used in this study has been a situated, explorative, mixed-methods approach. Taking as its starting point social constructionism and complexity theory, it primarily followed an inductive form of reasoning. The action research was set on a single-case study, combining semi-structured interviews and workshops. In addition, the data was collected through a broad online survey aimed at subject matter experts, as well as through a focus group.

The analysis was conducted by segmenting and cross-referencing online responses, as well condensation, thematic analysis and categorization of meaning, narrative structuring, meaning interpretation and ad hoc methods on the more qualitative data sets.

The lenses, or units, developed for the analysis in the convergence phase were the following:

- Notions of innovation
- Success
- Frameworks, methods and tools
- Notions of leadership
- Notions of organization
- Notions of strategy
- Complexity theory and innovation
- Social constructionism.

In other words, the research has combined prospective and retrospective methods (Darsø, 2001).

3.12   Emerging questions following chapter 3

Here follows a reflection on the research design and methodology, crystallized into four emerging questions.

- Single case-studies
  Using a single case as the base for data collection can be argued to be too specific or too limited to draw any conclusions on a more general level. However, that is not same as saying that it holds no value outside the particular (Brinkmann and Kvale, 2015). It can be argued that the single case study can then "discover" something that can be useful in other settings, but that also comes down to how the translation and application is done, not just what has been discovered.

140

Leung (2015) claims that evaluation of generalizability is pertinent, as there is a rising trend for knowledge synthesis from qualitative research via meta-synthesis, meta-narrative and meta-ethnography. An example here could be the understanding and use of metaphors (Morgan, 1996) and "generative narratives" (i.e. stories that can travel and influence people and systems). A pertinent example for this thesis would be Google X. Where a sound assumption would be that no company would really assume that they could copy and paste the Google set-up and expect the same result, the story of Google X certainly inspires, influences and to some extent impacts decisions made by companies seeking the same type of radical innovation.

What would distinguish "generative narratives" as a potential quality mark for a single-case study?

- Roles
  In terms of research, as we take the social constructionist position, it is not only a question of what research tells us about what "is", but also a matter of "what can be" as the researcher engages with the case study with the intention to change something or to create something. The action research clearly indicates that the researcher is not researching by being an observant, but rather by being a co-creator of knowledge and change (Winter, 1989; McNiff and Whitehead, 2011). As such the study essentially follows the epistemological and ontological stance of social constructionism. Lewin first used the term *action research* in his 1946 paper "Action Research and Minority Problems". He characterized it as a form of "a comparative research of the conditions and effects of various forms of social action, and research leading to social action (Lewin, 1946: p. 35). According to Darsø (2001) we need to study innovation processes in their making, that is in their openness. This means that the researcher needs to be present. "Only in the midst of process in its making is it possible to see how innovative crystallization comes about…" (Darsø, 2001: 216). This is, however, different from being present, facilitating, co-creating or essentially leading.
  In many ways, conducting action research as a consultant offers some opportunities, as well as some challenges. The consultant's expertise can become part of the process in a more legitimized way and the illusion of a neutral bystander is eradicated (i.e. one affects the process just by being present). The question then seems to be more about to what extent should one should be an active contributor? Here Schein's position on "to what end" seems fitting. It is about what is helpful for the client. However, that is not always easy to know before the intervention has taken place. As a consequence, less helpful interventions also take place. That needs to be accepted. Avoiding situations where one's own agenda and ideas about how to proceed supersede the one's of the client also seems to be an art rooted in experience.
  It would be an error not to accept the power relations involved. The consultant is hired because he or she can do something the client can't, and at the same time the client is paying the consultant.
  How actively can a consultant steer a conversation before they essentially become the one trying to solve the "problem"? Or, how far can action research go – is there a point where the research essentially becomes more a question of the researcher rather than the subject matter itself?

- Methodologies
  This has been a mixed-methods study. In that respect, there is the consideration of how these different methodologies actually fit together. In the action research phase of the inquiry, appreciative inquiry was the preferred methodology. Cooperrider and Whitney (2005, p. 3) says that: "Appreciative inquiry is a co-evolutionary search for the best in people, their organizations and the relevant world around them. It is about asking questions that reinforce a system's positive potential. As such it is correlated with the epistemological and ontological views of action research; arguably both can be derived from a social constructionist view of the world. Yet what about Schein's philosophy around consulting, research and change? And how does that go together with the social constructionist stance? Social constructionism does not prescribe a method per se, but that is not the same as saying that Schein's philosophy and

141

methodology supports a social constructionist stance. According to Wright (1994: 3), Schein "holds both an interpretive and a positivist approach to organizations in a way that appears contradictory to an anthropologist". At the same time, Schein argues for the relationship and the helping relationship, which certainly indicates a fundamentally relational approach. Furthermore, Schein also agrees with Lewin on that decisions are best implemented by those who help make them. It therefore seems that even if Schein's philosophy and methodology have not been articulated by him in a social constructionist light, they do share many of the more fundamental orientations. Perhaps this comes down to how one goes about the roles and the application of the methodologies that define whether they are mutually exclusive or more supplementary.

What does a utilitarian view of methodologies allow us in terms of drawing upon a multitude of traditions, disciplines and findings?

- Findings
  A mixed-methods approach offers the opportunity not only to situate (i.e. use the best fit) methodologies, but also to investigate and go about findings from different angles. As the present inquiry is primarily qualitative, it relies upon what research came out of the workshop but more than anything what came out of the interviews. Brinkmann and Kvale (2015) speak about the need to get away from subjective relativism in interviews where everything can mean everything and the absolutist quest for the one and only truth.

  Constructionists would argue that all analysis is inevitably a work of interpretation, and that for reasons of honesty, writing up should make this clear by applying reflexive techniques and an open-endedness concerning the "truth" of the report (Fox, 2004).

  There are at least three obvious challenges: the "ex post fact" fallacy (Shotter, 1993), hindsight biases (Weick, 1995) and groupthink (Tompkins and Rhodes, 2012). The "ex post fact" fallacy refers to how a situation is attributed with a "determinant" it may or may not have had, by the terms and condition of the social systems by which it is later discussed, analysed and/or constructed. According to Weick (ibid.), one of the central propositions of sense-making is that we come to know what we think by seeing what we say (Weick, 1995). Hindsight biases suggest that people engage in meaning-making processes and reconstruct them according to how they appreciate them. Groupthink is counter-effective, yet it is still very much alive in organizations (Tompkins and Rhodes, 2012). Senge (1994) speaks about "The Ladder of Inference" as an opinion-forming theory. It consists of seven steps: Observable data, selection of data, added meanings, making assumptions, drawing conclusions, adopting beliefs and taking action. He goes on to suggest that it can be used as a tool to improve credibility and influence when used consciously to move between data and inference, linking words and concepts to perceived meanings. In short, our memories and assessment of them are not fixed, but open to influence and derived from complex, intuitive reasoning.

  As the validity of findings is essentially a social construction, how can we understand the value of data obtained in retrospect through interviews, as opposed to observations themselves and dialogue around them?

4 Empirical findings and analysis

4.1 Introduction to chapter 4

This chapter presents the empirical findings. It begins with a presentation of the case, its context and operations. Then the four types of empirical data are presented, one at a time: The quantitative survey, the action research, the interviews and the focus group. In chapter 5 the different findings are discussed together.

Since the interviews were done in different contexts and time periods, they have been divided into two groups. The first set of interviews is more oriented towards the work around building capacity for leadership and innovation (but also including impressions on the contextual questions around the research question). The second set of interviews discusses more the outcome of the process the company has been through, how it works and how that is to be understood.

The chapter ends with a summary and the emerging questions. Here follows an outline of the different parts of the chapter. It should be noted that each of the empirical sections ends with an emerging view and meta findings. The emerging views can be understood as "sub-conclusions" or "hypotheses in the making", but in order to stay true to the emergent nature of the thesis, "emerging views" is more suitable. Meta findings are findings and considerations around the actual research role and research methodology applied.

- Case presentation analysis
- The quantitative survey and analysis
- The action research and analysis
- The interviews part I and analysis
- The interviews part II and analysis
- The focus group and analysis
- Summary
- Emerging questions.

4.2 Case presentation and analysis

Telefónica is one of the world's leading communications services providers. Its objective is "to create, protect and promote fixed and mobile connections for our customers helping them to take control of their digital lifestyle" (Audit report, 2016: 188). It offers its customers connectivity, simple products and services – hereunder the security to protect its customers' data.

4.2.1 Facts and figures

According to its website,[78] as of December 2016 Telefónica has consolidated revenue of 52,036 million euros in 2016 (January–December), employs around 125,000 people, operates in 21 countries and has 350 million total accesses.

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[78] https://www.telefonica.com/en/web/about_telefonica.

Telefónica is a 100 percent listed company with more than one and a half million shareholders, and is traded on several of the most important stock markets around the world.

4.2.2 Strategy

On its website,[79] the company states that it is "aware of the new challenges posed by today's society". As such it offers "the means to facilitate communication between people, providing them with the most secure and state of the art technology in order for them to live better, and for them to achieve whatever they resolve".
According to the group's Audit report (Audit report, 2016: 188) the Telefónica Group's strategy aims to:

- Enhance value through:

    o Offering excellent connectivity, for which our infrastructure management and our continuous investment in network are key. We aim to return the control over the data to our customers.

    o Providing a bundled offer with video and digital services. We offer our customers additional data in order to amplify their services, such as video or digital services, through unique, simple and clear offers.

    o Providing increased customer value and customer experience with digital access, aiming to offer the best products, solutions and contents.

- Enhance the following enablers:

    o End-to-end Digitalization. We reduce our legacy investments to improve virtualization, reduce physical servers, data centres and applications, digitalization of IT systems and processes, digitalization of front and back office, offering a true digital experience to our customers.

    o Big Data and Innovation to add value to our customers and return the control over data to our customers.

    o Continued focus on capital allocation in our legacy investments and simplification processes in order to continue investing.

The report goes on to state, "new digital technologies are the main driving force of social and economic transformation today. This premise is the basis upon which we build our vision: we want to provide access to digital life, using the best technology and without leaving anyone behind" (Audit report, 2016: 192).

Explaining a bit more, the company points to "connectivity" as an ally in reducing the digital divide. Essentially this suggests that a) digital life is good and b) connectivity is the way forward. Said differently: By being connected you get access to the benefits of the digital life.

Furthermore, the company points to a key source of competitive advantage when it says that thanks to its fixed and mobile network infrastructure and the services it has developed around it, it aids progress in the communities in which it operates.

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[79] https://www.telefonica.com/en/web/about_telefonica.

In pursuit of this vision, Telefónica works on three basic fronts:

- Providing access to technology through digital inclusion, in other words, by means of network roll-out and an accessible and affordable offer for all sectors of the population.
- Developing innovative services that add value to our connectivity and which we develop through innovation: Big Data, the Internet of Things (IoT), eHealth, digital education and eFinances.
- Incorporating sustainability principles to all of our product development processes. (Audit report, 2016: 192)

Telefónica defines its business along three lines: mobile, fixed-line telephony and digital services.[80]

4.2.3 Innovation[81]

Telefónica's innovation strategy can be described as a balancing act between its own, internal activities and the generation of more network-oriented activities. Its aspiration is clearly stated as to be "committed to technological innovation as a fundamental tool for being one of the main actors in the new digital universe, with the capacity to help to create a more sustainable world while achieving competitive advantages and distinctive products" (Audit report, 2016: 263).
This is to be done by introducing new technologies and developing business solutions and processes, that will make the company more effective, efficient and customer-oriented.

Telefónica balances its innovation strategy between two main models:

- Promoting internal research, development and innovation (R&D&i) capabilities, for which they have developed their own innovation model, which allows them to promote the application of technical research in developing commercial products and services using the knowledge developed in research centres, technological institutes and universities, among other sources.
- Promoting the creation of open innovation ecosystems, in which the "Open Future" initiative stands out as a global programme designed to connect entrepreneurs, start-ups, investors, venture capital funds and public and private organizations around the world, which promote innovation in collaboration with other actors.

This is representative of a company that believes that competitive advantage cannot be achieved solely by acquiring new technologies. Internal R&D and innovation efforts are key to achieving "strategic differentiation" (Audit report, 2016: 263).

The company has developed an innovation policy that seeks to ensure that the solutions guarantee Telefónica's commitment to developing a responsible business under the criteria of economic, social and environmental sustainability, by:

- Developing new products and services that enable growth and competition in an increasingly global environment, while being adapted to the diversity and local needs of each market.
- Encouraging the return of innovation through open innovation and creating value from the technology generated.
- Increasing its customers' loyalty and satisfaction.

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[80] See appendix 9.2 for more information.
[81] Here we look more broadly at the stated innovation orientation of Telefónica.

- Increasing the revenues, profits and value of the company.
- Increasing the quality of its infrastructure and services, as well as its relationship with its technology providers and solutions.
- Improving business processes and operations with the aim of optimizing resources, increasing efficiency and reducing environmental impact.

In addition, Telefónica seeks to promote the development of sustainable solutions that have a positive impact on the economic, social and technological progress of the regions in which they operate. Here it is also pointed out that in order to achieve this a new subsidiary has been created that focuses on product innovation and the development of disruptive technologies (NB: it is not clear from the document if this refers to Alpha, but the author believes this to be the case).

In such a large company, it is not easy to say that innovation can only take place in one or another entity. However, a large number of the innovation activities and projects are carried out by Telefónica Investigación y Desarrollo S.A.U. (Telefónica I+D). In addition, the entities of Open Future and Alpha can be as the complementary manifestations of its innovation strategy. Alpha will be discussed later in this chapter and to some extent also Discovery.

4.2.4 Telefónica I+D

Telefónica I+D is a wholly owned subsidiary of Telefónica. Its main task is to support Telefónica's different business lines. It receives support from other companies and universities to execute its functions. The mission of Telefónica I+D is "improving our competitiveness through technological innovation and product development. Telefónica I+D is also responsible for experimental and applied research and for the development of products to increase our range of services and reduce operating costs" (Audit report, 2016: 264). As stated on the website[82]:

> The mission of the Telefónica I+D Research groups is three-fold: (1) lead the early stages of the innovation funnel with expert knowledge and scientific expertise, (2) generate intellectual property rights for Telefónica, and (3) create innovative technologies and services that will enable Telefónica to maintain its leading position in the telecommunications market and be a strong player in the digital world as a true innovator.

Telefónica I+D focus is on technologies that are likely to impact Telefónica's service offerings in three to five years' time. It concentrates on three main areas:

- The development of new networks. These activities are related to new radio and fibre optic access technologies (technologies on the virtualization of network functions.
- The development of new products and services, which are carried out within the framework of the digital services strategy. The following stand out among these activities:
  o Interpersonal communication of the future with natural access, taking advantage of the possibilities of the Internet and smartphones
  o Services related to Big Data, regarding the concept of the Fourth Platform, whose vision is to return the value associated with the data it generates to the customer
  o Video and multimedia services (combining text, audio, images and video) with a user experience on all connected devices
  o Advanced solutions in emerging ICT businesses, such as cloud computing or security

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[82] http://www.tid.es/long-term-innovation.

- o Management of Internet of Things (IoT) services, related to enriched mobility, energy efficiency and smart retail
- o Using users' communication profiles to obtain opportunities to exploit different products and business models (marketing campaigns, targeted advertising, contextual services, churn reduction, cross-selling, etc.).

- - Experimental and applied research: With a medium and long-term outlook, Telefónica also has "Scientific Groups" whose mission is to investigate the possibilities of new networks and services and to solve the technological, social and environmental challenges that arise.

Telefónica I+D had just over 600 employees and a budget of a little more than 900 million euros in 2016. This represented 1.7 percent of the Group's consolidated revenue.

4.2.5 Open Futures

Open innovation is also a theme within Telefónica. Its initiative is called "Open Futures". This unit includes an open, global programme designed to connect entrepreneurs, start-ups, investors, and public and private organizations from around the world. The main objective of Open Future is to "detect, develop and enhance the talent and technological entrepreneurship in all its phases, for that which drives and accelerates the growth of ideas, projects, initiatives and companies" (Audit report, 2016: 265).

Essentially Open Futures can be seen to combine accelerator and incubator activities – that is tech, space, expertise and money. Its integral character enables innovation to be developed in different stages. It is structured around seven initiatives, the objectives of which are as follows:

- - Drive (Think Big and Talentum Start-ups).
- - Accelerate (Crowd working and Wayra).
- - Invest (Telefónica Ventures, Amerigo and CIP Telefónica).

At the start of 2017,[83] more than 1500 start-ups have been supported. Telefónica Open Futures is present in 16 countries. It ended 2016 as one of the main investors in the Spanish area of open innovation, positioning itself as one of the major funds in Europe and Latin America in venture capital investment.

4.2.6 Alpha

Not very much is written about Alpha, and it will be dealt with in more detail in a later section. However, here we will just briefly introduce, to contextualize it and contrast it against other units devoted to innovation (and R&D).

Alpha was started in 2016, initiated by its current CEO, Pablo Rodriguez.[84] The full name of the company is Telefónica Innovation Alpha, but in the thesis, it will be referred to as Alpha as that it is the name used in daily jargon. It is smaller unit, around 30 people and the company is chartered with future disruptive technology and innovation (i.e. identify and develop Moonshots). It is labelled "Telefónica's long term disruptive research unit"

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[83] https://www.openfuture.org/en/info/about.
[84] https://www.linkedin.com/in/pablorr/.

and it exists to "solve social problems through technology".[85] In relation to that, it can be said to help the company get the most out of, and ensure maximum growth in terms of digital transformation (El Economista, 2017). It came to be as a consequence of the demise of the Telefónica Digital – hereunder the former PDI unit of (Product Development and Innovation). It was set up as an independent unit in the Telefónica Group and should be seen in parallel to The Open Future initiative and Telefónica I + D, although it is separate from these.

Alpha is still a very new company and far from any real breakthroughs. According to El Economista (2017), the technologies it will focus on will be in areas such as voice recognition, touch and visual communications.

The president of Telefónica César Alierta highlighted in the Telefónica Meeting 2015 the strategic plan that the company is carrying out to adapt to technological change (El Economista, 2017): "We are living a real revolution and we are fortunate to be at the centre of this revolution. Digitization and Big Data are the key to innovating and giving more value to our customers as well as making better business decisions, a business that has a great positive social impact, contributes to flattening the world and creating wealth and well-being."

4.2.7   Changes 2013–2016

This section takes as a starting point the structural changes that took place as the researcher engaged with Telefónica. It offers an illumination on what people experienced and expressed throughout the action research (i.e. workshops) and the interviews. Furthermore, it provides a description of the process – as well as the rationale – behind the changes that led up to the innovation strategy and organization as of today, that is Alpha.

In short, to offer an organization context: The action research was done with the PDI unit of Telefónica Digital (Product Development and Innovation)

Telefónica Digital was created, complete with its own management team and operational agenda, in September 2011 (Le Maistre, 2014). It was poised to be a hothouse for new digital services, and charged with developing new business plans and opportunities that might otherwise not be conceived within the regular management structure of a traditional telephone company (telco).
Telefónica Digital was started as a way to innovate in business that needs to change to keep up with the changes (Le Maistre, 2012a). It is not so easy, however, for large companies to change because there are many different interests vested in their operation. The core business could carry on as normal, running fixed and mobile voice and data services. Telefónica Digital was charged with being different: it was created to push the boundaries of digital service innovation (Thomas, 2013).
Telefónica Digital was, at launch in 2011, a business with annual revenues of €2.4 billion (Le Maistre, 2012b). In 2012, it had around 6,000 staff, multiple services units inherited from its parent and annual revenues in excess of €2.4 billion (Le Maistre, 2012a).

In 2014, Telefónica SA undertook a corporate restructuring process, which resulted in the carrier's digital operation ceasing to exist as an independent company. This restructuring was done to bring the formerly independent Telefónica Digital business in-house (Donegan, 2015b).
It followed a board decision to centralize a number of operations, "bringing them closer to the corporate decision-making centre, simplifying the global structure...to improve flexibility and agility in decision making", the operator noted (Le Maistre, 2014a).
However, Telefónica was not shutting down an unsuccessful entity. Instead the operator stated that Telefónica Digital had "duplicated its value" in the previous two-plus years and had "achieved incremental revenues to reach a growth of nearly 20%. In this way, it has become the seed for the Telefónica of the future" (Le Maistre,

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2014). But if it was going well for Telefónica Digital, then why change? It seems that one of its key strengths – its independence within the Telefónica group – was also its main problem (Le Maistre, 2014). Located in London it was not close to the core powerbase in Madrid, nor had representation among the top management. As such it had to work through layers, which may have stalled its processes and created opaqueness and friction. As a consequence of these changes, the previous head of digital and the manager under which the PDI functioned under both left. And Telefónica Digital became part of a new centralized digital services unit under the leadership of Chief Commercial Digital Officer Eduardo Navarro.

Such an upheaval does not come without teething pains, as Le Maistre points out (2014). On one hand the centralization of management may risk suppressing the exuberance and innovation that had characterized the digital unit. On the other hand, it could also impact staff morale, which then could stifle the flow of ideas and development.
Yet telcos need to develop and adapt to the challenges and opportunities of the information society. While they may have thrived in previous eras the core competence they need and the roads to success often change dramatically.

What Telefónica Digital did differently was (amongst other things): to invest in start-ups, develop over-the-top unified communications apps, strike many different partnerships, hire people from non-traditional IT sectors, move KPI from one year or six months to every four months, and award bonuses to senior managers based on the number of new products launched (Le Maistre, 2012a). Donegan (2015a) characterizes Telefónica Digital as innovative, disruptive and downright un-telco-like in spirit. She points out that the same characteristics are still alive and well in some parts of the Spanish telecoms giant.

4.2.8 Innovation thinking and methodology

As described earlier, Telefónica has a stated commitment to innovation. There is also a need to get closer to how one works with innovation – not just in terms of strategy, policy and organizational setup, but also in how the methodology and process can be described.

According to Ian Small (CEO of Communications Services and Product Innovation at Telefónica), big telcos can innovate (Donegan, 2015a). This is actually an important statement because it is the premise of all innovation efforts that follow – the belief that one can do it.
Telefónica is a large company and as such its innovation efforts are not pursued through only one channel or setup. They can, in simplified fashion, be divided into external and internal activities. Externally, the innovation efforts are pursued by teams through venture capital (investment) and business ventures; internally, the innovation efforts are catered for by teams looking after networks, data and moonshots (Lopes, 2017). "Moonshots" refers to the projects worked on by Alpha.

Telefónica has tried, and is trying to transform its innovation process by employing lean start-up techniques (Juarado Apruzzese and de Olano Mata, 2014). Or as Dr Richard Benjamins (director of business intelligence at Telefónica Digital) stated (Thomas, 2013): "We use a lean startup methodology. It's not about big products and rolling them out in two years. We put customers' needs at the heart, capture data, talk to them and understand what's working or not."
But there are important contextual differences in employing lean start-up techniques inside a much larger company, as opposed to a small start-up (Juarado Apruzzese and de Olano Mata, 2014). In terms of how a company like Telefónica can innovate, Small says that it can't behave like a lean start-up, but must act as a "lean elephant" (Donegan, 2015a).

According to Donegan (2015b), Small has established an "innovation environment" in which to foster the development of new services. It is more risk-oriented and more aggressive in taking things to market than other parts of Telefónica. Here failure is not a bad word.

The way a telecom operator the size of Telefónica can innovate, according to Small, is to create an environment in which innovation can thrive, and then take methodologies from the start-up world and employ them inside the company (Donegan, 2015b). Ian Small (Donegan, 2015b) also speak about the "lean elephant" and says that a "lean elephant is what happens when you apply [start-up methodologies] inside a company the size of Telefónica" and goes on to say that he "strongly believe that if you're a company the size of Telefónica, you can't be better at being a startup than a startup can be. You just can't."

The variety of this approach (as described in Donegan, 2015b) can be seen in the different go-to-market strategies in the Communications Services group: Tu Go is a Telefónica O2-branded application, TokBox is an independent subsidiary, Tuenti operates as an independent brand in Spain and Latin America, and Firefox Hello is a partnership with Mozilla.

Donegan (2015b) says it is difficult to measure in traditional ways how well Small is doing because specific business metrics for the Communications Services unit are not available. On the other hand, much of what he and his organization are working on at Telefónica is maybe difficult to evaluate. This is because much it is about changing culture and introducing new ways of working to blend the best of both the start-up and telco worlds. What Small and his approach to innovation represents is knowing "how to invent the future working in very tight cycles, validating and experimenting with users every step of the way" (Donegan, 2015b). This clearly indicates that he is no supporter of the secluded development way of thinking.

Patrick Lopes, VP networks innovation at Telefónica Steering Committee, states that innovation is a process and a methodology at Telefónica (Lopes, 2017). He goes on to say that the process, which is essentially to employ lean startup techniques (Jurado Apruzzese and de Olano Mata (2014), has been the "source of Telefónica's early advances in IoT, big data, smart cities...It has also killed, merged, pivoted and spun off hundreds of projects". Lopes (2017) goes on to outline the innovation process more in detail, with regard to the practice of a large telco like Telefónica in a fast-paced environment:

- Ideation
  This phase revolves around ideas, but the ideation is directed. This means that different sources of input – for instance customer sentiment studies – form the basis for an innovation call around particular themes. "Artificial intelligence and networks QoE" is launched across the group, with local briefings that include our selection parameters. A jury reviews the hundreds of ideas and the most promising ones are shortlisted. The selected entrepreneurs are given a month to prepare a formal presentation (a pitch) of their idea. Customer experience specialists help them refine the problem they are trying to solve, as well as the idea's applicability and its market appeal.

- Feasibility
  If the idea is selected after this phase, the entrepreneurs move to the innovation team. There they work full time for a few weeks to create a feasibility plan and preliminary resource budget for prototyping. When this is ready, the project/proposition is presented in detail to the jury.

- Prototyping
  The selected projects are given resources and three to eight months to prototype their project. When the project has reached this stage, it must demonstrate strong internal sponsorship, with verticals or markets within Telefónica. The sponsors commit to testing the prototype in their labs. Finally, the prototype, together with the value proposition and market analysis, is examined before it goes on to the next phase.

- Market trial
  This phase can last for up to six months. At this stage, the prototype is tested in a commercial arrangement. The testing and subsequent refinements follow a step-by-step approach whereby the number of users and sophistication increases so as to measure the effectiveness of the value proposition. In this phase, a full product (or service business) case is completed based on the feedback from the market trials.

- Productization and transfer
  Here the project is evaluated to see if it should be transferred to an existing business unit, or become a new one. Questions to be addressed are for example: Does it meet customer requirements? Is it innovative? Does it offer differentiation? And does Telefónica have a comparative advantage in terms of this solution?

4.3   The quantitative survey

Here the findings from the quantitative survey are presented. Key numbers to remember and placing the findings in perspective are: There were 103 respondents, four from four different telcos and one from Telefónica. As such, the primary purpose is not inferential statistics, but more descriptive, offering an image and an indication of the state of things.
Please see section 3.9.2 for more info about the methodology and design.

This section is divided into several parts. First an understanding of the respondents is offered (for a more in-depth presentation together with graphs and tables please see appendix 9.15). Then come the findings based on the individual questions asked in the survey and cross-referencing with some other questions. This is followed by a more specific comparison and analysis between the telecos, Telefónica and all responses. This section ends with a short description of the emerging views and a meta-analysis.

4.3.1   The findings from the fixed responses

4.3.1.1 Understanding the respondents

Some overall findings are useful in understanding the next sections. For a fuller analysis and description of the findings, please see appendix 9.15.

- The main networks the respondents came from are Kaospilot (i.e. clients, alumni and friends) as well VL (a Danish association for business leaders). Together they make up more than 60 percent of the respondents. Adding the *Harvard Business Review* respondents increases this number to almost 80 percent.
- Innovation is a newer subject within higher education, however for more than 50 percent of the respondents it was included in their educational background in some way.
- 35 percent consider their training in innovation in the workplace is not indicative.
- 27 percent do not have an indicative working experience within the field of innovation.
- The majority (54%) of respondents are senior level executives.
- More than 80 percent of the respondents are directly involved in innovation work in their organization.
- Almost 70 percent of the respondents work in private companies.

- 20 percent of the respondents represent a consulting and advisory organization, IT accounts for a little more than 10 percent and telecommunications for a bit more than 5 percent.
- 27 percent of the respondents have over a 100 million euros in annual turnover (and 10 percent can be considered to be really large with over 10 billion euros in revenue).
- The respondents represent both younger companies (less than two years) and old ones (more than a hundred years). The spread is fairly even.
- In terms of number of employees there is also a fairly even spread. Approximately 8 percent have more than 100,000 employees.

4.3.1.2 The competitive business environment

Q11 I would characterise the competitive business environment for my organisation as:

Answered: 100   Skipped: 5
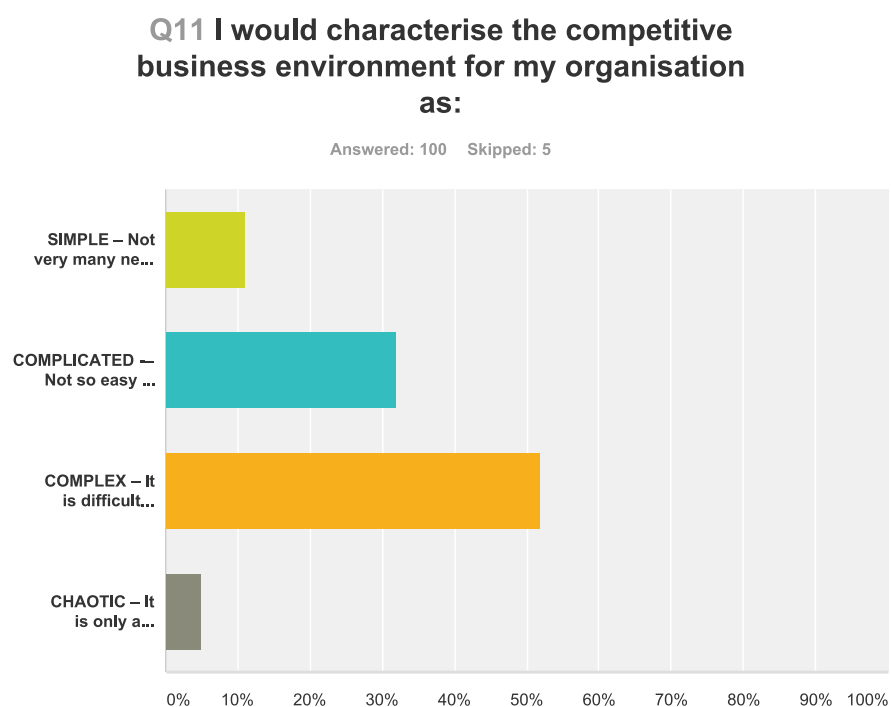
Answer Choices	Responses	
SIMPLE – Not very many new competitors, customer changes, new technologies ect cause and effect are clear. Here it is more a matter of best practice.	11.00%	11
COMPLICATED — Not so easy to know what is the best way forward. Causes and effects are separated over time and space, but they are discoverable. Expert diagnoses often required. It is a matter of good practice.	32.00%	32
COMPLEX – It is difficult to know what is the best way forward. What was a good solution yesterday is not the right one tomorrow. Cause and effect are only clear in retrospect. It is a matter of patterns and emergence.	52.00%	52
CHAOTIC – It is only a matter of making decisions as they arise. No point in looking for the right answer. There is high tension and high turbulence.	5.00%	5
Total		100

Table 4.1 The competitive business environment

152

The question, rooted in Snowden's framework (see 2.6.2.4) shows that a majority (52%) describe their business environment as "complex". 11 percent describe it as simple, 32 percent as complicated and 5 percent as chaotic. As such the data provide a picture that respondents view their environment as difficult to navigate, and need to test and find their way forward. As a consequence strategic plans would be less relevant in themselves, although planning may still be very important. The spread of the respondents suggests that this speaks to a general sentiment about business being increasingly difficult to navigate.

The responses to this question were cross-referenced with:

- The turnover of the company (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.

The analysis showed that the higher-ranking respondents view their business environment as more complicated (46%), tightly followed by complex (44%), whereas only 6 percent see it as simple and 4 percent as chaotic. This is not a dramatic deviation, but perhaps an indication that being in charge offers a more complete picture and allows one to balance certain aspects different than if one were, say, a middle manager. This may explain why complicated is the top scorer here.

When looking at larger organizations (i.e. more than a 100 million euros in revenue) the picture changes a little with, simple receiving 12 percent, complicated 32 percent, complex 56 percent and chaotic 0 percent. This is also an indicator of some larger organizations being public organizations, which can be assumed to operate in a less volatile market space than private companies.

A quick check on companies established less than 20 years ago shows that close to 50 percent view their business environment as being complex. This probably illustrate the type of business they operate as well as their feeling of not being established, and having gone through different business cycles and phases to the same extent as the more senior organizations.

4.3.1.3 Innovation as a priority

Q12 Innovation has been a formal priority within my organisation since:

Answered: 98   Skipped: 7
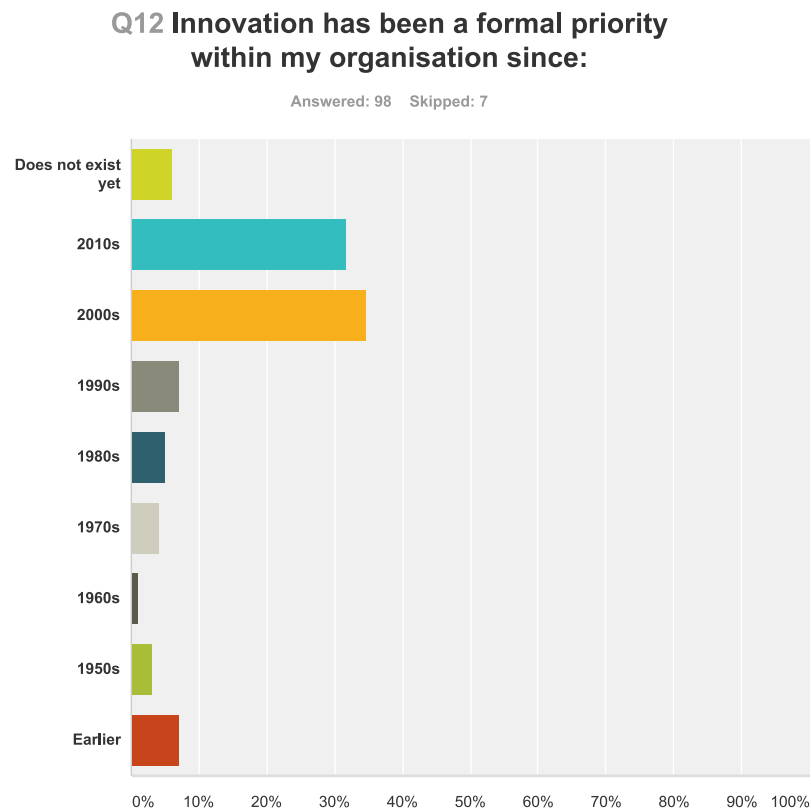
Answer Choices	Responses	
Does not exist yet	6.12%	6
2010s	31.63%	31
2000s	34.69%	34
1990s	7.14%	7
1980s	5.10%	5
1970s	4.08%	4
1960s	1.02%	1
1950s	3.06%	3
Earlier	7.14%	7
Total		98

Table 4.2 Innovation as a priority

Perhaps the most surprising answer here is that a number of respondents actually claim that innovation is not yet a priority in their organization. The data also shows that for a clear majority innovation was not a priority in their organization 20 years ago.

The responses to this question were cross-referenced with:

- The turnover of the company (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.

The data showed that amongst the CEO/president and executives, 35 percent said it has happened since 2010, and an additional 39 percent said it has happened since 2000. 4 percent said it is still not a priority. These responses show no significant difference to the general trend, except that there the indications are 5 percent higher. Perhaps this is because people on a lower hierarchical level and tenure at the company have less knowledge, but this cannot be substantiated.

Looking at the segment of larger companies, the numbers change quite a bit. Here, none do not have innovation as a priority, and 12 percent of the respondents say it has been a priority since before the 1950s. 16 percent indicate that it has been a priority since after 1990 and 44 percent states that this happened between 2000 and 2010. The turnover of the organization does not seem to play a significant role in terms of when innovation became a priority per se. This can of course be surprising given the resources they have at their disposal and their opportunity to be up to speed on changes in the market place. Perhaps it has to do more with semantics and signs of the times?

Doing some extra analyses, we can see that a substantial number of respondents state that innovation has actually been a priority since their organizations were started. This supports the notion that a start-up (i.e. entrepreneurship) is essentially about innovation in some form. If it was called innovation then or if that is a term that has been attached afterwards is open for debate.

Those respondents for whom innovation is not yet a formal priority range from companies with small revenues to old public organizations.

4.3.1.4 Innovation models

Q13 What kind of innovation model does my organisation primarily follow:

Answered: 94   Skipped: 11
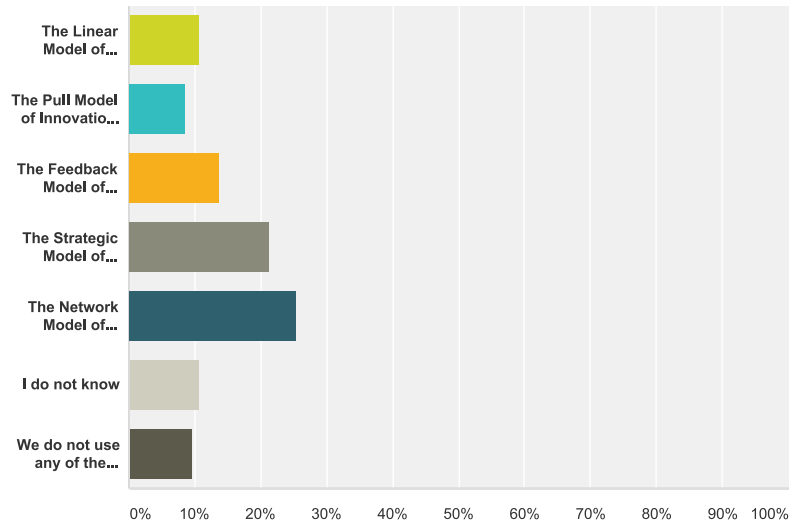
Answer Choices	Responses	
The Linear Model of Innovation: Innovation is pushed from the research phase to the commercial application phase in sequential manner: Product Idea – Product Development – Production – Product Introduction	10.64%	10
The Pull Model of Innovation: The consumer or end-user drives the requirements of technology through a process of: Listen – Solve – Impact	8.51%	8
The Feedback Model of Innovation: The end-user or consumer has influence over the incremental innovation of this product through their feedback and requirements: Product Idea – Product Development – Production – Product Introduction – User Feedback – Requirements – Product Idea Improvement	13.83%	13
The Strategic Model of Innovation: Innovation lines up with company strategy and invites end-user requirements feeding back in, but only feedback within the scope and range of the strategic plan of the company is catered for thus eliminating spawning products outside the scope of the plan.	21.28%	20
The Network Model of Innovation: Based upon collaboration and networking, the term open innovation is used synonymously with this model. Extra-enterprise and cross-discipline organisations join together, ideas can come from external as well as internal sources and can enter the innovation process at any stage.	25.53%	24
I do not know	10.64%	10
We do not use any of the above mentioned models	9.57%	9
Total		94

Table 4.3 Innovation models

This question is rooted in Rothwell's discussion of different generations of innovation models. What is perhaps most interesting is that so few of the respondents (11%) adhere to the linear model of innovation. This stands in contrast to the suggestion by Godin that it is still the dominant model and owes its status to the fact that it is easy to communicate and still promoted by, for instance, the OECD. The relative dominance of the network

156

model (26%) and the strategic model (21%) suggest a relatively high comprehension of and orientation towards the matter of innovation. At the same time, the respondents who do not know (11%) and those that do not use any one of the described models (10%) indicate that there might be uncertainty on the matter of innovation models as well.

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years of age.
- The type of organization (question 6) – segmenting private and public organizations.

The data showed that larger organizations express a much higher adherence to the linear model (22%). Furthermore, 17 percent state that they do not know which model they use. This is 69 percent more than the average for all. Consequently, fewer adhere to the network model (13%) or the strategic model (17%). It should also be noted larger organization may operate with several models.

The formal position indicates much less variance in comparison with the weighted average from all respondents. None of the indicators varied by more than 5 percentage point. This may have to do with the fact that many of the respondents are actually executives or CEOs. The top scorer here is the strategic model. One can only guess if this may also have to do with the CEOs' inclination towards strategy and management – where sheer talk of strategy tends to create a positive connotation.

When looking at the age of the organization, the picture changes quite drastically. The linear model falls to 3 percent and the network model goes up to 38 percent. This may have to do with the fact that smaller and younger organizations are "born" in a networked world, where they realize and appreciate that resources do not exist within their organizations. Hence, they must act in a networked world through and through.

The type of organization displays an interesting variance. For private companies, the network model falls to 15 percent adherence, where for public organizations that number goes up to 31 percent. For public organizations 48 percent state they do not know which model is used or they use none of the ones offered.

4.3.1.5 Sources for innovation strategies

Q14 Please indicate how important you find these sources to developing your innovation strategies:

Answered: 96   Skipped: 9
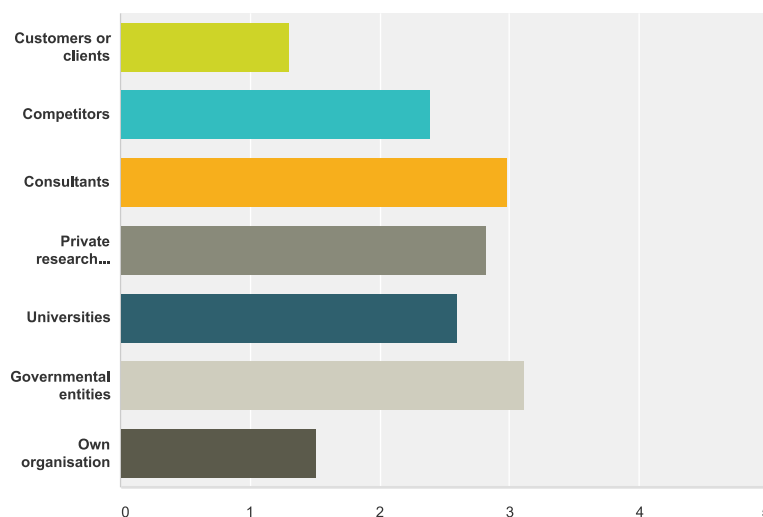
	Very Important	Important	Neither Important Nor Unimportant	Unimportant	Very Unimportant	Total	Weighted Average
Customers or clients	**76.04%** 73	**19.79%** 19	**2.08%** 2	**1.04%** 1	**1.04%** 1	96	1.31
Competitors	**10.64%** 10	**56.38%** 53	**21.28%** 20	**6.38%** 6	**5.32%** 5	94	2.39
Consultants	**4.17%** 4	**28.13%** 27	**39.58%** 38	**20.83%** 20	**7.29%** 7	96	2.99
Private research entities	**7.45%** 7	**36.17%** 34	**30.85%** 29	**18.09%** 17	**7.45%** 7	94	2.82
Universities	**17.71%** 17	**30.21%** 29	**31.25%** 30	**15.63%** 15	**5.21%** 5	96	2.60
Governmental entities	**7.37%** 7	**25.26%** 24	**28.42%** 27	**27.37%** 26	**11.58%** 11	95	3.11
Own organisation	**54.74%** 52	**42.11%** 40	**2.11%** 2	**0.00%** 0	**1.05%** 1	95	1.51

Table 4.4 Sources for innovation strategies

The responses show clearly (weighted average) that when it comes to developing innovation strategies, organizations tend to favour customers or clients and their own organization. The weighted average also shows other sources are fairly on par with each other, although government entities score the lowest. When looking at more particular scores a few things stand out:

- Universities are clearly favoured by some

- While many think competitors are very important, most (54%) still think they are important
- Consultants are not very favoured, which may come as a bit of a surprise.

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years of age.
- The type of organization (question 6) – segmenting private and public organizations.

The analyses showed that very few things were strikingly different when segmenting as stated. The top three sources are the same – customers, own organization and competitors. One of the more striking features was that CEOs placed the least importance on governmental agencies for their innovation efforts, followed by consultants.

Larger organizations placed the least importance on governmental agencies and private research entities, followed by consultants.

For newer organizations (those established less than ten years ago), the only thing that stands out is that they tend to be more favourable towards consultants than the average.

Looking at answers from public organizations, what stands out here is that they favour clients or customers, consultants and private research entities less than the average. In general, they find other governmental agencies and universities more important.

4.3.1.6   Importance of innovation goals

Q15 **In your opinion, how important are the following goals with respect to the innovation strategies of your company?**

Answered: 96   Skipped: 9

	Very Important	Important	Neither Important Nor Unimportant	Unimportant	Very Unimportant	Total	Weighted Average
More products or services offered to our customers and clients (number of products/services)	19.79% 19	34.38% 33	32.29% 31	12.50% 12	1.04% 1	96	2.41
More qualitative products or services offered to our customers and clients (quality of product/service)	56.25% 54	37.50% 36	5.21% 5	1.04% 1	0.00% 0	96	1.51
Bigger market shares in our existing markets	21.05% 20	49.47% 47	20.00% 19	7.37% 7	2.11% 2	95	2.20
Entering into new markets	32.29% 31	32.29% 31	21.88% 21	11.46% 11	2.08% 2	96	2.19
Reduced cost of production in terms of material and/or energy	18.09% 17	40.43% 38	23.40% 22	12.77% 12	5.32% 5	94	2.47
Improved productivity (including reduced labour costs)	23.16% 22	47.37% 45	17.89% 17	10.53% 10	1.05% 1	95	2.19
Increased flexibility in terms of production	22.11% 21	35.79% 34	27.37% 26	12.63% 12	2.11% 2	95	2.37
Reduced environmental impact	13.68% 13	27.37% 26	31.58% 30	16.84% 16	10.53% 10	95	2.83
Improved health and safety	18.95% 18	30.53% 29	27.37% 26	15.79% 15	7.37% 7	95	2.62
Meeting regulatory requirements	20.65% 19	35.87% 33	23.91% 22	13.04% 12	6.52% 6	92	2.49
New organisational structure or new ways of organising the work	25.26% 24	34.74% 33	28.42% 27	8.42% 8	3.16% 3	95	2.29
Obtaining new competencies	32.63% 31	45.26% 43	15.79% 15	5.26% 5	1.05% 1	95	1.97
New leadership systems	19.79% 19	38.54% 37	26.04% 25	12.50% 12	3.13% 3	96	2.41
New findings regarding innovation and innovation work and systems	21.05% 20	44.21% 42	27.37% 26	6.32% 6	1.05% 1	95	2.22
Increased revenue	40.43% 38	37.23% 35	13.83% 13	4.26% 4	4.26% 4	94	1.95
Reduced time to respond to the needs of customers or suppliers	29.79% 28	40.43% 38	20.21% 19	8.51% 8	1.06% 1	94	2.11
Reduced cost in sales, marketing and consumer experience	9.47% 9	35.79% 34	26.32% 25	21.05% 20	7.37% 7	95	2.81
Increased employee satisfaction and reduced employee turnover	25.53% 24	46.81% 44	14.89% 14	9.57% 9	3.19% 3	94	2.18

Table 4.5 Importance of innovation goals

The data show that in general (the weighted average for all respondents) the more important goals of the innovation strategies (i.e. what they are supposed to bring) are:

- More qualitative products and/or services
- Increased revenue
- Obtaining new competencies.

The ones that received the lowest (average score) are:

- Reduced environmental impact
- Reduced cost in sales, marketing and consumer experience
- Improved health and safety.

161

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years old.
- The type of organization (question 6) – segmenting private and public organizations.

The analysis shows that when segmenting for larger organizations a few changes stand out. While the top scorer is "more qualitative products and services", the second most important goal is "meeting regulatory requirements". A bit surprising perhaps is the fact that "increased revenue" and "obtaining new competencies" fall quite dramatically in importance. However, this may be because some of the large organizations are in fact public companies. Their least important goal is "reduced cost in sales, marketing and consumer experience".

Segmenting by CEOs and executives we see a few differences as well. While the two most important goals for them are the same as the average, in third place we find "reduced time to respond to the needs of customers and clients". Fourth we find "obtaining new competencies" and fifth we find "increase employee satisfaction and reduced employee turnover". Their least important goal is "reduced environmental impact".

Looking at organizations established no longer than ten years, their most important goals do not deviate from the weighted average of all respondents. Here "improved health and safety" and meeting regulatory requirements are the lowest scoring goals.

