THESIS FOR THE DEGREE OF DOCTOR OF TECHNOLOGY

Organizational Innovations: A conceptualization of how they are created, diffused, and sustained

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Abstract

Organizational innovations are essential for firms' long-term competitiveness. In spite of this, there is less research on organizational innovations than on technical innovations. The purpose of this thesis is to contribute to our understanding of how organizational innovations are created, diffused, and sustained.

The journey started by exploring the creation and diffusion of organizational innovations through a literature-review-based article and an empirical study on the organizational innovation 'TQM'. The journey continued with an empirical study elaborating upon the role of the board in sustaining the organizational innovations 'TQM', 'TPS', and 'Lean'. In each empirical study, data were collected through interviews, supplemented by secondary data. The three concepts 'creation', 'diffusion' and 'sustainability' of organizational innovations were found to be three intertwined concepts, rather than three separate and sequential ones. One reason was that organizational innovations were constantly re-invented through the processes of creation, diffusion, and sustainability. In this context, the concept 'Sustainability' refers to an improvement trajectory, rather than to a particular organizational innovation. The improvement trajectory is path-dependent and directs the creation, diffusion and sustainability of organizational innovations to and within a firm. Due to this complexity, a question was raised about how the creation, diffusion and sustainability of organizational innovations can be understood and conceptualized (RQ1). The answer is a conceptual model that integrates the three concepts 'creation', 'diffusion' and 'sustainability' in a five-step process, circling around a firm-specific improvement trajectory. The five steps are: 'Desirability', 'Feasibility', 'First-Trial', 'Implementation' and 'Sustainability'. Each step is affected by three sets of influencing factors: the external context and interpersonal diffusion channels, the firm-specific internal context, and the characteristics of the innovation itself.

To find out how the characteristics of organizational