Looking at the type of organization, private companies have the same top three goals as the weighted average for all respondents and they also view "reduced environmental impact" as least important. For public companies "more qualitative products and services" is the top scorer, but it is less pronounced than for private companies. What is perhaps more striking is not that they give less importance to goals such as "obtaining larger market share", "entering into new markets" and so on, but more that the lowest scorer was "reduced cost in sales, marketing and consumer experience". While this may be a matter of how this question was understood, it could be argued that it would have been expected to receive more prominence, given the present discussions around governmental spending, private vs. public services providers on tax money and the growing emphasis on experience design within the public sector.

4.3.1.7 Assessment of aspects of innovation

Q16 To what degree would I say that my organisation has:

Answered: 84   Skipped: 21
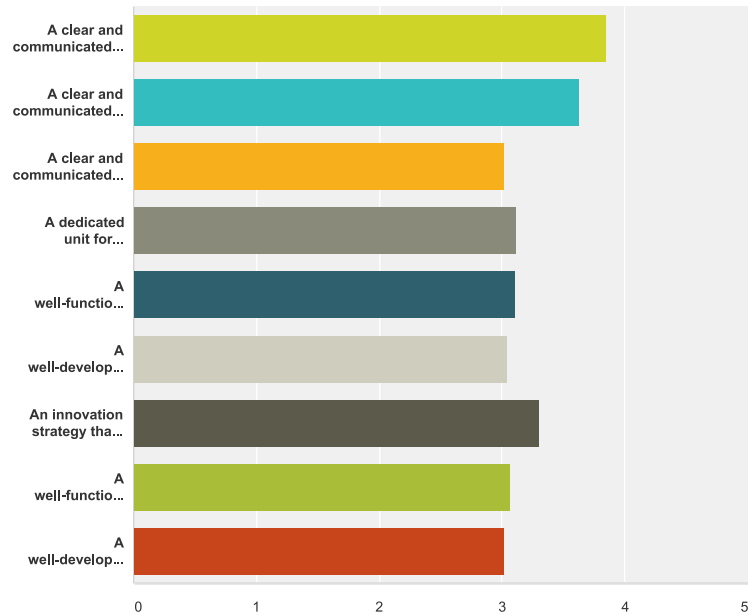
	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total	Weighted Average
A clear and communicated vision	7.14% 6	4.76% 4	9.52% 8	53.57% 45	25.00% 21	84	3.85
A clear and communicated strategy	7.14% 6	8.33% 7	15.48% 13	52.38% 44	16.67% 14	84	3.63
A clear and communicated innovation strategy	8.33% 7	22.62% 19	30.95% 26	34.52% 29	3.57% 3	84	3.02
A dedicated unit for innovation or clear responsibilities	9.64% 8	21.69% 18	27.71% 23	28.92% 24	12.05% 10	83	3.12
A well-functioning innovation system	4.82% 4	24.10% 20	34.94% 29	27.71% 23	8.43% 7	83	3.11
A well-developed and implemented leadership system for innovation	3.61% 3	27.71% 23	32.53% 27	32.53% 27	3.61% 3	83	3.05
An innovation strategy that is a consequence of an overall strategy	4.82% 4	18.07% 15	28.92% 24	37.35% 31	10.84% 9	83	3.31
A well-functioning setup for ensuring the development of innovation strategies	3.66% 3	23.17% 19	37.80% 31	32.93% 27	2.44% 2	82	3.07
A well-developed and implemented leadership system for innovation (hereunder competencies for leading innovation)	3.61% 3	28.92% 24	32.53% 27	31.33% 26	3.61% 3	83	3.02

Table 4.6 Assessment of innovation aspects

For the weighted average for all respondents there is a clear trend that innovation becomes less defined (or at least less clear to the respondents) as we move away from business strategy and into innovation strategy, organization and leadership. What is also striking, however, is that all parameters obtain in general between 3 and 4 as a score, although most are closer to 3. This indicates that for most there is at least a sense that something is set up and conducted according to these parameters.

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years old.
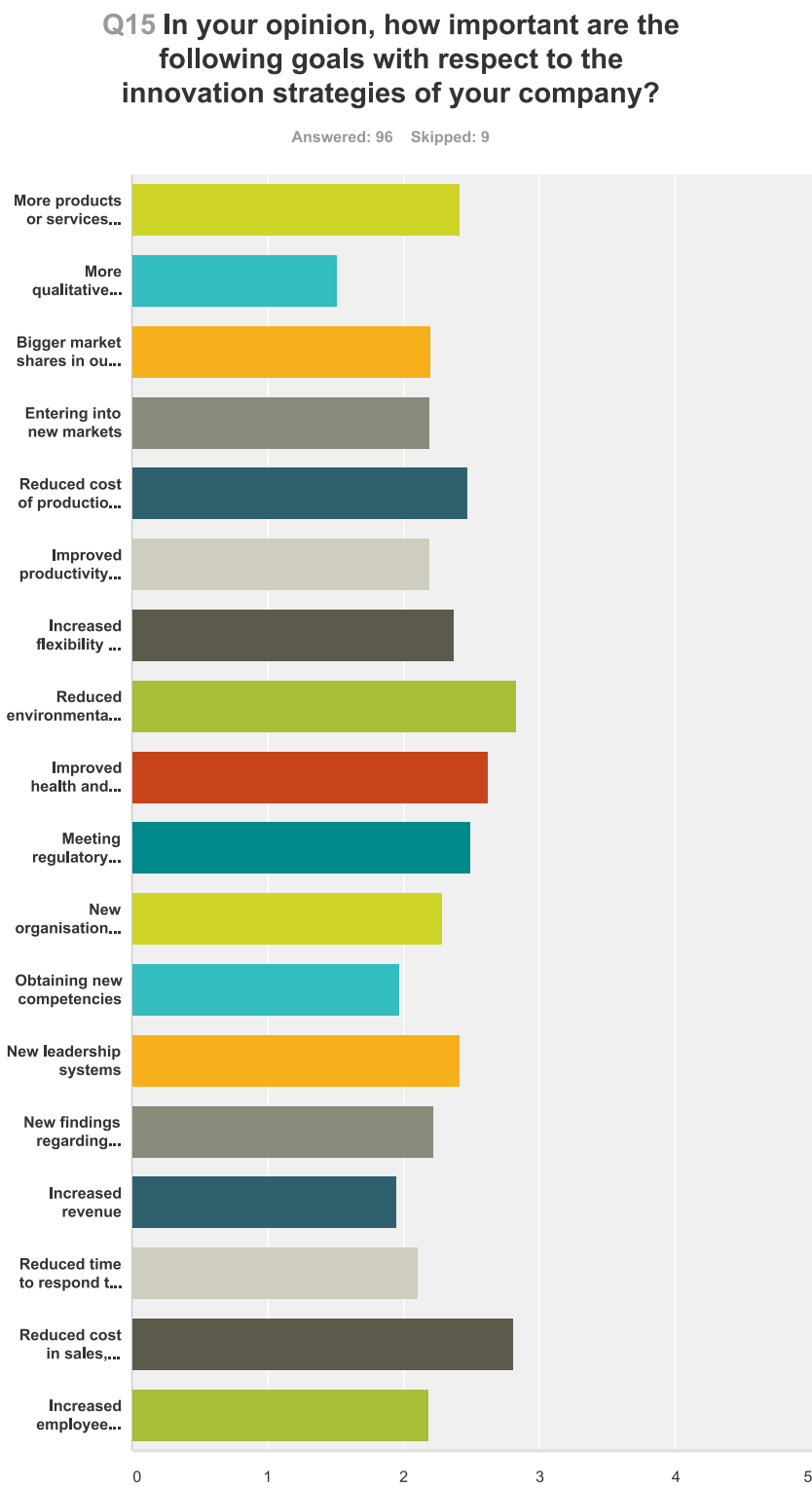- The type of organization (question 6) – segmenting private and public organizations.

The analyses showed that larger organizations, in comparison with the weighted average for all responses, have a higher score for "a clear and communicated vision" and for "a dedicated unit for innovation or clear responsibilities" – but on the rest of the parameters they score lower. One potential reason for this is that in larger organizations complexity increases, making it harder to disseminate set ups, rather than assuming that it is not there.

When looking at CEOs and executives what is striking is that they score higher on all parameters than the average. The two parameters with the biggest relative difference compared with the average for all are "a clear and communicated strategy" and "a clear and communicated innovation strategy". The reason for this may of course be simply that this is very much the assumed responsibility of top management and as such it is quite clear to them, but the decisions and set ups do not necessary trickle down into the organization to the same extent.

For organizations that are younger than ten years, the data does not provide a significant deviation from the weighted average for all respondents.

Analysing the type of organization reveals again no significant deviation. For private companies, what may be a bit surprising is that the parameter "a clear and communicate innovation strategy" receives the lowest score. Looking at the public organizations, apart from "a clear communicated vision" and "a clear and communicated strategy" all other parameters are significantly lower scored than the average for all.

4.3.1.8 Responsibility for innovation

Q17 Responsiblity for developing innovation strategies and processes resides with:

Answered: 82   Skipped: 23

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total	Weighted Average
The top management	2.44% 2	8.54% 7	9.76% 8	48.78% 40	30.49% 25	82	3.96
A department within our company	8.75% 7	23.75% 19	23.75% 19	35.00% 28	8.75% 7	80	3.11
A mix of functions, competencies and departments	2.50% 2	8.75% 7	15.00% 12	52.50% 42	21.25% 17	80	3.81
We do not really do it	44.30% 35	25.32% 20	22.78% 18	5.06% 4	2.53% 2	79	1.96
We rely on external participants	35.80% 29	24.69% 20	28.40% 23	8.64% 7	2.47% 2	81	2.17
It is a mix of external and internal participants	13.58% 11	22.22% 18	22.22% 18	33.33% 27	8.64% 7	81	3.01

Table 4.7 Responsibility for innovation

This question reveals that for the majority of organizations the responsibility for developing innovation strategies and processes resides with the top management. Given that "a mix of functions, competencies and departments" also received a high score one can assume it is because innovation (and herunder innovation strategies) is a delegated and distributed activity, involving many people and instances. It is also clear that very few agree that they do not do this at all.

The responses to this question were cross-referenced with:

165

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years old.
- The type of organization (question 6) – segmenting private and public organizations.

The analyses showed that for larger organizations the responsibility for developing innovation strategies and processes still resides with top management, but fewer consider it to be so. On the other hand, there is virtually the same decrease at top mangement level as for the increase for "a department within our organization".

In terms of CEOs and executives, what stands out here is that agreement that responsibility resides with top management is even more pronounced than with the average organization.

Looking at organizations established within the last ten years, the top scorer here is "a mix of functions, competencies and departments", followed by "top management".

For public organizations, the top scorer here is "a mix of functions, competencies and departments"; for private companies it is both a top management concern and "a mix of functions, competencies and departments".

4.3.1.9 Assessment of innovation strategy development

Q18 When we develop strategies for innovation, it is:

Answered: 80   Skipped: 25
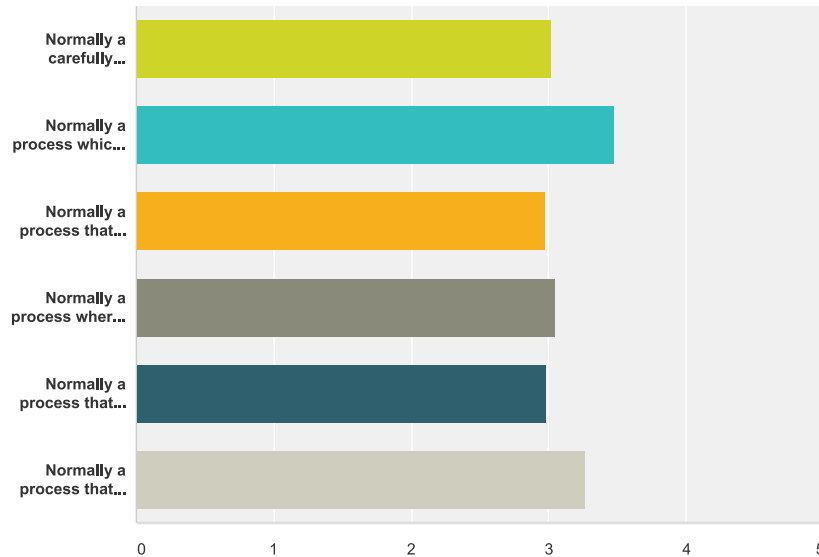
	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total	Weighted Average
Normally a carefully crafted process that includes all relevant stakeholders	8.75% 7	23.75% 19	27.50% 22	36.25% 29	3.75% 3	80	3.02
Normally a process which includes as much expertise as possible	3.75% 3	12.50% 10	25.00% 20	50.00% 40	8.75% 7	80	3.48
Normally a process that is done effectively within a short timeframe	6.25% 5	32.50% 26	21.25% 17	37.50% 30	2.50% 2	80	2.98
Normally a process where a few people write a suggestion which is then discussed and improved	5.06% 4	29.11% 23	22.78% 18	41.77% 33	1.27% 1	79	3.05
Normally a process that is preceded by a thorough and comprehensive analysis of the situation	8.75% 7	25.00% 20	31.25% 25	28.75% 23	6.25% 5	80	2.99
Normally a process that is approved on board level	1.25% 1	22.50% 18	36.25% 29	27.50% 22	12.50% 10	80	3.27

Table 4.8 Assessment of innovation strategy development

In terms of the developing the strategies for innovation the weighted average for all shows that parameter receiving the highest score is "normally a process which includes as much expertise as possible". The lowest score was given to the parameter of "normally a process that is done effectively within a short timeframe". Where it may be hard to make definitive conclusions about these responses they may highlight that expertise is more important than the number of people involved and that often innovation is tricky thing that does not easily follow an agreed-upon time and action plan.

167

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years old.
- The type of organization (question 6) – segmenting private and public organizations.
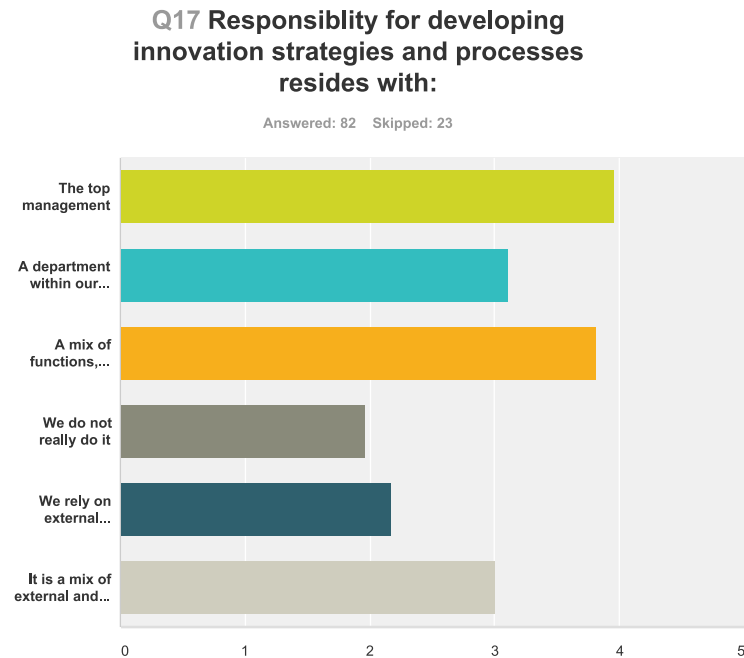
The organizations with the highest turnover are in line with the average respondent in that "normally a process which includes as much expertise as possible". What is interesting, however, is that on all parameters the score is lower than for the weighted average for all, apart from the parameter "normally a process where a few people write a suggestion which is then discussed and improved". As stated in an earlier analysis, this may be a result of the complexity in larger organizations.

For CEOs and executives, again the top scorer is "normally a process which includes as much expertise as possible". What perhaps stands out the most is that lowest scoring parameter and the only parameter that receives a lower score than the overall weighted average is "normally a process where a few people write a suggestion, which is then discussed and improved". Given the response from larger organizations, it could have been interesting to see what other groups within these organizations would have responded to this question.

Looking at organizations established within the last ten years, the top scorer is "normally a process that is approved on board level" and the parameter receiving the lowest score is "normally a carefully crafted process that includes all relevant stakeholders". This is a bit surprising, but one possible explanation could be that smaller organizations normally have a smaller distance between top management (and the organization in general) and the board – meaning that board is more involved or engaged in operations. The lowest score for "normally a carefully crafted process that includes all relevant stakeholders" could be explained with lesser resources at their disposal.

The type of organization offers some differences. For private companies the parameter on expertise (normally a process that includes as much expertise as possible) receives the highest score and the lowest is given to "normally a carefully crafted process that includes all relevant stakeholders" and "normally a process that is done effectively within a short timeframe". Public organizations display much the same picture as the private companies.

4.3.1.10 Assessment of innovation methodologies

Q19 When it comes to developing innovation strategies and processes we use tools, methodologies and approaches like:

Answered: 79   Skipped: 26

169

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total	Weighted Average
PEST Analysis	20.00% 15	22.67% 17	40.00% 30	9.33% 7	8.00% 6	75	2.63
Scenario Planning	6.58% 5	15.79% 12	22.37% 17	46.05% 35	9.21% 7	76	3.36
Porters Five Forces	15.58% 12	24.68% 19	23.38% 18	29.87% 23	6.49% 5	77	2.87
SWOT Analysis	7.79% 6	11.69% 9	11.69% 9	49.35% 38	19.48% 15	77	3.61
Growth-share matrix (BCG)	22.97% 17	20.27% 15	33.78% 25	18.92% 14	4.05% 3	74	2.61
Balanced Scorecards	19.48% 15	27.27% 21	20.78% 16	25.97% 20	6.49% 5	77	2.73
Strategy Maps	9.21% 7	13.16% 10	22.37% 17	39.47% 30	15.79% 12	76	3.39
Capability Maturity Model	30.67% 23	18.67% 14	38.67% 29	10.67% 8	1.33% 1	75	2.33
The Disruptive Innovation Approach	25.33% 19	26.67% 20	30.67% 23	13.33% 10	4.00% 3	75	2.44
The Blue Ocean Strategy	13.33% 10	18.67% 14	22.67% 17	33.33% 25	12.00% 9	75	3.12
The Momentum Effect	29.33% 22	29.33% 22	33.33% 25	8.00% 6	0.00% 0	75	2.20
The Framework From Good to Great	24.32% 18	28.38% 21	29.73% 22	13.51% 10	4.05% 3	74	2.45
Vision and Mission Approaches	12.00% 9	9.33% 7	25.33% 19	34.67% 26	18.67% 14	75	3.39
Total Quality Management (TQM)	21.92% 16	28.77% 21	30.14% 22	15.07% 11	4.11% 3	73	2.51
Idea generating techniques like brainstorming	3.95% 3	3.95% 3	14.47% 11	46.05% 35	31.58% 24	76	3.97
Internal competitors for idea generation	14.29% 11	20.78% 16	22.08% 17	32.47% 25	10.39% 8	77	3.04
External competitors for idea generation	20.78% 16	23.38% 18	18.18% 14	31.17% 24	6.49% 5	77	2.79
Design thinking	5.33% 4	12.00% 9	24.00% 18	42.67% 32	16.00% 12	75	3.52
Anthropological and ethnographical studies	14.67% 11	20.00% 15	37.33% 28	21.33% 16	6.67% 5	75	2.85
Collaborative workshops	3.90% 3	9.09% 7	12.99% 10	57.14% 44	16.88% 13	77	3.74
Interviewing customers	2.56% 2	2.56% 2	12.82% 10	60.26% 47	21.79% 17	78	3.96
Interviewing employees	5.13% 4	11.54% 9	16.67% 13	48.72% 38	17.95% 14	78	3.63
Statistical data	8.00% 6	16.00% 12	22.67% 17	42.67% 32	10.67% 8	75	3.32
Gut feeling	3.90% 3	5.19% 4	23.38% 18	49.35% 38	18.18% 14	77	3.73
User-driven innovation	2.63% 2	9.21% 7	18.42% 14	59.21% 45	10.53% 8	76	3.66
Graphical facilitation approaches	13.51% 10	21.62% 16	31.08% 23	24.32% 18	9.46% 7	74	2.95
Cultural analyses	14.67% 11	22.67% 17	29.33% 22	26.67% 20	6.67% 5	75	2.88
Return on investment	13.33% 10	10.67% 8	26.67% 20	34.67% 26	14.67% 11	75	3.27
Scrum	17.33% 13	29.33% 22	33.33% 25	16.00% 12	4.00% 3	75	2.60
Prince2 project management	30.67% 23	26.67% 20	36.00% 27	5.33% 4	1.33% 1	75	2.20
The Doblin Model	32.88% 24	30.14% 22	32.88% 24	4.11% 3	0.00% 0	73	2.08
The Cynefin Model	32.43% 24	31.08% 23	32.43% 24	4.05% 3	0.00% 0	74	2.08

Table 4.9 Assessment of innovation methodologies

The overall weighted average shows that the top scoring tools and methodologies for developing innovation strategies and processes are:

- Idea-generating techniques like brainstorming
- Interviewing customers
- Gut feeling.

The tools and methodologies that received the lowest score are the Doblin Model and the Cynefin Model.

The responses to this question were cross-referenced with:

- The turnover of the organization (question 8) – segmenting those with more than 100 million euros in turnover.
- The formal position of the respondent (question 3) – segmenting those who are executives and or CEOs/presidents.
- The age of the organization (question 9) – segmenting all those that are less than ten years old.
- The type of organization (question 6) – segmenting private and public organizations.
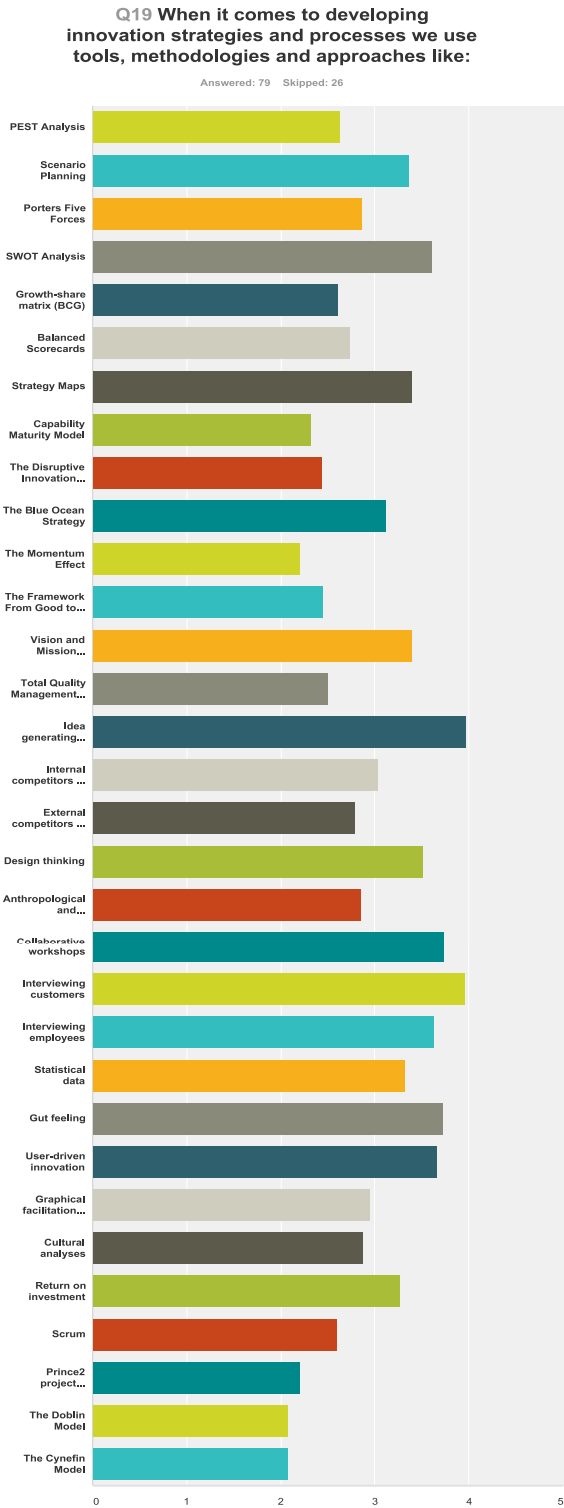
These analyses showed that for the larger organizations, "interviewing customers" is followed by "collaborative workshops" and "idea generating techniques like brainstorming".

For CEOs and executives the importance of "interviewing customers" is even more pronouced, followed by "idea generating techniques like brainstorming" and SWOT analysis.

Looking at organizations not older than ten years we see that "idea generating techniques like brainstorming" is a clear top scorer, followed by "gut feeling" and "interviewing customers".

The type organization analysis – segmenting by private companies – shows that "idea generating techniques like brainstorming" again is a top scorer, followed by "interviewing customers" and "balanced scorecard". Gut feeling comes in as the fourth highest scorer. For public organizations "interviewing employees" is followed by "collaborative workshops" and "gut feeling".

For all, the lowest scorers are the Doblin Model and the Cynefin Model.

What is perhaps most surprising is the prominence placed on "gut feeling" given the normal considerations around science, proof and predictability. Likewise, the relative lesser prominece given to statistical data and vision and mission approaches. While for the latter, the lack of data may leave conversations very open to "opinions", and the absence of direction may leave innovation aspirations without direction and clarity, it may also open paths for more explorative and plural conversations and findings. Gut feeling is an interesting aspect. The challenging side of this is of course the risk that comes from shying away from "evidence", and having "over-confidence" in one's own abilities. On the other hand, the emphasis placed on gut feeling may be an acknowledgement of the inherent nature of uncertainty and risk within innovation.

4.3.1.11 Findings from the open-ended responses

In the survey, there were two questions (question 20 and 21) that offered the respondents a chance to write something without limitations. These were:

- In your experience, what has been most helpful when generating successful strategies for innovation in your organization – and why?
- In your experience, what has done most to hamper the development of innovation strategies in your organization - and why?

Fifty-four respondents answered the first question and 53 the second. For this open-ended question the participants could respond at length or with just by a single sentence. As such, it is important not to view their responses as exhaustive in any way. There could be many more additional and supplementary responses.

The analysis was conducted using thematic analysis, as follows:

- Identify key words from each response
- Identify words that are synonyms and group them together
- Go through the sentences and group those that speak to the same thing together
- Find overall themes for groups of words.

Below follows a table of the two analyses that were made.

Utilizing a thematic analysis to identify key words that run through the different responses, then grouping synonyms, bring out some things in the answers.

In terms of what has been most helpful, the responses can be grouped into certain categories:

Themes	Indicators	Number of mentions	Representative quotes
Leadership and management	Top Management Leadership CEO Innovation director New manager role as facilitator	6	"Setting goals" "Management attention, commitment and resource allocation, which then spreads to employee dedication"
People and competences	Specialists Key people Right people Best people Team Staff	8	"Bring the right people together" "Involve everyone"
Strategy and direction	Purpose Vision Burning platform Need Competition New trends Customer insight Goals	18	"The customer is king when it comes to describing the problem, however finding the solution requires smart people and experience. In our experience, the customers often think they know what they want, but in reality – their solutions are often just more of the same. It is our job to bring new thoughts and solutions to the table."
Organizing and culture	Roles Responsibilities Mandate	16	"Collaborative work (having different background experts (sectors and countries)."

	Decision-making Delegation Diversity Collaboration – internal and external New culture Intrapreneruship		"In a natural and collaborative way set the objectives, KPIs, roles, responsibilities and rewards (financial/emotional)."
Psychological characteristics	Trust Will Commitment Ownership	5	"Will and commitment."
Tools and methodologies	Brainstorm Prototyping User-, customer- and stakeholder engagement Questions Brainstorms SWOT Disruption Stakeholder analysis AI Vocabulary	21	"Letting ideas come alive and going where they lead, throwing the ideas out there for others to kill or improve, quick and dirty prototypes. This allows us to stay open and agile, adapt the strategies as we get new information or the context changes."
Resources and rewards	Rewards Incentives Time Experience Network Risk willingness Satisfaction Open mind-set	14	"Giving people the time to innovate (e.g. free code camps Friday afternoons) and to reward innovative solutions."

Table 4.10 Thematic analysis, open-ended responses, "What has been most helpful…"

In terms of what has most hampered the development of innovation, the responses can be grouped into certain categories. In order to facilitate the understanding of indicators they are here given a wording unlike that in the previous table.

Themes	Indicators	Number of mentions	Representative quotes
Leadership	Lack of and poor leadership Lack of alignment Top-down Lack of alignment between staff and management Too many decision makers or lack of the same No buy-in	8	"Innovative projects that came from the Top-Management without the agreement of the staff." "Self-focus, egos and lack of strong leadership (purpose & values)."
People and competence	Bad utilization of people and competence Staff Lack of talent Commercialization ability Can't maintain momentum	3	"Lack of understanding from upper management. Bad utilization of people with the understanding and competency needed to make the best choices."
Strategy	Lack of understanding of burning platform Short-sighted strategies and goals and non-supported strategies Unclear direction External factors like recession Lack of inspiration No innovation strategy Business models and external changes Focus and lack of planning	11	"There is no innovation strategy available in my organization." "Burning platform - need for change is understood by everybody." "If the management do not give time enough to the involved people, and let the daily business have a higher priority, the organization will not have focus enough on the strategic development."
Organizing and culture	Legacy culture Self-focused culture Lack of collaboration Internal politics Culture of control No feedback or reflection	18	"Missing innovation culture and spirit. Top-down <-> bottom-up. Missing self-reflection, high degree of structure and low power to change it."

	KPI terror Lack of delegation and mandate Bureaucracy Silo thinking Deadlines above results Power struggles		
Psychological characteristics	Peer-pressure Closed mind-set Stress fear Change resistance Fear of the unknown Risk averse Will Commitment Sloppiness Individualism	13	"Stress and fear leads to bickering, fights, a sense of being lost - and more stress and fear. This closes you off both for new and creative thoughts and for working efficiently towards change."
Tools and methodologies	Poor tools Too many studies and benchmarks SWOT No data Idea development Not trying out and testing Too customer oriented Poor systems and delays	11	"Relying on old standard innovative tools and not be open to new methods."
Resources and rewards	Use of poor externals No expertise Lack of experience No understanding of what it takes No funding Lack of resources Time	19	"External facilitators without context knowledge, teaching generic innovation models to clinical experts." "Being too much eaten up by daily business." "Networking and the courage to invest in analysing and testing of new ways of doing things, testing new markets, testing new products, and employ people with a different background."

Table 4.11 Thematic analysis, open-ended responses, "What has done most to hamper…"

It is of course not appropriate to conclude that certain categories are more important and relevant than others based on the analysis conducted. The grouping of words/concepts/indicators/meaning is not a precise science and could have been done in a different way, which would have given a slightly different result.

What stands out, however, is that in terms of what has done most to hamper the development of innovation strategies, lack of resources – lack of time and lack of funding – really stand out. Furthermore, lack of direction, clarity on strategy, organization and a leadership that is not in tune with its employees are also not surprisingly

negative indicators. Organizational culture is – where it has been expanded upon – often directed towards being self-centred, stuck in old ways of doing things, being non-collaborative and subject to policies and procedures that hinder new thinking and doing. There is also quite some attention given to risk-aversion and fear of change, as well as lack of commitment and will.

Looking at what is perceived to work when making innovation happen, this to some extent is a reversal of the negative indicators. Perhaps what stands out most is that suddenly strategy receives more attention overall. There are also a number of respondents who write about the customer and user as absolutely key to the development strategies as well as products and services. It is also interesting that there are mentions of incentives and rewards. Not all have made this point, but given how little people have written in general, the fact that some have chosen to write this indicates that it is important for them.

4.3.2   The findings – comparing the case with industry and all responses

Here the relationship between all responses, the telecommunication responses and Telefónica with respect to weighted average are presented.

It is worth noting that only four respondents stated that they were a telecommunications company and only one indicates that he/she works at Telefónica. This analysis has been done regardless of the very low number of respondents because it shows a general picture that can be contrasted with the more qualitative research conducted later with Telefónica.

A few notes on the background data:

- The telco people consist of a CEO, an executive, a middle manager and a specialist.
- Their main functions are general management, HR and R&D (2).
- They have different roles in terms of responsibility when it comes to innovation: one is a leader of innovation in his/her company, one is head of a unit, one works mainly with questions of innovation but has no direct responsibility and one has units report to him/her but is not directly involved.
- They are all from private companies.
- One of these companies is a start-up with less than 100,000 in turnover, one has a turnover of more than a million, one more than 100 million and one more than 10 billion.
- One company started less than five years ago, one less than 20 years ago, one less than 50 years ago and one over 100 years ago.
- One company has less than five employees, one less than 50 and two more than 100,000.

In terms of background data nothing really stands out apart from the response from Telefónica being more pronounced – particularly in terms of lack of educational background and innovation.

Background data	All	Telco	Telefónica
My educational background included studies in innovation	3.53	3.00	1.00
I have obtained training in innovation in the workplace	3.65	3.75	4.00
I have obtained more than three years of experience within the field of innovation	3.91	4.00	5.00
My educational background is important for my work with innovation	3.89	3.75	4.00

Table 4.12 Specific analysis, background data

176

Looking at how the competitive business environment for the organization is characterized one can see a clear indication that it is viewed as "complex", which is supported by the Telefónica annual reports from 2013 and 2016.

	All	Telco	Telefónica
Simple	11.46%		
Complicated	32.29%		
Complex	51.04%	75%	100%
Chaotic	5.21%	25%	

Table 4.13 Specific analysis, the competitive business environment

In terms of when innovation became a priority nothing substantial stands out apart from Telefónica having prioritized innovation earlier than the majority of the respondents.

	All	Telco	Telefónica
Does not exist yet	6.45%	0%	
2010s	31.18%	25%	
2000s	34.41%	50%	
1990s	7.53%	25%	100%

Table 4.14 Specific analysis, Innovation as a priority

Looking at the innovation models utilized there is a slight discrepancy between the telcos and the sum of all the respondents. Perhaps there is an industry specific reason for this. The response from Telefónica also offers a specification (in the free text where it responds "lean start up/customer development methods in combination with strong tech scientific research". This is an echo of the analysis of the company (see section 4.3).

	All	Telco	Telefónica
The Linear Model	11.24%	25%	
The Pull Model	8.99%		
The Feedback Model	13.48%		
The Strategic Model	22.47%	50%	
The Network Model	21.35%		
I do not know	11.24%		
None of the above	11.24%	25%	100%

Table 4.15 Specific analysis, Innovation models

When it comes to how important particular sources for developing innovation strategies for the company are, there are some interesting discrepancies. Observe that the scale goes from 1 to 5, with 1 being very important and 5 very unimportant. What is most striking is that telcos in general and Telefónica in particular view private research entities and universities as more important than the weighted average of all the responses. This may have to do with the particular industry's heavy reliance on R&D and so on. The clear response from Telefónica on governmental entities' unimportance may have to do with a particular Spanish situation (i.e. the assumption is

that the respondent works in Spain) or a general view that government policies are not geared towards telcos' needs, or that telcos do not actually need them.

	All	Telco	Telefónica
Customers or clients	1.31	1.5	1
Competitors	2.36	2.5	2
Consultants	3	3	3
Private research entities	2.84	2.75	1
Universities	2.63	2.5	1
Governmental entities	3.1	3.25	5
Own organization	1.52	1.5	2

Table 4.16 Specific analysis, Sources for innovation strategies

Investigating how the three segments view goals with respect to the innovation strategies of their companies also shows a picture in which telcos view things slightly differently to the weighted average of all respondents. Again the scale goes from 1 to 5, with 1 being very important and 5 very unimportant.

While more qualitative products and services, followed by increase revenue, come out as top scorers for all respondents, for telcos they score the other way around, with increased revenue on top. It is interesting that telcos judge more qualitative products and services as equally important to the goal of "New findings regarding innovation and innovation work and systems".

The biggest difference between all respondents and the telcos comes in respect to "Reduced time to respond to the needs of customers or suppliers" (0,66). Perhaps the most striking thing here is not where they differ in views, but the fact that to a large extent they actually view the goals as on a par.

The areas where Telefónica is significantly at odds with all and with other telcos is "Reduced environmental impact". This may be one individual's view, but it is at odds with the aspirations stated in the annual audit (Audit report, 2016).

	All	Telco	Telefónica
More products or services offered to our customers and clients (number of products/services)	2.42	2.25	3
More qualitative products or services offered to our customers and clients (quality of product/service)	1.55	1.75	2
Bigger market shares in our existing markets	2.22	2	2
Entering into new markets	2.21	2.5	2
Reduced cost of production in terms of material and/or energy	2.46	2.75	2
Improved productivity (including reduced labour costs)	2.19	2.75	3
Increased flexibility in terms of production	2.42	3	3
Reduced environmental impact	2.82	3.25	5
Improved health and safety	2.6	2.25	2
Meeting regulatory requirements	2.46	2.25	2
New organizational structure or new ways of organizing the work	2.34	2.5	2
Obtaining new competencies	2	2.5	2
New leadership systems	2.41	2.25	2
New findings regarding innovation and innovation work and systems	2.26	1.75	2
Increased revenue	1.93	1.5	1
Reduced time to respond to the needs of customers or suppliers	2.09	2.75	2
Reduced cost in sales, marketing and consumer experience	2.8	3	2
Increased employee satisfaction and reduced employee turnover	2.19	2.5	2
Bigger market shares in our existing markets	2.22	2	2

Table 4.17 Specific analysis, Importance of innovation goals

Looking more closely at questions around strategy one can see a fair degree of consistency among the different segments. Here 5 is the highest score and 1 is the lowest. Where telcos in general rate themselves above average (except for "An innovation strategy that is a consequence of an overall strategy"), Telefónica always rates itself slightly higher than telcos or at least on par. What perhaps is more surprising is that in general responses around innovations do not yield higher response given its prominence in today's business climate. It may have to do with being "taken for granted" and deserving a more manifested attention or quite the opposite – that it is still fairly uncharted territory and as such is very much in the making or simply relatively ignored.

	All	Telco	Telefónica
A clear and communicated vision	3.82	4	4
A clear and communicated strategy	3.62	4	4
A clear and communicated innovation strategy	3	3.25	4
A dedicated unit for innovation or clear responsibilities	3.1	3.5	5
A well-functioning innovation system	3.06	3.75	4
A well-developed and implemented leadership system for innovation	3.01	3.25	3
An innovation strategy that is a consequence of an overall strategy	3.27	3.25	3
A well-functioning setup for ensuring the development of innovation strategies	3.04	3.25	4
A well-developed and implemented leadership system for innovation (hereunder competencies for leading innovation)	2.99	3	3

Table 4.18 Specific analysis, Assessment of innovation aspects

When it comes to responsibility for developing innovation strategies and processes, this resides primarily with top management. It is also quite evident that many parts of a given organization take part in setting the directions for innovation. Again, there is a slightly more pronounced indication in terms of telcos. What stands out is that at Telefónica (perhaps given its size) innovation is more delegated. A common thread seems to be that organizations in general have chosen to do it themselves, or at least rely to a lesser extent on externals than on their own capability. What may be a bit paradoxical is that while they do develop innovation strategies and processes, in the previous analysis we saw that questions around innovation strategies, units, systems and so on were average. This could be because it is clear that organizations do something, but the clarity around how and what comes out of this remains unclear. In this table, 5 is the highest score.

	All	Telco	Telefónica
The top management	3.96	4.25	3
A department within our company	3.09	3.75	4
A mix of functions, competencies and departments	3.8	3.75	4
We do not really do it	2.01	1.5	1
We rely on external participants	2.13	2.25	1
It is a mix of external and internal participants	2.95	2.25	1

Table 4.19 Specific analysis, Responsibility for innovation

Looking more closely at the process and how it is developed (5 is the highest score here) there are some differences that could be worth pointing out. Telefónica stands out a bit – primarily on the three parameters at the bottom of this table. If one were make a proposition here it would be that innovation is distributed;: the different units have a quite inclusive and exploratory orientation towards the process, but they are acting more on experience or gut feeling than on r analyses per se.
In general people see their process as thorough, but not something that drags out. Rather it is knowledge driven and designed.

	All	Telco	Telefónica
Normally a carefully crafted process that includes all relevant stakeholders	3.96	4.25	3
Normally a process which includes as much expertise as possible	3.09	3.75	4
Normally a process that is done effectively within a short timeframe	3.8	3.75	4
Normally a process where a few people write a suggestion which is then discussed and improved	2.01	1.5	1
Normally a process that is preceded by a thorough and comprehensive analysis of the situation	2.13	2.25	1
Normally a process that is approved on board level	2.95	2.25	1

Table 4.20 Specific analysis, Assessment of innovation strategy development

When it comes to developing innovation strategies and processes, the tools, methodologies and approaches used differ quite a bit (5 is the highest score). Differences between, say, Telefónica and the weighted response are of course accentuated by being singled out like this. What stands out is that the weighted average favourite tools and methodologies are: Vision and mission approaches, idea-generating techniques, gut feeling and interviewing

employees. Where the first two of these may not come as a surprise (they are echoed in the literature review and the later focus group: you need a direction for the innovation effort and you need new ideas to build from), the third does. Intuitively gut feeling stands in contrast to what was stated in the previous table about the "carefully crafted process". In terms of telcos as a whole, this picture changes some. Here gut feeling, idea generating techniques and internal competitors for idea generation are the top scorers, closely followed by interviewing employees and customers, as well as SCRUM. What stands out is more the fact that vision and mission frameworks does not receive a very high score. This may have to do with respondents assuming that a direction is provided by the business strategy, but that is a more open question and cannot be validated here. Again, gut feeling scores really highly. Perhaps the respondents view gut feeling as experience, but this interpretation does not fit with previous replies. Perhaps it is more a recognition that uncertainty and chance always play a role in the decision-making processes around innovation.

In terms of Telefónica, the most striking thing is the number of 5s and 1s scored. This indicates a high degree of clarity about what they actually use: SCRUM, user-driven facilitation, interviewing employees and customers, workshops, design-thinking, anthropological and ethnographical methods, idea-generating techniques, and internal competitors for idea generation. They also state that they use lean start-up – which perhaps can be seen as a philosophy and an overall methodology within which many of the tools and methodologies mentioned here can fit.

	All	Telco	Telefónica
PEST Analysis	2.61	2	1
Scenario Planning	3.35	3	4
Porters Five Forces	2.89	2.25	1
SWOT Analysis	3.63	2.5	1
Growth-share matrix (BCG)	2.6	2.25	1
Balanced Scorecards	2.73	2.25	1
Strategy Maps	3.4	3	4
Capability Maturity Model	2.3	2	1
The Disruptive Innovation Approach	2.42	3	4
Blue Ocean Strategy	3.13	3	4
The Momentum Effect	2.18	2	1
The Framework from Good to Great	2.44	2	1
Vision and Mission Approaches	3.39	2.5	1
Total Quality Management (TQM)	2.52	2	1
Idea generating techniques like brainstorming	3.99	4	5
Internal competitors for idea generation	3.03	4	5
External competitors for idea generation	2.75	3	4
Design Thinking	3.54	3.5	5
Anthropological and ethnographical studies	2.86	3	5
Collaborative workshops	3.71	3.75	5
Interviewing customers	3.97	3.75	5
Interviewing employees	3.64	3.75	5
Statistical data	3.32	3	4
Gut Feeling	3.75	4	4
User-driven innovation	3.64	3.75	5
Graphical facilitation approaches	2.93	2	1
Cultural analyses	2.87	2.75	3

Return on investment	3.3	3	3
Scrum	2.61	3.75	5
Prince2 project management	2.18	2.50	1
The Doblin Model	2.06	2.25	1
The Cynefin Model	2.06	2	1
Other			

Table 4.21 Specific analysis, Assessment of innovation methodologies

Wrapping this section up, there is overall a fair amount of overlap between the weighted average response from all participants in the survey in relation to the telcos and also (but slightly less) to Telefónica. Innovation is certainly on the agenda for most organizations in the survey, but there seems to be quite a spread when it comes to formal, articulated orientations around systems, strategy, leadership and so on.

4.3.3   Emerging views following section 4.3

The analysis of these findings can be summarized as follows:

Leadership
It is absolutely vital to have an understanding, buy-in and support. There is, however, a discrepancy between how directive of supportive the leadership should be. Innovation that comes from the top without acceptance and support from the people in the organization seems less positioned for success. Leadership requires followership. Leadership is not a just a matter of one position, but can be done from many different types of positions. If there are too many egos involved they will hamper the process.

People
The right people are crucial for innovation. A mix of specialists and generalists is needed. Different types of background and expertise can be utilized, but at the same time – it seems like the dominant view is that innovation requires deep knowledge of the subject/field/technology/customer itself. Although expertise and willingness are pivotal, it seems sometimes that organizations are not positioned to utilize them. Management can have a challenge in delegating.

Strategy
Some quite challenging views emerge: Whereas an innovation strategy is considered key, often it does not exist and if it does it is not really helpful. Burning platforms may be important but is not a strategy. Likewise, if time, focus and resources are not allocated towards the development of a strategy it becomes poorly designed, difficult to communicate and not supportive of execution. The relationship with the market – customers, collaborators and competitors, is key when developing and adapting a strategy over time. Strategy in a complex world is in itself challenging, suggesting that strategy should be strategized or innovated to succeed.

Organization and culture
The idea of organizational culture seems to be very strongly emphasized. No one doubts that it is there. The lack of the same normally means it is not what is hoped to be needed. When it comes to innovation, it is clear that innovation culture refers to an idea of how something needs to be in order for innovation to happen. This indicates that it has been created somehow and, more often than not, it seems like there is an understanding of it as a choice – something that can be designed and created or not. Structure seems to be asked for, but at the same

time it is highly debated. This probably means that there are some structures that are desired and others that are not.

Psychological characteristics
There seem to be a fairly clear idea of what is good and what is bad. The same characteristics can be argued to be universal, and not specific for innovation at all. Stress and fear is bad, will and commitment are key for success. What can perhaps be accentuated is that it is suggested that innovation is depends upon how people feel about their work and their workplace. Why innovate if you are not interested in being there or if innovation is not supported?

Methodologies
The fact that gut feeling emerges as an important approach – or at least one often used – may be surprising. However, in the light of an absence of systems, strategies and culture, it is less surprising. Relying on old views and tools to create the new seems to be less effective. If, however, SWOT remains a utilized tool, it is not necessarily the tool itself that is the problem, but more how it is used. Speed – from idea to testing – is emphasized as desirable. This approach can of course quickly become challenging in bureaucratic and large organizations, but it is not impossible to work enact. It requires attention and good organization.

Resources and rewards
Rewards are seen as imperative, so too resources. Without proper resources, there is no innovation. It is interesting that rewards are assumed and desired. It is not clear if these are primarily monetary or if for instance recognition would be sufficient, but that fact that they are assumed says something about the relationship between the employee and the organization. How this is manifest in, say, NGOs or governmental organizations is not clear.

4.3.4 Remarks on section 4.3

The aim of survey was to investigate a number of organizations to see if a pattern could be distinguished around the research question. The aim was not to find an all-encompassing system, but more to see whether there are similarities and differences between a diverse group of organizations regarding how they make strategies for innovation.

- Given the nature of the networks, there is also a bias towards western respondents. It is not equally easy to assume a larger percentage of technical people as the respondents, as individuals, are quite different from each other. However, there is perhaps an additional bias in their education as one can assume that a number of the respondents from the Kaospilot network are former students – and they would have had modules on the topic of innovation.

- There is of course also the challenge of what people are saying vs. what they are doing, as well as a vast sea of uncertainty around how questions are assumed and responded to.

There are many limitations with this quantitative survey. Everything from representation to its conclusions can be debated. However, given these limitations, some indications of trends and patterns stand out. As such there is a potential value in doing quantitative research and there is a potential value in the data. The value of quantitative research concerns its relative cost-effectiveness – you can simply reach many more for less money. On the other hand, there is the risk that you do not reach those you hope to reach. Given that some of the answers in the survey – for instance the question about responsibility in the relation to innovation at the workplace – when 100 percent of respondents indicate one of the potential answers, this indicates at least that the people invited to the survey are the right ones. Whether they answer truthfully is of course another matter.

All in all, this clearly indicates that the data should be considered with caution. This is not to say that the responses are non-true, but more to be observant of what is not asked for and who is not asked and so on, as well as the breadth of respondents.

This survey has been primarily to sharpen the researcher's understanding of how innovation is perceived and acted upon. As such it has been more indicative than definitive. It has helped to make some of the questions in the interview more precise and, more so, helped to develop the research lenses (see 3.9.3.10).

4.4 The action research

This section concerns what came out of the action research phase. The methodology and research design for this are described in section 3.9.1. The action research phase had a two-folded orientation. On the one hand, it was a way to collect and create data for the thesis. At the same time, it was a way to help Telefónica (as client) to realize its stated aspirations.

First the findings are presented chronologically within the context of each workshop and interaction with the client, then they are discussed in terms of what stood out and what emerging views came out of this phase. Finally, a meta-analysis is presented.

4.4.1 Findings

4.4.1.1 Prelude sessions

From the very first meeting with the head of the unit (Palo Rodríguez) one of the notes states, at the researcher's suggestion: "Let's not make a massive, lengthy contract. Let's do one session. We should try to collaborate and see how it goes."

The reason for this proposition was on the one hand to be humble towards the client's needs and not impose a solution. Afterwards it was clear that the client received this in a good way. He liked not being tied to a solution, or to a conversation in which he would eventually have to say yes or no to a proposition. The explorative orientation it indicated also landed well as the client was not clear about what they wanted. This explorative orientation continued to form and foster the relationship throughout the collaboration, meaning that the different sessions initially planned were always assessed, tweaked and adapted.

Through subsequent conversations it was evident that Palo Rodriguez had ambitions on behalf of his team and Telefónica at large. He saw that a new direction was possible and doable. However, it was not so easy to argue this from decisive numbers or general strategy at the company. As stated, he wanted to "have an impact on Telefónica through innovation".

The challenges that the team was facing could be articulated as:

- What are we to innovate?
- What will success look like?
- What opportunities do we have?

- What is needed for this to happen?

In addition, there was uncertainty about the future direction of the company looming over the team, as well as more internal challenges around how it could collaborate and work together in order to make all of its aspirations happen.

4.4.1.2 Workshop I (March 14th, 2013)[86]

This workshop was introduced alongside a rationale for why this series of workshops had been initiated in the first place. It was stated that: "The workshop was commissioned as a first step in a process of rethinking the entire research and innovation headed by Pablo Rodríguez". Furthermore, it could potentially include "the strategic focus, the culture and the organizational setup" (as stated by Pablo Rodríguez). Pablo's second in command Oriol Lloret said that it was intended to make it possible to "step back, look at what we have with a fresh and open mind and find ways to further engage and raise enthusiasm in the whole PDI organization and beyond".

The workshop was designed to focus on creating a common understanding of the current situation, to set a direction and to clarify the challenges of the change processes being undertaken. As part of setting the agenda Pablo Rodríguez was asked to offer a lengthier introduction to the current state of affairs and his view on the future – facilitated by questions from the action researcher.
Rodríguez's team was asked to take notes on the guiding questions: "What did they hear and what were the questions that arose while listening?"
Sessions around personal motivation, moving from me to we, and exercises around envisioning the future followed.

What stood out in the workshop was the expressed commitment and capability of the group. They all had expertise and experience and showed themselves very proud to be part of the company. Two of the main findings from the work that day were that they seemed very aligned around the concept of a "digital telco" and the goal of "transforming Telefónica", although it should be noted that the precise meanings of concept and goal were not expressed in detail. Second, in their individual expressions about their ambition, most of the team members went beyond Telefónica, mentioning their desire to make a difference in the world.

Concerning the work that they were doing that day, the main things that stood out were:

- A clear notion that a break is imminent from how innovation has been previously done.
- A feeling of being at the beginning of a journey. Less clarity about the destination of the journey (beyond the products and services that they wish to create).
- Few mentions of actual products and services around what had been done in the past or what were going to be future game changers.
- Recognition of the role of Pablo and Carlos in creating a space for innovation inside Telefónica. Desire for more entry points at a lower level to Telefónica's organization (to "lubricate" the relationships with OUs, to have more clear inputs about the business impact etc.).
- Positive view on breaking the silos between groups.
- Mentions of the need to be innovative in different time frames.
- In terms of criteria for success, different things were highlighted, such as patents, publications, pilots, commercial launch, understanding new industries and press coverage.

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[86] The description and analysis is based upon the report (Windeløv-Lidzélius and Ruiz de Querol, 2013a).

- The idea of the future – what success would like – spoke very much towards societal gains, but not very much towards financial gains, market shares and so on.

A number of concerns were also listed:

- Some demands for "more clarity" about goals, criteria for success and strategy appeared (e.g. "Telefónica has done well in the past as a fast follower. What kind of innovation is now needed?").
- Questions arose about "how to best share our sense of opportunity with everyone else".
- There were some doubts about "how to manage uncertainty".

A few reflections that stood out from the recap session with Pablo and Oriol. A little surprising was the fact that the group was new. This workshop was the first time that the people attending had met in the same room. On the notion of alignment, "Everyone is in the same floor, but maybe not looking through the same window". Indeed, even as they look out of the same window, they see "different things". There was also recognition of our own capability, which was stated as: "We are probably more capable than we think".
In terms of the group being new, and representing different areas of responsibility and expertise, it was said that: "Diversity is good if people understand what the others are doing".
A lot of details were considered to be missing to generate understanding. The dedication to their work was reinforced, but nuanced: "There is a clear sense of commitment; maybe not so much a sense of belonging". A question rose around how to create some "sense of security" in a context of insecurity. This was a nod to the looming uncertainty around the future. Finally, there were some considerations around leadership. This had been discussed in the workshop – more from the perspective of their lack. This was not a criticism per se but more a general consideration of uncertainty around the subject: "What type of leadership do you expect? Need? Exert?"

4.4.1.3 Workshop II (April 24th, 2013)[87]

This workshop took place quite soon after the first one. This was because it was seen as desirable to conduct the workshops within a relatively short time frame. However, this also made it more difficult to arrange and to gather people.
The objective of this particular workshop was to work on culture and principles. The intention was "to explore the culture in our unit, identifying existing values and creating principles that will guide us in our work towards a new future."
On a second note, it started to be articulated that these workshops would help shape and align the leadership group.

Like the others, this workshop included an update on the organizational and business matters from Pablo Rodriguez, as well as a recap of the previous workshop. A model and a methodology were introduced, together with some theory around change and organizational culture. The saying "Culture always beats strategy"[88] set the tone for the workshop. Schein's definition of culture (2010) was used, together with other ideas around organizational culture, as well as Dee Hock's model (1999) for organizational change (particularly focusing on the first two steps, purpose and principles).

In terms of the update from Pablo Rodríguez some things stood out:

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[87] The description and analysis is based upon the report (Windeløv-Lidzélius and Ruiz de Querol, 2013b).
[88] Note. The saying is often attributed to Peter Drucker, but I can't find the actual quote by him. This does not mean he did not say it though. Edgar Schein though, in his book Organizational Culture & Leadership (1985), writes, "culture determines and limits strategy". It is not as catchy but the message is the same.

- There are new ideas in the making and new people have joined the team. There is a visibility coming about the team, all the way up to the CEO level.
- A few results are starting to come about, for instance the web phone with Firefox.

In the recap and subsequent conversation, speaking to the purpose and the rationale of the unit it was noted that: "We are here because we started a journey two months ago: generate new products; change from PDI the culture of Telefónica Digital."
Further on that point it was noted that the team "are here because they are the people that can drive this." It was also said that "We can build a good story together, but we are not there yet."

The journey ahead was also addressed, as well as the overarching aspirations and rationale for the workshops: "In the next two years we need to introduce more products like the Firefox phone and create a transformational movement within Telefónica Digital, that eventually
leads to the transformation of Telefónica within the next decade. We have what it takes to get there. We have the money, the people and the network. These workshops will help us on our path throughout the year."

The commitment was articulated as "We will either succeed or fail together."

Other things also materialized in the workshop:

- The cultural safari exercise (being an anthropologist in your own organization) showed that many people had never visited many of the other parts of the company, even those in the same building. As stated in the report: "The safari brought better awareness of the different cultures in the Telefónica that the PDI team seeks to ultimately transform. It might also suggest that changing the culture of Telefónica might also entail to change some of the artefacts that are part of it."
- The challenge with conflict, as stated in the report: "The safari brought better awareness of the different cultures in the Telefónica that the PDI team seeks to ultimately transform. It might also suggest that changing the culture of Telefónica might also entail to change some of the artefacts that are part of it."
- Leadership was not brought up as a value or a principle – something was needed to make the aspirations happen.
- Customer orientation was not brought up as a value or a principle – although when PDI develops products and ideas, there is a clear focus on user-value. However, in order to get to the user/buyer you also need to convince the internal business units take it on and bring it to market.

From the recap session, it was articulated that finding common ground was a "messy" process. Not that there was nothing that brought people together or that there was no direction given to the unit, but when asked people used different words and it was clear that they preferred certain things. The matter of how little culture had been articulated and discussed in the past was noted. This was seen as tightly linked to the leadership exercise and productivity so it was assumed to be a point of reference for the coming meetings. Again, it was noted that the "workshop will help shape and align the leadership group".

4.4.1.4 Workshop III (June 26th, 2013)[89]

Approaching summer, the third workshop took place in Barcelona in the same premises as before. This workshop was aimed more than anything at establishing the unit's purpose. It would also touch upon principles and culture, but the main point was to gain clarity and agreement about why the unit exists. The structure of the

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[89] The description and analysis is based upon the report (Windeløv-Lidzélius and Ruiz de Querol, 2013c).

workshop followed the previous ones as well as the forthcoming ones – using the I Do Art setup, checking in and checking out, theory offered as input, participatory and co-constructive in nature.

The debrief from Pablo and the recap from the previous sessions highlighted the following comments (taken directly from the report):

- Telefónica is seen as a company with a lot of potential.
- Telefónica Digital is seen as a source of new revenues. Telefónica Digital looks at the PDI as an engine for products and innovation.
- Telefónica is placing increased focus on internal product development (vs. the previous policy of outsourcing development), but rebuilding the product factory will still take some years.
- We must be doing something right. The key company executives are coming to visit and readily accept invitations.
- PDI is being put on the spot, as in the event of the tenth anniversary of the Barcelona centre. We are now one of the KPI of Telefónica's CEO. We will be visible at the next Executive Summit.
- We need to come up with disruptive technologies within a year.

In addition, it was mentioned that the unit needed to set up an ambassador's network for internal communication and relationship building and some sort of test labs for direct user connection (this was a clear note from the previous meetings).

A clear definition of innovation was also offered by the unit: "Innovation = Invention + Commercialization". It was mentioned that in the larger context Spain is the eighth country in the world when it comes to knowledge development, but in terms of licensing is roughly on the same level as MIT.

Other needs that where expressed were:

- We need common tools to explain what we do.
- It is important to set expectations right, otherwise things will backfire.
- A need for a communication. This was countered by a comment that "results should speak for themselves".

The day took a deep dive into the question of purpose. Participants worked in groups, exchanging findings and questions. Formulating the purpose took longer than expected. As one of the participants said: "We might have the same understanding among us, but we still have to formulate it". The team was fully engaged during the whole day and seemed to be learning from each other's views and seemed satisfied to do so. The meaning of certain words, what concepts meant and what value should be attached to them was intense and vivid.

The unit's purpose was eventually landed as follows:

> The Purpose of the PDI is to create transformative opportunities, based on a culture of digital innovation and deep customer insight, for people and businesses who want to become leaders of change.

The values that were identified (and developed more in detail towards the next workshop) were:

- Empowerment
- Collaboration
- Helpfulness
- Initiative

- Commitment.

In the recap, a few comments about the result came about:

- It does not mention Telefónica or Telefónica Digital. It seems to be an implicit understanding of business units wanting to become "leaders of change" and as such be the clients of the PDI. This may be important to amend and ensure.
- The digital culture speaks both into a start-up mentality and one of where digital is the big underlying wave in societal transformation. And PDI supports this movement and focuses on "leaders of change".
- Products and services have disappeared from the final version. The understanding is that the purpose of the PDI is wider, encompassing also the identification of trends, the vision of new opportunities and the creation of narratives about them that prompt the conceptualization and design of new products and services.

4.4.1.5 Workshop IV (September 30th, 2013)[90]

This workshop took place after the first round of interviews (see next section) was done and as such with some "gains" from it (i.e. people had a chance to express their thinking around these workshops and their work in general – the emotional aspect of being seen and heard). This workshop looked more into the challenges and opportunities for the unit. This was done in light of the purpose, principles and cultural conversations. The previous outcomes were further explored as the consequences needed to be revisited to inform future development.

It was noted by the action researcher that the initial plan of what was to be reached within the framework of the contract was somewhat hampered by the development within the unit and the company. This meant that the initial plan for the different sessions was not possible – we were not going to be able to reach all the objectives, and the different workshops would not cover what had initially been planned. It was agreed among the group that important conversations and developments had taken place and it was important to continue on the path we were on and not rush it. It was also noted that we had obtained "other" outcomes that were maybe more important – such as to get a better idea of leadership, team, culture and direction and so on.

The presentation and recap from Pablo highlighted that:

- Our mandate one year ago was to centralize the innovation function. We are on the right path and doing quite well.
- We need to get together as a leadership team in order to have more impact and help transform the company.
- We are now looking at several hundred ideas every year. Only up to three will make it to the market. That means that we might need to ramp it up and look at thousands of ideas. It is therefore good that 80 percent of the ideas we look at are coming from Marketing and Businesses. The organization wants to participate. We have started to infect the organization.
- There are things to improve. We currently organize our work around products and ideas. We might consider working in areas in order to gain more focus. We might need to step back, look at what we are doing, select and take a risk. What we can do is largely in our hands.

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[90] The description and analysis is based upon Windeløv-Lidzélius and Ruiz de Querol (2013d).

Part of the session was to take a deeper dive into what do we now know about expectations, strategy development and what think about consequences around this. There is strong alignment around the concept of a "digital telco" and the goal of "transforming Telefónica" – as well as the stated purpose. There is still considerable uncertainty about what the result of this transformation will look like, however. Likewise, the precision – or the decisions – given the purpose, if we are talking about opportunities within Digital, Telefónica at large or outside Telefónica is still undecided. The same goes with the strategic objectives – products/services or transformation. Is there a need to choose or is there a need to balance different initiatives in one direction or the other?

Some clarity around expectation had now come about and it was expressed that the unit needed to generate one to three products per year, each one bringing 1 million euros in revenue in the first year, and reaching 10 million in the second or third year.

An extensive part of the workshop was dedicated to develop a context map – identifying trends and tendencies, strengths and challenges. The more important aspects that stood out after the exercises were:

- There was a very common view on technology trends.
- The different descriptions of Customer Needs were very general, non-specific.
- In general, there were more common views on internal trends than external trends.
- A lot of uncertainty around internal issues (i.e. the company at large).
- Competition was absent from the outcomes.
- Competition almost does not appear at all in the context maps.
- In terms of strategic advantages there were also some clear indications. First, these were very general and not very specific. Most of them were internal and looking at the outcomes of them is almost all internal – i.e. not externally oriented. For instance, the customer was totally absent.
- The strategic opportunities were also very general and not so easy to make actionable.
- In terms of additional challenges, coming together as a team and getting a big success soon were addressed. An emphasis was placed on building a start-up culture in a large company with focus on operations.

In the recap that followed, it was noted that there was a need to better describe who the client actually is and how to engage with them more fully. Questions around strategic opportunities and advantages need more work, as they seem unclear. Again, it was noted that uncertainties around internal issues and priorities also leave the strategy development at PDI a bit amputated.

4.4.1.6 Workshop V (November 25th, 2013)[91]

This workshop was organized around the idea of stakeholder identification and inclusion. As a consequence it was designed around what seemed most important at that particular point in time. The purpose and principles/values of the PDI had been created, the more quantifiable objectives had been set and there was a general sense of strategy and situation in place.

The update from Pablo and recap on matters highlighted that:

- There might be preparations for a consolidation of the telecoms industry through a new round of mergers (this had been a recurring theme throughout the year but now it was more explicitly articulated).

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[91] The description and analysis is based upon Windeløv-Lidzélius and Ruiz de Querol (2013e).

- Telefónica could be a target, because its traditional business (64 billion turnover) was shrinking by 6–7 percent each year. On the other hand, its new businesses (4 billion turnover) were growing at the tune of 20–25 percent a year.
- Our challenge is to contribute to the acceleration of the growth of the new, thus showing the industry how much the new opportunities are worth.
- Changes in the Digital division had been announced: a new structure around the three Ds (Discover, Disrupt, Deliver).
- The objective of the new organization is to de-risk the innovation process and the innovations it generates.
- The focus now is on getting traction and the capability to scale. The two mandates around Discovery are innovation longevity and bringing products to the delivery organization.

This points to challenges and opportunities for PDI:

- That means, on one hand, that the stories generated will most likely need to encompass the invention of new businesses. This may require partners. On the other hand, we might have to bring innovation capabilities to the delivery side of the organization.
- Our three main challenges for the coming year: (a) Demonstrate a business with potential (e.g. Smart Steps); (b) Maintaining a healthy pipeline: two new proposals, each with a powerful story; (c) Keep the focus on strengthening and spreading the culture.

It was noted that the purpose is right on target. The next steps could be fun and we were positioned to deliver.

The stakeholder exercises focused on who our customers are now, which ones are important to making our work a success, which are depending upon us and which are we depending upon?
The outcome of the work really showed a broad orientation towards stakeholders.

The next step was then to go a step deeper and offer clarification. The questions that were asked and that helped to group the different parties were: Who might be excited to work with us? Who would/should/could we be excited to work with? Who has a vested interest in the problems/solutions we are working on? Who has resources that we could gain from?
While external organizations were fairly divided between more groups or industries and certain specific organizations, the internal organization also came with specific names attributed to it.

The last exercise began with a series of questions that the groups engaged in:

- How do we have to think and act to attract great collaborators?
- What has to happen to have collaborators stay engaged?
- What do we need to know about their needs and concerns to minimize the risks of collaboration?
- How do we ensure that frustrations and concerns are raised and released in powerful ways?

The work is summarized in Table 4.22.

Abstract	• Manage expectations • Prioritize targets and offerings (e.g. OBs, start-ups, data scientists, youth) • Focus on real costumer needs (more than technology challenges) • Communicate a concrete and powerful purpose • Good storytelling • Offer opportunities for targets (e.g. young people) to tell their story

Engage	• Generate win-win scenarios • Involve others in the storytelling • Demonstrate a culture of anticipation, transparency, tolerance for risk and failure. • Work in highly aligned, loosely coupled groups • Exercise constant feedback with collaborators • Build things together/offer opportunities to co-create • Empower others and give them credit • Flexibility
Need to know	• Develop and exercise empathy with stakeholders • Find bridges that make the scenarios and stories understandable • Not sure to know what we need to know
Do	• Organize short (one-day) internal innovation hackathons • Organize mind-swapping events • Set up a brainstorming session with a third party around a powerful issue (like personal data) • Learn from failures: practise, demonstrate, teach

Table 4.22 Summary of the work in workshop V

The workshop ended in fairly high spirits and it was decided that the next should go one step further on this subject. The plan was that this workshop would take place in February.

4.4.1.7 Workshop VI (February 20th, 2014 and June 24th, 2014)

This workshop never really happened as intended. This was because after the workshop in November it became clear that something more massive was taking place at Telefónica. The biggest challenge was that the scope and range of this was unclear. Probably some people within the unit knew more than they had revealed at the time, but over Christmas 2013 it was still unclear. Thus, when February came, we decided to postpone the workshop until we had more knowledge. In its place we had a longer conversation about the current state of affairs. Here it became clear that some of the indications that had been touched upon in autumn were now suddenly becoming very real. Around a week after the meeting, it was announced that the whole division, Telefónica Digital, would cease to exist. This was the result of a larger re-structuring process (see 4.3.8 for a more through description and analysis of the turn of events).
In the meeting, it was clear that a) the work being done in these workshops was very important both on a leadership and team level, and also to develop the capacity for innovation and b) given the uncertainty around the direction of the company, there was no real point in doing the workshop at this point in time. It was decided it would be postponed until closer to summer.

As summer approached, it became clear that the changes would be more substantial for the unit than was previously anticipated. Once it a situation could have expected in which Digital was closed down as an independent unit, and merged into another one – and PDI more or less continued as it had done before, but now in a different setting. Now it was clear that it was not going to be that simple. However, much of this work was happening on a more executive level than PDI operated on and it was evident it was not an inclusive process. As in February, instead of a workshop there was a meeting between the leader of the unit – Pablo Rodriguez – and the action researcher. The meeting this time evolved around themes and questions such as:

192

- How to keep motivation and engagement going when there is so much uncertainty surrounding the unit.
- How to balance the knowing-sharing part as a leader in relation to the co-workers. What to share, when and in what way are all questions to be approached in delicate way as it is so easy to be misunderstood or generate more confusion as opposed to generate safety and trust.
- Scenarios for the future – not only for the leader himself, but also for the unit and the company at large. The balance between mere speculation and actually promoting desired futures. Wait or act.

The two meetings can be said to have served a few different ends: 1) they cemented the relationship between the leader and the action researcher, 2) they served as closure of the contract between the company and the action researcher and 3) they served as some sort of assessment of the work done.

In the 12 months that would follow, no major turn of events at the PDI level happened that required a new start to the collaboration. There were a few phone calls between the action researcher and Pablo Rodriguez, but nothing substantial. In a phone call in summer 2015 the action researcher offered the general advice that "all things considered, it is better to choose one's own boss if one can". This was based on the notion that PDI had been under the wings of the leader of Digital. With those people gone, what would be the smart thing to do to ensure its future success?

In the latter part of 2015 a new strategy around innovation started to emerge (see 4.3.8 and 4.3 for what it came to be) and here Pablo Rodríguez started to form his new idea for this venture – later to be called Alpha (see section 4.7 for a more through description and analysis). In 2016 the former CEO and Chairman Cesar Alierta Izuel stepped back and José María Álvarez-Pallete López took over. With this a process and a new strategy was underway, and in summer 2016 Alpha opened its doors.

4.4.2   Emerging views following section 4.4

When going through the findings some things stand out:

Outcome I
What came out of the action research and consultancy work for the researcher? First and foremost a lot of data, information and indeed knowledge around Telefónica and PDI. As a second tier, insights into innovation, strategy leadership and organization emerged. On a third level, experience and insights into how to run strategy and leadership development programmes for an organization to promote innovation were obtained.

Outcome II
There were also a number of outcomes for the client. However, the main thing – the unit's ability to make innovation happen – would never to be tested as external circumstances (massive organizational changes) eventually dissolved the PDI as it was known. On the other side, some of the other criteria – making the group more of a team, carving out a direction, developing a common language and so on – did come about.

Process
People need to meet, align and co-create. These sessions really tapped into this need. So many of the comments suggest this need and also why its absence generates uncertainty, mistrust and sub-optimization. The organization certainly had meetings and certainly also met, but it seems that the space for the leadership group to come together, think together and do together – as a whole – seems to have been underrepresented.

Identity

It is striking that identity is a very powerful factor when building strategy, making priorities and making decisions. When people are part of more than one organization or group, it seems to be challenging – not just with juggling time and focus, but also if the agendas start to conflict. Related to this, but independent of it, is people's professional identity, which is often rooted in their educational background and expertise. An example is the scientist: Their training makes them very prone to question, analyse and be critical. Their identity comes from published papers, which makes this a focus for them. Similarly, designers seem to be inclined towards considerations around users and what the solution should allow them to do. While business people lean more towards how the business unit is to receive and take the output to the market and so on. It is not the case that people were not occupied with the common strategy, but in the conversations people often resorted to their immediate interests and focused on what they felt was "right". Dialogue is difficult, and finding common understanding even harder.

Uncertainty
It was a recurring theme that "something" was happening at the company. But most people did not know what it was or how it would affect them. Some were even quite oblivious about it. How do people continue in such a situation? It was fairly clear that people have different ways of coping with uncertainty. Some were more explicit about it, some less. As one participant said, "It is difficult to innovate if you do not know if you have a job or not". The focus on strategy also became difficult for some, who assumed that the overall changes would eventually make the work obsolete. Others viewed the work more in terms of "let us make something great, and that will affect the decisions that are to be taken around our fate". A third group saw the strategy more as a focus, something to work on, while the real work was happening – which was to build a leadership group and culture.

Language
While the action researcher often experienced challenges in understanding the jargon and particulars of the client's organization, work processes and so on, several of the participants also had diverging views on the topics of leadership, strategy and innovation, or a lack of knowledge of what "it is". The natural way to combat this is to bridge through dialogue, as well as simply present a view and seek buy-in on it. In reality, however, this is not so easy: It may seem like people understand or that they accept a certain definition or explanation, but when being we are challenged we often resort to our own world-view. A technological-economic world-view, for example, differs from a human-centred design approach. This is not just a problem, it is also a source for learning and renewal. However, it also generates friction and irritation from time to time.

Methodology
The methodology was rooted in appreciative inquiry as opposed to more positivistic or therapeutic approaches. There was an initial challenge as people were not so experienced with this and had a natural tendency to orientate quickly towards problems and challenges. That said, it is clear that a more relational approach, manifested in the appreciative inquiry framework, gave the participants a different dynamic in their interaction and development.

Contract
Relatively few givens were stated by the client when the contract was signed. They were designed more in the ongoing conversation between the client and the action researcher. Those givens that were formally agreed upon were related to the intention and desired outcomes of the collaboration, as well as who should be in the meetings, the frequency of the meetings, the roles and responsibility of the different actors, reporting and feedback, and so on. This allowed the collaboration to be co-created along the way as understanding increased, as well as to be nimble in relation to the changes that occurred. For something like this to work there needs to be a lot of trust between the client and the consultant, and both need to be fairly open to feedback and comfortable with change.

4.4.3   Remarks on section 4.4, the action research

The work with the client, aimed at co-learning and co-construction, also generated some considerations that are worth sharing.

It is possible to combine different roles, but there is a need to be clear about responsibilities and tasks. For a client, taking part in action research carries the risk of portraying yourself as someone who is creating value for yourself, rather than the client. It comes down to how we normally appreciate words and the connotation of value creation in that respect. The key thing here is communication.

Work that stretches over a longer period of time provides a variety of opportunities and challenges. With time comes a more intimate relationship with the client. One gets to know each other better and develop a much more informal and casual exchange. This may ease the collaboration, but it is important to remember who actually owns the challenge (the assignment). Likewise, with time comes also a much deeper understanding of the company – its industry and its competitive landscape. While this certainly helps in terms of offering advice, conducting analyses and so on, it may also muddy roles and responsibilities if one is not careful. Perhaps the client does not need advice but more good questions?

By writing reports – summarizing the work and its the outcome, outlining questions and assignments, and so on – one also ends up "defining" reality. Clearly this may be part of the job of the consultant, but it must be written carefully. It could be argued that such a report is promoting an agenda (for instance the agenda of the manager, or perhaps the clients' own agenda). Not being explicit about what a report is challenges its actual value. On the other hand, making an extensive account of the events and bringing in numerous voices, is also challenging. Not least because in a busy day-to-day operation people may not read a report that is too comprehensive. Precision, clarity and ensuring feedback seem to be viable ways to create alignment and buy-in.

4.5   The interviews part I

The interviews in question here are those 13 that were undertaken with the old unit (PDI in Telefónica Digital). Here the findings of the thematic analysis are presented, followed by the emerging views of this part of the research and a meta-analysis.

The thematic analysis takes begins with the identified theme and a description of the sub-theme, as well as a few examples of participants' quotations.

The thematic analysis is rooted in Grounded Theory. From loose classifications something more solid was developed that could be used in the two sets of interviews and for the focus group. For a full presentation of how the framework for the thematic analysis – its themes, sub-themes and descriptions – was developed, see section 3.8.13.

4.5.1   Thematic analyses

Here each theme is described more in detail, including any sub-themes and descriptions as well as examples of extracts that have been coded for that theme. It is first done in a matrix form, followed by a short narrative format expanding upon the matrix.

Theme	Sub-theme	Description	Participant quotes
Direction	Vision	A picture of the future, of something to be realized.	"Impact people in the world." "Doing innovation processes is something that should enable us to get where we want to get…"
	Purpose	The why of the unit. The reason it exists and long-term aspirations.	"We generate three types of value. The first is scientific excellence, the second is patents and the third value is internal impact like technology transfer." "The third value…we cover the whole range…from giving a presentation to transferring code…to join early innovation projects."
	Meaning	The motivation for the work and effort, the significance and value of the work.	"My passion always since I started doing research is how can we use technology to have a positive impact in the world." "For me it is not to use the existing technology, it is how we can push the existing and come up with new things that have a positive impact."
	Focus	What is emphasized and given attention to.	"Everything has to with our inspiration with the users." "I always consider the end-users. In a large company, it is easy to only satisfy internal customers. We need convince internal clients that customers will buy it."

Table 4.23 Thematic analysis interviews I, "Direction"

Theme	Sub-theme	Description	Participant quotes
Culture	Beliefs	The expressions of integrated patterns of convictions.	"That all share the purpose and the vision." "…giving people autonomy. Give the people the tools, the conditions and give them trust…and then people things happen."
	Values	What is believed to be true, espoused and worthy of pursuit.	Trust is very important. That everyone trusts each other and trust leadership." "It was good that people realized that they think different things."
	Attitudes	The views and ideas of what is right and effective when it comes to the work.	"Researchers challenge everything you know. Their whole careers they have been asking questions, opposing and the other way around." "No conflict culture in Barcelona, but no asshole culture either like in Madrid."
	Conventions	The accepted social practices and norms associated with what is appreciated in the organization.	"People are afraid of failing and we do not want to glorify a failure as a start-up thing." "People need to become leaders to succeed at their job. They need more self-leadership. You cannot always rely upon your boss."

Table 4.24 Thematic analysis interviews I, "Culture"

Theme	Sub-theme	Description	Participant quotes
Challenges	Problems	Identified things that do not work and stand in the way of progress or success	"Our challenge is to go from being an operations company to a product or a service company." "The three biggest challenges are: Internal structures (truly embrace a dynamic way of innovation, start-up approach, get the politics and administrative side out), trying to engage in business innovation (new models) and find new services and segments (elderly for instance.)"
	Uncertainties	Things that are relatively known, but unclear if they will become a real problem or not.	"Internal impact…often one of the biggest challenges for most industrial research labs." "For all of them it is also the issue of the business model and demonetization model because this is something we are not necessarily exports on, although for everything we do, we have an idea of how this will be monetized."
	Fears	Things or consequences of things not understood or understood that generate worries and anxieties.	"Mandate…from the top-management…there was a fear…many ways we would have to fold things…" "You know it is really hard to have people innovate if they are uncertain if they have a job or not."
	Doubts	Hesitations about what is what, the right way forward and if something that happened was good or bad, or what it meant.	"…not all ideas are good…the leadership style…listening…decisions…" "…going to be difficult…but they need to communicate how it is going to be…"

Table 4.25 Thematic analysis interviews I, "Challenges"

Theme	Sub-theme	Description	Participant quotes
Success	Achievement	That something planned has been accomplished or that something beyond expectation has been realized.	"We have best paper awards." "I think for my area is about 18 or 16 patents over the years." "We have to deliver something in the excess of a 100 million in one or two years. I am not sure how we are doing or if this is possible. But good things are happening."
	Recognition	That others consider what has been done, or been attempted, to deserve respect or acknowledgement.	"Recognition means that some identity is given – some positivity…" …it is through publications, not innovations…"
	Motivation	What makes us do what we do – for different reasons.	"…identify some opportunities for Telefónica in terms of innovation. The new products. New

		What makes the work meaningful and encourages people.	services that we could create." "The big part is inspiring people but they're also about is impacting and really trying to help people…"
	Inspiration	What is stimulating or moving us or spurring us to become more or do more.	"In the projects that I work on, that I am excited about". "A new thing that we haven't done before is to establishing longer relationships with MIT."

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Table 4.26 Thematic analysis interviews I, "Success"

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Theme	Sub-theme	Description	Participant quotes
Strengths	Resources	That certain assets are at one's disposal, whether that be money or other things.	"Many smart people and good ideas." "…other units…key…they are really assets."
	Qualities	That there are certain attributes that provide an advantage, such as others' belief in what is represented or to be accomplished etc.	"I really don't know about a case of someone being really passionate about something, making a pitch about it and not getting the resources needed to be able to do it." "People are really eager to do good work. Low ego. Strong mutual respect amongst disciplines even if tech is the highest priority. Good work culture."
	Knowledge	That the knowledge, competence and attitudes available and provided are what are desired and needed.	"I bring design capabilities. I bring a customer point of view. This is a house of techies." "I have a clear view on what conditions have to be created in order that the innovation to flourish."

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Table 4.27 Thematic analysis interviews I, "Strengths"

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Theme	Sub-theme	Description	Participant quotes
Opportunities	Collaborations	That there are network and relations available or possible to develop inside and outside of the company.	"There is the Telefónica Dynamic Insights team." "The Smart Steps team."
	Ideas	That there are new possibilities readily available or creative powers to come up with new ones.	"Big data could be our next thinking things, but it requires that we change our relationship with our customers." "Biggest opportunities are graceful ageing, staying in contact with youth and enabling a start-up approach for internal start-ups."
	Potentials	That there are certain ideas or competencies that are currently untapped.	"The other big opportunity I think is the entire concept of data and the other two elements are big data…big data for social good…how we could scale aggregated anonymous data that we have to improve the world." "Personal data – huge potential. Giving people control and transparency over how the data is being used and who access the data."

Table 4.28 Thematic analysis interviews I, "Opportunities"

Theme	Sub-theme	Description	Participant quotes
Process	Methods	The views, approaches and techniques needed to generate progress and alignment.	"Projects work best when we decide and then make them happen. Not the fireman approach (i.e. putting out fires) and I do not appreciate political involvement." "The lean start-up methodology comes in…"
	Models	The description of how something is supposed to happen, that generates clarity and meaning.	"Organizational innovation is very strongly connected to products and service innovation. It means culturally, it means how you do things there and how people are involving doing those things. When you transform that, all the rest of the innovation comes next" "The process is like entrepreneurial process, having an idea, build the idea, ask the experts, ask the stakeholders, review the proposal, get the proposal into the public…"
	Structures	The arrangements that make sense and enable people and ideas to move in an orderly way.	"We work a lot with sub-contractors and have both internal and external clients." "The people are in the teams because their team is their project, a kind of start-up. So, it is very complicated to build team building strategies."
	Competence	The expertise and	"…good communication between us is

		capability to make the overall manner (or process) effective.	important." "…we are improving our business skills." "…give feedback."

<div align="right">**Table 4.29 Thematic analysis interviews I, "Process"**</div>

4.5.2 Emerging views following section 4.5

A few things stand out from the thematic analysis.

- Direction
  There is a strong common, *general*, sense around direction. On the one hand it is something around transforming Telefónica and on the other hand to do with having an impact in the world. Ideally the first is being realized through the second. The developed purpose is quite well received, although there are some who do not feel inspired or have any particular ownership of it. For these respondents there is not a clear idea about what there is in the world that would have a massive impact, or what a transformed Telefónica would look like or do.

- Challenges
  There seems to be a lingering feeling of being under time pressure to come with a hit – a product or service that will deliver money, customers and recognition. It is unclear where this pressure comes from. It seems both to be a self-inflicted demand as well to come from external expectations. Communication is perhaps the biggest challenge; most people refer to this in one way or the other. There are also a number of uncertainties around internal work – decision-making, organizing, prioritization, processes and so on – but certainly also the context for the unit.

- Culture
  There is an approach towards building an entrepreneurial culture internally, but there is also the larger company culture of seeing failure as something bad and a bureaucratic, power-political entity. It is widely agreed that purpose and vision are important even through what they are is a bit vague. Trust is considered a key value, together with transparency. Different disciplines, like designers, scientists, social scientists, engineers and so on, have slightly different values related to their professions, which at best create dynamics but at worst stifle the conversations.

- Success
  Success is seen on a vaguer level as making a difference, having an impact and so on. More concretely side, it is referred to 10s of millions in revenue within a short time frame. There is also a discrepancy between individual achievements and recognition and those of the unit as a collective. The question of the new is imperative. This is articulated more in terms of products and services, but from time to time it also touches organizational processes and structures. It falls sometimes closer to invention, sometimes closer to innovation.

- Strengths
  Far more individual strengths are mentioned than collective ones. Often, these fall into the categories of knowledge, experience or attitudes. In general, there is a conviction that the unit has great people on-board and sufficient resources to make things happen. As stated: "we have a good working culture" and "we have great people".

- Opportunities

  There are quite a number of fairly concrete ideas – or at least areas that need to be catered for and that will generate products and services. Big data seems to be the most potent one after thinking things. Data connected to privacy seems to have quite a strong attraction as well. There is also things about other people profiles – like entrepreneurs – and other resources – like internal networks – that are still untapped.

- Process

  In terms of competence, feedback and communication are quite pivotal. The structures described seem quite confusing, as there are no real clear boundaries around who is in the unit. That is more defined by the actual projects. There seems to be some sort of innovation model and method here – more of a pull type – through using calls to have people suggest ideas and projects. However, there is also a strong indication that there is more than one model of innovation – for instance deduction from trends and tendencies, customers feedback and, as well as "experience-expertise-intuitive-proposals" and the classic "push-research-model".

Further observations on going through transcripts and the thematic analyses can be framed as two questions:

- What were the views of the situation they were in?
- What did they consider important in order to build capacity for them to grow?

The respondents seem to be torn in terms of how they view their own situation. They are privileged to be able to work with what they deem as highly valuable and important. On the other hand, they almost seem to expect it given their expertise and assessment of their own qualities. They are supposed to deliver quickly and that stresses them, but at the same time they do not see this something to fight even though they consider that their work best proves its value over time. They call for more leadership but at the same time they want to decide for themselves. They say that they have the resources they need to succeed, but at the same time there is uncertainty whether they will succeed or not.

The respondents need more clarity and better communication. From time to time it seems they are calling for the idea, the project that will get the traction and make it all come through. At the same time, what is really expressed is a need for a direction that they all can buy into. They need to develop leadership in their group and carve out a strategy.

4.5.3   Remarks on section 4.5, the interviews part I

Conducting these interviews with the purpose of co-learning and co-construction has generated a few comments and a few findings.

The interviews worked in terms of reviewing of how the larger processes worked with the unit. In these more individual settings, the interviewees opened up and expressed more about their thinking, concerns and hopes around the process they were in. This helped calibrate the action research phase in the sense that the sessions were modified to better cater for the need for information, speed in the exercises, and the need to just talk and connect. The interviews also provided the interviewers with some more nuanced views on how the work in their unit proceeded.

For the interviewees, as asked at the end of all interviews, it was valuable too. For some it was the intimate, free, safe space for conversation that stood out, for others it was having their ideas reflected and expanded upon.

Another outcome was the creation of a stronger bond between the interviewer and the interviewee. This is probably due to time spent and attention paid. The sense of getting to know each other better, generating trust, is valuable for the type of co-constructing work that was done in the workshops.

4.6 The interviews, part II

The interviews in question here are those five that were undertaken in 2016 (i.e 2.5 years after the first round of interviews) with representatives from the new unit, Alpha, and the leader of the remains of the old unit (PDI) and a former Telefónica employee (with insight into the R&D inception process in Barcelona).
Here the findings of the thematic analysis are presented, followed by the emerging views of this part of the research and a meta-analysis.

The thematic analysis begins with the identified theme and a description of the sub-theme, as well as a few examples of participants' quotations. For a full presentation of how the thematic analysis was developed, see section 3.8.13.

4.6.1 Thematic analyses

Here each theme is described in more detail, including any sub-themes and descriptions as well examples of extracts that have been coded for that theme.

Theme	Sub-theme	Description	Participant quotes
Direction	Vision	A picture of the future, of something to be realized.	"Large-scale change." "How can we transform Telefónica from a telecommunications company to a communications company?"
	Purpose	The why of the unit. The reason it exists and long-term aspirations.	"We – as opposed to Alpha – need to come up with new products and services at a three-year horizon. Alpha is long-term." "As a telco, we are in the middle – between the customer and the user of brands."
	Meaning	The motivation for the work and effort, the significance and value of the work.	"Make a difference in the world." "People love to work here."
	Focus	What is emphasized and given attention to.	"…purely focused on certain innovation. We do not have to ship a product. We are a people brand."

Table 4.30 Thematic analysis interviews II, "Direction"

Theme	Sub-theme	Description	Participant quotes
Culture	Beliefs	The expressions of integrated patterns of	We are consumers of jobs, trying to find something more perfect, more purposeful."

			convictions.	"Your culture is your brand." "Culture is owned and has to be owned by everyone." "All the employees are part of this journey."
	Values	What is believed to be true, espoused and worthy of pursuit.	"A new culture is fundamental when especially laying the grounds. For the behaviour and what you want people to do…" "We have a cultural manifest and values." "Those values come some of the initiatives of this Alpha project. They are dynamic and will probably change." "We shape value as we go along."
	Attitudes	The views and ideas of what is right and effective when it comes to the work.	"You never get the best ideas when someone wheels in a flipchart and says – alright, give me your five best ideas." "Ideas happen outside constraints." "You need a work place where people mingle together…creating a working environment for people to innovate and contribute."
	Conventions	The accepted social practices and norms associated with what is appreciated in the organization.	"We are an organization that is neutral…trying to solve the world's problems." "…using the move to a new floor to reinforce and embed our values…" "Expertise." "Training." "Politics play a role in the organization of innovation efforts."

Table 4.31 Thematic analysis interviews II, "Culture"

Theme	Sub-theme	Description	Participant quotes
Challenges	Problems	Identified things that do not work and stand in the way of progress or success.	"Is there a way to replicate where people get good ideas?"
	Uncertainties	Things that are relatively known, but unclear if they will become a real problem or not.	…as an example, a person operates in a culture we create and need to accept direct feedback from a peer or a manager…" "…is this the right training for me?"
	Fears	Things or consequences of things not understood or understood that generate worries and anxieties.	"…you have to be comfortable with failing…" "…we need artists, and we need people that I guess I cannot describe."
	Doubts	Hesitations about what is what, the right way forward and if something that happened was good or bad, or what it meant.	"…building a staff and pushing the boundaries of humanity and attract talent that will so." "We need to be evaluated in the context of the resources available."

Table 4.32 Thematic analysis interviews II, "Challenges"

Theme	Sub-theme	Description	Participant quotes
Success	Achievement	That something planned has been accomplished or that something beyond expectation has been realized.	"We build this methodology/environment that attract talent, propel talent. It is the brand, the narrative that does this." "Talent acquisition is fundamental." "Training is fundamental for growth. But it to have a purpose." "When I look back, I see a lean structure, people doing their job, passionate about what they do, giving it the extra mile because it is meaningful for them. "
	Recognition	That others consider what has been done, or been attempted, to deserve respect or acknowledgement.	"…you need to reward them and it is maybe not a pay check that is the right move." "People want to join Alpha because of what it offers. "
	Motivation	What makes us do what we do – for different reasons. What makes the work meaningful and encourages people.	"…inward motivation around driving the HR industry...it is stuck in the dark ages…vertical development" "They invest in me."
	Inspiration	What is stimulating or moving us or spurring us to become more or do more.	"I have a unique opportunity to do this." "I am never satisfied."

Table 4.33 Thematic analysis interviews II, "Success"

Theme	Sub-theme	Description	Participant quotes
Strengths	Resources	That certain assets are at one's disposal, whether that be money or other things.	"Yes, we can set the team. Fitness with care. Emotional fitness." "...we have the ability to be patient."
	Qualities	That there are certain attributes that provide an advantage, such as others' belief in what is represented or to be accomplished etc.	"...we have to appreciate our strengths and weaknesses and look for ones to help us. You have to be open and honest."
	Knowledge	That the knowledge, competence and attitudes available and provided are what are desired and needed.	"…what make people more innovative? Background, the environment…a tough question…" "It is like a skill you practice."

Table 4.34 Thematic analysis interviews II, "Strengths"

Theme	Sub-theme	Description	Participant quotes
Opportunities	Collaborations	That there are network and relations available or possible to develop inside and outside of the company.	"Collaborate where it makes sense." "Internally and externally" "Telefónica has vehicles for open innovation. Wayra for instance."
	Ideas	That there are new possibilities readily available or creative powers to come up with new ones.	"Opportunities for cross-pollinating ideas. Broaden the thinking." "How to leverage the resources we have."
	Potentials	That there are certain ideas or competencies that are currently untapped.	"Expertise and passion…key combination for innovation…" "Future of TV." "Communication Antennas." "Alpha only works with large potentials."

Table 4.35 Thematic analysis interviews II, "Opportunities"

Theme	Sub-theme	Description	Participant quotes
Process	Methods	The views, approaches and techniques needed to generate progress and alignment.	"It's hard to measure EQ (emotional intelligence) …but it is not just about IQ." "Often you hire like for like, but you really need to balance." "It is not a one-off event, it is a continuous journey." "Agile." "Lean" "We have different methods on all our pillars."
	Models	The description of how something is supposed to happen, that generates clarity and meaning.	"We need to have new formats." "The first thing we did when I started was to do a cultural kick-off event." "…organizes into moonshot teams…" "…a moonshot consists of different competencies, needed, falling into four buckets: Tech & engineers, data scientists and research, product and service people and strategic partnerships. They have to work together."
	Structures	The arrangements that make sense and enable people and ideas to move in an orderly way.	"The environment is created for them." "We try to get rid of this hierarchy." "We can get rid of the hierarchy based on behaviour." "Alpha tries to keep the structures as flat as possible. The last thing you want are layers and layers of managers." "As a company grows, you need to incorporate and define more processes."

			"…basecamp enables support and consist of finance, HR, operations and ideation…" "The organization in Telefónica is complicated."
	Competence	The expertise and capability to make the overall manner (or process) effective.	"…my role here…be able to identify the talent…. skills…but also genetics…" "Get all the HR stuff up and running – the on-boarding process, compliance, contracts and agreements…" "…much comes from employee serendipities by allowing behaviours…"

Table 4.36 Thematic analysis interviews II, "Process"

4.6.2 Emerging views following section 4.6

A few things stand out from the thematic analysis.

- Direction
  Alpha is on a mission. It really wants to make a difference. It wants to be the vehicle that catapults Telefónica into the digital age and at the same time transforms life for millions of people. This is to be done not only with technology, but also with and through the people that are brought on board. There are also notions around size, composition and so on, that speak to the organization having done some thinking and design around how it wants to be and to run.

- Challenges
  The overarching test is whether Alpha will come up with a moonshot that becomes a success. There are others, however. In a large organization, politics become important. Alpha is no exception and will be most certainly challenged on several fronts: "Does it really create value", "is it worth it", "it should be run differently" and so on. In addition, their innovation model has not shown its value yet – will it deliver the progress hoped for?

- Culture
  There is a strong focus on culture. Statements like "we need to hire people with the right mind-set", or "we have to run by our values" speak to this, but also to the leaders' view of what is needed. Launch events at which people have a chance to challenge and unfold values are a potentially effective way to build culture. As the company has a historical legacy around politics (Madrid-run), tech (the phone company that connected Spain) and today very much finance (the CEO, and the former CEO are not engineers or politicians – they are finance people), this is not necessarily a clash, but invention for the sake of invention is probably not going to be accepted in the long run.

- Success
  Definition of success are very clear – "make 100s of millions of euros" and affect "100s of millions of people". There are also more intermediate steps such as "getting the right people on board", "having people wanting to join", "having created a strong innovation culture", "support Telefónica" and so on. They also have a number of years before they have to prove something so for now it is really a burning platform. Of course the question of whether this will prove the right way forward is still open.

- Strengths
  It is interesting that the first two people recruited were not scientists or tech people. They were essentially HR people. This certainly sends a signal that the company views people as a critical asset for its future performance. All interviewees mentioned that they view the size of the company and its resources, coupled with its independence as a recipe for success. Furthermore, to have the support CEO of Telefónica together with other executives must be viewed as a strength, ensuring backup and support.

- Opportunities
  Alpha seems very confident in its own capabilities. A striking thing was how relatively silent interviewees were on which moonshots they had considered or what they had chosen. While many other companies are perhaps more silent on how they do things, here it is far more crucial to be careful about revealing the "what".
  However, ideas around the big macro trends – like migration, aging, food, digitalization and so on – were all mentioned.

- Process
  The interviewees have a fairly clear process for generating ideas and translating them into something more tangible. Likewise how the organization is to be built, how it will get the best talent and so on. Again, the company is still young and has not yet been tested, but much has been designed and thoroughly considered. To what extent this will play out as intended or not is too early to say.
  They seem to rely very much on either their own creative powers or the explicit needs or insights of Telefónica at large. It is not clear to what extent a model around user-driven innovation will eventually come more into play, but Alpha has an aspiration to be futuristic and visionary. How it will understand needs that are not yet experienced is a daunting challenge.

Further observations on going through transcripts and the thematic analyses can be framed as two questions:

- What were the views of the situation they were in?
- What did they consider important in order to build capacity for them to grow?

The respondents seem to see themselves as privileged to be with Alpha. They speak much of helping Alpha. It very much gives the impression of functioning as a "people first" type of company, not only when it comes to future clients and users of its products, but also when it comes to those building Alpha itself.
What is pivotal is identifying and developing the moonshot that will deliver success. Since success is not being considered for many years they will have to be good at developing a proposition for something that the board actually understand and can see. This is not only about individual insight or tech foresight, but about building a story, compelling arguments, a vision of the future and an offering that creates belief in the road to get there.

4.6.4 Remarks on section 4.6, the interviews part II

Conducting these interviews with the purpose of co-learning and co-construction has generated a few comments and a few findings.

The interviews took place at an early time in an organization's history. The energy was high, belief in the future was strong and satisfaction was obvious. These could be felt just walking into the premises. These conversations were thus strikingly different to the ones conducted in 2013. What does this tell us about doing interviews, and generating insights and new learnings?

Interviews or conversations are of course not the same as observations – it is not the same as seeing people doing innovation or exercising leadership as, for instance, the action research phase offered insight into. One thus has to rely on what people say.

Given that the organization is so new, and still being built, there are many things that have not yet been experienced or materialized. These will come with maturity. At the same time, the organization is riding on a positive wave – meaning the support it has from the mother company – and has not yet met challenges such as disbelief or disappointment from its supporters, internal turmoil and so on. A challenge here (as in every start-up) is that people are only occupied with what they do, or are supposed to do, and have not (or do not) really paid attention to what is going on in the larger scheme of things. To some extent the interviews run the risk of being speculative (i.e. what do you think will happen) or directive (i.e. is it not so that…).

On the other hand, a conversation or an interview at such a stage can also be really influential. Here the interviewee may be very receptive to the experience and views of the interviewer, allowing him or her to co-create value. This is, however, a balancing act so that the interviewee does not feel intimidated by the interviewer or that the interviewer comes out as ignorant, offering advice that is not anchored into the interviewee's reality.

4.7 Focus group

Here are presented the findings of the thematic analysis of the focus group (that was done after the interviews – part I in 2013 and part II in January, 2016), followed by the emerging views of this part of the research and a meta-analysis.

The thematic analysis takes an offset in the identified theme and a description of the sub-theme, illustrated by a few quotes from the participants. For more examples of participant quotes, see appendix 9.14.

4.7.1 Thematic analyses

Theme	Sub-theme	Description	Participant quotes
Direction	Vision	A picture of the future, of something to be realized.	"Without a clear vision, we do not start. A clear need or a challenge we want to pursue." "A vision is the most aspect of innovation. Steve Jobs had a vision of everything needing to be wireless. Apple did not invent much, but they combined existing products…and put it into the relation to the vision. A clear vision is the shining star in the innovation strategy."
	Purpose	The why of the unit. The reason it exists and long-term aspirations.	"If we want to be able to have people follow a direction, it is not helpful with a structure." "Take Bang&Olufsen, they have a vision about the perfect entertainment system, but then price it so that very few can actually afford it. It was nicely designed and developed, but technology moves so fast and suddenly you are not state of the art anymore."
	Meaning	The motivation for the work and effort, the significance and value of the work.	"Innovation comes from a sense of urgency." "But you need to ask yourself – what would disrupt yourself?"

	Focus	What is emphasized and given attention to.	"How do you innovate technology? Companies often overlook the social side. One thing is to get it invented, the other one is to get people to accept it. The other one requires attitude changes." "It is incredibly important to have an innovation strategy. The more you are able to focus, the more likely you are to get a result. Strategy helps set a direction. It should be built upon the purpose and the vision – what it is that they want to achieve – combined with an understanding of the core capabilities of the company. What they do well. Each department then can set their strategy in relationship to that."

Table 4.37 Thematic analysis focus group, "Direction"

Theme	Sub-theme	Description	Participant quotes
Culture	Beliefs	The expressions of integrated patterns of convictions.	"Innovation is multifaceted." "Maybe we can distinguish between improvements and innovation, based on our ability to forecast where we are going to end. So, it is something about the uncertainty." "About culture. It is about bringing people together."
	Values	What is believed to be true, espoused and worthy of pursuit.	"Often evolution is adding one thing at the time and suddenly when you look at a distance – it becomes an innovation." "It is not about the idea. It is the execution. It is about creating the conditions – creating new territory and exploring. A culture of learning and experimenting."
	Attitudes	The views and ideas of what is right and effective when it comes to the work.	"It is about culture and the dream." "Success came from people get together, having a beer and making it happen. It had nothing to do with systems, it was more despite the system."
	Conventions	The accepted social practices and norms associated with what is appreciated in the organization.	"Is there something above innovation – like a paradigm shift? For instance, the Swiss watch industry developed the quartz watch. Then the Japanese bought it. Or the electronic calculator. But what matters here is the perspective – both are watches. It is about the user experience."

Table 4.38 Thematic analysis focus group, "Culture"

Theme	Sub-theme	Description	Participant quotes
Challenges	Problems	Identified things that do not work and stand in the way of progress or success	"Research and measuring points also take into account what we call social the society readiness level. We have the technology leaders' readiness that work and that are going to be used at all but also will be accepted in society if it cannot be accepted in society, just dropped the court. So, you have to have both. Society readiness – can it be accepted." "A challenge is that many of the managers we put in front of innovation are risk managers. Great at avoid and manage risk. Uncertainty navigators is what we need. They need relations, experience and organic growth."
	Uncertainties	Things that are relatively known, but unclear if they will become a real problem or not.	"Tandberg was for years a company you mentioned as a company with great social consciousness. But it died. No ideas came out of it? Is it the same with Google over time? Treat them too well and nothing good get out of it." "There some studies that suggest that diversity slows the process, but the quality of the outcome might be better. So, is it more about changing the culture than the idea?"
	Fears	Things or consequences of things not understood or understood that generate worries and anxieties.	"There is a resistance against new ideas. Specialists do that. Protective." "If you don't make it happen nothing will change. People will stay in their own silos. If you have it like that no power is transferred because fear of change."
	Doubts	Hesitations about what is what, the right way forward and if something that happened was good or bad, or what it meant.	"At Lego no one talked about innovation, but it happened all the time. 60–70 percent of products changed very year – so it has more to do with the fashion industry. We spoke more about specifics – how do we get stronger in say our front-end, how do we get better at…" "User-driven innovation – the challenge is that the customer does not really know anything about the company or the technology. Indeed, not even very much about their future needs, only some about their present needs. But a lot of their previous needs."

Table 4.39 Thematic analysis focus group, "Challenges"

Theme	Sub-theme	Description	Participant quotes
Success	Achievement	That something planned has been accomplished or that something beyond expectation has been realized.	"How do you predict if something would be a success or not? To what extent the employees believed that the ideas would have a positive effect on themselves." "If we measure success as learning, a change behaviour."
	Recognition	That others consider what has been done, or been attempted, to deserve respect or acknowledgement.	"We need to have incentive structures that support effort – not just success or failures." "How do we incentivize team development and dynamic changes. Can we make a structural support for them?"
	Motivation	What make us do what we do – for different reasons, What makes the work meaningful and encourages people.	"You can't see progress from day to day. You have to be motivated by yourself. If you can't do that you need to quit."
	Inspiration	What is stimulating or moving us or spurring us to become more or do more.	"Big organizations cannot go beyond certain bonuses. In a small one, you can get on the inside and really cash in." "Large companies cannot really leverage the small internal start-ups. But it can be spun out and incentivized differently."

Table 4.40 Thematic analysis focus group, "Success"

Theme	Sub-theme	Description	Participant quotes
Strengths	Resources	That certain assets are at one's disposal, whether that be money or other things.	"A bad team can destroy a good idea. A good team can lift a bad idea. Because they can adapt."
	Qualities	That there are certain attributes that provide an advantage, such as others' belief in what is represented or to be accomplished etc.	"Hope is not a strategy. You need to have some kind of system." "The question is if the strategy is assisting or if it demands compliance."
	Knowledge	That the knowledge, competence and attitudes available and provided are what are desired and needed.	"Learn from others, IBM for instance. Surrounding themselves with ideas, tech and people."

Table 4.41 Thematic analysis focus group, "Strengths"

211

Theme	Sub-theme	Description	Participant quotes
Opportunities	Collaborations	That there are network and relations available or possible to develop inside and outside of the company.	"If you keep them separated in different parts of the organization, they will never start to cooperate. This also increase the understanding of users and empathy for others." "Different pyramids within organizations only limit and prohibit innovation."
	Ideas	That there are new possibilities readily available or creative powers to come up with new ones.	"Our employees can go directly to the boss and present an idea and almost often they are given money to test it out. Our sandbox. It is essentially what has always been expected by engineers, but now something is defined."
	Potentials	There are certain ideas or competencies that are currently untapped.	"Integrating and up scaling ideas. So, IBM was good at tapping into what worked somewhere and then using their capability to bring it in and bringing it out."

Table 4.42 Thematic analysis focus group, "Opportunities"

Theme	Sub-theme	Description	Participant quotes
Process	Methods	The views, approaches and techniques needed to generate progress and alignment.	"We run it in two-work cycles. A sprint. We abandoned stage gate because you have too much time. It is more agile. You compete with the others on the resources. After two weeks, you assess. You are only guaranteed for two weeks. You need to make it count."
	Models	The description of how something is supposed to happen, that generates clarity and meaning.	"It is not just the customer that drives innovation, or the company so to speak – it is also the competition. VHS vs. Beta is the classic example. A superior product, but it did not land." "Innovation is not just new improvements on new improvements."
	Structures	The arrangements that make sense and enable people and idea to move in an orderly way.	"Lego team always consist of equal responsibility and the capabilities needed. So, they do not need to do a handover. They can follow it through the whole value chain."
	Competence	The expertise and capability to make the overall manner (or process) effective.	""XXX the company almost killed itself around 15 years ago because they innovated and developed in all directions, into areas where they did not have any competence." "People need to know the strategy of course."

Table 4.43 Thematic analysis focus group, "Process"

4.7.2 Emerging views following section 4.7

A few things stand out from the thematic analysis.

- Direction
  The focus group is clear in its view. A direction is needed. Perhaps not for inventing, but turning something into innovation is absolutely key. However, it is also clear that the direction is not set in stone. As one participant said: "In successful organizations it is about the vision, but also being flexible enough. Revisit from time to time. Change it even." A direction helps make choices, prioritize and allocate resources. At the same time, the future is difficult to forecast. However, there is no real alternative to not having an idea about where to go. More important is how one strategizes, organizes and acts in the face of new knowledge. As one participant said: "Strategy is also a proxy for behaviour. It needs to be articulated or else it is just a piece of paper."

- Challenges
  A multitude of challenges face anyone steering towards innovation. The division between technological breakthroughs and societal acceptance and wants is not a problem of the past even though literature, experts and companies alike have pointed it out for years.
  People who are placed to run innovation are not necessarily geared towards exploration, new futures and so on, but are rather steeped in a tradition of risk-management and risk avoidance. That of course contributes to a particular orientation towards innovation, which is not necessarily bad, but it does not promote uncertainty.
  Innovation is also something that is heavily emphasized and talked about, but it is not always something that happens. It runs the risk of losing its meaning and value. In companies where it happens, it is noticeable, without it having to be talked about all the time.

- Culture
  Culture is about bringing people together. Innovation happens when the culture permist and supports personal initiatives, tinkering and collaboration: companies that have engineers who test and experiment in their free time. Building such a culture requires strong leadership and having the right people on board. Creating such a culture can easily end in failure. As one participant said: "A company I worked for had made a decision on something the called a cultural turn-around. It was a complete bottom-up. So, what happened was that the employees felt that what they were thinking and doing was apparently wrong, but they were not told what was then right way to behave. It massively backfired. Took two to three years to get back."
  Culture needs to be paired with a dream about something, a vision.

- Success
  It is not possible to forecast success precisely. It seems, however, that if people have something at stake, or they have a vested interest in a project, that project will have a greater chance of success. Success is often spoken about in terms of incentives. These are not only about money; there could be many other areas and ways by which people get something back for their effort. The question is what should be rewarded – success or effort? While we would intuitively say that if someone had made millions for a company they should perhaps be entitled to some sort of reward, this may create a culture in which risk, new thinking, collaboration and so on are not promoted. But effort without ingenuity may not cut it either. Perhaps a combination of the both would be worth exploring.

- Strengths
  A strategy is needed that leverages strengths and accommodates weaknesses. In terms of innovation there is a challenge in that the strategy is decided upon and things are supposed to orientate themselves

213

in that direction, but what happens if something occurs, something is learned, that points in a different direction? Often in larger organizations, it is not as easy to handle variance as one would have assumed, given the resources at their disposal. Smaller organizations, on the other hand, may be nimble and flexible, but they are unable to pursue multiple strategies that take into account the several possible roads to success.

Today's business environment is about not only who you are, but also who you know and how you are able to learn from others.

- Opportunities
  No one is best at everything. The key is to figure what one does better than other, and then to try to put that into a system that reinforces itself. Perhaps copying is a better strategy for some than trying to invent, for some it may be acquisitions, for some it may be spinning out new ideas rather than cultivating them inside the company.
  There needs to be a space – a sandbox – in which one can explore new ideas that may not find support are traction in the normal hierarchical systems.
  Collaboration is key, not least inside the company, between the different departments. This is not a new thought. The question is, then, whether we know it and want it: Is it not happening, is it happening too poorly or is it a dream that can't be fulfilled?

- Process
  Innovations are different from mere improvements. There needs to be a model, a process that fits the company. While one can have models that on an abstract level fit more than one situation, the minute you go into the details they become messy, particular and situated in many specific considerations and operations. In terms of innovation, it seems that agile approaches are more achievable, since the end-goal may not be known. At the same time, at least for a front-end innovation, there needs to be clarity and perhaps even a bit of competition for it to lift. One area that was debated concerned internal idea competitions and idea banks. As one participant said: "There seems to be an underlying idea there is an Edison in our company just waiting to be discovered. Unfortunately, that is not the case." But perhaps there are other values that come out of these initiatives – for instance sparking general creative thinking, fostering engagement and perhaps even showing that management cares about people and their ideas. Regardless of whether it is a need or more of political-cultural process, the challenge lies in the assessment. If that is not done carefully, disengagement and waste of resources will be the result.

Two questions emerge when going through the transcripts and the thematic analyses:

- Should R&D – innovation projects – be outside or inside the company?
  There seems to be a challenge between having a separate R&D department or an integrated one. To some extent is seems necessary to create autonomy and liberate it from company politics, allowing it to create a new culture and a new type of policies. On the other hand, there is a need to have it incorporated, allowing for a freer flow of ideas, and ensuring a tight connection to business units and other departments.

- Is there a difference between strategy and innovation strategy?
  Innovation is definitely desired in a strategy and innovation benefits from strategy. Probably strategy is strategy regardless of whether one speaks about innovation as the end-goal or not. The question is more what is the difference in development, description and execution – if any.

4.7.3   Remarks on section 4.7, the focus group

The focus group was a very different experience to the interviews and the action research. A few points are worth mentioning here.

Since only two members of the focus group knew each other from before it was important to create a safe space and ensure a good flow.

The conversation was more difficult to steer than the interviews. This was perhaps due to the actual people who were there or perhaps it was because we were a group rather than a couple in discussion. This offers food for thought on how much leeway to give while at the same time not losing focus. On the other hand, things occurred and were talked about that feasibly could not have been considered beforehand, or probably would not have come about if one had been stricter about the flow and process.

Experts also offer a challenge to bringing a group together. On one hand, they can create lively conversation, with different propositions, disagreements and so on, but on the other hand they can create a situation in which status and power play make themselves visible. The difficulty of challenging dogma and discourse can be accentuated by the presence of experts – particularly if they are exponents of the very same arguments. As the group was made up of academics, consultants and executives – both younger and more senior – there was an interesting dynamic taking place. In general, though, it was clear that the participants were there to contribute and were also keen on learning new things.

Time is also a factor. A focus group needs a bit of time to really come to life. However, there is a challenge if time is stretched out too much. People lose interest and have a hard time focusing if they have to listen to others for too long. It is plausible that a slightly different setup to a discussion – perhaps having them create something – would have created a very different approach.

4.8   Summary of chapter 4

This chapter has offered an in-depth insight into the field research, the data collected and the interpretation of the findings. The different sources for the data were the following:

- A quantitative survey
- A desk-top research on the case study
- An action research process
- A set of interviews from 2013
- A set of interviews from 2017
- A focus group.

Over the timespan between 2013 and 2017 much has happened that shaped the particulars of the conversations as well as the data. Looking back, the nuances and contextual aspects of the knowledge are situated differently. Since the focus group and the quantitative research can be are not explicitly linked to the case study it can be argued thay they provide less value. On the other hand, both of them are a consequence of the case study, and the views that they were needed to expand the thinking and get a broader perspective on the research question, and to get a nuanced discussion around the findings.

Below follows an outline of the main findings arising from the different empirical materials.

The quantitative survey

Leadership is vital, but it needs to be accepted in the organization. Leadership is exercised but requires followership. In terms of personnel, a mix of backgrounds and expertise are preferred. It is assumed that a deep knowledge of the field is required for innovation. How people feel about their workplace and job is considered important for innovation. Innovation strategy is seen as important but is often lacking or poorly designed. Culture is seen as a defining factor, but also something that can be affected or even designed. Structure is asked for but there are mixed emotions around its effectiveness. Will and commitment are seen as key psychological characteristics. Methods preferred are gut-feeling and SWOT. Rewards and resources are seen as imperative. Some more quantifiable results are summarized here:

- More than 50 percent consider their business environment as complex and only 5 percent as chaotic, 10 percent as simple and a little more than 30 percent as complicated.
- 65 percent say innovation has not been a priority in their company before 2000, only 30 percent after 2010. 6 percent say it still is not a priority.
- Around 20 percent claim they do not follow any innovation model or do not know which one they use. 25 percent say they use the network model.
- In terms of resources more than 75 percent indicate that clients and customers and 50 percent own organization are very important – consultants, universities and competitors score low.
- 56 percent consider quality of products and services very important goals for innovation, followed by increased revenue (40%) and obtaining new competencies (33%), whereas reduced environmental impact, increased safety and health and reduced cost in marketing and so on were the lowest scorers.
- Only 25 percent consider their organization to have a very clear and communicated vision, 17 percent a very clear and communicated strategy and only 4 percent a very clear and communicated innovation strategy.
- Only 4 percent consider that the process for developing innovation strategies is carefully crafted and includes all relevant stakeholders.
- Tools mostly used are Brainstorming SWOT and Mission/Vision statements, followed by design thinking by strategy maps and scenario planning, as well as blue ocean strategy.

The action research

The processual and relational aspects of the work are considered vital, but are not always prioritized. Meeting each other, having conversations and co-creating it is assumed generates innovation and, at the same time, a stronger sense of community and well-being. Identity is a powerful facet of organizational and innovation work, both in terms of re-enforcing beliefs and methodologies, and in terms of decision-making and reflecting on what is valuable. This is a double-edged sword as it on one hand strengthens culture and perhaps efficiency, but at the same time may hamper diversity and novelty. Closely related to identity is language, and it is clear that a technological-economic world-view differs from a human-centred design world-view. Ironically, one may say that uncertainty, in which innovation is so steeped, does not correspond well with people's working situation. When there is uncertainty in the larger organization, it reflects negatively upon the group's ability to perform. An appreciative methodology seems to work well when one wants to build capacity for innovation as it recognizes the plurality of voices and aims at "what can and should be" rather than limitations and problems. Utilizing consultants may be helpful in processes like this, but requires a high level of trust to work.

The interviews part I

In terms of direction, there is a strong common sense around changing the company and affecting the world. However, the consequences or results of such outcomes are unclear. The challenges are many and can be found in the perceived need to deliver a breakthrough product, as well as the challenges experienced around communication. Trust and transparency build culture. Hoewever, there is a view of differences in culture within the company and between professions. Success is in general viewed in terms of impact. It is talked about far

216

more in terms of products and services and is clearly denoted as something "new" (i.e. not making something old and existing work). Views about strengths are articulated on a more individual level than a collective one. Opportunities are visible and accepted in the team. Feedback and communication are seen as key competencies for moving onwards, as are how to harness different approaches – for instance inside-out methodologies (expertise and experience) and more inductive approaches (from market trends).

The interviews part II

Alpha is on the move. It has strong belief in its future success and gaining of experience. It has a similar orientation around its purpose and function to the former unit (see "The interviews part I", above) with regard to changing the company and affecting millions of customers. The difference now, perhaps, is a stronger commitment to a digital future. The setup is not a consequence of many different projects, initiatives, legacy and so on, but an entirely new composition, and it provides a very different clarity and focus. In terms of challenges, the main one is whether they can produce a moonshot that actually delivers. Culture is also very much seen as something that is to be designed by the people on board. This is promoted by the fact that so much emphasis is given to bringing the right people on board, and highlighted by the fact that the first two people to be employed were not scientists or engineers, but HR and recruitment people. While the unit's working process is fairly standardized, its actual moonshots are more secretive. This is interesting as one could argue that there are no apparent comparative advantages in terms of competencies or methodology or resources. The advantage essentially comes down to the actual idea and how it solves a particular problem in the marketplace.

The focus group

Direction is seen as imperative. Sandbox development or innovation for the sake of innovation is not well-regarded. However, one needs to look out for changes. A direction should not be set in stone. But strategy needs to be acted upon; it is a proxy for behaviour. The number of challenges is massive but the distinction between the technological breakthroughs and market acceptance is a key one. Tradition – expertise, education, company approaches – is not necessarily what is needed to embark on innovation journeys. One needs to be geared towards risk. Culture can kill innovation. Yet culture needs to be paired with a dream, a vision. Success cannot be guaranteed, but it seems like people/groups who have something at stake, something vested in the project, seem to have a higher chance of success. Strategy is needed. Small and large companies have different challenges. Larger one have the resources to pursue a multiple strategy (i.e. not put all their eggs in one basket) but are not always well-suited to handle variance. Small ones are nimble but seldom have the capacity to pursue multiple strategies. None are best at everything. The key is to find out what one is best at and refine that. Collaboration is key – both inside and outside the company. A process model is needed not to waste resources.

4.9   Emerging questions following chapter 4

The questions that stand out after the analyses are as follows:

- Case study
  How is a multi-national company best studied? It is not really possible to fix it in time and detect all the potential intricacies that may or may not play a role. Its sheer size seems to require a macro study that then shies away from details, or a micro study that leaves much of the context out of the study.

- Innovation
  How is it best studied? This has been a question that followed the entire research, although it is not an innovation per se that is the object of this study. Yet there is a dilemma in the sense that an innovation is – given the definitions and understanding of it – only an innovation after its success. As such it seems

more doable to look back, use hindsight and figure out what happened. But that is of course difficult since what happened may have been forgotten, distorted or at least interpreted differently in retrospect. So, it may not be as helpful as one would hope. On the other hand, to come in before it starts, and follow its inception to dissemination and recognized success, seems daunting at best.

- Analyses
  Do we understand more by breaking something up into details?
  Using a thematic analysis and forms of analyses is a fascinating activity. It reveals much. Yet at the same time there is a challenge to bring it back together, into a coherent understanding. It seems like the researcher, as the medium, is only part of the picture. The researcher, regardless of how neutral, or true they aspire to be, is a creator of knowledge. Someone who makes something explicit, something that was not there before. Perhaps this is like reading a novel versus analysing it: They are not the same thing, so it is ludicrous to assume one would come to understand them in the same way.

- The generative interview
  Conducting interviews within a social constructionist framework implies that the interviewer has a direct effect on what is being said and understood. The natural consequence of this is to recognize it fully and assume a role as a speaking partner, having a conversation or dialogue, indeed perhaps even jointly engaging in problem solving. This is a balancing act, however, because one can only go so far as a researcher in such a conversation without it being the researcher's own presumptions that own the conversation.

5 Discussion

5.1 Introduction to chapter 5

Here, in the "conversion phase" (Fetters et al., 2013 and Pluye and Hong, 2013), the qualitative and quantitative research, as well as the literature research, are brought together and discussed.

In order to structure the discussion, a number of lenses that have been developed (emerged) throughout the research process are used in the form of questions. Where they come from and how they should be understood are explained before each is applied. They are then applied to all the findings (i.e. the qualitative and quantitative research are brought together and discussed).

Since the journey from PDI to Alpha made up the structural trajectory of the empirical work, Alpha (as it stood in 2016) is presented and discussed with particular emphasis upon the notion of "moonshots", as well as the setup of Alpha and how it fit into the larger context of Telefónica as its strategy – and subsequent innovation strategy – became clearer during the final interviews in 2016. Apart from being an important piece of research in itself, since the Alpha unit is a new phenomenon and not much has been written about it, it also serves as a description of the parameters in question. Although this does not cover every point arising under these parameters, it is clear that there are several echoes between what stands out from the parameters and why Alpha and its surroundings are the way they are. For instance, there is the recognition that a new culture and structure is needed and that, subsequently, Alpha is an independent company that has emphasized different values.

Closing the chapter is a summary and a reflection on the emerging questions from these discussions.

Here follows an outline of the different parts of this chapter.

- Presentation of the lenses
- Application of the lens
- Discussion of Alpha
- Summary and emerging questions.

5.2   The lenses

While each set of empirical data has been described and discussed individually (see chapter 4), when bringing them all together there is a need to structure discussion. A number of lenses have been developed to unpack the accumulated and collective findings.

During the literature review a number of considerations, ideas and questions arose around the findings on innovation and connected areas. These were not directly accounted for but rather brought forward as reflections with the researcher (some appear in the emerging questions more directly). During the empirical phase, some of them became more accentuated and some new ones appeared. The following are those that were chosen as parameters:

- Notions of innovation
- Success
- Frameworks, methods and tools
- Notions of leadership
- Notions of organization
- Notions of strategy
- Complexity theory and innovation
- Social constructionism and innovation.

The reasons why these parameters have been chosen are:

- The company's own understanding of the concept of innovation is of uttermost importance to understanding how they go about it.
- Innovation is seen as key to success, but as such success needs to be identified and understood.
- How they go about innovation is also of importance as the methodological choices can help us understand more about their world-view and how they succeed or fail.
- Leadership is considered key to making innovation happen, but leadership can take many forms and still provide results.
- How things are organized affects processes, decision-making and utilization of resources, for instance – hence matters of innovation are interwoven with organization.
- Strategy defines the orientation and to some extent the rationale for an organization's work; as such innovation can be viewed as a consequence of it, or indeed the lack of it.
- Both complexity theory and social constructionism are fundamental to this research and thesis. Given the empirical findings and analyses, it is only natural to ask what these findings offer in terms of utilizing them in studying the topic of innovation.

The lenses are here formulated as questions so as to help frame and sharpen the discussion.

1) What is the notion of innovation in terms of scope and range within the organization and how does that relate to theory?

2) What does success look like and how is it articulated, on both overall and more local levels?

3) What does the analysis tell us about which frameworks, methods and tools that are used to bring forth innovation and to what extent they are considered effective?

4) What can be said about notions of leadership in terms of innovation when it comes to role, style and distribution?

5) What can the analysis tell us about notions of organization in terms of innovation when it comes to autonomy, identity and ways of working?

6) What can the analysis tell us about notions of strategy in terms of innovation when it comes to deliberateness, framing and execution?

7) How can complexity theory be used to explain innovation?

8) How can social constructionism be used to explain innovation?

5.3 Applying the lenses to the findings

5.3.1 Notion of innovation

Question: What is the notion of innovation in terms of scope and range within the organization and how does that relate to theory?

In terms of innovation there is a stated commitment to societal gains: Alpha seeks to promote the development of sustainable solutions that have a positive impact on the economic, social and technological progress of the regions in which it operates (Audit report, 2016).

Innovation as a concept is ambivalent. On one hand, it is stated that this is not technology per se. Small says, "Technology is what you focus on when you're not paying attention to end users" (Donegan, 2015b). On the other hand, the company is firmly positioning itself as a telco. Over and over it talks about products and services, albeit also hinting towards markets, processes, business models and organization (Audit report, 2016). Innovation is seen as both a product/service and a process by which to obtain objectives. The fact that it has its own chapter in the audit report (2016) speaks to its prominence, as does the fact that Alpha now has a chief innovation officer on board (website).

Going through all the reports from the workshops and other notes, it is clear that innovation is a product or a service. It is not branding, organizational development and so on. It is essentially the company's output – what its customers buy. This can be seen for instance in expressions from the first workshop such as "We like to create new things" (Windeløv-Lidzélius and Ruiz de Querol, 2013a).
To be even more specific then, it is very clear that innovations have a technological "engine" that makes the innovation happen. Indeed, one could argue based on the comments from the participants that this engine, more than the actual application of it, constitutes "innovation". As such, from a strict, classical innovation perspective, it is invention that is the object of their work.
Yet this did not prevent respondents from thinking in terms of users and greater societal trends as informing and shaping their work. Their inventions were never expressed as the consequence of a genius idea conceived one morning that was later found to have a market. They consistently spoke of a sort of deductive process by which ideas arose from a greater understanding of what is happening in the world – technological trends, changing user-preferences, demographic changes and so on – that then turned into the development of technologies (products).
An additional parameter is of course that the unit does not go directly to its customers, but to the company's business units, who then take on production, marketing and sales. During 2013, however, PDI did set up a few labs in which they could more easily engage directly with different users (Windeløv-Lidzélius and Ruiz de Querol, 2013c).

It seems, therefore, that there is preference for products. This leans just to one side of Edquist's model (2001), and does not emphasize process per se, even though many statements speak about innovation as a process. This may not indicate a dichotomy as such but it is still interesting to note. There is also the possibility that innovation as a process – and all that comes with that – is a conceptually recognized but not fully grasped.
However, work had been done to improve the innovation process, under the helm of Oriol Lloret, but this seems very much to have stemmed from the lean start-up methodology as proposed by Ries (2011). It is also interesting that in the conversation there was a heavy emphasis on "disruption" (although not necessarily in the strict sense as proposed by Christensen, 1997; Christensen and Bower, 1995; Christensen and Raynor, 2013) or radical solutions (Afuah and Bahram, 1995).

Innovation is viewed as a multi-layered phenomenon by the interviewees. It is a frequently used word and concept. It does not fit easily into a category (such as being a product), because it is used so extensively, but there are quite some orientations towards R&D and technology that reinforce Godin's (2006 and 2008) arguments for instance.

On the other hand, on listening deeper, the concept of innovation appears as fairly concrete and speaks towards the more classical idea of innovation as a new product, as well as something more in the line of Schumpeter (1934 and 1942) and the idea of change and value.

Going a bit deeper still, the classical Maclaurin view of innovation as an invention that is commercially introduced (1953) shines through or, even more so, the Utterback and Abernathy (1975) view of a new technology or combination of technologies introduced commercially to meet a user or a market need.

In the interviews, as well as in the workshops, the orientation of innovation as a process (Tidd et al., 2005) or as an act (Drucker, 1985 and 2007) that endows resources with a new capacity to create wealth was also stated. This was particularly the case when interviewees spoke about the objective to "transform Telefónica".

In terms of innovation models, it seems that the fifth generation model as proposed by Rothwell (1992 and 1994) is the most fitting, more than anything because it factors in the multiplicity of stakeholders and local, fairly linear processes. This may by a very broad model, but it is also complex, less intuitive and not so easy to explain. Looking at the reports (Windeløv-Lidzélius and Ruiz de Querol, 2013d and 2013e) it is also clear that there is a strong emphasis on stakeholders and clients, echoing facets of Chesborough's (2003, 2005 and 2006) notions of open innovation and user-driven innovation (Thomke and von Hippel, 2002).

On the one hand, therefore, innovation is to some degree considered to be confined to those entities that are to develop new ideas. On the other hand, it is the aspiration to spread widely the capacity to generate it and the culture that promotes it.

It is also quite clear that innovation strategy is seen as a subset of business strategy. There are many forms of organizing in order to make it happen, although in the more aspirational conversations there are hints that business strategy is seen as essentially delivering innovation that changes the world. As such it is the difference in the market place that really counts and everything else is a supporting or hindering factor.

5.3.2   Success

Question: What does success look like and how is that articulated, both on an overall and a more local level?

Telefónica is a very large multi-national company (Audit report, 2016). Its presentation of itself leaves no doubt that it sees itself as a telco. But by looking at a few statements one can also see that it is a telco with a societal orientation, an idea about what the future will hold and a dedication to technology as pivotal to unlocking potential (Audit report, 2016).

The company describes its aspiration as wanting to "provide access to digital life, using the best technology and without leaving anyone behind" (website). This vision, together with the stated objective "to create, protect and promote fixed and mobile connections for our customers helping them to take control of their digital lifestyle" (Audit report, 2016) offers several insights into how how it views itself as well what will make it successful and, indirectly, what kind of world it operates in.

The idea of digital life runs through their argumentation, both as an idea of the world as well as the promise of a good, or better life. There is also an underlying threat or possibility that non-access to the digital life reduces opportunities. There is also a felt need to take control of the digital lifestyle. This is echoed when the company states that it is "aware of the new challenges posed by today's society" (Audit report, 2016).

222

The company's aspiration and orientation is not prescriptive, however. It is more orientated towards providing tools or offering "the means to facilitate communication between people, providing them with the most secure and state of the art technology in order for them to live better, and for them to achieve whatever they resolve" (Audit report, 2016).

Here again we can see the underlying challenge concerning security and privacy, and of course also the innate need to need to communicate and take part of a connected world. Here they also reveal that what they want to is "facilitat[e] communication" (website), using the best technology available for this purpose. Being connected can be seen as an opportunity to share value (Kramer, 2011).

Their commitment and belief in technology is of course understandable being a telco confirmed by the statement that "new digital technologies are the main driving force of social and economic transformation today" (Audit report, 2016). It is a clear ideological or philosophical position – a world-view – that leans towards "technological determinism".[92] Indeed, it points towards a "technological utopianism".[93] One does not need to be a "neo-luddite"[94] to see a challenge here.

Telefónica do point out that they want to provide access to the digital life "without leaving anyone behind" (Audit report, 2016). As well as the business potentials here (Prahalad and Hart, 2002), this is a clear societal objective that offers references to Kaplinsky (2007 and 2011), and suggests a global ambition (Friedman, 2006) that once more underpins the notion that a digital life is essentially good and desirable.

Here the company points to "connectivity" as its ally in reducing the digital divide. Said differently: By being connected you gain access to the benefits of the digital life. Where it is to be disagree to many of their aspirations and positions, one could point out that digital life is not a well-defined concept per se, and not by Telefónica either. As such, what the digital life offers remains somewhat obscure.

In the first workshop, one exercise was aimed at determining individual views of success. Here it was quite evident that "making a difference", "putting something out there" and "changing the company" were dominant views (Windeløv-Lidzélius and Ruiz de Querol, 2013a).

Other aspects also arose over the course of the workshops and in the meetings. Most notably one finds patents, publications, pilots, commercial launches, understanding of new industries and press coverage. The nature of these success criteria can be understood from an "input" perspective (i.e. they are rather milestones in the service of innovation), from an "output" perspective (i.e. people write or acknowledge the success of the innovation) or as "results" (i.e. as the end or the extent of the unit's mandate and work).

On a unit level, there was a very aspirational orientation – particularly at the beginning of the collaboration. For instance, in the first workshop it was expressed that: "We like listening to people and understanding their needs", "we like to put something in people's hands and see them smile" (Windeløv-Lidzélius and Ruiz de Querol, 2013a).
A red thread that became more and more outspoken throughout the workshops was the idea of fundamentally changing Telefónica, and that PDI would be the catalyst for this (Windeløv-Lidzélius and Ruiz de Querol, 2013b and (Windeløv-Lidzélius and Ruiz de Querol, 2013c). As seen, there was also conversation around how this objective or success would be understood in relation to other objectives around new and ground-breaking products. Curiously, these were not seen as supplementary objectives (or that these products would – given their success change the company), but rather as two different ones.

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92 See, https://en.wikipedia.org/wiki/Technological_determinism, for introduction.
93 See, https://en.wikipedia.org/wiki/Technological_utopianism, for an introduction.
94 See, https://en.wikipedia.org/wiki/Neo-Luddism, for an introduction.

Over the course of the year, expectations from the Digital division and the executive level were expressed in a very quantified way (Windeløv-Lidzélius and Ruiz de Querol, 2013d). What is perhaps more interesting is that little (if nothing) was discussed about whether these objectives were possible to achieve at all. In retrospect, there seems to be a discrepancy between the ambitions around radical and disruptive products and the commercial expectations placed upon them. If the unit had continued, this would probably have been a matter of clarification and levelling of expectations and mandate in the years to come.

Success is often talked about in "aspirational" ways. As can be seen in chapter 4, it is seen according to a taxonomy[95] of how far impact occurs away from the unit itself:

- Society is changed
- Groups and individuals experience improvements (thanks to products and services)
- Telefónica makes money
- People by the products developed
- Telefónica sells the products developed
- Telefónica develops the products
- Telefónica business units pick up the products from PDI
- PDI produces new products
- PDI makes patents and papers.

In the interviews success is essentially argued on a range from from "papers and patents" to "changing the world". People think of success differently according to their different roles. Scientists tend to focus on papers, whereas designers tend to focus more on the world and changes there. There seems to be a bit of a middle road, where a more profitable Telefónica is considered a desirable thing – at least a Telefónica that has new, exiting products and services in its portfolio in order to stay competitive.

In the interviews, the notion of changing Telefónica was not as pronounced as it was in the workshops. This may have to do with this becoming more of a shared aspiration along the way, whereas at the time of the interview it was more isolated.

To a large extent the second round of interviews as well as the focus group echoed the levels, considerations and aspirations around innovation.

Zooming out a bit and looking at the quantitative survey through distilled parameters, one can see overlaps with the analysis findings, but also some differences.
Success was addressed through the question of what innovation should lead to. The responses varied but the alternatives that obtained the highest score were: More qualitative products and/or services, increased revenue, and obtaining new competencies.
Those that received the lowest score were: Reduced environmental impact, reduced cost in sales, marketing and consumer experience, and improved health and safety.

There are some interesting observations here – although there are naturally local variations – when viewing the sum of responses. For instance, the societal good around the environment is not seen as an important outcome of the organization's innovation effort. This could indicate that innovation is seen as something different, something more directly linked to what is perceived to be the role of the organization. It is not as simple as saying that the respondents principally view innovation only as the final output of their activities (i.e. products and services), because the other alternatives could also be seen as important outputs. This separates the findings from the quantitative survey from those from the qualitative one.

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[95] The taxonomy has been developed by the researcher.

The fact that obtaining new competencies is the third most important stated outcome in general could be viewed as an orientation towards learning and the learning organization (Senge, 1990), but also an orientation towards Porter and the idea of competitiveness, as well as a nod towards Peters and Waterman (1982) and their "in search of excellence".

Alpha employees echo this sentiment quite clearly throughout the interviews. They see their impact from a long view and recognize the need to learn in order to achieve that.

5.3.3 Frameworks, methods and tools

Question: What does the analysis tell us about which frameworks, methods and tools are used to bring forth innovation and to what extent are they considered effective?

What stands out here is how the notion of the lean start-up methodology is viewed as what will help the company thrive. This is well documented in the HBR case study, "Telefónica: A Lean Elephant" by Chesbrough, Jurado Apruzzes and de Olano Mata, and also covered in Jurado Apruzzes and de Olano Mata (2014).

Eric Ries, using his personal experiences in adapting lean management principles to high-tech start-up companies, first proposed the lean start-up methodology in 2008 (Ries, 2011). The methodology has since been expanded to apply to any individual, team or company that is looking to introduce new products or services into the market. Some credit to the reputation of the lean start-up methodology must be given to the success of Ries' bestselling book *The Lean Startup* of 2011. The methodology is based on the work of the lean manufacturing pioneer Taiichi Ohno, who in return took a cue from the flow process principles of Henry Ford of 1906 (Womack, Jones and Roos, 1990). The philosophy behind the lean start-up methodology suggests that start-ups cannot rely upon the release of product that will make it. Instead, it suggests that their focus should be on releasing a minimally viable product that is not yet finalized. The company can then make use of customer feedback to help adapt its product to the specific needs of its customers.

Where lean manufacturing and the lean start-up methodology meet is in the goal of using the smallest amount of resources possible.

There has been criticism, for instance from Ben Horowitz, co-founder and general partner of Andreessen Horowitz, who disagrees with "running lean" being portrayed as an end when in fact it is a means (Horowitz, 2010). However, on comparing the principles of the lean start-up with the findings in Collins' book *Great by Choice* (2011), one can see striking similarities (at least on some accounts), allowing some more validity apart from the merely anecdotal (Griffith, 2012).

However, as the lean start-up methodology began to spill over into the corporate world it began to be applied in different settings to start-ups (Juarado Apruzzese and de Olano Mata, 2014). The success of this methodology may yet be empirically validated over time, but as data is lacking (or at least not revealed as of now), one has to resort to what Small and others say in interviews – see for instance Donegan (2015b) and Lopes (2017).

To what extent the process described by Lopes (2017) applies to the whole of Telefónica as opposed to the part in which he operates (network innovations to invent tomorrow's mobile, fixed and TV networks) is slightly obscure. To some extent it probably does, but in a large company it seems far-fetched to assume only one methodology and process. It is a little peculiar that it never really came up as a topic during the action research (according to the researcher's notes), but that may be a coincidence.

Throughout the case study, there was quite strong sentiment around the Fourth Industrial Revolution and its different technologies, applications and possible consequences as discussed by Schwab (2016), for instance. In particular, areas around the Internet of Things were often articulated and discussed. In general, "trends" were referred to as something defining the possible scope and range of the innovation efforts.

There seems to be a fairly strong orientation around the more "aspirational" orientations (for instance De Hock (1999) and Collins (2001), shown in the workshops and also through conversations (interviews 2016) and the action research phase.

The analysis is not very helpful in terms of laying out a distinctive and shared understanding of how things happen. There are, however, a number of pieces to the puzzle that are worth outlining.
Normally there are calls from different parts of Telefónica that PDI (and later Alpha and to some extent Open Futures) can bid on. These may take the form of problems to be solved, challenges that need to be addressed, ideas around products, themes, trends and so on. The process may also to some extent work the other way, with a member of the group or a group within the group coming up with something that is then presented and approved before being taken further. This was reinforced by the focus group as a normal procedure for bringing about innovation in organizations.

It must be noted here that neither the workshops nor the different conversations mapped out all that was used or argued about within the unit concerning methodologies and tools, nor was there any intention for them to do so. The tools that were mentioned were those that were more apparent and perhaps idealized. As well as the lean start-up methodology outlined by Ries (2011), design thinking[96] was outlined by some of the interviewees, and open innovation perspectives (Chesbrough, 2006) and user-driven innovation (Thomke and von Hippel, 2002) by others. Relatively widely used methods, such as SCRUM, the stage-gate model and agile principles, are probably well-known and utilized when needed but were not really outlined in the conversations. In the focus group, agile orientations were favoured for when the outcome was unclear (i.e. radical innovation).

Other tools are so widely used that they were not even really discussed. Yet they can be seen to have been used when one walks into the Alpha facility, and through comments said between the interviews. Such examples include brainstorming, trend analysis, segmentation analysis and network mapping. Since the groups were quite diverse, certain things were more prominent with some groups than with others. For instance, design-thinking and user-research from an anthropological perspective were common for some groups, whereas the stage-gate model and product design were more evident with others. In retrospect, however, there remain questions around how often identified methods and tools are used, exactly how they are used and to what extent they actually deliver.

What was apparent, nevertheless, is that much of the work seems to be caught between a start-up methodology and a bureaucratic model. Where much of the first is how one likes to see oneself and also how one wants to work, but quite often one is subject to the rules, regulations, policies and structures that come with a larger organization.

In the quantitative survey a number of tools, methodologies and frameworks were listed for the respondent to indicate those they considered most useful. One could also ask about the value of experts, universities and so on as sources and collaborators for innovation.
Going through the data, it is quite evident that fairly established methodologies are favoured. Idea-generating techniques like brainstorming, interviewing customers and gut feeling come out as the top scorers, whereas the Doblin model and the Cynefin model are the bottom scorers. This data does not tell us anything on how the methodologies are used, however.
Since the respondents list them as being helpful, we must assume they are to some extent effective. It is fairly surprising that gut feeling is so openly stated as being used and seen as effective, since most people in the business community and in the public sector have been exposed to a numerical and quantitative paradigm that

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[96] Design Thinking is a methodology used by designers (and others) to solve complex problems, and find desirable solutions (often for clients). It is increasingly used for innovation, but a full account of it lies outside the scope of this thesis.

seeks to counter the idea of feelings, sensing and so on. Perhaps the interviewees consider that they have internalized knowledge and expertise and, as such, regard gut feeling as a sign of experience and expertise.

The qualitative survey showed a prominence of customer interviews that was echoed by the response that customers are the most important sources for innovation. "Own organization" was also seen a key source of innovation, which perhaps can be matched with the fact that idea developing techniques were favoured by many. "What competitors doing" also come out as important for innovation efforts. Least favoured was consultants (a point also echoed in some of the open-ended responses).

These findings can be contrasted with the case study and the focus group. The focus group followed very strongly the idea of customer insight as key for innovation, and so did Telefónica. However, in the interviews and during the action research there was very little evidence or clear indication of such applications. That of course does not mean that they did not occur, but only that they did not come up. Both Telefónica and the focus group confirmed "own organization" as the source for innovation. However, in some interviews, Telefónica was not considered an innovator per se, but more of a good copycat.

There are hints of a strength-based approach towards innovation following the notions of Cooperrider and Srivastva (1987) and Cooperrider, Barrett and Srivastva (1995) for instance, but only small ones. These took the form of leveraging existing assets (understood as installations, technologies etc.).

On a final note, it is worth mentioning that very little if any mention was made of social constructionism or even complexity theory in relation to strategy, innovation or organizational development. During the action research, it became quite clear that a co-constructive, integrative approach – rooted in appreciative inquiry and different strategic frameworks – was considered helpful in building a capacity that would then enable innovations to come about.

5.3.4   Notions of leadership

Question: What can be said about notions of leadership in terms of innovation when it comes to role, style and distribution?

Very little is described in the material consulted. The former head of Digital is attributed with "success" as Digital grew in a positive way under his leadership (Le Maistre, 2014). Given the number of products one has to consider it being quite effective as well – at least in this respect. However, it is difficult to say anything conclusive, as comparative data with other telcos has not been consulted.

One can also detect the positive usage of the term "entrepreneurial". This was the case not only in the old unit of Digital, but was also displayed under Small's leadership (see for instance Donegan, 2015b), and in the new unit of Alpha. It implies a wide distribution of mandate and responsibility and an aptitude for failure as well.

This is an intriguing question here because action research also allowed the researcher to come close to the individuals in PDI. Its leader Pablo Rodriguez is an internationally acclaimed scientist with many patents directly attributed to him. Several other people in the team are also recognized within their specific domains.

Going through the reports, there is fairly little that directly addresses questions of leadership in the sense of questions like "what is your view on leadership within the unit" and so on. There are some indications of the views on leadership that shine through indirectly. The first batch of interviews also reinforces many of the same indications.

On the wider level, comments such as the idea of PDI "showing the way" and "transforming the company" (Windeløv-Lidzélius and Ruiz de Querol, 2013c) really situate the unit's understanding of its unique role.

In the work on culture (Windeløv-Lidzélius and Ruiz de Querol, 2013b), and also reflected in the stated purpose (Windeløv-Lidzélius and Ruiz de Querol, 2013d), the idea of a "culture of digital innovation" captures a few strong indicators. The idea of culture follows the work of Schein (1988 and 2010). What is implied here is a start-up culture and ideally a digital start-up culture. With that comes a particular orientation of entrepreneurship, initiative, decentralization, informality and so on. Here one can assume that the idea of a decentralized leadership (Dee Hock, 1999) and a non-authoritarian leadership style (Amabile, 1998) are implied. With this comes general assumption that innovation follows motivation, freedom and resources (Amabile et al., 2002). However, the company is not a start-up company but a giant, ruled by formal structures, policies and traditions. Since many members of the organization, indeed the leadership team, have engagements with other parts of the organization this may create a conflicting situation.

This does not place any formal authority on the leader; at least nothing like this was shown in the workshops. What was expressed from time to time was that the leader was too thinly spread between assignments and did not share enough of what was going on. That could of course be a result of looming changes that were known amongst the leadership, but not shared due to perhaps secrecy concerns.

Leadership is thus a complex matter in which authority and power stems from expertise and formal roles, exercised through a more supportive and facilitative approach. At the same time, the ideal of creating a start-up culture in a more bureaucratic organization is a daunting task, but it is seen as imperative to bringing forth innovation.

To a large extent leadership is used in tandem with management. There is often no real distinction between the two. While there is a notion of oneself operating a bit like a start-up unit, or at least functioning on start-up principles, a similar "image" (Morgan, 1986) for leadership does not exist. When leadership is referred to, this sometimes means the distant leadership in Madrid (top management), sometimes the leaders of Digital and sometimes the leaders of PDI.
Some find this a bit confusing as they have either more than one project or they are lent out to other projects, which makes who their leader is somewhat fluid.

On the one hand, bringing about innovation calls for leadership that is clear and concise in showing the direction, clarifying the objectives and summoning the resources to make it happen. On the other hand, a leader is often seen as someone who solves problems, someone who brings out resources that set people free to do what they think is best, someone who trusts and does not direct. This dual view seems to be shared amongst the interviewees. The same dual view was also expressed again and again by the members of the focus group. The task of leadership is both very clear and immensely complex.

In the responses from the quantitative survey, there is also clear trend pointing towards leadership as instrumental for innovation. There are some differences in how this is best done. This may have to do with the particular type of organization (for instance if it is a public or a private one), its industry (IT for instance) and whether it is more mature or newly started. Although it cannot be ruled out, there is no evidence in the data that culture – as in national culture – plays a particular role. There is a range of individual orientations about what type of leadership is considered needed or helpful for innovation. It is broadly agreed that it is the responsibility of leadership to set direction, allocate resources and support. But how to set direction – if it should be done in cooperation with staff or be more directive or more delegated – is an open affair. While support is equally agreed upon, how that support should be manifest is more open to interpretation. Some indicate sparring, some close monitoring, some more creating freedom to do their thing. This means that there are different needs, perhaps given the individual situation of the person and/or the organization.

There is a leaning towards a more facilitative role of leadership, one that distributes a mandate to the experts and those closest to the work to be done. This can be contrasted with, say, a more expert or authoritative oriented

way of leadership. The first can be likened to the inventor who knows the craft "better" than the others. The latter to a more formal and hierarchical approach to leadership (I have the responsibility; this also means I know how to do it best).

In general, then, the study shows that leadership can be seen as a quality to be shared amongst all and distributed so that people feel empowered. Leadership should be more facilitative than directive, cultivating processes and solving problems more than deciding. This pays homage to Van de Ven et al. (1999) and draws upon the classical work of Yukl (1994).

5.3.5   Notions of organization

Question: What can the analysis tell us about notions of organization in terms of innovation when it comes to autonomy, identity and ways of working?

Innovation is seen as a subset of the activities and initiatives of the business strategy. Again, the notion of being "entrepreneurial", making things happen and creating value shines through in the articles and reports. There is no question about the company being a telco, but it is not "your usual" telco (Audit report, 2016). This is echoed in the idea of doing things differently, without necessarily comparing how things used to be done or how things are done in other companies.

In terms of the balance between the main models for innovation very little is stated around what this actually looks like and how that is achieved. However, there is a certain organizational clarity about the division between Telefónica I+D, Open Futures and Alpha. Clearly there are other initiatives throughout the company but since they receive little mention in the annual report or the website, or during the interviews, they are left out here.

Here again the notion of the digital start-up culture comes about. The adoption of the words "digital start-up culture" is a direct link to an ideal, a metaphor (Morgan, 1986). It refers on the one hand to a strong identity, being part of making something new; but at the same time it refers to something that is fluid, changeable and adaptive.
On a more fundamental level, culture is seen as something that is "existing" and that can be "created" (Schein, 1988 and 2010).

The PDI was a unit that was quite difficult to get a grip on. Questions like "how many works here" and "can one see an organizational map" were met with vague answers. This was partly because of the nature of the work done, which involved other units and required certain expertise, and meant that the unit had a large number of people who did not work only for PDI or who were connected for only a limited period of time. This means that the bulk of the work was done within projects. Here the overview seemed to rest more clearly with the leader and much less with the others in the leadership team. The rotating of commitments and obligations underpins the challenge to identity, although autonomy seems to be very well distributed.

The understanding of being an organization within an organization, and the dependency and autonomy that follows from that, was very well portrayed in the fifth workshop (Windeløv-Lidzélius and Ruiz de Querol, 2013e). Again, there is chasm between the idea of functioning as a start-up and being part of bureaucratic system. There are limits to the autonomy and identity, indeed even the conversations, around this. Success to a large extent happens through others. It should be mentioned that only a few interviews directly expressed the idea of being a start-up per se, but many of the qualities that were raised point directly towards this model so the analogy is not entirely misplaced.

The view is clear that in order to bring innovation out, the organization need to have a strong innovation culture (Schein, 1998 and Van de Ven et al., 2008) and an identity (Weick, 1995). While the identity can create a sense of "we" it directly implies a "them", which is a balancing act in any organization. The culture is often addressed indirectly in terms such as trust, belonging, transparency and the right to fail. The notion of "digital culture" did not come up in the interviews, but to some extent it bridges the start-up organization with the lean start-up methodology.

To some extent it can be argued that by adopting a view of "self" as a start-up – or at least functioning like a start-up – one will obtain the qualities that come with it. These are ingenuity, inventiveness, high energy and a certain "coolness". A challenge is of course that the units (both old and the new) are also not a single-product – nor even a multi-product – unit, but essentially an innovation unit that is also at the mercy of larger organizational matters.
These matters are often described as being challenging for bringing about innovation, but at the same time there is clear agreement on the benefits of the resources and access a large company like Telefónica can offer.

For the majority of respondents in the quantitative survey, there is a clear orientation towards the matter of culture – innovation culture. Even though there were no direct questions on the subject, there are indications and suggestions in many of the responses and analyses that suggest that a) innovation culture is a "real" thing, b) the absence of it hampers innovation, c) the existence of it promotes innovation and d) it can be changed. As such these follow very much the assumptions of Telefónica as well as those of the focus group.

There is also a clear dualism around autonomy. While the organization seems to require independence and self-governance by innovation units in order to make it work, at the same time it is assumed that support from the top and exchange between the organization and its surroundings are needed. While these two sides are not opposed to each other per se, in the responses one can often see that the respondent does not think this dualism works very well. Often it is portrayed as interference from top management, and internal policies, goals and deadlines that do not support innovation efforts. Again, this is echoed by the focus group and restates the utter importance of innovation being led from the top.

The question of identity is subtler when going through the findings from the quantitative survey. One can argue that all questions to some extent point towards identity. For example: If one has an innovation strategy or not, that says something of the organization. Identity also points towards the individual respondents' identity – level of knowledge, expertise and responsibility. If one considers individual responses, one can see for instance to what extent an individual can be considered an expert on the matter – whether or not she or he states that. Without going too deep into whether or not one can be considered an expert, it is clear that identity can be seen as a function of educational background, job function and so on, and also the other way around. Being titled, for instance, innovation manager also – over time – promotes features around identity, such as expertise.

5.3.6   Notions of strategy

Question: What can the analysis tell us about notions of strategy when it comes to innovation
                                       when it comes to deliberateness, framing and execution?

Part of the challenge for Telefónica is that phone networks, its classical business, are becoming less relevant to consumers. Essentially, they don't care which network they use. The accessibility and quality of the services that they want to use matter more. As Small says (Donegan, 2015b): "I communicate when I'm connected. And so, when I think about where a communications company like Telefónica sits in the middle of all that, I think about how we make sure that our services reach the customer on whatever device they're on, on whatever network they're on, in whatever mode makes sense for that device."

Perhaps this can be illustrated even further by how Telefónica thinks in terms of the acquisition of other companies. According to Dr. Richard Benjamins, director of business intelligence at Telefónica Digital (Thomas, 2013): "We've seen that you shouldn't try to integrate small companies – you tend to kill them. You buy them because you need them for some specific reason. If you try to impose telco processes, it doesn't work."

Telefónica does seem to be acting very atypically in the sense that it also makes a conscious attempt to create the kinds of disruptive services and applications that other telcos would view as threats to their traditional revenues (Donegan, 2015b). This is done by, for instance, the Communications Services and Product Innovation group, which consists of around 1,000 people and is headed by Ian Small. This may be understood as the company pursuing a multi-sided strategy in which they recognize that:

- If they can disrupt themselves, so can others and as such it is better to be the one leading the change.
- What may come out of this effort is not only/necessarily better and more attractive products and services; indeed, it can be new learnings that enhance the company's ability and capacity to innovate.

At first, the whole action research evolved around building capacity for innovation – by developing leadership and strategy. Hence, strategy may have existed, but it was a clear sentiment of something else was needed. From the first workshop to the last, all the outcomes can be seen as pieces in a puzzle that forms the more coherent and cohesive strategy formulation for the unit.

What has been absolutely key has been the fact that the unit (PDI) felt it needed a strategy. This can be detected in all the workshops (see for instance Windeløv-Lidzélius and Ruiz de Querol, 2013a). A question of why this was the case, given that the company had a strategy, emerges. The best response is that that even if the larger propositions are in place, there are many alternatives and decisions needed at local levels. Strategy then becomes a way of harnessing resources towards a direction that is in line with the company's overall objectives.

Another stark facet of strategy is its dependency on its surroundings. At the second workshop the CEO and chairman at the company, Mr. Alvarez Pallete, was quoted as saying "liarla parda" as a description of what PDI should accomplish. The meaning of the expression is something like "make a mess of things, in a good way" (Windeløv-Lidzélius and Ruiz de Querol, 2013b). This can be seen as the background to Pablo Rodriguez's note "that the innovation unit ceasing to be necessary, with its qualities permeating the whole of Telefónica", when expressing his hopes for the outcome of the work of his unit (ibid.). Strategy does not happen in a vacuum. This again became very evident as the sentiment at the company around Digital changed. Suddenly the notion of local strategies became obsolete. In reality, much was still valid in the sense of providing a sense of direction, and part of the work had generated areas for focus on new projects and so on. Yet it felt less important now to continue to carve out directions and make larger organizational changes and resource allocations.

The first batch of interviews pointed towards a few interesting notions around strategy, which is worth exploring in a bit more detail.
There seemed to be uncertainty around the strategy. Some asked for it, indicating that they considered it needed, although not all did. When talking about strategy, either directly or indirectly, the interviewees expressed a fair amount of agreement upon direction, albeit it not fully set within a single, shared overarching policy or aspiration. Challenges were more randomly offered, in terms of primarily internal challenges (networks, acceptance, quality of ideas etc.), as wel as external onces such as "do we really know what our customers want or need" or "our competition is growing". What has not been very clear has then been which initiatives were set in motion to overcome these challenges. It seems like there was a jump from clarity (papers and ideas, prototypes and new technologies, certain trials and collaborations etc.) to uncertainty about what they were doing, or randomly going about their business or organizational strategy.

The strategy for innovation, as dependent upon the business strategy, is the consequence of a pull, meaning that the calls seem to define a lot of the effort. When that is said, much of the work done seems also to be bottom-up and experimental, or part of a very broad scope. In a similar fashion, the strategy for innovation was at the time of the interviews a "work in progress" and could not be very clearly articulated.

What seemed to be challenging to the interviewess was knowing whether the work they were doing would create the impact and success that was asked for and that they wanted themselves. As such its framing still needed more shaping, and the intentions needed to be better articulated and catered for in terms of resource allocation. There was a fairly strong sense that it could happen, as long as the frames where created in a proper way.

The findings from the quantitative survey show some different responses to the question of the innovation strategy, ranging from not knowing what the strategy is to it being directly linked to its linkage being less clear. Nevertheless, it seems that there is strong agreement that strategy is something that is needed and indeed a given in terms of developing an organization. There is in the responses, however, a clear indication that innovation strategy is less present in organizations as opposed to strategy in general. One thing that is fairly clear is the understanding that innovation strategy is linked directly to, but also subordinate to business strategy. This indicates that innovation strategy, when it is discussed, is seen as something that exists to ensure innovations that deliver on the business strategy. To a large extent the responses also echo much that can be found in the literature on innovation and strategy. For instance, one should involve people (all and/or experts) when developing, monitor progress, give clarity on direction and so on.

The focus group very much supported the same findings, stating that strategy is imperative and that an effective method is to work top-down and bottom-up. Management should set the strategy; the departments should interpret the assignment for themselves. Not only would this create a good overlap between the broader and longer view, with the deeper knowledge, but it would also generate motivation and ownership. To some extent one can view the organizational setup between Open Futures, Alpha and so on, with their different time horizons, scopes and ranges of activities, to be the organizational manifestation of a strategy.

5.3.7   Complexity theory and innovation

Question: How can complexity theory be used to explain innovation?

While the company's strategy is fairly straightforward, given the scope and range of the company, its manifestation is slightly more involved. The number of products and services, business units, markets and people indeed follow Czarniawska-Joerges' (1992) notion of an organizations as "complex".

The company's multi-sided orientation on how to bring about innovation, speaks to an understanding of the uncertainty about what makes a success. While one can argue that the clear division along which units operate suggests a somewhat linear orientation, this is a hasty conclusion. It is rather an organizational need to bring some sort of order in place. The orientation towards the lean start-up methodology is rooted in a positivistic approach, but how one should work within it is not really expressed – apart from the steps pointed out by Lopes (2017). Questions around emergence, for instance, are not really discussed. Looking at Snowden's Cynefin model (2002) it is fair to argue that in terms of innovation the company lies somewhere between "complicated" and "complex" in its understanding of itself – but in terms of explanations, there seems to be a tendency to drag it towards "simple" (i.e. Alpha is clearly positioned as complex). This is perhaps a result of unconsciously trying to make it easier to communicate. However, this risks losing its intricacies and different dimensions. From the perspective of organizational development and restructuring, it is quite clear that there is an idea that management can design and impose changes (Stacey, 1995 and 2011). But while Stacey is critical of such convictions, there is nothing in the material consulted that suggests that management is not aware that this approach may not determine success. If anything, it rather suggests that management considers it their

responsibility to think ahead and come up with propositions to better cater for a changing world. Whether this is done in isolation or in close exchange with people is not clear.

Complexity was not really a part of the conversation per se, apart from the utilization of the Chaordic Model for organizational change as presented by Dee Hock (1999) and in some of the theoretical consideration around organization, strategy and innovation provided by the researcher to the PDI on a few occasions during the action research phase.

Again, inter-connectivity stands out in this part of the study as discussed by Holland (2006) and Buckley (1968). It was aexpressed in every workshop conversation around how to bring the unit's work into the market as well as how trends in society change the internal focus internally. Viewing the unit of the PDI as a CAS (complex adaptive system), consisting of a number of individual agents (or CAS), as part of a larger CAS (Digital) and an even larger one (Telefónica), can help us understand its behaviour as unified whole, learning from experience and adjusting to changes in its environment. For instance, the actions of an individual agent – indeed even all the agents – are not enough to predict the behaviour and properties of the CAS. It is more than the sum of its parts. In addition, the unit changes in response to the feedback it receives from its environment.

At Alpha – and before that the PDI – the understanding is that innovation is not something that is given, regardless of the effort made. It is simply not possible to predict it. Nevertheless, there are certain indicators that while perhaps no guarantee, do offer a probably better bet. Examples could be better technology, great people and so on.

Complexity as a topic was not really discussed in either of the empirical settings. It was more ingrained into the different conversations, often coming out as an explanation for certain phenomena.
The interviewees from the PDI saw one of their assignments – to change the company at large – as a key task. They assumed that this would happen through a) the great products they produce or come up with b) communication in the form of presentations of different kinds and c) collaborations. They spoke indirectly to the Lorenz (1963) idea of non-periodic flow and of course Cilliers's (1998) description of a complex system. Said differently, innovation happens thanks to a large number of elements that interact in a non-linear way – and likewise it depends upon the history of the elements and needs a constant flow of energy to evolve.
At Alpha, complexity is of course also a huge part of their daily work (as expressed in the interviews), but there seems to be a larger focus on the moonshots they are working on than the company itself. With those moonshots come an abundance of uncertainty, which could easily be discussed in terms of complexity. However, theories around complexity did not come about as part of the vocabulary used.

The interviews made it quite clear that there is no clear recipe for making innovation happen. However, some key elements that were expressed and desired were: direction, process, method, network, knowledge, collaboration and resources. Although these came out fairly loosely, unsubstantiated and not very precisely, they do point towards something that is considered important and is assumed to exist.

It is also clear that certain "elements" are not considered particularly desirable. They are, however, not discussed if they also have positive effects on innovation. Examples are: uncertainty, lack of communication and clarity, time pressure, non-collaborative environments and power struggles.

The different interviews represent a mosaic of the views, opinions and lived experiences of individuals, but they have a common anchoring in the organization in which they work. Utilizing Cilliers's (1998) description, the individuals emerge as elements that interact as a system within a larger system. Their challenge is to affect a wider system – represented by their customers, the market and society at large.

No direct questions were directed to the respondents around complexity theory per se. However, in some of the questions – for instance the description of their business environment and indications around certain methodologies and tools used – notions of complexity were addressed.

Both Holland (2006) and Buckley (1968) point to the inter-connectivity within a system and between a system and its context. In the quantitative study, it is quite evident that the respondents view their organization and its work on innovation to be in an inter-dependent relationship with its environment. Competitors' initiatives, changing customer preferences, legislation, new discoveries and so on all have an effect on an organization's performance, albeit the relationship may not always be linear.

Looking more closely at the journey from a need or an idea about an actual innovation, one can easily see that it is virtually impossible to map every single action that made it into an innovation. A key point here is that understanding one component – or action, or group of actions – may not be sufficient. It is the understanding of the aggregate behaviour, the sum of interactions that is important to focus on.

Looking at organizations that have existed for some time, one can wonder how come innovation is hard. Logically, at one point they must have done something that was innovative that enabled them to establish themselves in the marketplace and be able to deliver. Furthermore, looking at the individual responses several of the organizations represented have made major innovations. Combining that with the idea that experience is important (as expressed by some of the respondents), why can't organizations innovate over and over again? Here CAS can help. In a CAS, it is the aggregated agent's behaviours that help us understand the system's behaviour, not the individual agent. However, since the agents are diverse, if one is taken out the system needs to reorganize, which implies changes. This means that the sheer number of agents within the system – and their particular state and actions at a given time – is virtually impossible to replicate. Even so, it is still dependent on the context, which will surely have changed.

Thus innovation displays features associated with complexity theory and particularly complex adaptive systems. By utilizing the principles of complex adaptive systems, it is possible to better understand innovation, its path from idea to dissemination to adoption.

5.3.8   Social constructionism and innovation

Question: How can social constructionism be used to explain innovation?

Social constructionism suggests that it is in relationships – in conversations – that meaning comes to life and evolves. Innovation here is certainly spoken of as being necessary to ensure future success. We see this when looking at the formulations and later when we see a change towards the encompassing idea of digitalization (which also justified the demise of Telefónica Digital as an entity): Why have a digital unit, when the whole company should be one?

There is a reason that it is being negotiated in the proclamations about the way forward. Furthermore, innovation's particular role and unfolding is conducted under the umbrella of greater societal gains, which suggests a legitimatization process – perhaps to ensure acceptance and respect amongst customers, staff and other stakeholders.

The social construction of innovation is not addressed directly in the material consulted (which is hardly surprising). This leaves the field open for the researcher to offer a perspective. Innovation is not seen as a construction within the company that is being "sold" to a market per se. It is a "real" invention – a technological one – that is brought to life to address some "real" challenges out in the market place (or the world). It is in the notion of being a tech/telco company from which the justification of bringing new, valuable products forward comes (i.e. that is what such a company should do – or at least what this company should do being a company in

this type of a business). Said differently: New and better products are needed in the market place and Telefónica is better off developing and offering them as opposed to not. Social constructionism as such then can help us understand the current discourse at the company – that is it makes sense that Telefónica engages more in innovation. It can also help us understand where it comes from – that is we have been in the business of innovation (although this is to some extent disputed in the interviews), but even more so we have to engage more in innovation to stay competitive. Finally, it helps us to understand the narratives or rationales that underlie where this is pointing – that is the digitalization of the world, the need to adapt and invent and the story of being recognized as an innovator or pursuing innovation successfully.

Innovation – in a broad sense – emerges as the very essence of both PDI and Alpha's work. It is their reason to exist and what they hope to achieve. Yet there is not a shared understanding as such of what innovation is in their respective units and how it is best done. There is general agreement, but in the deconstructing conversations different facets, notions and personal inclinations come out. Of course, this are less defined at Alpha since the unit has existed for only a short period of time.

On the one hand are the scientists and researchers. They express a focus on producing research, and not really on the application of the research. On the other hand, that is their job. The social scientists seems to be more oriented towards processes, models and so on. Another group of social scientists and designers seems to orientate itself more towards trends, examples and users. Then there are the more technical staff who are more concerned about making something new. These are not silos per se, but there are differences in how people speak and approach the subject, albeit this difference is also a shared reality that is constructed over and over again. In the workshop on values and where they come from there was an orientation towards deconstructing "what is" Windeløv-Lidzélius and Ruiz de Querol, 2013d). In the workshop on culture (Windeløv-Lidzélius and Ruiz de Querol, 2013b) a more accurate description would be that the co-construction just weaved more and more layers, rather than taking anything away.

"Words create reality" could easily be seen as a mantra for how the team and unit were defined. Expressions like "we like to create new things", "we like listening to people and understand their needs" and "we like to put something on people's hands and see them smile" (Windeløv-Lidzélius and Ruiz de Querol, 2013a) can be seen as accurate descriptions of how the unit sees itself. They could, however, also be seen as a tactics to form and affect the members' understanding of self.

The actual workshops, and the processes from the first workshop to the last, were characterized by their members as valuable, useful and necessary. They did serve a purpose, and all members were present all the time, fully engaged and utilizing the time available. "Day to day activities eat all available time from the staff, leaving little time to reflect on the overall picture" (Windeløv-Lidzélius and Ruiz de Querol, 2013e).
Pablo Rodriguez summed up the experience by saying: "Being able to make time to participate in these workshops is a gift, because otherwise urgency might kill the important. This is not a decision forum; it's a space for co-creation" (Windeløv-Lidzélius and Ruiz de Querol, 2013d).

Looking more closely at the units' effort to create a strategy for innovation it can be argued that it serves many purposes. One is to help the unit define a direction, make better decisions and so on. One can be seen as an attempt to fill out the blanks left by the company's business strategy. In that space – that inter-dependence between responding and adjusting to external changes, and responding and adjusting to internal changes – strategy emerges as a negotiation, a process of social identity by which people come together and make reality as a consequence of relating to each other.

The interviewees did not express any particular knowledge about social construction as a theory or world-view. This was also seen in the conversation afterwards where the interviews were addressed. An appreciative, co-constructive approach seemed to be understood and accepted when it was explained, but whether it really changed the interviewees' views of their work is debatable. However, comments like it is a "good interview" and

235

"I learnt something" would speak towards its value – just like the sense of togetherness and more open conversations in the following workshops could be seen as proof of its impact.

Innovation in the words of the interviewees comes out as something concrete and tangible and that makes a difference. There is also a fairly consistent view that this is done in two ways by PDI: products (and services) and changing the culture of Telefónica (i.e. Alpha is on a different path, but there are hints towards the same objectives over time). There was, however, discrepancy in terms of a) the products generating value in the market place or more precisely making massive positive changes and b) if innovation was more aimed at the business units or was something to be done more directly.

Examining more directly the interviewees' joint understanding of the world, it seems fairly clear that a combination of their educational background (mostly tech or science) together with an understanding of the company generates shared assumptions about their reality. In terms of changing the company's culture, it is by leading by example that innovation within the company will happen. Linguistically, it is a separation of "we" and "them" – identities separated and manifested not only by what is done or worked on, but also by how things are done and should be done.
The interviewees' world-view and shared assumptions quite quickly steer towards products. Innovation as a social construction is then manifested by products not only as means to generate change, but more the objective itself. Innovation then becomes a combination of a physical entity (the product), the theory of change (the value the product creates and how that is done) and a cultural system (for whom it is useful, why and how it fits into the pattern of their reality).

Looking at the responses from the quantitative survey, at first nothing can be directly found that mentions social constructionism. On the other hand, it was not part of the survey and given the networks utilized this is perhaps not so surprising. But upon interpreting the data and the analyses, there are some aspects that emerge.

Among the responses to the opened-ended questions none has questioned the need for innovation. Furthermore, none said anything about it not being of importance. Quite the contrary: it emerges as a very live topic for the respondents. There seems to be an agreement that innovation makes sense, and that it is meaningful.

When looking at innovation, how to make it happen and what hinders it are recurring themes, as are networks, collaboration, diversity and so on. Relationships seem to be a defining factor for innovation. It is not possible in the data to find out how relationships per se have given birth to specific meaning, nor motivations around innovation, but questions around educational background and workplace-training point towards a socialization process.

Going through the more quantitative responses and analyses, there is a pattern in the responses (as demonstrated previously), but at the same time the range of responses covers the full scale on virtually all questions. This indicates that there are differences (local realities) and it is important not to get stuck in some median interpretation orientation, although it is useful to find patterns and indications.

One of the aspects in the quantitative survey revolves around when innovation became fashionable or something that was understood as vital for business success. The natural question that comes to mind is: Was there no innovation before the word was used or became part of the organizations' reality? Given how innovation is being understood and proclaimed the answer is that of course there was. It was just not called innovation (Godin, 2011). The second question that then comes to mind is: What does the word and concept of innovation now enable us to understand, explain and do? Here we can see that innovation can help us understand social phenomena concerning newness, value creation, adoption and so on.

One interesting aspect is that in this research innovation is portrayed somewhat as being brought into being through certain activities, processes, structures and decisions (see the research question). However, it can also act the other way around. It can work as a lens through which to understand organizational matters such as leadership, organization, power and communication. As seen in the analysis there are several notions of leadership hampering or being in the service of innovation – for instance questions around decision-making, delegation, type of leadership and so on.

5.4   A discussion of Alpha

In this section the setup of Alpha is accentuated, contrasted and compared, by unfolding the perceived innovation strategy at Telefónica and by discussing the phenomena of "moonshots". Much of the actual information about Alpha stems from the second round of interviews (see 4.6) and some public information.

The reason why Alpha is discussed separately and not just merged into the parameters is that it is very much a manifestation of the strategy development stretching back to the start of the thesis in 2013 – or at least one direct outcome of the unfolding events. In addition, these types of setup are a recent phenomenon and deserve special attention.

5.4.1   Moonshots – beyond radical innovation

In recent years a new phenomenon has started to emerge – primarily in the more public media and as part of the vocabulary within business. It is called "moonshots".
The term stems from the Apollo 11 spaceflight project, which landed the first human on the moon in 1969 and has come to signify a bold effort to achieve a seemingly impossible task (Casadevall and Fang, 2016). "Moonshot" may also reference the earlier phrase "shoot for the moon", meaning aim for a lofty target.[97]

The term gained attention traction as Google launched Google X in January 2010, renamed X as part of the restructuring of Google into Alphabet in 2015,[98] but it was used by management thinkers prior to that (for instance by Hammel, 2009). X is an attempt to go about solving huge problems rather than fairly big problems (Rowan, 2013 and Gertner, 2014). It is a "shoot-for-the-stars-ideas" factory (Miller and Bilton, 2011). The X stands for 10 – making a problem 10 times better, within a timeframe of about 10 years.[99] Even though not all moonshots at Google are part of X (for instance their life-extension program Calico is not), several have reached massive media attention. Examples of moonshot projects within X are: self-driving cars, Loon (internet access to everyone by using balloons in the stratosphere), Wing (which is about delivering products using flying vehicles) and Google glass (augmented reality head-mounted displays). An example of a project that has left X is, for instance, the Google brain (deep learning), and an example of a project that has been shelved is the space elevator.[100]

Google lists three criteria for a project to be labelled a moonshot project (Gertner, 2014):

1. It needs to address a huge problem
2. It needs to propose a radical solution
3. It should use breakthrough technology.

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[97] http://whatis.techtarget.com/definition/moonshot
[98] https://en.wikipedia.org/wiki/X_(company)
[99] http://www.bbc.com/news/technology-25883016
[100] See https://www.solveforx.com/about/ for more info.

In a technology context, a moonshot is an audacious, experimental and revolutionary project that is undertaken without any definitive expectation of success or profit any time soon. This does not mean, however, that it does not aim for future success.

The notion of moonshots has started to find its way into areas other than technology. For instance, the Obama administration called for a moonshot to cure cancer (Casadevall and Fang, 2016). It is important to note that while Google may be the company most renowned for working with moonshots, it is far from alone. Many of their projects have counterparts in other companies. For instance, Google glass has a counterpart in Microsoft's Hololens. Google Wings has a counterpart in Facebook drones, and Loons at both Facebook and Microsoft (although here they are focused on using radio white spaces). When it comes to driver-less cars, virtually every large carmaker is testing in that space as well, with probably Tesla as the most notable actor (consider that company's work on hyper-fast trains in California). Google's space programme has competitors in Virgin Galactic and Space X, to mention just two. As such what may really stand out with Google X is their ability to organize around the project, attract talent and create attention (i.e. brand build).

Other companies, such as Danske Bank in Denmark, are also using the moonshot metaphor. What separates the approach of Danske Bank from, for instance, that of Google is that it is more of an actor within the company's perceived core business (banking and financial services)[101].

In order for moonshots to be successful Casadevall and Fang (2016) consider it important to have an appropriate knowledge of "the basic science underlying a problem in question so that efforts can be focused on engineering a solution". They do admit, though, that history has proven that massive research often leads to conceptual and technological discoveries that have provided society with unforeseen benefits.

5.4.2 Alpha[102]

Alpha came into being during the thesis work and became the natural focal point as the old PDI transformed and Telefónica changed its strategy.
The Telefónica initiative may be considered to aim for moonshots in the mould of Google X more than Danske Bank, by engaging in far-ranging projects and ideas that exist far outside the scope and range of their operations.

It took two to three years for Alpha to be established. It is structured as an independent company, a fully owned subsidiary of Telefónica, with its own board. The CEO of Telefónica chairs the board. Other members are executives from Telefónica and a scientist from the Max Planck Institute.

The model it operates on is that the board approves a budget and the CEO of Alpha suggests moonshots to the board. The board needs to be unanimous in its approval of these or else they are not pursued. Once approved, however, the board cannot withdraw its support.

Alpha is essentially divided into two parts: The actual moonshots and the basecamp (or moonshot factory). They call their model "The Knowledge Hub". An ideation team spots opportunities for a moonshot. After these have been verified and approved an organization is built around them. These consist of small teams that attract capabilities on demand so as not to get shut into only doing the moonshots the team is capable of, but rather to look at their potential.

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[101] As clarified in an interview between the researcher and the head of mobile pay, autumn 2016.
[102] The factual information here is based on the interviews (4.7) conducted in January 2017.

The process for developing a moonshot is based on future scenarios and opportunity thinking – trying to take the case as far as possible considering a back-casting model of the steps that are needed in order to get there. After this is done, experts are consulted to verify and expand the thinking. When the case is solid, it is brought to the board for review.

Five criteria are used for labelling something as a moonshot:

- It should touch 100s of millions of people
- It should require a radical solution
- The tech component in that solution should be strong
- The opportunity should be in the 100s of millions of euros
- Telefónica should have an advantage compared to other potential players – a role to play.

If they work on a moonshoot for two years and suddenly realize that there are a number of start-ups in the space, then they consider this a failure of timing and/or choosing the moonshot. Given these criteria they will have look outside the traditional telco industry to find these opportunities.

If all goes well and the moonshot delivers, it can either be spun off as a separate company or feasibly be brought into Telefónica. One of the reasons they set up Alpha as a separate company is that they wanted to get the incentives right – that is, a revenue-sharing model for the employees.

The plan was to stay small and not start more than one moonshoot per year.

5.4.3   The bigger picture[103]

In the conversations with Telefónica in January 2016, the notion of how innovation was to happen became much clearer.

Telefónica today does not have a fully centralized innovation unit that runs or even oversees all innovation efforts, although according to one interviewee it looks like it will gravitate that way (although internal politics are strong). There was an attempt in 2016 to map out all activities. After a companywide study on "who does innovation and what is it about", there was a distillation process to outline what innovation really is. This led to an understanding that around 3,000 projects across Telefónica could be framed as innovation. This number is of course debatable as what exactly constitutes an innovation project was not revealed. Indeed, one interviewee pointed out that the real number was probably more in the range of 300. In any case, there are many, and they are spread out in terms of scope and range.
Apart from the more open innovation platforms – like Wayra, Investments and so on – there are two official areas: Product Innovation and Alpha.

Telefónica is now pursuing what can be described as a "platform strategy". This thinking apparently originates from the innovation units and has now been elevated to a more or less companywide strategy. Telefónica operates on four platforms:

1st Platform. Based on networks. Very costly to build and has the highest barrier to entry. Here cables are put into the ground, antennas are placed etc.

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[103] The factual information here is based on the interviews (4.7) conducted in January 2017.

2nd Platform. This concerns the software or the IT to manage the first platform. All the software that is placed on top of the physical infrastructure network.

3rd Platform. This is digital services, internet of things etc. – all that can be built on top of the second platform.

4th Platform. This concerns what we do with all the data that the three first platforms generate. What business can we build on this? This could be about privacy, for instance.

The fourth platform is not just about Big Data, which in many ways applies to the 3rd platform. It is about bringing all the personal data we have back into the hands of the customers and users.

Telefónica is far from immune to competitors. And it is not just traditional telcos that threaten its business, but also larger IT companies such as Facebook and Google. They use the infrastructure of Telefónica to offer their services (a simplified picture would be that they take advantage of the existence of Platforms 1 and 2 and to move into Platform 3 without having to carry any costs of the first two). This is also important to understanding why Platform 4 becomes important, and understanding how they think about innovation, how they organize, and how they lead and strategize around it.

R&D Telefónica at the Barcelona Centre and the Discovery Area, run by Oriol Lloret, differs from typical product and service development in the sense that it has to come up with growth engines outside the main areas of Telefónica – networks and data (the regular business of a telco). For this a three-pillar strategy has been developed:

- Platform products. Since they have the platforms, what can they offered on them?
- Inside-out analysis. Ideas that emerge from inside that can leverage the existing resources.
- Outside-in analysis. This is more based on trend analysis and ethnographic research.

If something is worked on that does not have the potential to be a new business area it is discarded. Examples that have come about now are antennas to improve the future of drones and the future of TV consumption. The background for the thinking around antennas as an opportunity was based on an internal idea competition in which almost 40,000 people were invited and more than 200 ideas were received. From those five were selected.

Contrasting this with Alpha and product and service development, it is easy to see that there are fairly clear distinctions in terms of scope and range:

- Discovery operates with a timeframe of 3–5 years, Alpha beyond that, product and service up to three years.
- Discovery is to leverage assets and develop new business areas from that, whereas Alpha is to look far beyond Telefónica does today.
- Discovery operates within the line/matrix of a larger unit whereas Alpha is an independent – but fully owned – subsidiary of Telefónica.

As can be seen here the challenge of innovation is met by organizing into units with different, but complementary scopes and ranges. These units can be argued to operate with different perspectives on uncertainty and complexity. It can be argued that this type of approach is a response to the challenge of not knowing what the future holds.

5.5   Summary of chapter 5

In this chapter, the findings from the different data collection and creation sessions have been brought together and discussed through parameters that were developed in order to combine the findings and enhance the learning from them.

It is quite clear that innovation strategy is seen as a subset of business strategy and that a multitude of forms of organizing are used in order to make it happen. It is also quite clear that innovation strategy as such is not very well articulated. However, what can be distinguished is not and *absence* of ways of going about innovation, but a gap between the loftier aspirations around what innovation should do or be and the more local activities that are supposed to make it happen. The responses to the quantitative survey indicate that innovation strategy is not unheard of, but it is far from a common theme.

The notion of innovation as a way to make strategy happen – innovation as strategy – or ways of thinking about strategy differently – innovation in strategy – were not views that stood out from the analysis in any substantial way.

There is a tendency to look at innovation as an output – that is products and services – even though many statements speak about innovation as a process (for instance interviews with people from Alpha). This may not indicate a dichotomy as such but it is still interesting to note. It could be the result of a clear orientation towards innovation being many things, but also a recognition that differentiation in the market place is what really counts and everything else is a supporting or hindering factor. There is also the possibility that innovation as a process – and all that comes with that – is conceptually recognized, but not fully grasped.

Alpha can be viewed as a new form of R&D. It is a format that tries to help the company move from what could be considered a risk-management orientation to reap the benefits of uncertainty. To some extent at least uncertainty points towards unidentified and unutilized markets and needs. From leadership, organizational and strategy perspectives, what stands out is that it is assumed that there is a need for a new type of culture (i.e. not dominant in the mother company today) – something that is more entrepreneurial and based on internet (or digital) thinking. This culture is then assumed to require a different organizational structure in order to thrive. Leadership is very much seen as a balancing act between being distributed and centralized, being a visionary leader and a curator of creativity, ingenuity and motivation. Given the particulars of the company, the leader is also a very political person in the sense of needing to anchor the company within its mother company in order to obtain support and traction. To some extent this is done by gaining recognition from people and organizations outside the company. This balancing act often ends up in the conversations as cultural-dependent. As such, when it comes to innovation strategy – as with strategy in general – culture is the enabler and the limiting construct.

5.6   Emerging questions following chapter 5

Questions that stand out after the discussions are as follows:

- Effect
  Why do things work? Given all the limitations, dysfunctions and direct contradictions in organizational work, how come anything gets done? It seems sometimes that innovation happens more despite designs and plans, rather than because of them. Still, virtually everyone insists that innovation is not only needed, but it is indeed helpful and even essential. Perhaps the answer lies in the actual conflict that

arises when plans meet reality: the "clash" actually produces a way forward and it is this tension that is needed to generate creativity and novelty.

- Culture
  How can one work with culture in an effective way? If culture is key to success, then what are good ways to make culture work? If it is treated as a complex system, it seems like strange attractors become of utter importance – what factors can be added or changed that can have a dramatic effect on the system? Adding the perspective of emergence would allow a way around "what wants to happen" as opposed to "what should happen". The third part that comes to mind is the notion of being far from equilibrium. Translating this to a social system suggests things not being perfect, perhaps even "off balance". This seems quite contrary to what people ask their organizations to be like. Indeed, it is a conundrum to be pondered.

6   Conclusion

6.1   Introduction to chapter 6

In this chapter, the meaning of the results and discussions are interpreted and concluded. This is done in two steps. First, the research question is addressed on a more general level, expanding upon the identified constructs of leadership, organization and strategy. Second, the research question is addressed through the main local empirical findings from the research, and own considerations around innovation, social constructionism and complexity.
The limitations of the research and its implications for the conclusions drawn are also discussed. Recommendations for future research are offered, followed by a summary and finally the emerging questions arrived upon as a result of this thesis.

The following areas will be covered:

- A recap of the research done
- Research design and methodology
- Applying the findings to the research question – general
- Applying the findings to the research question – the specific main findings
- Recommendations for future research
- Limitations
- Summary
- Emerging questions.

6.2   A recap of the research done

The research question – *How do organizations go about developing capacity for bringing about innovation in complex systems?* – offered a number of possible ways to go about the actual investigation. For this thesis, it was decided to pursue an emergent approach, utilizing a variety of methods.

The nature of the study is exploratory with an orientation towards generating questions as the research progress –reffered to in this study as "emerging questions". These questions are furthered (changed or confirmed) as new insights are obtained throughout the study.

The empirical findings were obtained through a qualitative and a quantitative study. The empirical data collection and generation processes were:

- An action-research phase stretching 1.5 years – primarily conducted through six workshops
- A quantitative survey with 103 subject matter experts
- 13 interviews with the leadership of PDI
- Five, interviews of which three were with the leadership of the new setup called Alpha
- A focus group consisting of five people.

Lenses for the discussion evolved during the study and were applied in the conversation phase (chapter 5) where the different data sets converged.

What became apparent was that leadership, organization and strategy were inter-connected themes. These themes were then used to discuss the findings so as to sharpen and heighten our multi-faceted definition of innovation and to illustrate the inter-connectedness of organizational life (see 6.5) – directly related to the research question.

6.3   Research design and methodology

How do we understand what has been obtained? Following the suggestion of Darsø (2001) the thesis contrasts the positivist (functional, modernist) and naturalistic research paradigms: That is, internal validity versus credibility, and reliability versus dependability.
Internal validity is not central to descriptive or exploratory studies (Yin, 1994:33) that are very centred on a single case, which then speaks more towards dependability. The central aspects of credibility (is it trustworthy?) and dependability (are the defining factors and aspects accounted for?) are authenticity (i.e. that it is genuine) and transparency (i.e. that all of importance is displayed).
As the study applies multiple perspectives, it argues mainly for authenticity and transparency.

Table 6.1 outlines the differences in data collection and generation. Primary data implies that the researcher has been in place and either seen or heard what was said or done, and is also directly involved in generating the data. Secondary data means data whose generation the researcher prepared, designed for and curated for – or data that was generated by others and handed over to the researcher in some way.

Data source	Workshops	First interviews	Quantitative research	Second interviews	Focus group	Informal conversations
Primary data						
Role	Leader Participant Observer			Interviewer Participant Analyser Co-creator	Interviewer Participant Analyser Co-creator	Speaking partner with board member, other in the organizations and members from the workshops.
Data	Notes and mind maps. Co-constructing reports.			Notes, mind maps, recordings and transcripts.	Notes, mind maps, recordings and transcripts.	Notes and mind maps.
Secondary data						

Role		Instructing interviewer and co-construction conversations with interviewer. Analysing interviews.	Survey designer and analyser. Collector of answers through online system.			
Data		Recordings, transcripts and minutes.	Questionnaire and reports.			Memos, presentations, website and annual reports

Table 6.1 Data collection and generation

The exploratory orientation of the research also defined the design and unfolding of the interviews, following Kvale's (1996) view of interviews as being, at their most basic level, conversations. Kvale goes on to propose that qualitative research interviews are attempts to understand the world from the subjects' point of view, to unfold the meaning of peoples' experiences, and to uncover their lived world prior to scientific explanations. The qualitative method offers something different from the quantitative method. As opposed to the tradition of observation in natural history, the qualitative method provides a basis for "thick" descriptions (Cupchik 2001). McNamee (2010) points out that the constructionist inquiry is relational, within which meaningful action is always emerging within relationships. This co-constructed reality also includes the the relationship between researcher and participants.

6.4   Applying the findings to the research question – general

It is hard to answer the research question – *How do organizations go about developing capacity for bringing about innovation in complex systems?* – in one sentence. What the research has shown is that there is not one synthetic, encompassing answer to this question. The literature review, the empirical research and my own experience all point towards the fact that we need local answers if we want to really understand the specifics.

This opens up a few key questions:

- How come?
- Does generalizability not then have any value?
- What can be learnt and said about these local answers from a more general perspective?

The reason we need local understandings to really understand how different organizations go about the same challenge (i.e. the research question) is because that each organization has unique features and facets. This does not mean that they cannot be similar, in structures, processes, cultures, business landscapes and so on, but at a fundamental level individual interactions are never fully the same and the aggregation of these micro-interactions reasonably leads to variances. Why certain things work in one organization or in one situation and not in another

has to do with the trajectory leading up to that particular condition, as well as the relational, negotiated views of what is right, true and real concerning the past, present and future.

However, to assume, then, that everyone is "unique" is not the same as saying that there are no connections or relations between events, situations or organizations. Through language, culture and so on we do share things, and we naturally interpret what we encounter. The quality of this interpretation is what shapes the way we learn from others. So, we do not stand alone and one can say something valuable of other situations and conditions. In essence, we can learn from others. As far as the research show and my experience tell me, it is a matter of perspective. If we zoom in, the differences grow and if we zoom out, we see more general patterns. For instance, there is a fair amount of agreement in all the variations around the topic of innovation; it is about something new and valuable. This agreement is what allow us to tap into others' experiences and potentially learn from them. Organizations are embedded in their culture and context. And that provides the conditions for innovation. Where organizations sometimes go wrong is in assuming it is easy to take one experience and transfer it to another reality. Innovation, like invention, favours the prepared mind. Luck is not a strategy, even if it may play a role. In order to really gain value from other experiences, one has to engage and co-create with one's local conditions.

What, then, can be said about how organizations go about developing their capacity to bring about innovation in complex systems? As we saw in the summary to the previous chapter (section 5.5), the discussions following the different lenses converge around three main constructs when it comes to developing the capacity for innovation in complex systems: Leadership, organization and strategy.

Innovation does not exist in isolation. It is an inter-dependent construct. The same goes for the constructs of leadership, organization and strategy, of course – they are not only conditions for innovation, but also shaped by the notion of innovation. Yet as we have seen, when organizations want to work on their capacity for innovation, they address it through the constructs of leadership, organization and strategy. As such, developing the capacity to bring about innovation means developing and implementing more effective forms of strategy, leadership and organization. In order to unpack this answer, the notions (constructs) of strategy, leadership and organization are here presented individually in order to help communicate the result more explicitly, even if these constructs overlap and are interdependent.

Leadership

Leadership comes in many shapes and forms. On an overall level, Drucker's notion of "effectiveness" (1967) seems to be paramount. This is leadership that delivers results. According to Collins (2001) it is leadership that blends extreme personal humility with intense personal will. The characteristics are: humility, will, ferocious resolve and a tendency to give credit to others while placing blame on oneself. This type of leadership stands in contrast to the often-stereotyped leader, who more often than not is portrayed as charismatic, energetic and equipped with a fair amount of ego. Ridgeway and Wallace (1994) offer a model that can map the leadership role to leadership qualities. Since innovation does not happen in isolation the question of team becomes important. In an echo of Hock (1999), Bens (2006) points to a "delegative" leadership style as employees today more often than not have the necessary skills and knowledge about what is the best way forward. As Hjort et al. (2011) point out, because of the increasing complexity of the tasks we face, the focus for leadership has shifted from leading creative individuals to leading creative groups. To bring innovation about, as Van de Ven et al. (1995) point out, managers at all different levels need to be involved. In the empirical material, there is nothing that suggests that leadership is not important; quite the contrary. According to the empirical findings, innovation needs to be not only sanctioned but also led from the top. This often means pointing out the direction, generating the strategy and then asking the different groups or departments or organizations to come up with a proactive answer that they can then pursue. Uhl-Bien (2007), using CAS as a lens, contrasts more traditional

views of leadership (Yukl, 1994 and Grint, 2011) and counters some of the research findings: Change is here initiated and led from the top, and leadership in complexity seems to depend on vision to guide the organizational work. However, this apparent opposition between the findings and the theory seemingly has more to do with "how" than "what" (van Dijk and Peters, 2011).

The task of leadership has changed over the last decades when it comes to innovation. The personal qualities (Van Loon and Van Dijk, 2015) and inter-personal skills are more desired and demanded, often placing the leader in a facilitative role in which he coaches (Flaherty, 1999) and becomes an expert in helping (Schein, 2009 and 2013). Innovation in complex systems seems to call for leadership that is able to reconfigure existing characteristics in a system (Cilliers, 1998 and Arthur, 1999) by probing, sensing and responding (Snowden and Boone, 2007). This can be traced back to acting by doing 'gestures' (Elias, 1939). Van Loon and Van Dijk (2015) state that coping with complexity, global interconnectedness and continuous change are the greatest leadership problems of today. Complexity leadership is a new orientation portrayed by Mary Uhl-Bien (2007) that uses CAS as a lens. It contrasts more traditional views of leadership (Yukl, 1994 and Grint, 2011):

- Align and control vs. Interaction and adaptability

- Change efforts driven top-down vs. Change is emergent (in context)

- Relies on leader vision, inspiration and execution vs. Seeds organization with generative (i.e. adaptive) properties and uses for day-to-day performance.

The conceptual framework of complexity leadership includes three entangled leadership roles (i.e. adaptive leadership, administrative leadership and enabling leadership) that reflect a dynamic relationship between the bureaucratic, administrative functions of the organization and the emergent, informal dynamics of complex adaptive systems (Uhl-Bien et al., 2007).

While conventional contingency theories suggest that accurate accounts of the context are a critical element in decision-making, Grint (2005) states that decision-makers are far more active in defining the context than conventional contingency theories allow. This then suggests that a persuasive rendition of the context legitimizes a particular form of action that is in line with the leader's preferred mode of engagement, rather than with what the situation requires. As such leadership becomes political in the sense that certain worldviews are preferred and define the context. However, as leadership is not value-free, it does not happen in isolation. It is essentiallly relational and contextual (Van Loon and Van Dijk, 2015).

Organization

Organizing is an interdependent facet of strategy and leadership. Leaders may show the way, but a consequence of that is some sort of organization. The same goes for strategy: Making strategy happen requires the organization of resources. As Czarniawska-Joerges (1992) point out, organizations – at least large ones – are complex. And they are political systems. That makes it difficult to research them and to fully understand how they organize for innovation. To say it is only thanks to one department, unit or group is too simplistic. It may be helped to view a unit – for instance an R&D unit – as a system, but that system is very interdependent upon other systems. For instance, it would make no sense to try to understand the PDI from a complexity perspective without including the much larger system of the mother company.
As the case study showed, only a thorough deep-dive allows one to see how the different units are set up to work for innovation – complementing each other in trying to realize the strategy and more local aspirations. What separated the units here were essentially their scope and range of work – expressed by time horizons for their innovations (as when they are supposed to be ready for implementation), resources to be used (existing or new ones) and where the impact would take place (for instance within an existing business unit or perhaps in a

completely, to the business, new field). Senses of autonomy and identity seem to play huge part in the case study and in from the focus group conversations. This observation is echoed by Ackoff (1981), Morgan (1986), Schein (2010), Amabile (1998) and Amabile et al. (2002). As stated by Leonard and Strauss (1997), companies with a strong culture can be very creative.

Strategy

According to the *Harvard Business Review* (2003) there are two schools of thought when it comes to strategy in relation to value creation. The first suggests that the road to value creation lies in driving out the old-fashioned practice of gut instincts and replacing it with strategy based on rigorous, quantitative analysis. Here the basis of thought is analytical thinking, aimed at providing certainty. The other school favours creativity and innovation and is more rooted in the idea of intuitive thinking. The findings from this study suggest a "both-and" approach, in which one does not rule out the other. As could be seen in the quantitative study, gut feeling was actually one of the top scorers as a "framework" or "methodology" when strategy was to be developed. On the other hand, the case study demonstrated a strong inclination towards data-driven decisions. The focus group described what can perhaps be seen as an ideal versus what actually happens – that is, "realized strategy" as described by Mintzberg et al. (1998). The quantitative study also illustrated that a large number of organizations did not have an innovation strategy at all.

Another polarized approach in strategy development concerns using problem-based business improvement methods and strengths-based constructionist methods. These are stereotypically seen as seen as an either-or proposition, therefore accepting as a predicate a field-limiting separatist paradigm (Cooperrider, Sorensen, Whitney and Yaeger, 2000). In the case study, as well as in the focus group, there was a clear inclination towards what are here labelled "problem-based methods". A note of caution is in order, however: Strategy work seems lean more towards framing challenges. This is because often it is not necessarily that a problem has sparked the strategy process, but rather that the realization of strategies requires identification and novel approaches to overcome the challenges that follow when one is trying to do something new. Newer theories, like Cynefin (Snowden, 2002 and 2012; Snowden and Boone, 2007) and Complex Responsive Processes (Stacy, 2000, 2007 and 20011; Stacy, Griffin and Shaw, 2000) offer different schools of thought in which strategy is emergent (Holland, 1992, 1993 and 1999) and cannot really be designed. Complex Adaptive Systems and Systems Thinking also offer interesting perspectives for how to develop and deploy strategies for greater success in complex systems. The underlying organizational dynamic needs to be included if a change strategy is to be effective (Van Dijk and Peters, 2011). Stavros and Hinrichs' (2009) SOAR (strengths, opportunities, aspiration and results) framework is a strength-based, appreciative inquiry (Cooperrider & Srivastva 1987; Cooperrider, Barrett and Srivastva, 1995) orientation towards strategy development. The present research makes clear that these newer theories are not yet widely adopted, even though, for instance, Alpha does unconsciously tap into some of them (like emergence and Cynefin). SOAR can be contrasted with the classical SWOT analysis in its focus on assessment rather than inquiry and appreciation. However, in a constructionist perspective it is not true that certain methodologies per se are preferred to others (McName, 2010 and McNamee and Hoskins, 2012). Instead, the focus is more on why, when and how they are utilized to produce change. What works in certain situations may be totally inadequate or even counterproductive in others (Van Dijk and Peters, 2011).

6.5   Applying the findings to the research question – the specific main findings

Whereas section 6.4 presents a general answer to the research question, *How do organizations go about developing capacity for bringing about innovation in complex systems?*, here follow answers from the more specific, local findings. From the theoretical and empirical research, and its analyses and discussions – see chapters 4 and 5 – the main findings can be grouped into four interlinked areas:

-   Findings around social constructionism, complexity and innovation
-   Findings around the state of innovation
-   Findings around capacity building for innovation
-   Findings around a new form of R&D.

These four areas are interlinked because they all originate from the same empirical material and its subsequent discussions and analyses. The findings are, to a large extent, nested within each other.

6.5.1   Complexity, social constructionism and innovation

In terms of complexity thinking, this study shows that even though it may be far-fetched to apply findings from the natural sciences directly to social systems and expect "predictable" results, such systems do seem to offer value in the form of broadening our understanding of why things are difficult and why they do not necessarily go as planned. Furthermore, applications of certain features of complexity theory can help organizations carve out strategies that better encompasses the current business environment. Innovation as a phenomenon can certainly be viewed as a complex adaptive system in itself. Complexity offers a way of understanding its intricate nature.

Social constructionism offers a very new way to view organizational life and in this case innovation. A social constructionist perspective allows us to see innovation as a relational orientation for bringing life into organizations and society. It implies not only that innovation is a consequence of the relationships (broadly understood) and "meaning-making" but also that innovation generates new relationships and meanings. Innovation can then be argued to be a process of changing perceptions towards meaning and relationships.

Bringing complexity theory and social constructionism together in this study shows that there are similarities in their stances, but naturally also differences – not least their origins. In terms of innovation and organizational life the convergence point is that organizational success cannot be guaranteed nor always foreseen. However, there seem to be certain ways of thinking and doing that are more likely to provide vitality – for instance notions of what brings organizations together, what can and should be accomplished, and how changing patterns of thought and action can generate massive change. A working definition of innovation that bridges social constructionism and complexity around innovation is proposed: "The emergence of new meaning in dissipating structures".

6.5.2   Findings around the state of innovation

A quantitative study was conducted as a way to explore some of the findings from the literature research and provide a backdrop for the qualitative interviews. This may not have been fully encompassing as the respondents represent a large variety of organizations, industries and functions, but it does provide some indications. What is striking is that in these organizations innovation is not a very long-prioritized concept, although almost all respond that it is a priority today. Even so, there is clearly much uncertainty around the strategy, organization, process and leadership required to make it happen. From the subject-matter expert survey came a large number of insights. Some of the more quantifiable are:

- More than 50 percent consider their business environment as complex and only 5 percent as chaotic, 10 percent as simple and a little more than 30 percent as complicated.
- 65 percent say innovation was not a priority in their company before 2000, 30 percent only after 2010 and 6 percent say it still is not a priority.

- Around 20 percent claim they do not follow any innovation model or do not know which one they use. 25 percent say they use the network model.
- In terms of resources more than 75 percent indicate clients and customers and 50 percent own organization as very important – consultants, universities and competitors score low.
- 56 percent consider quality of products and services to be very important goals for innovation, followed by obtaining new competencies (33 percent) and increased revenue (40 percent), whereas reduced environmental impact, increased safety and health, and reduced costs in marketing and so on were the lowest scorers.
- Only 25 percent consider their organization to have a very clear and communicated vision, 17 percent a very clear and communicated strategy and only 4 percent a very clear and communicated innovation strategy.
- Only 4 percent consider that the process for developing innovation strategies is carefully crafted and includes all relevant stakeholders.
- The tools mostly used are brainstorming SWOT and mission/vision statements, followed by design thinking by strategy maps and scenario planning, as well as blue ocean strategy.

The limitations of this study are described and discussed in length in chapter 3.

6.5.3   Capacity building for organizations

PDI was set up to generate innovation. The sense from the leader was that there was untapped potential that could be ignited through the support of the researcher. This phase – with the stated aim of building capacity for leadership and innovation – produced a number of findings. Capacity building in itself was to be understood as creating more distributed leadership whereby people stepped up and took initiative and responsibility beyond the normal expectations. Furthermore, there was a notion that the leadership group could become a team whereby they would be able to do more and better if they could align, find a direction and develop a culture and structure around their work. Ultimately, the assumption was that better ideas would emerge and that there would be more readiness to act them out successfully so that they would be furthered by the different business units.

The most pronounced findings were:

- Context is everything. Unclear organizational changes and direction kill creativity and motivation.
- Leadership needs to be visible and communicative.
- Meetings are important, but meeting is more important.
- Agreeing upon strategy is difficult in less hierarchical organizations.
- People like to be part of a developing processes, but it needs to result in action.
- In times of trouble there is a need to come together and build relationships.
- Seeing possibilities for innovation requires a change of mind, view and patterns. A consultant can make a positive difference.
- A consultant needs to be clear on whether they have been hired as a process or expert consultant.
- The leader (employee) needs to be present and vouch for the work.
- Getting everyone on the same page and looking out of the same window is the start.
- There needs to be a certain tempo to ensure motivation and to remain ahead of changes.
- The process needs to be well-crafted, experiential and open to change.

These findings, together with others, were developed in a particular context that may not be easy to transfer into a different setting. However, the findings may be of value as inspiration and general recommendations.

6.5.4 A new form of R&D

Organizations have different options for bringing about innovation: They can own and operate the development process (in whole or in part), they can outsource it (in whole or in part), they can do it through partnerships or they can come about it through merger and acquisitions. Many large companies operate on all fronts at the same time. Telefonìca S.A. has certainly done so and through conversations conducted as part of the current research it was clear that many acquisitions had failed to deliver value (i.e. in terms of digital solutions). After the demise of Telefonìca Digital and the structural limitations bestowed upon the PDI unit, the emergence of Alpha can be seen as a way to bring the previous experiences into a new setting with the aim of capturing the opportunities between the resources at hand and the perceived unexploited market opportunities. As such Alpha can be seen as an innovation unit, but given its explorative and experimental nature it leans towards the very early phases of innovation as described for instance by Godin (2006 and 2013b). It is therefore fitting to view it in the light of an R&D unit – but not R&D as understood in a classical setting. This is more R&D arriving as a consequence of realizing that the world is complex and the business environment unstable and fast-moving. The rationale can be described as essentially inventing a new market where the company has a natural competitive advantage to exploit it. The market and opportunity is "out there" but it is created by combining data and creativity to "re-configure" the company's understanding. In short, one can see Alpha as the advancement of strategy work done by the company to tap into perceived massive opportunities. It is rooted in a digital culture around what creates winners and losers, where speed and radical approaches (i.e. generating strange attractors) are rewarded be increasing returns (i.e. positive feedback). It becomes part of a portfolio way of thought in which the company assumes it is increasing its chance for success by betting on different initiatives to generate innovation. Likewise, it is not just about minimizing risk. Adopting recent success histories from the digital revolution, the increased uncertainty on account of Alpha's initiatives are also assumed to be accompanied by hopes of excess rewards. Essentially, this is a view that future success and growth lie beyond today's existing markets and the company's scope and range.

The company's main thoughts (but also echoed by the researcher's own experience, the focus group and the literature review) on how to make this initiative a success include:

- People first. Get the right people on board and the rest will follow.
- It needs to be set up as a relatively autonomous unit with a high degree of independence.
- The mandate needs to be clear and the support clearly articulated.
- The rationale for the initiative needs to be aspirational as well as motivational.
- The business case – even though the initiatives and the projects may be considered in some cases as science fiction or at least moonshots – needs to be massive and transformational.
- Legitimization and success also seem to depend upon connections with what the company views as its core competencies and to some extent its value system.
- It needs to be not only permissible but also necessary to develop a different culture from than the one prevailing in the mother company.
- The structure is looser and more project oriented, taking a step-by-step approach.
- Some projects require and rely heavily upon external collaborations.
- The leadership provided leans towards the visionary, the ability to persuade and obtain buy-in inside and outside the company. Legitimization and support seems to rest upon a combination of qualities – for instance the leader(s) technical/business competence and zeal – and not only on the power granted by the position.
- The actual projects chosen – although high-risk and to some extent surprising – do actually speak directly towards the business rationale of the initiatives and also to the mother company's own business case and capabilities/strengths.

One could argue that this new initiative is not necessarily a massive deviation from classical R&D. However, the feeling around the setup within the company is that it is different. In many ways, it is seen as an initiative tasked with inventing the future, unsettling the industries affected by the new projects and changing the course of the company. It should also be mentioned that the company investigated in-depth in this study also has R&D facilities. However, they are more connected to existing business and products and services rather than with dramatically changing other industries.

6.6   Recommendations for future research

This thesis has had an explorative nature and has generated questions all throughout its course. There are indeed many different areas that would be interesting to explore even further.

- What does a pluralist approach to innovation grant us and how do we overcome the obstacles that come with it?

  The point here is that there are so many views, understandings and definitions on the subject that they generate confusion and tiredness – particularly when they do not deliver. However, a pluralist approach may grant other benefits, such as creativity, not locking ourselves into one way of working, creating collaboration and co-ownership, and so on.
  Any theory on innovation needs to offer opportunities for its practical application. It seems that researchers do not particularly favour approaches that are easy to grasp and communicate – and this may be for good reason! The divide between the desire for an all-encompassing and universally applicable approach, and the needs of the very local and particular may not be bridgeable. Yet to dismiss any attempt to simplify explanations may not be the best forward. Complexity theory and social constructionism offer a fascinating window into an open future.

- Given the importance given to innovation as the panacea to all virtually all challenges for organizational vitally and competitiveness, how come so much work seems to be left to chance?

  It may very well be so that it is actually not left to chance at all, even though the findings of this thesis make it seem so. Here, in particular, the findings around the lack of carefully, communicated innovation strategies stand out. Perhaps by addressing these findings from different approaches new answers and more nuanced answers will emerge. Furthermore, something certainly is steering the innovation process – and if it is not strategy, then what?
  Perhaps one avenue to pursue is to be present in the innovation process from its inception to its dissemination. Ideally this should be done by a number of researchers so that different cases can be compared.

- In deciding on which innovation tracks and opportunities to pursue, are we really more prone to following our intuition and hunches rather than systematic evidence-based approaches? Or do our intuition and decision-making processes depend on the quality of the system in place?

  Perhaps the larger question is around how intuition and logic go hand in hand and how one can cultivate a dual approach. Again, there seems to be an abundance of theories, models and methodologies for helping organizations make decisions, indeed the best decisions. However, it is unclear to what extent these are actually employed or not – and to what extent they are deemed valuable. One idea would be to find agreed upon innovations and work backwards to see what can be distinguished about

what has been deemed valuable. Here "history-mapping" from a social constructionist perspective and "pattern-mapping" from a complexity perspective could perhaps go hand-in-hand.

In general, the subject of how organizations develop and deploy strategies for pursuing innovation is not well developed and more research is needed.

6.7   Limitations

As all research on innovation tends to show, you can always find research that shows the opposite of what you have found. An example could be trying to apply Collins' (2001) level five leadership to the characteristics of Steve Jobs: They does not match. Any theory on innovation need to be pluralistic to be effective, but in that respect, it is also worth remembering Stephen Hawkings' words (1999: 10): "Any physical theory is always provisional, in the sense that it is only a hypothesis; you can never prove it. No matter how many times the results of experiments agree with some theory, you can never be sure that the next time the result will not contradict the theory. On the other hand, you can disprove a theory by finding even a single observation that disagrees with the predictions of the theory."

If the study had examined a different case than Telefonìca it must be expected that some aspects of the findings – if not all – would differ. Likewise, a different study might have interpreted the material quite differently. As such the study is qualitative, and aims for authenticity and transparency.

6.8   Summary and closing words on chapter 6

This chapter has presented a recap and summary of the research, the research design and the methodology utilized in order to provide perspectives on the conclusions offered. The findings and analyses from chapter 4, which were brought together and discussed through the developed parameters in chapter 5, were collected and categorized into four main findings. These were findings around: A new form of R&D, capacity building for innovation, the state of innovation and the connections around complexity, and social constructionism and innovation.
The refined and condensed findings were then applied to the research question and answered through the three key notions identified around capacity building for innovation: Strategy, leadership and organization. Finally, recommendations for future research were offered and the limitations of the study were discussed.

Closing comments

As we move into the twenty-first century we are experiencing many challenges. Innovation – although a fluffy and fuzzy concept – seems to be our best explanation of what will bring us forward. Yet that same energy – the creativity coupled with determination and effort – is a double-edged sword. What can bring forward positive changes also holds the power to bring forward solutions that threaten our world as well as bring greater inequality and social division.

Margaret Wheatley (1992) has attempted to illustrate one of the greatest challenges of our time by contrasting two concepts: the speed of light and the speed of life. Companies are engaged in/tied to/struggling with, on the one hand, making things faster, cheaper and better with fewer resources, and one the other with the loss of meaning, depth and quality of life. Relations are connected to meaning and depth, but they are overlooked or forgotten when people are busy. The paradox is that people leave organizations if they lose meaning, taking their

expertise with them – which then puts companies in the situation of losing out on the efficiency they sought in the first place.

According to Godin (2010a: 41), "Innovation has become a major category of Western thought". It has virtually become an end in itself (Godin, 2011). If one wants to be critical, one can argue that today anything goes in the name of innovation and everyone should be an innovator. It has become a slogan more than anything else. Being creative and innovative at work is a recent management discourse. According to Hjort (2005), the entrepreneur has been recycled as an emblem of a proper employee. Here, however, the notion of the innovator, the disruptor, becomes part of the company's own story and aspiration. As such it falls between the normalizing, controlling and predictive forces at the company and irrational and non-prescriptive behaviour. Thus the question becomes of course whether a new narrative – even if it is backed up – will be possible to achieve. When the new is to be predicted and the unexpected the norm, will we fall short of innovtion and essentially just reinforce business as usual?

The central meaning of innovation thus relates to renewal. Most scholars agree that innovation is not creativity alone. Innovation can be seen as the "process of bringing something different and valuable, successfully into being." Bringing innovation into the realm of complexity and social constructionism allows for further understanding as well: "The emergence of new meaning in dissipating structures".

Complexity theory can help us understand why it is so hard to innovate and why so much strategy seems not to deliver, but it is hardly an easy recipe for guaranteeing success. In the words of Robert Burns (1785): "The best-laid schemes o' mice an' men / Gang aft a-gley".

Utilizing the notion of complex systems, we see that innovation can be explained by contextualizing it within an arena that suggests emergence, self-organization, adaptive behaviour and so on. It also suggests that innovation in itself could be viewed as complex system. However, complexity and its root theories also suggests that we should be careful about just translating physical and biological systems into our social spheres.

Finally, in our pursuit of innovation Dee Hock, founder of VISA, reminds us: "It is no failure to fall short of realizing all that we might dream – the failure is to fall short of dreaming all that we might realize".[104]

6.9   Emerging questions following chapter 6

Looking back at the research question, the methodology, the data collection process, the case study and the analysis a few questions emerge:

- The notion of innovation
  As shown in the thesis, innovation is a construct, a multifaceted, fuzzy concept. In today's society, it is often portrayed as the "Holy Grail" in terms of competitiveness, productivity and value creation. It is virtually impossible to find to come out as an opponent of innovation – suggesting we need less of it. Regardless, if we consider it to be a product or a process, we assume more is better. But with this orientation it runs the risk of leaning towards ideology. And ideology can deteriorate into dogma – which may then lead to stifle the very thing it was supposed to bring about (i.e. the qualities that comes from the idea of innovation).
  Is it so, therefore that innovation – with all our flaws in understanding it – is, thanks to human interaction, an unavoidable and self-perpetuating phenomenon that we just don't currently understand?

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[104] Dee Hock (1997) stated and cited on the Paradigm Shift International website (www.parashift.com/Speakers/Speak010.htm)

- Innovation as value creation
  Innovation is seen as key to the generation of value – renewal, competitiveness and returns. But where are our systems, models and processes? They exist, but they seem a far cry from, say, TQM and other productivity increasing approaches. We have simply not been able to develop a coherent and cohesive setup that is equally transferable, replicable and communicative. Part of the challenge lies within the question around "the notion of innovation" – because it starts with some sort of definition. Thus, the question that comes up is: What is needed for us to develop a system of innovation that can carry value across local realities?

- Strategies
  Why is there so little written about innovation strategies or strategies for going about innovation? Clearly one answer is that it may just fall into a broader strategy discussion, or is divided between R&D and other functions. Another answer may be that the idea is still fairly new and has not received proper attention. Another possibility is that innovation is a fairly ambiguous concept and much more focus has been given to its front end.
  When looking at the particular case in question, it seems that innovation does not happen by chance. Invention may emerge by chance, but its application is a conscious choice. An innovation strategy seems to be the consequence of emerging realities manifested – coming about through the different aspirations pursued by individual players, coupled with more agreed upon world-views and opportunity spaces.

7   Reflections on my own journey

Here I offer some broad reflections on the development of my thesis. These will offer some perspectives on being a PhD student, the development of a thesis and reflections upon my journey rather than the theme of the thesis, even though there are a few remarks on this as well.

The reason for writing this section goes back to the guidance sessions I have had with my supervisors. They have offered of course input and guidance on the thesis, but they have also helped to spur my thinking, learning and progress as a learner. In short: When writing a thesis, one also learns about the process of doing research and putting together a comprehensible dissertation.

The framework used is the one proposed by Schön (1983) around reflective practice, which he describes as "the ability to reflect on an action so as to engage in a process of continuous learning". As such it makes sense to use this in a social constructionist context. A person who reflects throughout his or her practice is not just looking back on past actions and events, but is taking a conscious look at emotions, experiences, actions and responses, and using that information to add to his or her existing knowledge base and reach a higher level of understanding (Paterson and Chapman, 2013).
Schön (1983) distinguishes between learning-in-action and learning-on action, whereby the first concerns "thinking on one's feet" and the second concerns analysing after the action has taken place. This section concerns more reflection-on-action.

A circular movement
In reality, my journey towards this thesis started many years ago, but it took quite some time to get my act together and pursue it. The reason for this comes down to me not being able to prioritize it, as well as me being a bit uncertain of why to do it. Was it due to pride? That I wanted to show that I could do it? Was it to show off? Did I want to elevate myself in the eyes of others? Was it as a career move? Did I have a fair ambition to pursue an academic career? Was it more that I wanted to learn about something?
Now, looking back, I can see that it was probably a combination of me wanting to prove myself and actually wanting to learn something. I had no real goal to pursue an academic career at the time and I am not a fan of educational snobbery.
I do like challenges and since I was not sure what obtaining a PhD would entail it allured me. In terms of learning something I was probably at the time too uncertain about which topic to select. In the end, I probably hadn't pursued it because I was too unsure whether I could juggle it with my other commitments.
The question of whether or not this is a good or valid reason can probably be argued. I do think that people have different reasons for pursuing endeavours such as writing a dissertation. To say that one reason is wrong provokes questions about what reasons are therefore good, and that in return raises questions about what legitimizes certain reasons as opposed to others.
Now, as I come to close, I am still committed to the same reasons. Yet it is fair to say that I have added one more: I would like to pursue an academic career as well. Perhaps not solely, but certainly I would like research to be a part of my life from now. It is rewarding to go deep and learn something, as well as to have the ambition to get it to be shared and furthered.

Conflicting projects
I have been working full-time as a principal at tertiary school in Denmark at the same as writing my dissertation. This is quite a demanding job in terms of travel, other writings and so on. Then there are additional projects and of course family, farm, training, friends and so on. All in all, it has been quite a demanding journey for me – and for those around me. Seen in retrospect I should of course have prioritized differently. That leads to the question of how come I didn't? Certainly, given the fact that I knew perfectly well what I got myself into. A dissertation is not a weekend occupation. One thing is the time you use for writing, reading, interviewing and analysing – another thing is the amount of time and energy you actually give to the project. When looking at myself this time

is divided into two areas: The first includes incubating and pondering about my work, the other concerns my bad consciousness about not doing enough.

I think my journey has led me to understand that I am probably someone who has a problem of "letting go" of tasks, and I am probably someone who like to finish them (i.e. perhaps enjoys the actual process less than being able to look back on a finished result). This means that I find projects that stretch over time challenging. I would not say it is devastating, but still, it is something to be aware of and to become good at providing space for for future progress.

In terms of why did I step into this while fully aware of the demands that would follow and at the same time making so few changes to my life (indeed some new things have been added to the mix – like having a new child, 25th anniversary celebrations at my work etc.), I see a few things now. One is that I probably had a vague idea that I would be able to adjust my workload at my job to fit. Another was that I assumed I would go with something I knew fairly well, which would allow me a bit of slack (I would have read a lot already etc.). Third, I probably have high opinions about my own work ethic and capacity. Here I think it is fair to say I have had a bit of bumpy ride. I have certainly not been very good – at least not systematically – at freeing up time for my research. Also, I am not good in just utilizing 30 minutes here and there. I need an hour just to get into things. Perhaps this has to do with lack of experience, since I work like that in my normal job. The idea that choosing a subject where I would have experience would grant me advantages can certainly be discussed (see below). The third reason – my belief in my own working capacity – is not blind faith. It has actually been a fairly good strategy for me throughout my life. I learn fairly fast and I can adapt and make OK judgment calls. This time, however, I have also been allowed to feel where my limits are, for which I am grateful. I do have limits. It is also clear when I assess my own work and private life. Not everything I have done throughout these years has been given the care it deserved. I have made compromises; my family life, for instance, has also been stretched.

Choosing a theme

I decided to go with a theme around innovation. Certainly, because I felt it was a good meeting point for my own background and expertise, partly because I am interested in it and partly because I assumed I would generate something that would provide me with opportunities afterwards. This is certainly still the case but there are a few other reflections here that deserve to be shared. I did not consider that the actual fieldwork would be so back and forth for me. My ideas for cases evaporated several times throughout the research. Sometimes this was because they were not consistent with the research question, sometimes because the initial interested I obtained changed for various reasons (e.g. the companies did not have time etc.). This actually took a lot of time; it provoked me and generated confusion and uncertainty. It led me several times to the point of shifting my research question. In the end, thanks to my supervisors, I stuck with my original.

A question I have been pondered quite a lot was why I did not go with my own organization – Kaospilot – as a case? It would certainly have been easier since I would essentially be able to draw heavily on my own experience and knowledge and there are ample of areas where one could indulge oneself, albeit the research question I went with would probably demand a bit more consideration. At the time, I was concerned that on one hand I would not be able to have any distance to my own research and perhaps run the risk of including too many political considerations and jeopardizing the value of the research. On the other hand, I was concerned about the applicability or the value of it outside the realm of Kaospilot.

Today I must admit that it would have had its advantages of going down that route. On the other hand, I am still content with the choice I did.

Delimitation and progress

Choosing a broad subject (innovation) and then adding even more broad subjects (leadership, strategy and organization) may not be the wisest decision ever made. On the other hand, it has granted me the opportunity to go deep and wide into fields I enjoy learning from.

When progressing into a subject and a question, I am consistently and increasingly confronted with how much there is to actually investigate and potentially learn. The numerous fields of research and related areas are growing by the day; I have calculated that it takes more time to read just what is being published in a day than there are hours. The equation does not add up.

Here I have learnt more about my own pattern and challenges within academic work. I like to be knowledgeable and in a situation like a dissertation I have the challenge of accepting that there will be areas where I just limit the thesis and myself. It cannot be all-encompassing.

Another area is that, as I progress, I also understand my original question better. This is an interesting observation, I think. In many ways, we see our work as linear – even though we consistently return more or less consciously to our starting point or research question. But we return with an expanded mind.

It is challenging to accept this, because it seems to me that one could perhaps ask a better research question at the end of the actual research. However, the consequence would be that it would be a never-ending story – at least if one were inclined towards a thesis where one actually expands on a specific question.

Guidance

This is a delicate question for many reasons because my reflections come naturally back to teaching and learning strategies as well as the individual fit between student and supervisor. I think that I was probably a bit oblivious and had only vague expectations. What has surprised me was perhaps the avoidance of prescriptive answers to my questions. Many of my questions were addressed either indirectly, or by asking questions aimed at bringing forth self-generated developments. Conversations have very seldom begun in details, and more often start from the overall lines.

Seen in retrospect, this has forced me to think for myself and make decisions where I have been very much in doubt. That has of course given me stronger learning points, I think; however, not necessarily stronger conviction about some of the decisions made. I am still convinced that my research could have taken other turns than it did and I am fairly certain that if my supervisors had been firmer on certain options I would have oriented myself differently. On the other hand, where does one draw the line? It could easily have been so descriptive that one could have questioned how independent the dissertation actually was.

Reflective practitioner

Much of the starting point of this thesis was rooted in the idea and recognition of myself as a reflective practitioner. That implied for good and bad that I had a relationship to the subject. I still do, but perhaps my relationship has changed. The privilege of having had the chance to spend years on a subject like this, in a guided relationship, does something to you. Ironically, I have for years been learning – at least to some extent – by being a supervisor for around a hundred graduating students from Kaospilot, many actually pursing projects within the field of innovation. You actually learn by being a supervisor too, but you learn differently and different things. You do not get as deep as you do when pursuing own research. Both approaches have the same challenges in the sense that you do not do innovation per se and as such you do not reflect upon doing innovation. Doing research in a new way might perhaps qualify for being closer to innovation, but since I know too little about innovation in research, I can't say. So where does the reflective practitioner come in? This has more formed my previous work and has offered a lens and a mirror with which to view my present research. I do find that reflective practice and the type of research I have conducted do go hand in hand.

Finally, the question to be asked would was it worth it? Would I do it again given what I know now? The answer is yes.

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9 Appendices

9.1 The quantitative survey – the questions

1 Individual information

1.1 My formal position in the organization is best described as:
- A board member
- The CEO/President
- An executive
- A middle manager
- A specialist
- An officer

1.2 My function in the organization is mostly related to:
- General management
- Planning
- Legal
- M&A
- Accounting & Finance
- IT
- HR
- Communications
- Marketing & sales
- Branding
- PR
- R&D
- Manufacturing/production/operations
- Product/service design
- New business development
- Other
- If you checked "other" please offer an alternative in the box below:

1.3 In terms of innovation, my field of responsibility is best described as:
- I am head of innovation in my organization (formal role)
- I am responsible for an innovation unit
- I am responsible for minimum one innovation project
- I work mainly with questions concerning innovation but have no responsibilities like the above stated
- I participate in one or several innovation projects

1.4 My nationality:
- Scroll down list

1.5 Sex:
- Man
- Woman
- Other

1.6 Age:
- Below 20
- 20 to 30
- 31 to 40
- 41 to 50
- 51 to 60
- 61 to 70

- 71 to 80
- Above 80

1.7 Education:
My formal educational level is (please check the highest obtained and best fit):
- A secondary degree
- A high school degree
- A bachelors degree
- A masters degree
- A PhD degree

1.8 Tenure and innovation:
- My educational background included studies in innovation. Y/N
- I have obtained training in innovation in the workplace. Y/N
- I have more than three years of experience within the field of innovation. Y/N
- I consider my educational background as important for my work with innovation. Low to high, and do not apply
- I consider my post educational training in innovation as important for my work with innovation. Low to high, and do not apply

2 Organizational and industry information

2.1 My organization is a (choose the best fit):
- Private company
- A governmental agency
- An NGO
- A hybrid of two or more of the above

2.2 My organization's primary business are (choose all that apply):

- Agriculture
- Automotive
- Chemical
- Communications
- Construction
- Consulting
- Energy
- Electronics
- Entertainment
- Education
- Financial services
- Healthcare
- IT-technology
- Logistics
- Manufacturing
- Mechanical engineering
- Media
- Mining
- Pharmacy
- Service
- Telecommunications
- Travel and hospitality
- Other

If you checked "other" please offer an alternative in the box below:

2.3 My organization's annual turnover in Euros (2013 or 2012):
- 0 to100.000
- 100.000 to 500.000
- 500.000 to 1 million
- 1 million to 5 million

- 5 million to 10 million
- 10 million to 50 million
- 50 million to 100 million
- 100 million to 1 billion
- 1 billion to 10 billion
- 10 billion to 50 billion
- 50 billion to 100 billion
- Over 100 billion

2.4 My organization was established:
- Less than 2 years ago
- 2 to 5 years ago
- 6 to 10 years ago
- 11 to 20 years ago
- 21 to 50 years ago
- 51 to a 100 years ago
- More than a 100 years ago

2.5 My organization's number of employees:
- Self-employment
- 1 to 5
- 6 to 10
- 11 to 20
- 21 to 50
- 51 to 100
- 101 to 500
- 501 to 1.000
- 1.001 to 5.000
- 5.001 to 10.000
- 10.001 to 50.000
- 50.001 to 100.000
- Over 100.000

2.6 My organizations can be characterized as being mainly:
- Local
- Regional
- National
- Continental (operating in for instance Africa)
- Global (operations on more than one continent)

2.7 My organizations headquarter is located in:
- Africa
- Asia
- Australia
- Europe
- North America
- South America

2.8 In terms of the business environment for my organization, I would characterize it to be: (Strongly agree to…not at all)
- Simple – not very many new competitors, customer changes, new technologies etc. Cause and affect are clear. Here it is more a matter of best practice.
- Complicated – not so easy to know what is the best forward. Cause and effect are separated over time and space, but it is discoverable. Expert diagnosis often required. Here it is matter of good practice.
- Complex – it is difficult to know what is the best way forward. What was a good solution yesterday is not the right one tomorrow. Cause and effect are only clear in retrospective. It is a matter of patterns and emergence.
- Chaotic – it is only a matter of making decision and no real time to think or wait and see. No point in looking for the right answer. There is high tension and high turbulence

2.9 In terms of my organization, I would characterize it to be: (Strongly agree to…not at all)

- Simple – not very many new competitors, customer changes, new technologies etc. Cause and affect are clear. Here it is more a matter of best practice.
- Complicated – not so easy to know what is the best forward. Cause and effect are separated over time and space, but it is discoverable. Expert diagnosis often required. Here it is matter of good practice.
- Complex – it is difficult to know what is the best way forward. What was a good solution yesterday is not the right one tomorrow. Cause and effect are only clear in retrospective. It is a matter of patterns and emergence.
- Chaotic – it is only a matter of making decision and no real time to think or wait and see. No point in looking for the right answer. There is high tension and high turbulence

3   Innovation, basics

3.1   Innovation has existed as a formal area of priority in our organization since:
- Not yet
- 2010s
- 2000s
- 1990s
- 1980s
- 1970s
- 1960s
- 1950s
- Earlier

3.2   When it comes to innovation, I think:
- It is primarily an outcome
- It is primarily a process
- It is a both an outcome and a process
- It refers primarily to something that that is new to the world
- It can also refer to something that that is new only to our organization
- It refers primarily to something that significantly changes the world
- It can also refer to something that significantly changes our organization
- It is a fairly straight-forward concept
- It is fairly easy to go about it and make it happen

3.3   My organization introduced between 2010 to 2013 introduced any of the following (Check Doblin classification! And can this one be check so that it does not overlap with the ones later on!!!):
- New or significantly improved products into the market place?
- New or significantly improved services into the market place?
- New or significantly improved methods of manufacturing or producing new goods and services?
- New or significantly improved support activities for our processes, such as maintenance systems of operations for purchasing, accounting or computing?
- New or significantly improved methods for sales and marketing, like communication, branding and delivery or distribution methods for our products and/or services?
- New or significantly improved business model?
- New or significantly improved methods for obtaining funding for activities?
- New or significantly improved methods for obtaining new knowledge in terms of network and alliances and/or attracting new staff?

3.4   What is my estimate of the share in the annual revenue of 2013 originates from products and services that were introduced no more than three years prior to the fiscal year in question?
- Less than 1%
- 1% to 5%
- 6% to 10%
- 10% to 15%
- 16% to 20%
- 20% to 25%
- Etc. until 100%

3.5   How many patents have my organization filed for between 2010 and 2013?

- 0
- 1 to 5
- 6 to 10
- 11 to 50
- 51 to 100
- More than 100

3.6 How much of our annual budget is dedicated to R&D approximately (i.e. does not include market research or product testing)?
- Less than 1%
- 1% to 5%
- 6% to 10%
- 11% to 15%
- 16% to 20%
- 20% to 25%
- 25% to 30%
- All the way to 100%

3.7 How much of our annual budget is dedicated to market research or product testing?
- Less than 1%
- 1% to 5%
- 6% to 10%
- 11% to 15%
- 16% to 20%
- 20% to 25%
- 25% to 30%
- All the way to 100%

4   Product and service innovation
Product attributes - How do you design your core services and products?
Product system - How do you create a platform for several products?
Service - How do you add increased value to customers and users around and above your product?

4.1 Between 2010 and 2013 my organization introduced:
- New or significantly improved products? Y/N
- New or significantly improved services? Y/N

4.1   What is my estimate of the number of new products and services introduced by my organization last year that have required changes in the production or delivery of them (i.e. small changes in existing outputs does not apply here):

- 0
- 1 to 5
- 6 to 10
- 11 to 50
- 51 to 100
- 101 to 500
- 501 to 1.000
- More than 1.000

4.2 These products or services (see 3.2) are they new to our company and/or given markets and/or the world at large?
- New to our organization. Y/N
- New to one or more of our markets. Y/N
- New to the world. Y/N

4.3 Who developed these products or services?
- Mainly my organization
- Mainly my organization together with other organizations (enterprises or institutions)?
- Mainly other enterprises or institutions?

291

5 Process innovation

Support processes - How do you support your core process and coworkers?

Core processes - How do you create and add value to your services and products?

5.1 Between 2010 and 2013 my organization introduced:
- New or significantly improved ways for the production of products and services? Y/N
- New or significantly improved ways for our supporting processes, such as maintenance systems of operations for purchasing, accounting or computing? Y/N
- New or significantly improved ways for training staff or acquiring new skills and knowledge? Y/N
- New or significantly improved ways for our logistics and distribution? Y/N
- Important changes in the organization, as a new management structure, integrating different departments or activities?
- New or significantly improved knowledge manage system or a quality management initiative/system or other organization wide policies to better utilize knowledge and competencies?

5.2 Who developed these products or services?
- Mainly my organization
- Mainly my organization together with other organizations (enterprises or institutions)?
- Mainly other enterprises or institutions?

6 Finance innovation (poor name)

Business model – How do you make money?

Network and alliances - How do you take part in alliances and networks with other companies for mutual benefit?

6.1 Between 2010 and 2013 my organization introduced:
- New or significantly improved business models? Y/N
- New or significantly improved ways for joining and engaging in alliances and networks for mutual benefit? Y/N
- New or significantly improved ways for obtaining funding for our activities? Y/N

6.2 Who developed these products or services?
- Mainly my organization
- Mainly my organization together with other organizations (enterprises or institutions)?
- Mainly other enterprises or institutions?

7 Sales & marketing

Sales channel - How do you get your services to the market?

Brand - How do you communicate your services?

Customer experience - What does your customers feel when they use your services?

7.1 Between 2010 and 2013 my organization introduced:
- New or significantly improved sales methods and/or initiatives for getting our products and services to the market? Y/N
- New or significantly improved brand or a way for communicating our offerings to our customers/clients? Y/N
- New or significantly improved customer experience? Y/N

7.2 Who developed these products or services?
- Mainly my organization
- Mainly my organization together with other organizations (enterprises or institutions)?
- Mainly other enterprises or institutions?

8 Innovation activities gone wrong or stopped

8.1 Between 2010 and 2013 my company initiated innovation initiatives that did not live up to its expectations?
- 0
- 1 to 5
- 6 to 10
- 11 to 20

- More than 20

8.2 Between 2010 and 2013, some of the innovation activities where:
- Discarded in an early phase
- Discarded when the development had started
- Discarded in market testing phase
- Very delayed

8.3 The reasons for these attempts going wrong, or deciding not to go through with an innovation project I attribute to (scale from High degree to do not apply)?
- Insufficient funding
- Unclear vision, ambition or objective
- An insufficient innovation strategy
- Poor strategy development process
- Poor execution
- Not sufficient allocation of resources
- Unclear mandates and responsibilities
- Lack of competencies and knowledge
- Shifting market conditions, including legislation

8.4 Innovation systems and learning?
- We have an innovation system that works well? A scale…
- We are good at keeping track of the innovation process from need to customer feedback? A scale…
- We work with performance or progress indicators when it comes to innovation? A scale…
- We have a reward system in place for innovation? A scale..
- We put a lot of effort into evaluation and learning when it comes to innovation initiatives? A scale…

9 Sources of knowledge and capabilities for innovation.
Please indicate how important you deem these sources in the work of identifying, developing or realizing your innovation efforts. Level of importance (high, medium, low or not used)

- Customers or clients
- Competitors
- Consultants
- Private research entities
- Universities
- Governmental entities
- Own organization
- Other

10 Importance of innovation effort
How important would you say that the following effects have been with respect to the innovation efforts between 2010 and 2013?

- More products or services offered to our customers and clients?
- More qualitative products and services offered to our customers and clients?
- Bigger market shares in our existing markets?
- Entered into new markets?
- Reduced cost of production in terms of material and/or energy?
- Improved productivity (including reduced labor costs)?
- Increased capacity of product or service production and delivery?
- Increased flexibility in terms of production?
- Reduced environmental impact?
- Improved health and safety?
- Met regulatory requirements?
- New organizational structure or new ways of organizing the work?
- New competencies obtained?
- New leadership systems?

- New findings around innovation and innovation work and systems?

11 Innovation development

11.1 To what degree would I say that my organization has:
- A clear and communicated vision
- A clear and communicated strategy
- A clear and communicated innovation strategy?
- A dedicated unit for innovation or clear responsibilities?
- A well-functioning innovation system?
- A well-developed and implement leadership style for innovation?

11.2 When it come to developing innovation strategies and processes:
- It is normally something top-management do
- To management dot really do it, but they are engaged and make the decisions
- It is normally a department within our company that does it
- It is normally a mix of functions, competencies and departments that do it
- We don't really do it
- We rely on externals
- It is a mix of externals and internals that does it

11.3 When it come to developing innovation strategies and processes we rely on tools, methodologies and approaches like:
- Pest analysis
- Scenario planning
- Porter five forces analysis
- SWOT analysis
- Growth share matrix
- Balanced scorecards
- Strategy maps
- Capability maturity model
- The disruptive innovation approach
- The blue ocean strategy
- The momentum effect
- The framework from good to great
- Vision and mission approaches
- TQM
- Idea generating techniques like brainstorming
- Internal competitions for idea generation
- External competition for idea generation
- Design-thinking
- Anthropological and ethnographical studies
- Collaborative workshops
- Interviewing customers
- Interviewing employees
- Statistical data
- Gut feelings
- User-driven innovation
- Graphical facilitation approaches
- Cultural analysis's

12 What would be important if you introduced a new innovation next year?
- Cost reduction
- Employee satisfactory or employee turnover
- Improved quality
- Reduced time to respond to customer or supplier needs

294

13 Funding

13.1 When it comes to attracting funding and capital for our innovation efforts we find it:
- Extremely challenging
- Somewhat challenging
- Not very challenging

13.2 We expect that will obtain funding for our innovation efforts from
- Venture capital
- Angel investor
- Private equity
- Corporate investor
- Government grant
- Crowd funding
- Bank

IPO
- Organic growth
- Other

14 Future

14.1 When it comes to next year our expectations are that:
- We will increase our revenue
- We will hire more people
- We will launch new products
- We will enter into new markets
- The business conditions is going to be better than last year

14.2 When it comes to attracting talent and competencies for innovation efforts we will rely on: (Scale)
- Internal
- Other companies
- Schools
- Agencies
- Acquisitions

14.3 In terms of acquiring talent and competencies, we consider: (Important to not important)
- Salary and benefits
- Skills
- Education
- Experience
- Localization

15 Open-ended questions

15.1 In your experience of your organization, what do you think has been most supportive of innovation?

15.2 In your experience of your organization, what has done most to slow done of stop innovation?

Contact information
Please provide contact info if you are interested in receiving the results from the survey. Your identity will remain confidential in all communication of the survey results.
- Email (required)
- Name
- Title
- Name of organization

9.2   Telefónica business presentation

One of the world's leading communications services providers is Telefónica. Its objective is "to create, protect and promote fixed and mobile connections for our customers helping them to take control of their digital lifestyle" (Audit report, 2016: 188). It offer its customers connectivity, simple products and services – hereunder the security to protect their customers' data.

Facts and figures

According to Telefónica's website[105], the company had a consolidated revenue of 52,036 million euros in 2016 (January–December), employed around 125,000 people, operated in 21 countries and had 350 million total accesses.

Telefónica is a fully listed company with more than one and a half million shareholders, and is traded on several of the most important stock markets around the world.

Strategy

On its website[106] the company states that it is "aware of the new challenges posed by today's society". As such they "offer the means to facilitate communication between people, providing them with the most secure and state of the art technology in order for them to live better, and for them to achieve whatever they resolve".
According to the Audit report (2016: 188) the Telefónica Group's strategy aims to:

- Enhance value through:

    o Offering excellent connectivity, for which, our infrastructure management and our continuous investment in network are key. We aim to return the control over the data to our customers.
    o Providing a bundled offer with video and digital services. We offer our customers additional data in order to amplify their services, such as video or digital services, through unique, simple and clear offers.
    o Providing increased customer value and customer experience with digital access, aiming to offer the best products, solutions and contents.

- Enhance the following enablers:

    o End-to-end Digitalization. We reduce our legacy investments to improve virtualization, reduce physical servers, data centers and applications, digitalization of IT systems and processes, digitalization of front- and back office, offering a true digital experience to our customers.
    o Big Data and Innovation to add value to our customers and return the control over data to our customers.
    o Continued focus on capital allocation in our legacy investments and simplification processes in order to continue investing.

The report (Audit report, 2016: 192) goes on to state, "new digital technologies are the main driving force of social and economic transformation today. This premise is the basis upon which we build our vision: we want to provide access to digital life, using the best technology and without leaving anyone behind."

Explaining a bit more, the company points to "connectivity" as the ally in reducing the digital divide. Essentially this suggests that a) digital life is good and b) connectivity is the way forward. Said differently: By being connected you get access to the benefits of the digital life.

Furthermore the company points to a key source of competitive advantage when it says that thanks to its fixed and mobile network infrastructure and the services it has developed around it, it aids progress in the communities in which it operates.

To move towards this vision, Telefónica works on three basic fronts (Audit report, 2016: 192):

- Providing access to technology through digital inclusion, in other words, by means of network roll-out and an accessible and affordable offer for all sectors of the population.

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[105] https://www.telefonica.com/en/web/about_telefonica
[106] https://www.telefonica.com/en/web/about_telefonica

- Developing innovative services that add value to our connectivity and which we develop through innovation: Big Data, the Internet of Things (IoT), eHealth, digital education and eFinances.
- Incorporating sustainability principles to all of our product development processes.

Business[107]

Telefónica defines its business along three lines: Mobile business, Fixed-line telephony business and Digital Services.

Mobile Business

General description	Telefónica offers a wide variety of mobile and related services and products to personal and business customers. The principal services and products are as follows:
Mobile voice services	Telefónica's principal service in all of its markets is mobile voice telephony.
Value added services	Access to a range of enhanced mobile calling features, including voice mail, call hold, call waiting, call forwarding and three-way calling.
Mobile data and Internet services	Current data services offered include Short Messaging Services, or SMS, and Multimedia Messaging Services, or MMS, which allow customers to send messages with images, photographs, sound recordings and video recordings. Customers may also receive selected information, such as news, sports scores and stock quotes. Telefónica also provides mobile broadband connectivity and Internet access. Through mobile Internet access, customers are able to send and receive e-mail, browse the Internet, download games, purchase goods and services in m-commerce transactions and use Telefónica's other data and software services.
Wholesale services	Network usage agreements with several MVNOs in different countries.
Corporate services	Mobile infrastructure in offices, private networking and portals for corporate customers that provide flexible online billing.
Roaming	Roaming agreements customers to use their mobile handsets when they are outside their service territories, including on an international basis.
Fixed wireless	Fixed voice telephony services through mobile networks in Brazil, Venezuela, Argentina, Peru, Mexico, Ecuador, El Salvador, Guatemala and Nicaragua.
Trunking and packaging	Digital mobile services for closed user groups of clients and paging services in Spain and most of its operations in Latin America.

Fixed-line telephony business

General description	The principal services Telefónica offers in its fixed businesses in Europe and Latin America are:
Traditional fixed telecommunication services	Telefónica's principal traditional fixed telecommunication services include PSTN lines; ISDN accesses; public telephone services; local, domestic and international long-distance and fixed-to-mobile communications services; corporate communications services; supplementary value added services (including call waiting, call forwarding, voice and text messaging, advanced voicemail services and conference-call facilities); video telephony; business oriented value-added services; intelligent network services; leasing and sale of handset equipment; and telephony information services.
Internet and broadband multimedia services	The principal Internet and broadband multimedia services include Internet service provider service; portal and network services; retail and wholesale broadband access through ADSL, naked ADSL (broadband connection without the monthly fixed line fee); narrowband switched access to Internet for Universal Service, and other technologies. Telefónica also offers high-speed Internet services through fiber to the home (FTTH) in certain markets (primarily Spain, Brazil and Chile) and VDSL-based services (primarily Spain and Germany). Telefónica also offers VoIP services in some markets.
Data and business-solutions services:	The data and business-solutions services principally include leased lines; virtual private network, or VPN, services; fiber optics services; the provision of hosting and application, or ASP, service, including web hosting, managed hosting, content delivery

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[107] This section is cut and pasted from the company website https://www.telefonica.com/en/web/about_telefonica as well as the Audit report (2016).

	and application, and security services; outsourcing and consultancy services, including network management, or CGP; and desktop services and system integration and professional services.
Wholesale services for telecommunication operators	The wholesale services for telecommunication operators principally include domestic interconnection services; international wholesale services; leased lines for other operators; network deployment; and local loop leasing under the unbundled local loop regulation framework). It also includes bit stream services, bit stream naked, wholesale line rental accesses and leased ducts for other operators' fiber deployment.

Digital services

General description	The main highlights in services developed by Telefónica Digital are as follows:
Video/TV services	IPTV services (Internet protocol), over-the-top network television services, and cable and satellite TV. Advanced pay TV services are also offered, such as high-definition TV (HDTV), Multiroom (allowing clients to watch different TV channels in different rooms), Digital Video Recording (DVR), Multiscreen (all contents in everywhere), CatchUp contents, third party contents and Cloud Video Services (such as Last 7 days, RestartTV and Cloud DVR). In addition, Telefónica offers accessible content with subtitles, audio description and sign language functionalities through the Movistar+ 5s service. The aim is to contribute toward the inclusion of disabled people across the country.
IoT (Internet of Things)	Telefónica Global IoT portfolio services include: - Smart Connectivity: horizontal services including mostly basic users (machines) managed through two different connectivity platforms, SmartM2M (developed and owned by Telefónica) and Jasper (third party developed) - Smart Services: full end-to-end "device + connectivity + application" solutions targeting to four pre-defined specific vertical sectors: Cities, Mobility, Energy and Retail - Personal IoT: set of services, focused on the B2C segment, supporting usual healthcare, safety and fitness practice through different electronic and communication processes (SMS and push messages, web-based solutions, tracking, wearables).
Financial services and other payment services	These services allow final customers and financial institutions to make money transfers, payments and mobile recharges.
Security services	A broad set of facilities (Managed Security, Cloud and Comms Security, Cybersecurity (threats, vulnerabilities and antifraud platforms)) targeting to protect information stored in different end customers' devices and networks from unauthorized access, use, disclosure, disruption or destruction, and including 11Paths developed services such as Latch, FaasT, Metashield or Tacyt.
Cloud computing services	Includes Managed Cloud, which allows us to build fully managed infrastructure environments for large enterprises and also manage the complex tools and applications that run on top of that infrastructure; and in addition, for small and medium sized businesses "All-in" Bundles (Comms+Devices+Cloud). Telefónica is bundling offers based on a Cloud Service Broker that provides a vast self-service experience to the customer and a large set of capabilities, flexibility and a comprehensive commercial offer.
Advertising	Portfolio of marketing channels that third party brands can use to acquire and engage with customers. Traditional channels such as messaging are utilized alongside new channels like programmatic display and sponsored connectivity – all fueled by powerful customer data.
Big data	Includes the product "Smart Steps" which helps retailers, municipalities and public security bodies to understand the influx of people. Anonymous mobile data network and aggregates are used to calculate the influx of people in an area. Telefónica also offers B2B opt-in services to the financial sector (Smart Digits) for improving fraud

prevention and credit scoring in Brazil, United Kingdom and Chile. Recently a Smart Steps joint venture has been launched with China Unicom based out of Beijing to sell data insights in China.

Innovation[108]

Telefónica's innovation strategy can be said to be a balancing act between its own, internal activities and the generation of more network-oriented activities. Its aspiration is clearly stated in the Audit report, (2016:263) as being "committed to technological innovation as a fundamental tool for being one of the main actors in the new digital universe, with the capacity to help to create a more sustainable world while achieving competitive advantages and distinctive products."
This is to be done by introducing new technologies and developing business solutions and processes, in order to become a more effective, efficient and customer-oriented company.

Telefónica bases its innovation strategy on the balance between two main models:

- Promoting internal research, development and innovation (R&D&i) capabilities, for which they have developed their own innovation model, which allows them to promote the application of technical research in developing commercial products and services using the knowledge developed in research centres, technological institutes and universities, among other sources.
- Promoting the creation of open innovation ecosystems, in which the "Open Future" initiative stands out as a global program designed to connect entrepreneurs, start-ups, investors, venture capital funds and public and private organizations around the world, which promote innovation in collaboration with other actors.

This is representative of the company's belief that a competitive advantage cannot be achieved solely by acquiring new technologies. Internal R&D and innovation efforts are key to achieving "strategic differentiation" (Audit report, 2016: 263).

The company has developed an innovation policy that seeks to ensure that the solutions guarantee Telefónica's commitment to developing a responsible business under the criteria of economic, social and environmental sustainability, by:

- Developing new products and services that enable growth and competition in an increasingly global environment, while being adapted to the diversity and local needs of each market.
- Encouraging the return of innovation through open innovation and creating value from the technology generated.
- Increasing our customers' loyalty and satisfaction.
- Increasing the revenues, profits and value of the Company.
- Increasing the quality of our infrastructure and services, as well as our relationship with our technology providers and solutions.
- Improving business processes and operations with the aim of optimizing resources, increasing efficiency and reducing environmental impact.

In addition Telefónica seeks to promote the development of sustainable solutions that generate a positive impact on the economic, social and technological progress of the regions in which it operates. Here it is also pointed out that in order to achieve this a new subsidiary has been created that focuses on product innovation and the development of disruptive technologies. (Note: it is not clear from the document if this refers to Alpha, but the author believes it to be so.)

In such a large company it is not easy to say that innovation only takes place in one or the another entity. However a large part of the innovation activities and projects are carried out by Telefónica Investigación y Desarrollo S.A.U. (Telefónica I+D), hereunder "Discovery" (the leader of which was interviewed in the second round). In addition the entities of Open Future and Alpha can be seen as complementary manifestations of its innovation strategy.

Telefónica I+D

The majority of the innovation activities and projects are carried out by Telefónica Investigación y Desarrollo S.A.U. (Telefónica I+D), which is a wholly owned subsidiary. Its main task is to give support to the different business lines in Telefónica. It receives support from other companies and universities in the execution of its functions. The mission of Telefónica I+D is "improving our competitiveness through technological innovation and product development. Telefónica I+D is also responsible for experimental and applied research and for the development of products to increase our range of services and reduce operating costs" (Audit report, 2016: 264). Or, as it says on the company website:[109]

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[108] Here we look more broadly at Telefónica's stated innovation orientation.

[109] http://www.tid.es/long-term-innovation

The mission of the Telefonica I+D Research groups is three-fold: (1) lead the early stages of the innovation funnel with expert knowledge and scientific expertise, (2) generate intellectual property rights for Telefonica, and (3) create innovative technologies and services that will enable Telefonica to maintain its leading position in the telecommunications market and be a strong player in the digital world as a true innovator.

Its focus is on technologies that are likely to impact Telefonica's service offerings in three to five years' time. Telefónica I+D focuses on three main areas for it innovation activities:

- The development of new networks. These activities are related to new radio and fibre optic access technologies (technologies on the virtualization of network functions.

- The development of new products and services, within the framework of the digital services strategy. The following stand out among these activities:
    o Interpersonal communication of the future with natural access, taking advantage of the possibilities of the Internet and smartphones;
    o Services related to Big Data, regarding the concept of the Fourth Platform, whose vision is to return the value associated with the data it generates to the customer;
    o Video and multimedia services (combining text, audio, images and video) with a user experience on all connected devices;
    o Advanced solutions in emerging ICT businesses, such as cloud computing cloud or security;
    o Management of Internet of Things (IoT) services, related to enriched mobility, energy efficiency and smart retail;
    o Using users' communication profiles to obtain opportunities to exploit different products and business models (marketing campaigns, targeted advertising, contextual services, churn reduction, cross-selling, etc.).

- Experimental and applied research: With a medium and long-term outlook, Telefónica also has "Scientific Groups", whose mission is to investigate the possibilities of new networks and services and to solve the technological, social and environmental challenges that arise.

Telefónica I+D had a little more than 600 employees and a budget of a little more than 900 million euros in 2016. This represented 1.7% of the Group's consolidated revenue.

Open Futures

Open innovation is also a theme within Telefónica. The initiative is called "Open Future". This is a unit that includes an open, global programme designed to connect entrepreneurs, start-ups, investors, and public and private organizations from around the world. The main objective of Open Future is to "detect, develop and enhance the talent and technological entrepreneurship in all its phases, for that which drives and accelerates the growth of ideas, projects, initiatives and companies" (Audit report, 2016: 265).

Essentially Open Futures can be seen as a combination of accelerator and incubator activities – hereunder tech, space, expertise and money. The integral character of Telefónica Open Future enables innovation to be developed in different stages. It is structured around seven initiatives, the objectives of which are as follows:

- Drive (Think Big and Talentum Startups).
- Accelerate (Crowdworking and Wayra).
- Invest (Telefónica Ventures, Amérigo and CIP Telefónica).

At the start of 2017,[110] more that 1,500 start-ups had already been supported. Telefónica Open Future is present in 16 countries, and ended 2016 as one of the main investors in the Spanish area of open innovation, positioning itself as one of the major funds in Europe and Latin America in venture capital investment.

Alpha

Not very much is written about Alpha. Here we will just introduce it brief, to contextualize it and contrast it with other units devoted to innovation and R&D.

Alpha was started in 2016, initiated by its current CEO, Pablo Rodriguez.[111] The full name of the company is: Telefonica Innovation Alpha. It is a smaller unit of around 30 people, and the company is charged with future disruptive technology and innovation (i.e.

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[110] https://www.openfuture.org/en/info/about

identifing and developing moonshots). It is labelled "Telefonica's long term disruptive research unit" and it exists to "solve social problems through technology".[112] In relation to this, it can be said to help the company get the most out of, and ensure maximum growth in terms of digital transformation (El Economista, 2017).

Alpha is still very new and is far from any real breakthroughs. According to El Economista (2017), the technologies it will focus on will be in areas such as voice recognition, touch and visual communications.

Alpha came to be a consequence of the demise of Telefónica Digital. It is set up as an independent unit within the Telefónica Group and should be seen in parallel to The Open Future initiative and Telefónica I + D., although it is separate from these.

The president of Telefónica César Alierta highlighted at the Telefónica Meeting 2015 the strategic plan being carried out to adapt to technological change (El Economista, 2017): "We are living a real revolution and we are fortunate to be at the centre of this revolution. Digitization and Big Data are the key to innovating and giving more value to our customers as well as making better business decisions, a business that has A great positive social impact, contributes to flattening the world and creating wealth and well-being."

Changes 2013–2016

This section begins from the changes that took place on a more structural level as the researcher engaged with Telefónica. It offers a contrast and an illumination to what people experienced and expressed throughout the action research period and the interviews. Furthermore, it provides a description of the process – as well as the rationale – behind the changes that led up to the innovation strategy and organization of Alpha.

In short, to offer an organization context: The action-research was done with the PDI (Product Development and Innovation) unit of Telefónica Digital.

Telefónica Digital was created, complete with its own management team and operational agenda, in September 2011 (Le Maistre, 2014). It was poised to be a hothouse for new digital services, and charged with developing new business plans and opportunities that might otherwise not be conceived within the regular management structure of a traditional telco.
Telefónica Digital was started as a way to innovate in a business that needs to keep up with changes (Le Maistre, (2012a). It is not so easy however for large companies to change because there are many different interests vested in their operation. The core business could carry on as normal, running fixed and mobile voice and data services. Telefónica Digital was given with the opportunity to be different. It was created to push the boundaries of digital service innovation (Thomas, 2013).
Telefónica Digital was, at launch, a business with annual revenues of €2.4 billion (US$2.95 billion) in 2011 (Le Maistre, 2012b). In 2012 it had around 6,000 staff, multiple services units inherited from its parent and annual revenues in excess of €2.4 billion (Le Maistre, (2012a).

In 2014, Telefónica S.A. undertook a corporate restructuring process, which resulted in the carrier's digital operation ceasing to exist as an autonomous operation. The restructuring was done to bring the formerly independent Telefónica Digital business in-house (Donegan, 2015b).
This followed a board decision to centralize a number of operations, "bringing them closer to the corporate decision-making centre, simplifying the global structure... to improve flexibility and agility in decision making," the operator noted (Le Maistre, 2014a).
However, this was not a matter of shutting down an unsuccessful entity. Instead, the operator stated that Telefónica Digital had "duplicated its value" in its last two-plus years, and had "achieved incremental revenues to reach a growth of nearly 20%. In this way, it has become the seed for the Telefónica of the future" (Le Maistre, 2014). But if things were going well for Telefónica Digital, why change? It seems that one of its key strengths – its independence within the Telefónica Group – was also its main problem (Le Maistre, 2014). Located in London it was not close to the core powerbase in Madrid, nor did it have representation among the top management. As such it had to work through layers, which may have stalled its processes and created un-clarity and friction.
As a consequence of this centralization, the previous head of Digital and the manager that the PDI functioned under both left. Digital became part of a new centralized digital services unit under the leadership of Chief Commercial Digital Officer Eduardo Navarro.

Such upheaval does not come without teething pains (Le Maistre, 2014). On the one hand the centralization of management may risk suppressing the exuberance and innovation that characterized the Digital unit. On the other hand, it could also impact staff morale, which then could stifle the flow of ideas and development.
However, telcos need to develop and adapt to the challenges and opportunities of the information society. While they may have thrived in previous eras the core competences needed and roads to success can often change dramatically.

What Telefónica Digital did differently was (amongst other things): to invest in start-ups, develop over-the-top unified communications apps, strike many different partnerships, hire people from non-traditional IT sectors, move KPI from one year or six months to every four months, and award senior managers bonuses based on the number of new products launched (Le Maistre, (2012a). Donegan (2015a)

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[111] https://www.linkedin.com/in/pablorr/
[112] http://rodriguezrodriguez.com/personal-biography/

characterizes Telefónica Digital as innovative, disruptive and downright un-telco-like in spirit. She points out that the same characteristics are still alive and well in some parts of the Spanish giant.

Innovation thinking and methodology

As described earlier, Telefónica has a stated commitment to innovation. There is also a need to get closer to how one works with innovation – not just in terms of strategy, policy and organizational setup, but also how the methodology and process can be described.

According to Ian Small Can (CEO of Communications Services and Product Innovation at Telefónica) big telcos can innovate (Donegan, 2015a). This is actually an important statement because it is sort of the premise of all innovation efforts that follows – the belief that one can do it.
Telefónica is a large company and as such innovation efforts is not pursued through only one channel or setup. They can, in simplified fashion, be divided into external and internal activities. Externally, the innovation efforts are pursued by teams through venture capital (investment) and business ventures; internally, the innovation efforts are catered for by teams looking after networks, data and moonshots (Lopes, 2017). "Moonshots" refers to the projects worked on by Alpha.

Telefónica has tried, and is trying to transform its innovation process by employing lean start-up techniques (Juarado Apruzzese and de Olano Mata, 2014). Or as Dr Richard Benjamins (director of business intelligence at Telefónica Digital) stated (Thomas, 2013): "We use a lean startup methodology. It's not about big products and rolling them out in two years. We put customers' needs at the heart, capture data, talk to them and understand what's working or not."
But there are important contextual differences in employing lean start-up techniques inside a much larger company, as opposed to a start-up (Juarado Apruzzese and de Olano Mata, 2014). In terms of how a company like Telefónica can innovate, Small says that it can't behave like a lean start-up, but must act as a "lean elephant" (Donegan, 2015a).

According to Donegan (2015b), Small has established an "innovation environment" in which to foster the development of new services. It is more risk-oriented and more aggressive in taking things to market than other parts of Telefónica. Here failure is not a bad word.

The way a telecom operator the size of Telefónica can innovate, according to Small, is to create an environment in which innovation can thrive, and then take methodologies from the start-up world and employ them inside the company (Donegan, 2015b). Ian Small (Donegan, 2015b) also speak about the "lean elephant" and says that a "lean elephant is what happens when you apply [start-up methodologies] inside a company the size of Telefónica" and goes on to say that he "strongly believe that if you're a company the size of Telefónica, you can't be better at being a startup than a startup can be. You just can't."

The variety of this approach (as described in Donegan, 2015b) can be seen in the different go-to-market strategies in the Communications Services group: Tu Go is a Telefónica O2-branded application, TokBox is an independent subsidiary, Tuenti operates as an independent brand in Spain and Latin America, and Firefox Hello is a partnership with Mozilla.

Donegan (2015b) says it is difficult to measure in traditional ways how well Small is doing because specific business metrics for the Communications Services unit are not available. On the other hand, much of what he and his organization are working on at Telefónica is maybe difficult to evaluate. This is because much it is about changing culture and introducing new ways of working to blend the best of both the start-up and telco worlds.
What Small and his approach to innovation represents is knowing "how to invent the future working in very tight cycles, validating and experimenting with users every step of the way" (Donegan, 2015b). This clearly indicates that he is no supporter of the secluded development way of thinking.

Patrick Lopes, VP networks innovation at Telefónica Steering Committee, states that innovation is a process and a methodology at Telefónica (Lopes, 2017). He goes on to say that the process, which is essentially to employ lean startup techniques (Jurado Apruzzese and de Olano Mata (2014), has been the "source of Telefónica's early advances in IoT, big data, smart cities...It has also killed, merged, pivoted and spun off hundreds of projects". Lopes (2017) goes on to outline the innovation process more in detail, with regard to the practice of a large telco like Telefónica in a fast-paced environment:

- Ideation
  This phase revolves around ideas, but the ideation is directed. This means that different sources of input – for instance customer sentiment studies – form the basis for an innovation call around particular themes. "Artificial intelligence and networks QoE" is launched across the group, with local briefings that include our selection parameters. A jury reviews the hundreds of ideas and the most promising ones are shortlisted. The selected entrepreneurs are given a month to prepare a formal presentation (a pitch) of their idea. Customer experience specialists help them refine the problem they are trying to solve, as well as the idea's applicability and its market appeal.

- Feasibility

If the idea is selected after this phase, the entrepreneurs move to the innovation team. There they work full time for a few weeks to create a feasibility plan and preliminary resource budget for prototyping. When this is ready, the project/proposition is presented in detail to the jury.

- Prototyping
  The selected projects are given resources and three to eight months to prototype their project. When the project has reached this stage, it must demonstrate strong internal sponsorship, with verticals or markets within Telefónica. The sponsors commit to testing the prototype in their labs. Finally, the prototype, together with the value proposition and market analysis, is examined before it goes on to the next phase.

- Market trial
  This phase can last for up to six months. At this stage, the prototype is tested in a commercial arrangement. The testing and subsequent refinements follow a step-by-step approach whereby the number of users and sophistication increases so as to measure the effectiveness of the value proposition. In this phase, a full product (or service business) case is completed based on the feedback from the market trials.

- Productization and transfer
  Here the project is evaluated to see if it should be transferred to an existing business unit, or become a new one. Questions to be addressed are for example: Does it meet customer requirements? Is it innovative? Does it offer differentiation? And does Telefónica have a comparative advantage in terms of this solution?

9.3   Telefónica consultant (action-research) contract

Research and Innovation Rethink

A Proposal for Strategy and Leadership Development with Telefónica in Barcelona
June 2013

Background
The KaosPilot is a self-governed education and consultancy institution situated in Aarhus, Denmark, with the sated purpose of bringing "Positive societal change through personal growth".
In order to fulfill its mission, the KaosPilots runs educational programs for individuals and offers consulting services for organizations, in most cases in the format of workshops designed around a specific client need.
After two workshops and several conversations held during the last months with Pablo Rodríguez and Oriol Lloret, from Telefónica I+D, they have expressed a desire to enter into a framework agreement around the continuous development in order to apply predictability and administrative efficiency.
The two workshops conducted has been oriented around finding a common ground for the future work, better understand "how things are" and identifying indications of future areas for development

Intention
The intention of the collaboration is to help Telefónica I+D to formulate strategy and develop leadership capabilities.

Desired Outcome
Developing and formulating a purpose and supportive principles.
Identify a direction and a strategy formulation.
Re-think the unit, feasibly the scope and range of its work.
An understanding of the organizational culture and strategies for development.
A more effective leadership practice.

Agenda
There is a certain uncertainty to how precise one can describe the actual desired outcome and scope and range of the workshops as of now, since the time frame is fairly long. That means that they may be subject to changes, based on the needs and challenges as described by the client. Per now the overall plan is as follows:
Foundation. Purpose and principles in place. Scope and range of the units work.
Opportunities and challenges for strategy/direction (interviews).
Decision framework. Exploring directions. Opportunities and challenges.
Organization and structure.
Brand. Product and services. Telefonicá the client/enabler/provider.
Leadership conversations. The next practice.
Note. There might be a need for work in between the workshops on behalf of the client (i.e. the participants).

Roles and Responsibility
Pablo Rodríguez is the client, and the target group is his management group and some senior staff members. From time to time this group may be subject to change. Their main responsibility is to develop the "product" (i.e. the strategy, principles, understanding, decisions etc.).
The Kaospilots are represented by Christer Windeløv-Lidzélius and Ricard Ruiz de Querol. They are responsible for the process, i.e. designing the "journey", deciding upon the "how" – in conversation with the client.

Time (and place)
The time plan may be subject to change on both parties account, but in principle this is the setup:
All workshops are done in a one-day format, and are conducted between 0900-1600.
All workshops are conducted in Barcelona.
All interviews are conducted over phone or Skype (or feasibly in Barcelona).

The tentative outline of dates are as follows:
June. Workshop.
July. Interviews.

September. Workshop.
December. Workshop.
March. Workshop.
June. Workshop.
June interview

Price
The sum for the full project is € 50.000 (if VAT is applied that will be in addition). That will include travel and accommodation (for the facilitators/consultants – not Telefónica staff), preparation, execution and debrief (wrap-up/report-writing), hereunder 1 hour of interview per person (note. Feasibly an additional will be done in the spring 2014).

Research and Innovation Rethink Session: a Workshop with the Kaos Pilots in Barcelona

March 14th 2013

About the Workshop

pablo wants to have an impact in telefonica through innovation

Background

The workshop was commissioned as a first step in a process of rethinking the entire research and innovation headed by Pablo Rodríguez. This was meant to potentially include the strategic focus, the culture and the organizational setup. As expressed by Oriol Lloret in conveying the meeting, it was meant to "step back, look at what we have with a fresh and open mind and find ways to further engage and raise enthusiasm in the whole PDI organization and beyond".

The workshop took place on March 14th 2013 in the premises of Telefónica in Barcelona. It was conducted by Christer Windelov-Lidzélius, the principal of the Kaos Pilot, with the help of Ricard Ruiz de Querol from Arquetip Lab, its representative in Barcelona. The full list of participants from Telefonica's research and innovation unit is included as Annex 1.

A summing up session, with a more reduced attendance, took place the following day.

The objective of this document is summarize the main points of the workshop and its conclusions, as a reference for further steps in the future. Pictures of the documents produced are inclosed as annexes.

Structure of the Workshop

The workshop was designed to focus on creating a common understanding (of the current situation), setting a direction and clarifying the challenges of the change processes being undertaken. It included an introduction by Pablo followed by group exercises around the following topics:

- What did we hear? Which were the questions arising?
- The individual motivation of the participants (a card game)
- Moving towards the 'we'. Successes and criteria for success
- Qualities / Strengths that brought about these successes
- The cover story: An exercise in imagining the future
- A summary exploration of opportunities and challenges

For most of the exercises (excluding the third and the last one) the participants were divided into groups. After each one of the exercises there was time for sharing and discussing the results.

The results of each session, along with a picture of the output produced and summary comments, are included in the Appendices. What follows is a summary of the conclusions of the whole workshop, including some of the insight shared during the recap the following day.

307

What we have found

About the group

- A good group, motivated, committed and capable.
- A widely shared sense of satisfaction, proud, privilege of being part of Telefónica and of that team in particular.
- Very much aligned around the concept of a 'Digital Telco' and the goal of 'transforming Telefónica' (although the precise meaning of those was not expressed in detail)
- In their individual expressions about their ambition, most of the team members went beyond Telefónica, mentioning their desire of making a difference in the word.

About the work being done

- Clear conscience of a break with former stages of innovation within Telefónica. Feeling to be at the beginning of a journey. Less clarity about the destination of the journey (beyond the products and services that they wish to create).
- There were fewer mentions to concrete products/services than we expected.

  This was somehow surprising when taking into account some of the remarks from Pablo's initial speech ("We like to create new things", "We like listening to people and understanding their needs", "We like to put something on people's hands and see them smile"). Few of those user-related 'emotional' characteristics emerged during the workshop.

- The team recognizes the role of Pablo and Carlos in creating a space for innovation inside Telefónica. But they would like to have more entry points at a lower level to Telefónica's organization (to 'lubricate' the relationships with OUs, to have more clear inputs about the business impact, etc.).
- Breaking the silos between groups is widely seen as positive
- There were mentions about the need to be innovative in different time frames.

  This can maybe be linked to the diversity of the criteria for success mentioned (patents, publications, pilots, commercial launch, understanding new industries, press coverage).

About the future

- The results of 'magazine cover' exercise focused on the results of the transformation (the 'digital telco') and somewhat in the 'how', but less on the 'what' (stories about the products/services, the benefits for the customers, the improvements on competitiveness, even about the financial impact).
- The theme, brought upon by Pablo in his initial opening, about his vision of the innovation unit ceasing to be necessary, with its qualities permeating the whole of Telefónica did not re-appear during the exercises.

- Some demands for 'more clarity' about goals, criteria for success and strategy appeared (e.g. 'Telefónica has done well in the past as a fast follower. What kind of innovation is now needed?').
- Questions about 'how to best share our sense of opportunity with everyone else'.
- Some doubts about 'how to manage uncertainty'.
  The consequences of the request for 'liarla parda' from J.M. Alvarez Pallete did not appear. What dose of 'activism' is reasonable? There is not a predictable system to handle uncertainty.

From the recap session

- The group is still very young. The workshop was the first time that the people attending met in the same room.
- Everyone is in the same floor, but maybe not looking through the same window. Even when looking through the same window they might be seeing different things.
- "We are probably more capable than we think".
- "Diversity is good if people understand what the others are doing". A lot of details are still missing.
- There is a clear sense of commitment; maybe not so much a sense of belonging.
- It might be convenient to explore how to create some 'sense of security' around the context of insecurity.
  - What type of leadership do you expect? Need? Exert?
  - How much insecurity can you endure?

Annex 1: List of participants

From Telefónica

- Pablo Rodríguez
- Oriol Lloret
- Enrique García Illera
- Pere Obrador
- Maria Olano
- Susana Jurado
- Lars Stalling
- Konstantina Papagiannaki
- Juan Carlos Valverde
- Xavier Capellades
- Linas Baltrunas
- Rodrigo de Oliveira

From the Kaos Pilot

- Christer Windelov-Lidzélius
- Ricard Ruiz de Querol

Annex 2: What did we hear? Questions arising

Selection of results

- Things have changed for the better, but could change more.
- How do we define success?
- What does innovation really mean? Providing solutions to new problems? Finding problems for new solutions? Need to align around innovation goals.
- Does innovation matter at all (for a fast follower as Telefónica)?
- Need to be innovative in more than one time frame.

- We are a terrific team. But we cannot do it alone.
- How do we transform culture?
- How close do we need to get to the business?
- How do we share this sense of opportunity with everybody else?
- How to impress people? Is that everything we want?
- How to navigate uncertainty?

- Pablo is doing too much.

Annex 3: Successes and criteria for success

Paul S. joined & was looking for people
First try to change (Nortel??)
⇒ no real understanding

|2006| → Carlos joins
contacts internal people < finance >

|2007| → Pablo & Oriol joins   ⎤   1st | CREATI
         Then Nuria   ⎥ Innovation | OF
                                    ⎥   Call | RESEA
                                    ⎥ | TEA
2008 → Pere joins   ⎦
2009 → NEW WAY OF WORKING FROM BCN
2010 → Carlos CEO @ TID / CDN TAKES SHAPE CMU

2011 → CREATION OF EMERGING TEAM / DINA JOINS

NOV 2011 → PDI IS CREATED (TEF DIGITAL CREATED.
         NEW WAY OF WORKING LINAS JOINS
2012 → RUNNING THE WHOLE INNOVATION BUDGET.

SUCCESS

RESEARCH 2007-2012 → 200+ international applicants
→ patents have been increasing. (IN 2012 more patents than in history)
→ publications, awards
→ academic visibility

| | | CRITERIA |
EMERGING : 50% of of → PATENTS   BBVA |
                                        LABORAL (GRAND | → LAUNCH
         BRAVO AWARD.   CHALLENGE) |
                                        (MARACO CLASSON) |
         AGBAR, RACC CAME TO US | → PILOT
         FERRAN, BARCA |
         WOITEK (CL) → GREBEI BETTER TRACTION | → PRESS COVER.
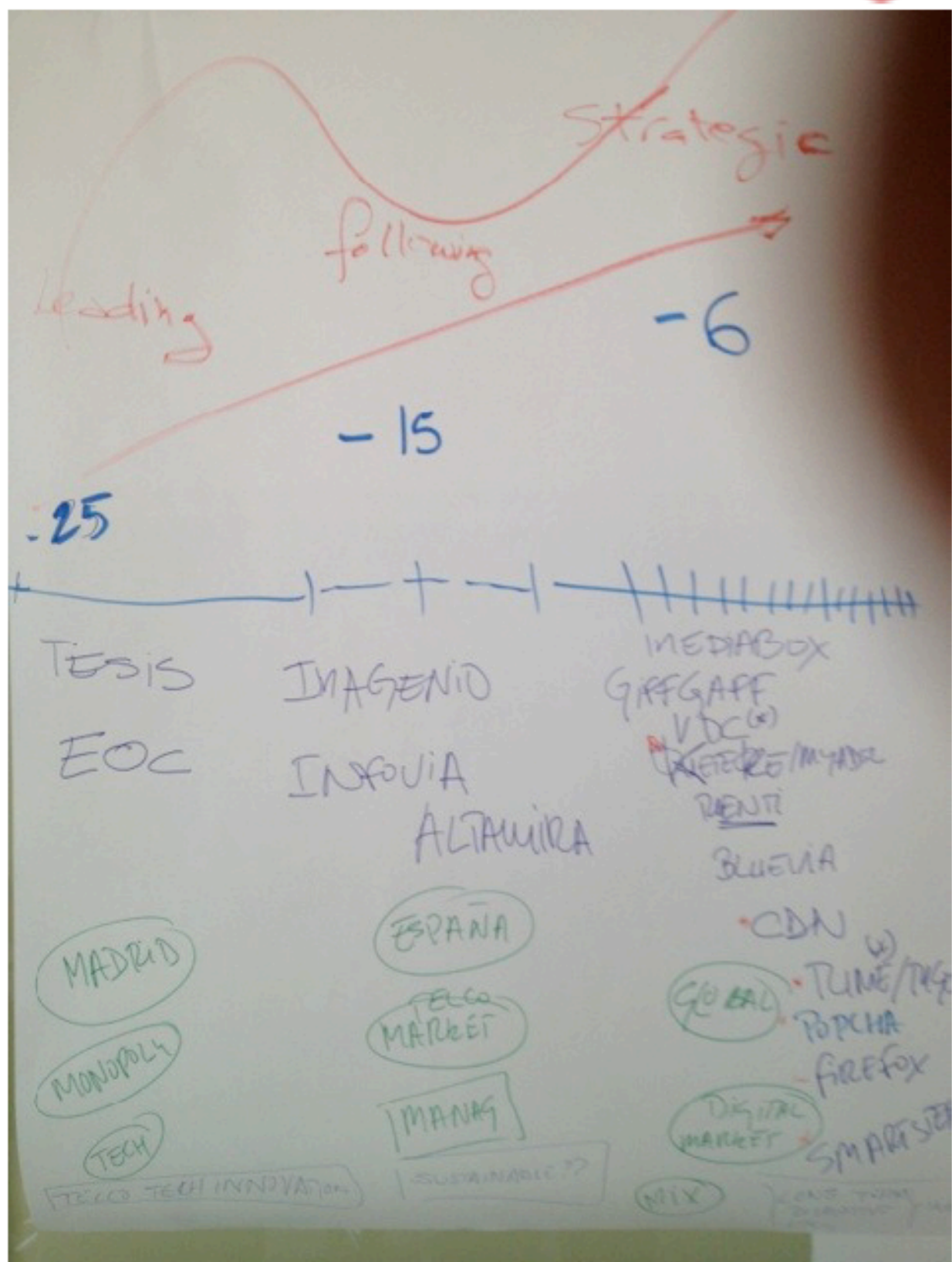PRODUCTS : CDN |
         GIFFGAFF | → PATENTS
         BENIFI / THINKING THINGS / 5G SHIELD |
         APOLLO → ENTERPRISE PRODUCT < LESSONS LEARNT? > | → PUBLICATIOS
         FRAMES → OOB BUT ANOND CLASSON? > |
PRESS : - UNITED NATIONS | → # NEW INDUSTR
         - FORBES | UNDERSTAND
         - FINANCIAL TIMES | AS A PARTNE
         - WIRED |

CRITERIA
- BIZ ENGAGEMENT
- CULTURAL / ORGANIZATIONAL CHANGE
- IMPACT — PR
  PRODUCT → MKT

2008   2009   2010   2011   2012   2013

                                    10F
12000   TID   BLUEVIA CARBON TD   PD
                                    (SPINOFF)

NEW WAY NEW WAY   GITFGAFF   THE   CDN   TUGO
OF WORKING OF   LAB   (RESEARCH   OLD
IN L2B0 WORKING   FROM   (INTRAPRE- → PRODUCT)   FIELDS
         ACROSS TID   SUPPLIER   NEURSHIP)
                          TO STRATEGIC   GEOGRAPHIC
INNAGENIO RESEARCH   PARTNER   TUME EXPANSION
         ACROSS   EMERGING   BRAZIL
         ALL TID AREAS UPSI   AREA   SPAIN
                                                     FOR DOX
                                    → UX   UK

         GASSET   INNOVATION
                                             CENTRALIZATION
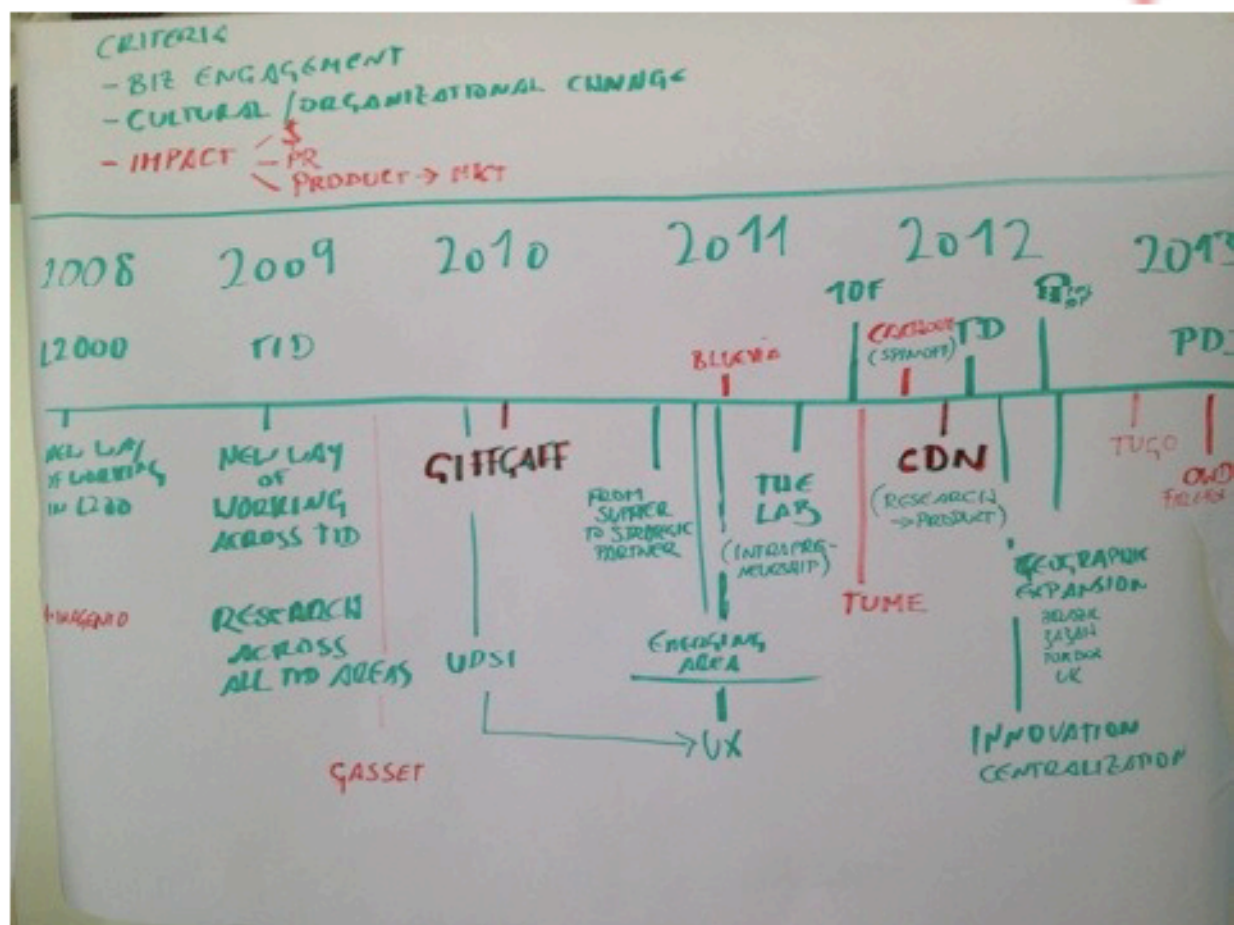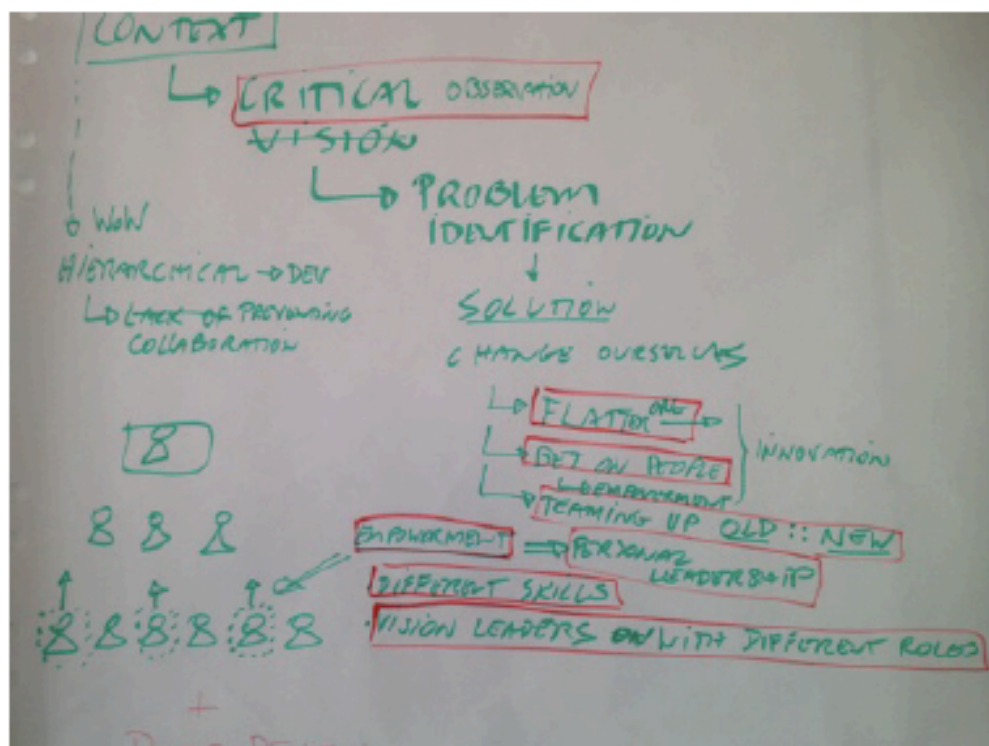
Comments

We found interesting that

- CDN and the mobile Firefox were spontaneously mentioned as the most successful products.
- The organizational changes and the recruiting of key people were also considered as milestones of success.

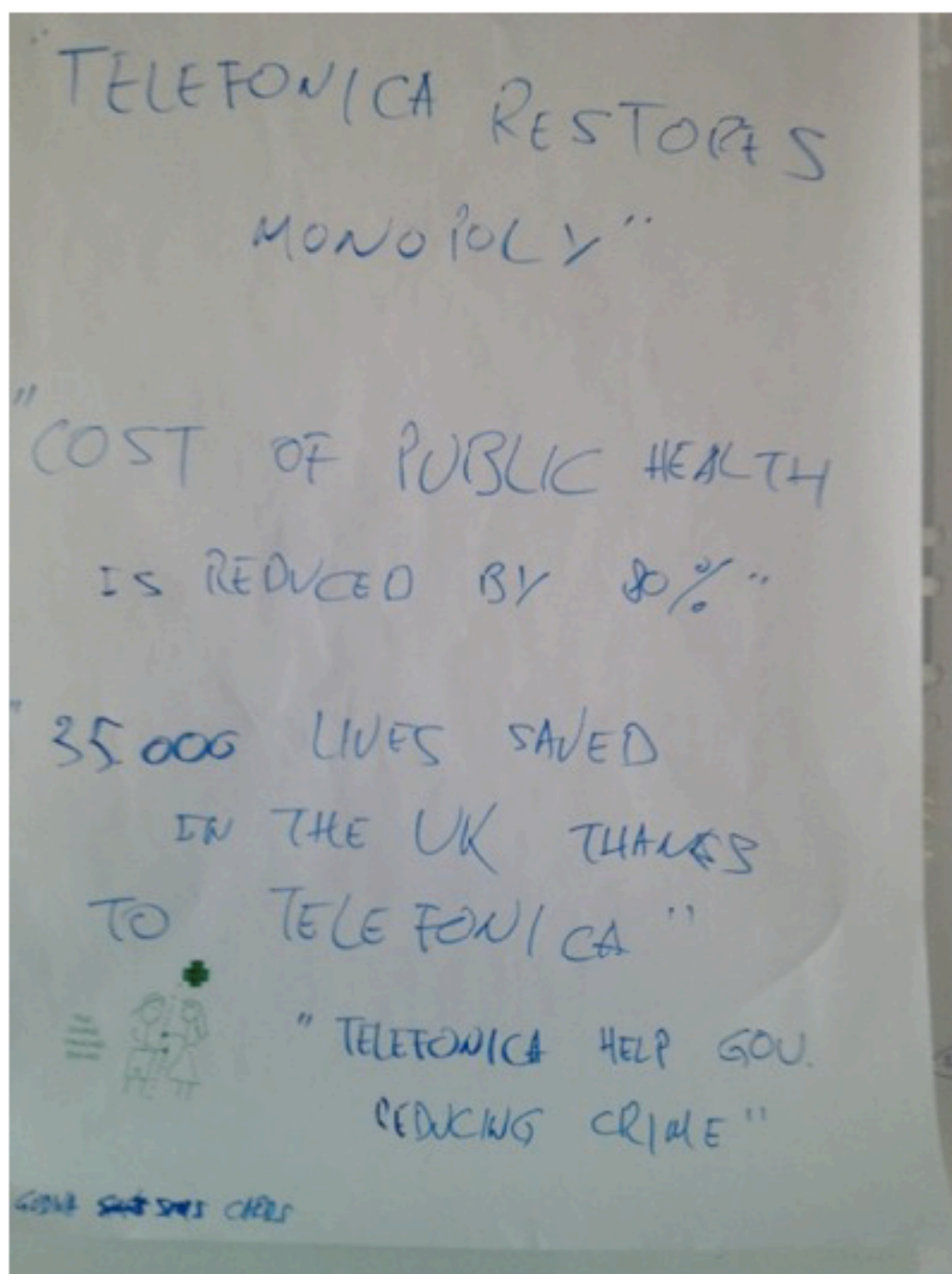# Annex 4: Qualities & Strenghts
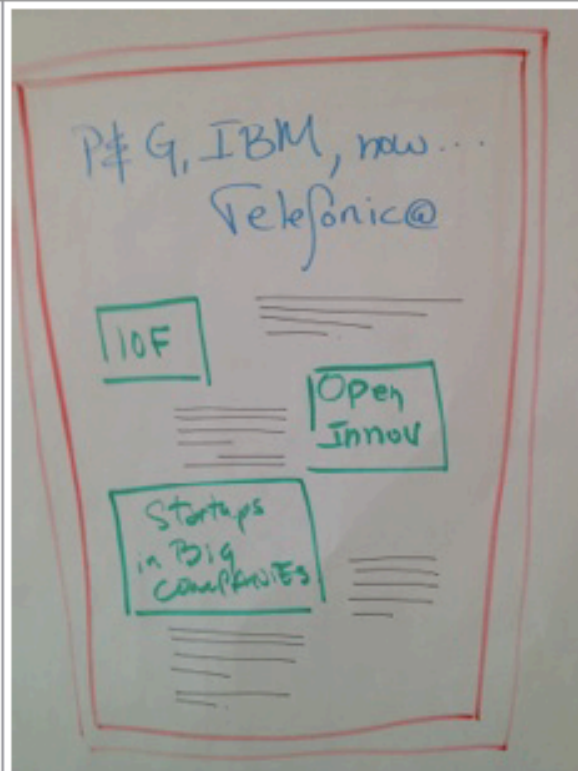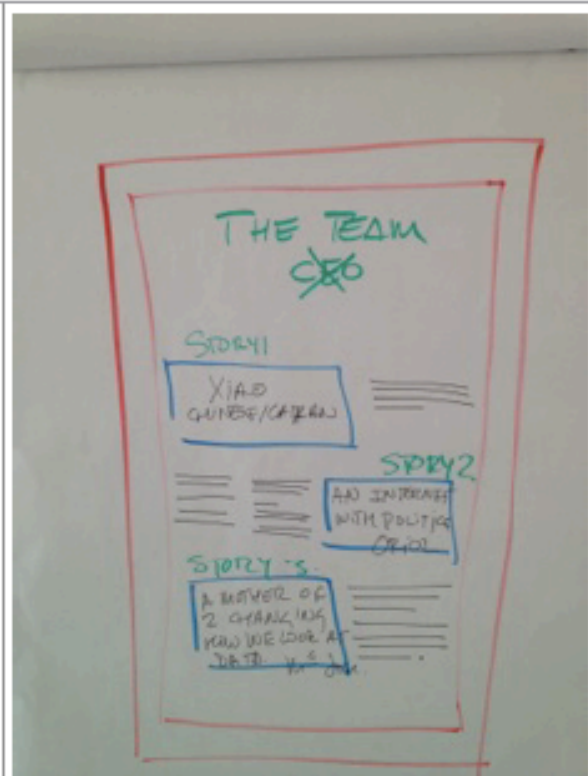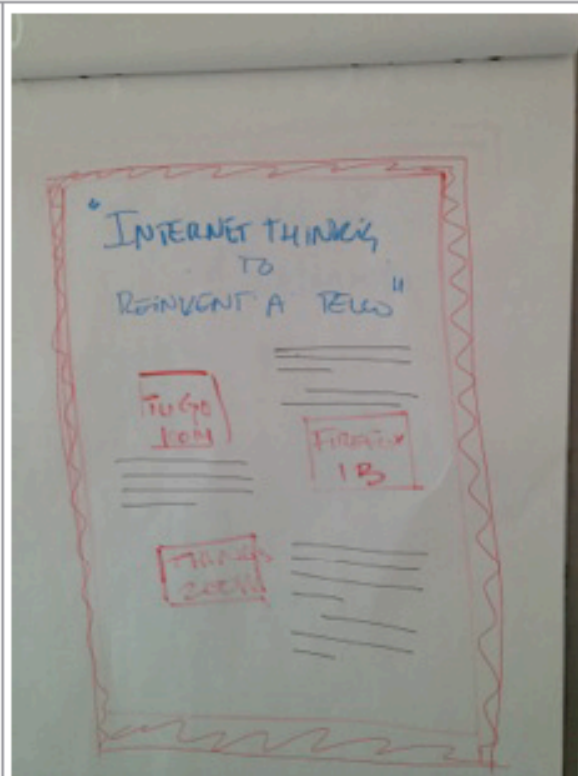
Annex 5: Cover story (Imagination)

The participants, divided in three groups, were asked to imagine a cover story, images and headlines of a magazine issue covering the future success of the team, providing the image below as a suggestion.

The results of the three teams are reproduced below.

Team 1

Team 3

Annex 6: Opportunities and Challenges

The participants were asked to write individually in a piece of paper the three bigger opportunities and the three bigger challenger they perceive for the future of the unit.

This was the last exercise. Very little time was allocated for it, and the results were not shared by the participants. The results are summarized below.

Opportunities

- Lead the way in which Telefónica (Digital) becomes a 'Digital Telco'
- Develop products with other companies, reducing the time to market

- Make people's life easier
- Improve people's life by becoming best in user profiling. Helping people to grow with their data.
- Make a true impact in society (thru the business)
- Leadership in the "Internet of Things"
- Build the "Next Big Thing"
- Become the 3rd world wide player in mobile business along with Mozilla Foundation (Firefox)

- We are part of a really big organization with the resources to create products and enable complete ecosystems.
- Become one of the best places to work

Challenges

- Convince the Telefónica OB's to get on board
- Skepticism in the mother company about our ability to deliver
- Build a real reputation in the digital world
- Increase impact
- Revenues from the traditional telco business disappear then the time needed to turn around Telefónica

- Cultural transformation towards an innovative organization (internal collaboration, resilience, trust, ...)
- What to prioritize and under which criteria
- Be innovative and have impact on different timelines

- Strength of competitors (e.g. Google getting into the telco business)

319

There was, as with other exercises, a fair degree of alignment among the members of the team, more so taking in account that it was an individual exercise with little time available.

It is therefore reasonable to expect that the results, specially the description of the opportunities, would have been more specific if the exercise was pursued further.

9.5   Invitation letter to SMEs for the survey

The invitation

Title: Interested in Innovation and Leadership in Complex systems?

Subtitle: An invitation to join a research study and get a chance to examine your situation in the light of others.

Dear member
In an effort to increase the knowledge around innovation policies and praxis's Tilburg University, Taos Institute and Kaospilot is conducting a research study (to be included in a PhD) with a selected target audience. Your input can help us deepen the knowledge around Innovation and Leadership in Complex systems. The findings will be made available for you and the hypothesis is that it will help you better understand how strategies and leadership for pursuing innovation is designed and realized. We estimate that it will take you approximately 20 minutes to complete the survey.
Simply click on the link below, or cut and paste the entire URL into your browser to access the survey:

We would appreciate your response by Monday the 16th of July 2014.

Your input is very important to us and will be kept strictly confidential (used only for the purposes of research for this project).

If you have any questions please call us at +45 27116030 or email me at christer@kaospilot.dk

Sincerely,
Christer Windeløv-Lidzélius
Principal
Tel. +45 2711 6030
LinkedIn: dk.linkedin.com/in/lidzelius
Twitter: www.twitter.com/lidzelius
Filmbyen 2
DK- 8000 Aarhus C
Tel. +45 8612 9522
www.kaospilot.dk

9.6   List of interviewees 2013

Name	Location	Role	Reports to
Konstantina Papagiannaki	Barcelona	Scientific	Pablo Rodriguez
Nuria Oliver	Barcelona	Scientific	Pablo Rodriguez
Oriol Lloret	Barcelona	Early innovation	Pablo Rodriguez
Susan Jurado	Barcelona	Innovation process	Oriol Lloret
Maria de Olano	Barcelona	Innovation process	Oriol Lloret
Laura Linares	Madrid	Human resources	Pablo Rodriguez
Xavi Capellades	Barcelona	New products	Pablo Rodriguez
Juan Carlos Valverde	London	Products	Pablo Rodriguez
Ariane Van de Ven	Barcelona	Trends	Pablo Rodriguez
Pere Obrador	Madrid	Open innovation	Pablo Rodriguez
Lars Stalling	Barcelona	Design	Pablo Rodriguez
Enrique García Illera	Barcelona	Big data	Pablo Rodriguez
Ramón Sangüesa	Barcelona	External advisor	Oriol Lloret

9.7 List of interviewees 2017

Name	Location	Role	Organization
Pablo Rodriguez	Barcelona	CEO	Alpha
Oriol Lloret	Barcelona	Head of unit	Telefonìca I+D
David Armengol	Barcelona	Head of HR	Alpha
Jon Stanners	Barcelona	Head of recruitment	Alpha
Ricard Ruiz de Querol	Barcelona	Consultant	Independent

9.8   Interview guide 2013

Christer Vindeløv-Lidzélius <lidzelius@me.com>
Para: Ricard Ruiz de Querol <ricard.ruizdequerol@gmail.com>
Re: interviews, follow up etc.
17 de julio de 2013 17:39

Hi Ricardo

OK, now I am back from the monocle thing. It has taken all day, but I hope it is worth it-;). I have a good feeling i must say. And I mentioned Barcelona.

In terms of the interviews, my thinking follows what I tried to outline in the word document I sent you earlier today. Key point is that it is not a given structure per se that has to be followed, it can be more indicative and allow for individual excursions.
The purpose is exploration, discovery and meaning making. perhaps we can divide the setup in certain areas, which could also function as a step-by-step process.

Setting the stage

It is clearly important that we start off by being sure that all people know why we are doing this and explains how the interview will unfold.

- The purpose of the interview is to learn more about the work we are doing, you and your take on the process that we are part of, as well as allowing you to understand more about us, the process and not the least yourself.
- The interview will be taped and will be done in English. It is confidential as such but you may do with the findings as you deem fit. We will probably summarise it all and use it as a foundation for the coming work, not the least use the summary as a starting point for generating collective meaning.
- Me Ricard will do the interview, but it is as such done in cooperation with Christer.
- We will talk about different things during this hour or so, but there are some overall areas:
* You, your work, your perception of your work, assets/strengths, challenges etc.
* Your unit, what part does it play, what works well, what value do you create etc.
* Opportunities & challenges
* The process that we have done so far, what is your understanding of it, why do we do it, how is this valuable, what is needed etc., where are we heading etc.
* The purpose.
* Principles.

You

- Tell me a little about yourself; who are you, what is your job, how long have you been here etc.?
- In term of your job - what is it, what are your responsibilities?
- Who do you report to and who is the recipient of the value you create?
- What is the value you create and how do you it?
- From your perspectives, what is important for doing a good job and what is a good job in that sense?
- What do you deem to be your strengths, what do see you contribute with - what could utilised even more?

Unit

- How do you view your unit? what does it constitute?
- What value do you produce and for whom?
- How is success measured (is it?)?
- If you would point out the areas where you see you are really strong, what would they be?
- What works really well at your unit, everything from internal procedures around purchases, to level of empowerment, to communication to…?

Future

Based on what you see your units and your job and function, can we discuss more around the future?
- What do you see as big trends that impact your work?
- What is your sense that the company as such is heading and how is your unit positioned in that work?
- What do you see as the biggest (3?) opportunities for your unit in the 3 to 5 years?

- Please elaborate more in detail here, time horizon, how come you see this as an opportunity, consequences etc. for you, what can/should you do more off etc.?
- Challenges, what are the big three as you see it - how come, how can they be countered, what happens if we do nothing about them?

Process

As you know we are in the middle of creating a new strategy as well as building up the leadership capacity in your unit…
- What is your understanding of this? is it needed? how come etc.?
- This process, how would you describe it, what is clear vs unclear for you?
- What has been lacking from your perspective, what is hindering the process and what is supporting it?
- What is your appreciation, expectation and desire for the end result - where would you like to be next summer?

Purpose

We now have a purpose, a draft purpose, a purpose 1.0 if you want. but it is there and we have all been part of this process and result.
- How do you see it?
- What does it say to you?
- How does it make you feel?
- Alignment with what we have talked about so far? ownership etc.?

Principles

We you know we have talked about this is an import next step for us, not only in terms of setting the direction for future outcomes, but also as a way create culture, support development and execution etc.
- What is good leadership for you?
- What do you value in leadership?
- What do you need in order to work really well?
- What does your co-worker need do you think?
- What characterises your leadership style? how is that compared to others in your unit vs in the company do you recon?
- In order to make the purpose a reality, to really be lifting your unit a step - what kind of things are important? What values, behaviours, rules etc. do we need?

Learning
This conversation is soon to end, but i am curious about what you have gotten out of it.
- How was it?
- Any key takeaways from you? How come?
- What did you discover in this talk that you may not have been conscious about earlier really?

Ricard, something like this i recon. Hhould we talk say 0930 tonight?

Best
C.

9.9   List of participants in the focus group

Name	Role	Organization	Came?
Anders Drejer	Professor	Albrog University	No
Kim Klastrup	Head of Branding Globally	Grundfos (retired)	Yes
Peter Elvekjær	Head of R&D	Grundfos (retired)	Yes
David Gram	Senior Innovation Manager	Lego (just left)	Yes
Jacob Høj Jørgensen	Senior consultant	Delendorff	Yes
Thomas Mathiesen	Senior advisor	Innovationsfonden	Yes

A small note. Both Kim and Peter are highly active in other companies on the subject of innovation.

9.10 Introduction paper to the focus group

Focus group, innovation board

This paper provides a presentation of the coming session – its purpose to participants – a presentation of the research, a description of the case study and the findings, and questions to think through before joining.

Page I	Summons and agenda
Page II	Questions for the focus group to think through
Page III	Research presentation
Page V	Main Findings

Purpose
To reflect and discuss the preliminary results from the research

Desired outcome
When we say goodbye, we should have:

- Unfolded the findings
- Deepened the learning
- Enhanced the results

As such there should be a more comprehensive and nuanced understanding of the research question and the "answers" and "questions" that have come about.

Agenda (tentative)
1215	Lunch
1245	Start, introduction and presentation
1300	Discussion I
1345	Break
1400	Discussion II
1445	Break
1500	Discussion III
1545	Wrap-up, final comments
1600	End

People
- Anders Drejer
- David Gram
- Jacob Høj Jørgensen
- Kim Klastrup
- Lemmy Jensen
- Peter Elvekjær
- Thomas Mathiasen

Note I. Our session will be recorded, but not distributed to anyone.
Note II. The conversations will be transcribed and here the names will be disguised.
Note II. I hope all is comfortable with doing this in English. If not, please let me know.

Questions

9) What is your notion of innovation and how do you experience the notion of innovation in your work with different organizations?

10) What does success look like and how is that articulated, both on an overall and a more local level?

11) What is your opinion of effective frameworks, methods and tools that are used to bring forth innovation and are there certain frameworks etc. you see often being used that you consider not being effective?

12) What can be said about notions of leadership in terms of innovation when it comes to role, style and distribution?

13) How do organizations organize themselves in order to bring forth innovation and how could that be understood in terms of autonomy, identity and ways of working?

INNOVATION IN COMPLEX SYSTEMS

- A study through the lenses of strategy, leadership and organization

The research question
"How does organizations develop and implement strategies, leadership and ways of organizing for bringing about innovation in complex systems?"

Research description
The empirical research has been explorative where findings generate questions that are brought onwards, through a combination of qualitative and quantitative research – with the emphasis on the qualitative research. It has been a single-case study.
It has contained a number of forms of research 8apart from literature and secondary sources):
- An open quantitative research with responses from 103 subject matter experts
- An action research with me as a consultant stretching for 1,5 years
- 13 qualitative interviews with the team I worked with in the action research 3 years ago
- 5 -6 interviews in January 2017

Case study presentation
Telefonica is one of worlds largest telecommunication companies with €60 billion in revenue, and 100.000 people employed, operating in 60 countries – primarily in the Spanish speaking part of the world (but also in UK as O2 for instance).
The research started off with the R&D unit of Telefónica Digital in Barcelona called PDI (which means Product Development and Innovation). Essentially it was centred on how to increase capacity for innovation and leadership in the group, consisting of approximately 200 people. Then massive changes came along around 2 years ago where amongst other things the whole division of Digital (€8 billion in revenue) was closed down or transferred into other existing business areas at Telefonicá. Many reasons for this but much had to do with digital becoming a premise for the business and not an area as such. This meant changes also at PDI.
After some time in limbo, the unit was distributed into many different directions and a small core with the former second in command at PDI now taking over it and the former leader being charged with establishing Alpha. Alpha – its context, rationale, aspiration and functioning becomes my key focus then.
So in short, my case study has followed the transformation of PDI into Alpha.

A brief contextual analysis
In the US there are 3 Telcos, in Europe there are 47 approximately. The competitive landscape has change dramatically in the last 15 years, where competition also come from organizations like Facebook and Google and the uncertainty of phenomena such as Internet of Things, digitalization etc.
Today Telefonica pursue something that can be interpreted as a 4-platform strategy (as well as the more usual suspects in terms of better products, acquisitions, new markets etc.). The first and second platform is very much the classical Telco setup – cables and antenna etc., as well as the systems that make them run. They have been very challenged by the likes of Google etc. who have entered directly into the third platform – utilizing the first two without the associated cost structures – offering services and products who are more attractive and potentially more profitable (i.e. not restricted through legislation). The response has in part been to try to invent a fourth platform trying to cap the third by introducing qualities such as "security" and "privacy" etc. as new entrances and gate keepers. The success of this is still uncertain.

Innovation at Telefonica
When I started off, in a lunch with one of the board members he said, "innovation is not a priority at Telefonica". It should probably be understood more in terms of resources allocated, track record, etc. more than being seen as unimportant. Over the course of three (i.e. some initiatives have a lengthier history but the understanding and articulation of them has not been on the level as it today) years much have changed. The new CEO appointed a Chief Innovation Officer who conducted a mapping exercise revealing around 3.000

innovation projects across the company. Wayra – the world's largest incubator – is still very much a CSR operation, but it is articulated as a potential source of ideas and talent. Apart from Wayra – innovation can be divided into three orientations – distinguished by time orientation around time:

- 1-2 years. Incremental innovation. Directly at operations (more or less)
- 3-5 years. Asset-based innovation. This is what the former second in command now heads. For instance: we have antennas all over the cities. What can they be used for?
- 5+. Radical innovation. This is Alpha.

Alpha
It has existed soon 1 year. Looking at it from the three lenses of my thesis we can see:
- It is organized in such a way that it reports directly to the CEO. It has a board with internal and external members, who approve budgets and initiatives.
- It has a feeling of inter-dependence if not independence. It is smaller unit, with its own office with its own look and feel and explicit idea of building an innovation culture.
- From a leadership perspective, it is very depending upon its leader, who is a brilliant scientist and the former boss of PDI. Interesting enough the first two employees are not tech staff or scientists, but experts in recruitment and building organizations.
- They are divided into an idea team, an administrative team and - as projects are identified - new teams are defined. There are strong incentives as employees are given financial incentives in future successes.
- Their strategy is not to be like Google X, but to larger extent leverage on Telefonica business areas and expertise. There will be no self-driving cars, but probably projects around health, aging, education etc. – where expertise around connecting and communication can come into play. It though will have to be radical – even science fiction – but with a potential of being important for hundred of millions of people.
- Their methodology will no be solidly planted in strategic planning or design thinking for that matter. It will be more step-by-step approach towards an emerging future.

Main findings
(Note, in the different sessions – additional information will be presented)

1. **Quantitative study** (general on innovation)
- More than 50% consider their business environment as complex and only 5% as chaotic, 10% as simple and a little more than 30% as complicated.
- 65% say innovation has not been a priority in their company before 2000, 30% only after 2010 and 6% says it still is not a priority.
- Around 20% claim they do not follow any innovation model or do not know which one they use. 25% says they use the network model.
- In terms of resources more than 75% indicate clients and customers and 50% own organization is very important - consultants, universities, competitors score low.
- 56% consider quality of products and services to very important goals for innovation followed by obtaining new competencies (33%) and increased revenue (40%), whereas reduced environmental impact, increased safety and health and reduced cost in marketing etc. was the lowest scorers.
- Only 25% consider their organisation to have a very clear and communicated vision, 17% on strategy and only 4% a very clear and communicated innovation strategy.
- Only 4% consider that the process for developing innovation strategies is carefully crafted and includes all relevant stakeholders.
- Tools mostly used are Brainstorming SWOT and Mission/Vision statements followed design thinking by strategy maps and scenario planning, as well as blue ocean strategy.

2. **Action research** (on developing capacity for innovation and leadership)
- A consultant can make a positive difference.
- A consultant needs to be clear on if one is hired as a process or expert consultant.
- The leader (employee) needs to be present and vouch for the work.
- Getting everyone on the same page and looking out of the same window is the start.
- There needs to be a certain tempo to ensure motivation and being ahead of changes.
- The process needs to be well-crafted, experiential and open for change.

3. **Interviews I** (on developing capacity for innovation and organizational transformation)
- Context is everything. Unclear org. changes and direction kills creativity and motivation.

- Leadership need to visible and communicative.
- Meetings are important, but meeting is more important.
- Agreeing upon strategy is difficult in less hierarchical organizations.
- People like to be part of developing processes, but it needs to result in action.
- In times of trouble there is a need to come together and build relationships.
- Seeing innovation possibilities requires a change of mind, view and patterns.

4. **Interviews II** (on the matter of Alpha and innovation in Telefonica)
- People first. Get the right people on board.
- Sanction and led from top management.
- Need clear governance.
- Culture is key. Entrepreneurial, curiosity, self-driven,
- Leadership can be symbolic as well as very directive
- A setup like Alpha is a contemporary research lab, as we know from Edison etc.
- It can be a way to create a future as opposed to only reacts to changes by looking really far, but it requires purposeful and systematic efforts.
- World-views of organization, strategy and leadership and innovation - tools and methodologies used - are still very positivist even though we recognize complexity as a fact.

9.11 I DO ART

All the workshops in action-research phase followed a certain structure and included a number of tools that were used consistently throughout the workshops. The main reasons for using them were:

a. They had historically proved themselves useful (for the researcher and different clients and groups).
b. They were easy to learn and use, giving the participants an opportunity to quickly apply new tools in their own work.
c. They created a sense of familiarity with the programme.
d. They fitted the larger design of the workshop in providing presence and direction for the participants.

One of these tools is called I DO ART.

I DO ART is short for:

- Intention
- Desired outcome
- Agenda
- Rules/roles
- Time.

It is essentially a structural approach to organizing in principle any meeting, event, programme and so on. It helps to create overview and clarity through the direction, focus and distribution of tasks and time allocation.

A simple example could be:

Intention:	To create an initial strategic outline for the department
Desired outcomes:	Learn about the group's strengths Understand the management's expectations Create a common set of priorities Identify main challenges
Agenda:	Startup, recap, introduction to the day In groups describe the situation Understand a describe main strengths and resources Given the company strategy, what is the proactive response Main challenges Main initiatives defined and wrap-up and next step
Rules/roles	The researcher is responsible for the process, the participants are responsible for the content.
Time	0900–1600

9.12   Respondents' information and analysis – quantitative survey

Q1 Please select the network of which you are a member: (If you are a member of more than one of the following networks, select the one that introduced you to this survey)

Answered: 93   Skipped: 12
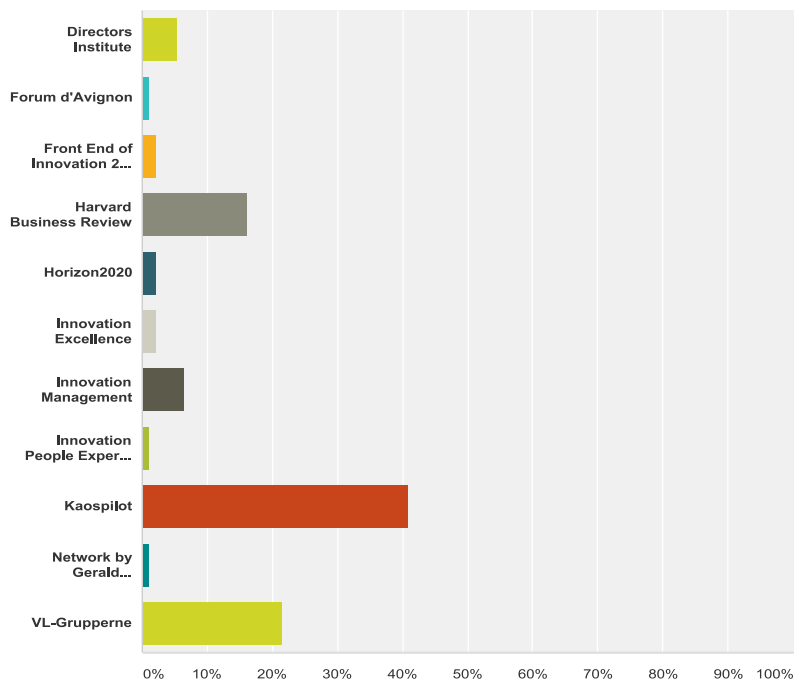
| Answer Choices	Responses	
Directors Institute	5.38%	5
Forum d'Avignon	1.08%	1
Front End of Innovation 2014 (FEI2014)	2.15%	2
Harvard Business Review	16.13%	15
Horizon2020	2.15%	2
Innovation Excellence	2.15%	2
Innovation Management	6.45%	6
Innovation People Expert Innovators	1.08%	1
Kaospilot	40.86%	38
Network by Gerald "Solutionman" Haman	1.08%	1
VL-Grupperne	21.51%	20
Total		93

This indicates where the respondents have come across the invitation to the survey. The networks were identified and decided upon based on their focus on innovation. One could discuss whether this also indicates where this survey is considered important, but the distribution of respondents amongst the different networks probably indicates more where the researcher are known and have impact. The Kaospilot

332

network is not just alumni and clients; it also includes a number of companies that are "friends" or related in different ways. People who are part of more than one have probably used the Kaospilot one. VL is a Danish association for business leaders of which the researcher is a member. The response from readers of the *Harvard Business Review* may relate to an article written by the researcher a few weeks before publishing the invitation to the survey.

In itself this distribution says very little apart from that the diversity seems quite wide, although with a weight towards Danish representation. That a little more than 10 percent skipped the question could indicate that they are not part of these networks but have just been exposed to them.

Q2 Tenure and innovation – the correlation between my education and my work with innovation:

Answered: 104   Skipped: 1
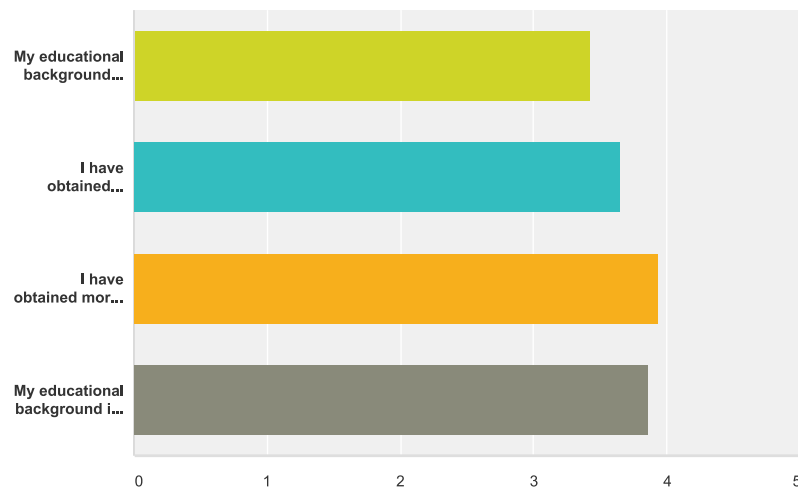
	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total	Weighted Average
My educational background included studies in innovation	9.62% 10	19.23% 20	18.27% 19	25.00% 26	27.88% 29	104	3.42
I have obtained training in innovation in the workplace	4.81% 5	16.35% 17	12.50% 13	41.35% 43	25.00% 26	104	3.65
I have obtained more than 3 years of experience within the field of innovation	6.73% 7	9.62% 10	9.62% 10	30.77% 32	43.27% 45	104	3.94
My educational background is important for my work with innovation	2.97% 3	9.90% 10	20.79% 21	30.69% 31	35.64% 36	101	3.86

Overall, the networks have a dedication towards innovation, which would assume a large quantity to have education and/or training, and experience correlating to the subject matter. When it comes to study background and innovation, it seems like innovation is not an absent theme. However, when you do additional segmentation and you take away Kaospilot (which is a school, where innovation officially has been part of the curriculum for 10+ years) the percentage of people who state that their educational background included studies in innovation drops from 27.88 percent to 13.21 percent in the segment of "strongly agrees". In general, factoring out Kaospilot network replies, there is a general drop in the weighted average in all the questions from 3.42 to 3.19, from 3.65 to 3.43, from 3.94 to 3.66 and from 3.86 to 3.63.

What can be deduced is that innovation is a newer subject within higher education, which may not come as a surprise. However, the fact that relatively many state that in terms of obtaining training (33%) and experience (25%) with innovation says that they do not agree (or strongly agree) is a bit surprising. That a majority have obtained training in their workplace is hardly surprising given the prominence of the subject in today's society. One can consider why – given the networks where the survey has been posted and the prominence of the subject matter – the score is not higher. It may have to do with its relative newness to the companies in question, but also with an

333

assumption on behalf of companies on "what can actually be trained" or a lack of knowledge on how to obtain training and expertise from the marketplace (see question 14 on collaboration with experts for instance). That 45 percent of the respondents say that they have obtained more than three years of experience in the field of innovation could of course be attributed to the networks invited to the survey. But comparing this with the fact that less than 30 percent strongly agree that they have had an education that includes innovation or obtained training, also suggests that people are also exposed to the field of innovation and obtain experience in it without necessarily being given tools, guidance and so on.

The question of the role of educational background when it come to the respondents' work with innovation suggests that – overall – it is important in more ways than just providing knowledge on innovation. It entail mean ways of solving problems, business understandings and so on. This is fair to say since more than two-thirds of the respondents agree, or strongly agree, that education is a "formative" experience, shaping future understandings and abilities.

That the average does not drop more when factoring out Kaospilot can be that their responses in general are quite polarized – perhaps it has to do with which curriculum they were actually subject to, as well as what type of organization they end up in.

Q3 My formal position in my organisation is best described as:

Answered: 94   Skipped: 11
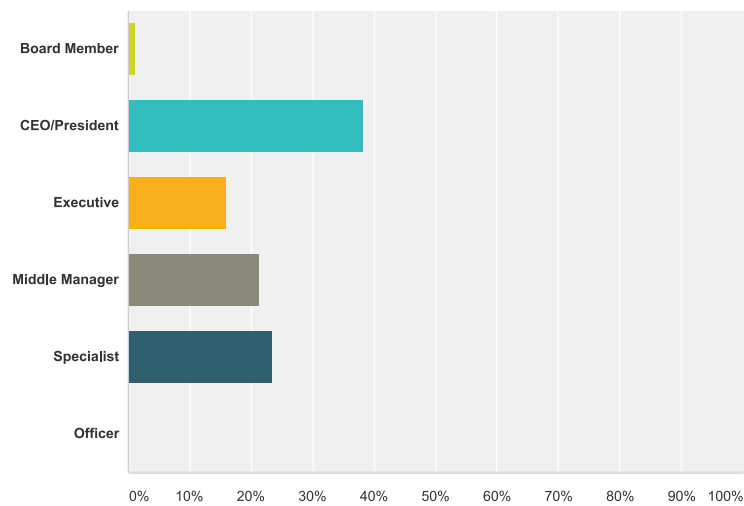
Answer Choices	Responses	
Board Member	1.06%	1
CEO/President	38.30%	36
Executive	15.96%	15
Middle Manager	21.28%	20
Specialist	23.40%	22
Officer	0.00%	0
Total		94

Since the VL group, for instance, is primarily for CEOs it is not surprising that main bulk of respondents are senior level executives. That around 10 percent skipped the question can be attributed to them not being easily placed in one of these groups, or that they have more than one role.

A cross reference suggest that most specialists are to find in mid-sized or larger companies and that more than 41 percent work within R&D and 35 percent within HR.

334

Q4 My function in my organisation is mostly related to:

Answered: 96   Skipped: 9
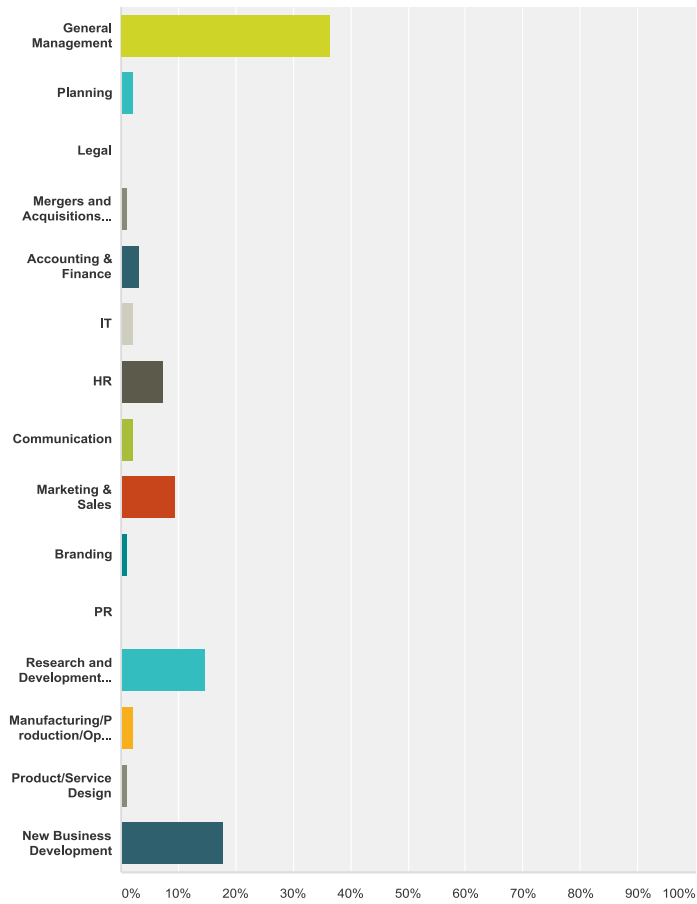
Answer Choices	Responses	
General Management	36.46%	35
Planning	2.08%	2
Legal	0.00%	0
Mergers and Acquisitions (M&A)	1.04%	1
Accounting & Finance	3.13%	3
IT	2.08%	2
HR	7.29%	7
Communication	2.08%	2
Marketing & Sales	9.38%	9
Branding	1.04%	1
PR	0.00%	0
Research and Development (R&D)	14.58%	14
Manufacturing/Production/Operations	2.08%	2
Product/Service Design	1.04%	1
New Business Development	17.71%	17
Total		96

335

The findings here largely echo the findings from the previous question. The main group of respondents is senior executives who have a general, overall responsibility for their business. The other main functions the respondents perform are within research and development and new business development. This again is not surprising given the classical thinking on innovation as developing something new. The next two groups are slightly more surprising – PR and marketing, as well as HR. These are not classically given when we think of innovation, but probably reflect the notion of its spreading importance and encompassing nature.

Q5 In terms of innovation, my field of responsibility is best described as:

Answered: 104   Skipped: 1
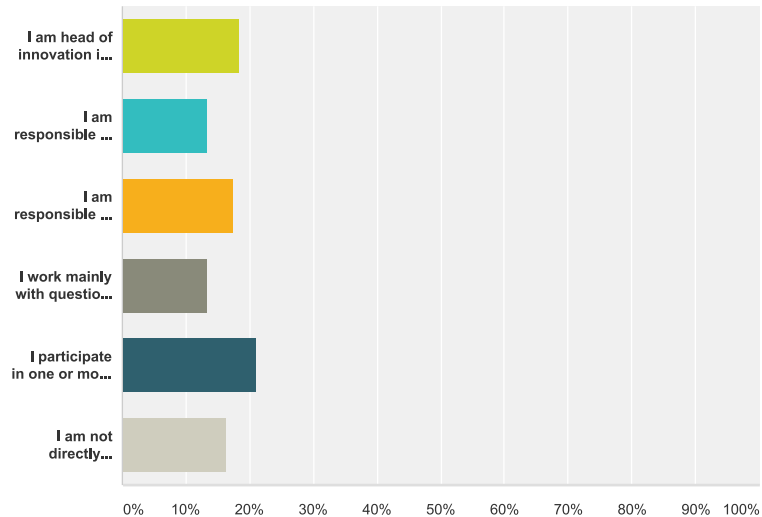
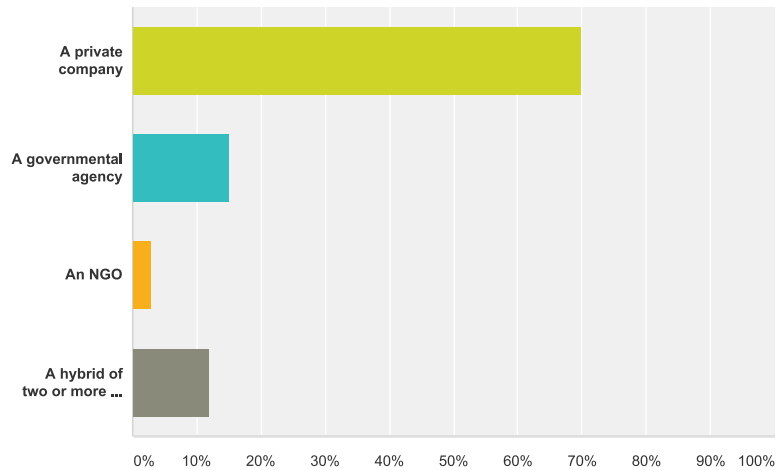| Answer Choices	Responses	
I am head of innovation in my organisation (formal role)	18.27%	19
I am responsible for an innovation unit	13.46%	14
I am responsible for a minimum of one innovation project	17.31%	18
I work mainly with questions concerning innovation but have no direct responsibilities	13.46%	14
I participate in one or more innovation projects	21.15%	22
I am not directly involved in innovation projects but different units report to me – I have indirect responsibility	16.35%	17
Total		104

This question confirms the relevance of the network strongly, as virtually 100 percent of the respondents placed themselves into one of the categories.
Drilling down in terms of responsibility, there is quite an even spread amongst the different options. The combination of the size of the organization and the more executive position indicates overall direct or indirect responsibility. These findings by and large confirm the idea that innovation, specialization and the division of labour are key organizing principles even when it comes to innovation.
Here it is also evident that many (more than 80%) are directly involved in innovation work in their organizations. The fact that this number is so high indicates that in some organizations even CEOs are involved directly in one or more projects, or directly lead or participate on a unit leadership level. Apart from confirming why people are part of these networks, it also indicates that innovation is seen as very important.

## Q6 My organisation can be characterised as:

Answered: 100   Skipped: 5

Answer Choices	Responses	
A private company	**70.00%**	70
A governmental agency	**15.00%**	15
An NGO	**3.00%**	3
A hybrid of two or more of the above	**12.00%**	12
Total		100

These data suggest that, by far, the respondents are private companies. Furthermore, more than 10 percent describe their organization as a hybrid between a private company and/or an NGO and/or a governmental agency. These mostly coming from the network of Kaospilot (45%). Only a few have skipped the question, but that may have to do with the fact that certain organizations – like a school or an entity of say a municipality – in a non-English market may not find the classification helpful.

## Q7 The core business of my organisation is:

Answered: 90   Skipped: 15
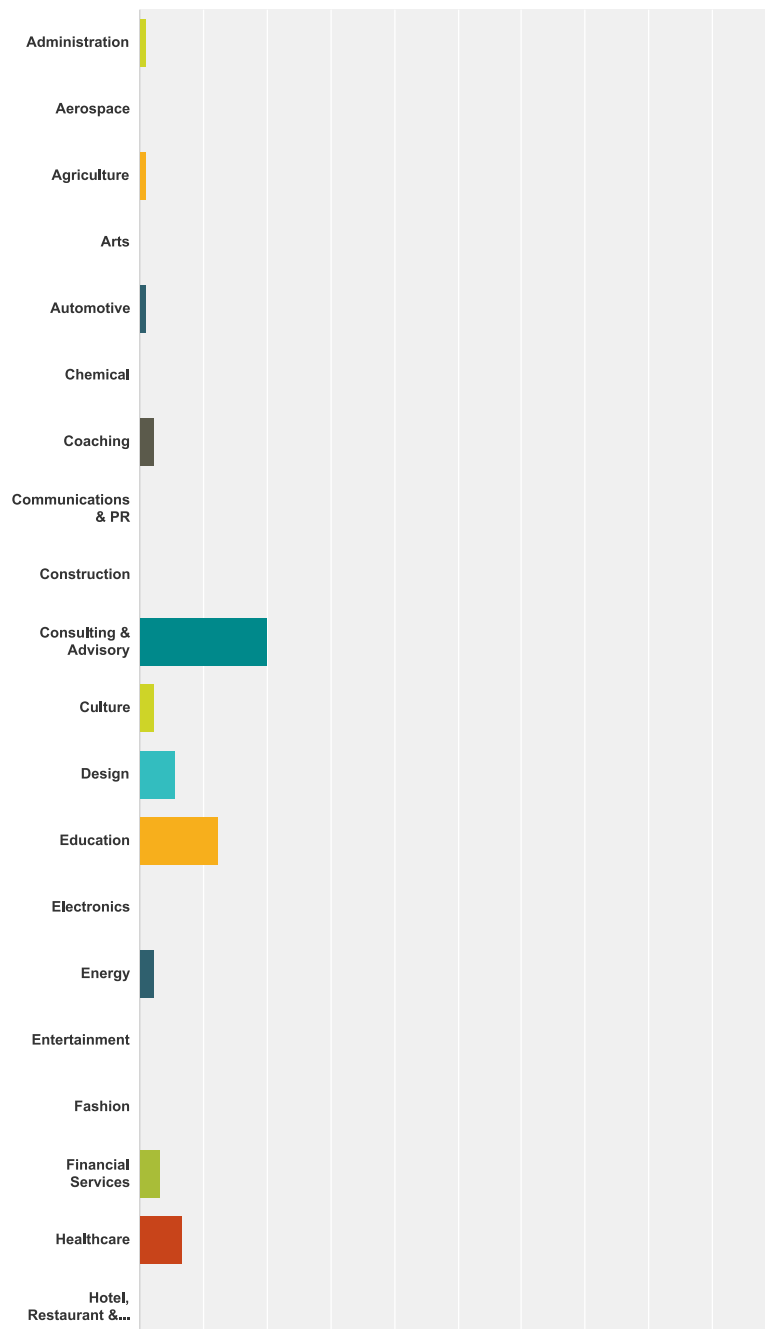
By far the most respondents represent a Consulting and Advisory organization. That again may not be surprising given the networks identified and used. Education and IT follow with slightly more than 10 percent each of the respondents. Telecommunication and manufacturing should also be mentioned since they represent more than 5 percent of the respondents. That a little more than 15 percent of the respondents did not indicate which business they are in might be attributed to the list not including specifically the classification of their business as they see it. Of course, neglect or uncertainty on behalf of the respondent are also plausible reasons.

338

Q8 The approx. annual turnover of my organisation, in euros (2013):

Answered: 90   Skipped: 15
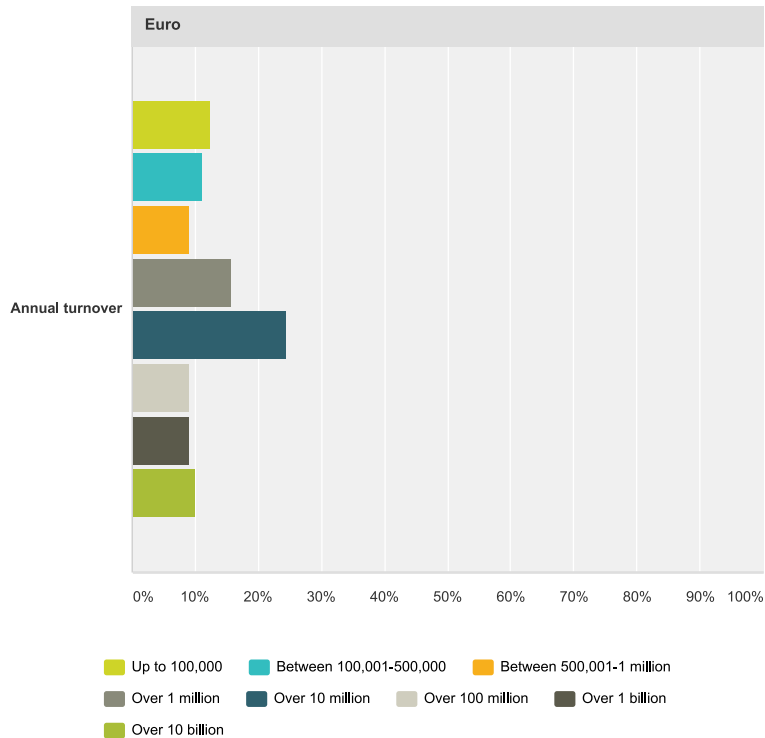
Euro

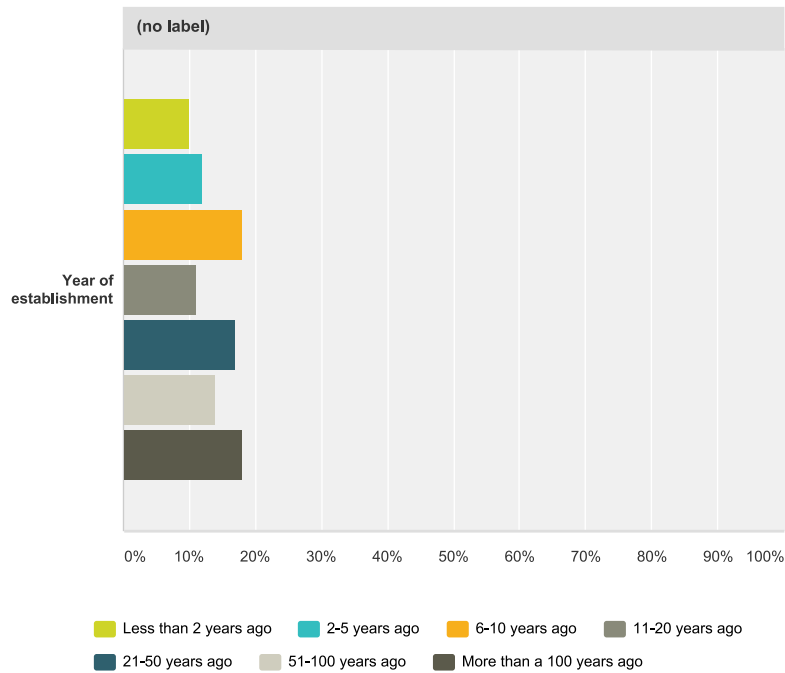|	Up to 100,000	Between 100,001-500,000	Between 500,001-1 million	Over 1 million	Over 10 million	Over 100 million	Over 1 billion	Over 10 billion	Total
Annual turnover	12.22% 11	11.11% 10	8.89% 8	15.56% 14	24.44% 22	8.89% 8	8.89% 8	10.00% 9	90

Of the companies that responded around 32 percent have a turnover below a million euros and 27 percent over 100 million euros in (10 percent can be considered really large with over 10 billion euros in turnover). In the mid-segment we find that just over 24 percent have more than 10 million in revenues.

Cross-referencing this with other parameters, we see that specialized roles and responsibilities in terms of innovation are associated with larger companies. Given the segmentation here, it seems like organizations need to pass 100 million in revenues before this becomes really significant. Of course specialized companies – say for instance within the field of consulting – also have specialist roles and responsibilities.

Of the larger companies (i.e. those with over 100 million in revenue), 16 percent say innovation has been a priority since after 2010 and 44 percent say it became a priority somewhere between 2000 and 2010. We also see that slightly over 10 percent of the respondents did not respond. There may be ample reasons for this (maybe they do not know the answer?).

Q9 My organisation was established in:

Answered: 100 Skipped: 5

Legend:
- Less than 2 years ago
- 2-5 years ago
- 6-10 years ago
- 11-20 years ago
- 21-50 years ago
- 51-100 years ago
- More than a 100 years ago

(no label)	Less than 2 years ago	2-5 years ago	6-10 years ago	11-20 years ago	21-50 years ago	51-100 years ago	More than a 100 years ago	Total
Year of establishment	10.00% 10	12.00% 12	18.00% 18	11.00% 11	17.00% 17	14.00% 14	18.00% 18	100

There is a fairly even spread across the different intervals. The most seasoned companies (those over 100 years old) are to be found in education, financial services and health care, followed by manufacturing, telecoms and administration. Telecoms and manufacturing are also part of the group with the highest turnover (more than 10 billion euros). There thus seems to be a correlation between turnover, age of organization and specialization in terms of roles and responsibility, albeit this is not clear-cut. 22 percent of companies with the highest turnover started less than 50 years ago, for instance.

Answered: 98   Skipped: 7
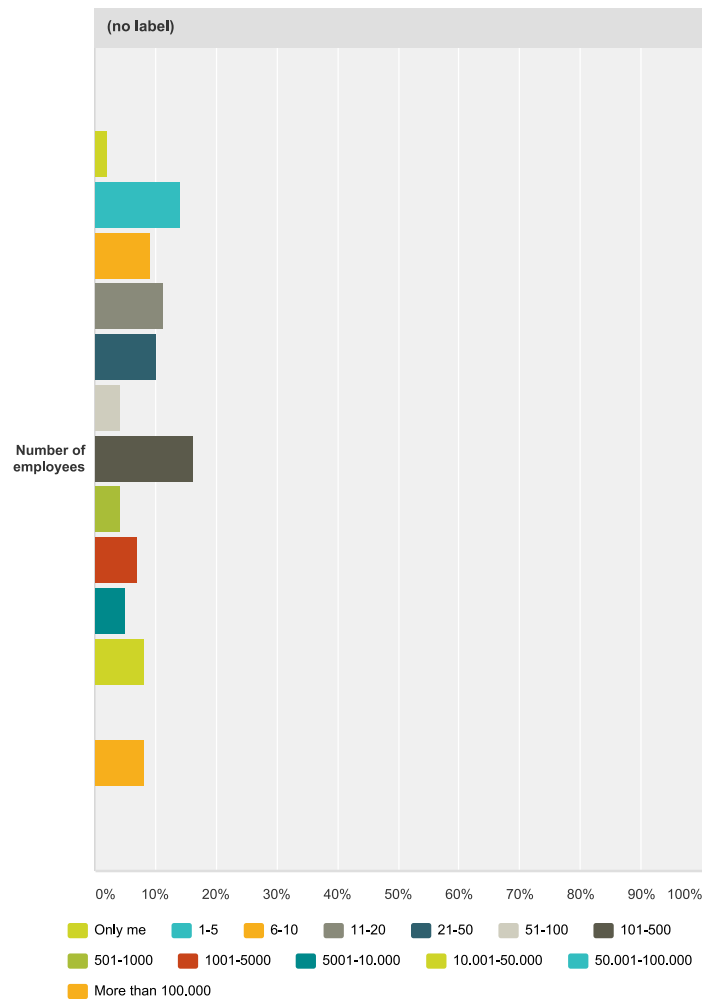
(no label)	Only me	1-5	6-10	11-20	21-50	51-100	101-500	501-1000	1001-5000	5001-10.000	10.001-50.000	50.001-100.000	More than 100.000	Total
Number of employees	2.04% 2	14.29% 14	9.18% 9	11.22% 11	10.20% 10	4.08% 4	16.33% 16	4.08% 4	7.14% 7	5.10% 5	8.16% 8	0.00% 0	8.16% 8	98

Again there is a fairly even spread. The connection between turnover and number of employees is fairly clear where five out of the nine organizations with a turnover exceeding 10 billion euros has more than 100,000 employees. None have fewer than 1,000 employees. Primarily the organizations with more than 100,000 employees come from telecoms, IT and automobiles. Thus, larger organizations in terms of number of employees point to higher turnover (not surprising), whereas higher turnover does not indicate an equally strong correlation in terms of number of employees (although the trend is clear).

Note: It is outside the scope of this thesis, but it would be interesting to look at whether the companies that have emerged within the IT industry suggest a more radical connection between number of employees and turnover. The valuation of newer companies is often disproportional to their revenue in comparison with more traditional industries. It would be interesting to see if IT and digitalization suggest a smaller ratio between number of employees and revenue (and/or valuation). If so, this may suggest a more efficient way of providing products and services. This also brings challenges to our societies in terms of job creation: does this free up space for other types of job creation or are we seeing a trend for less jobs in general?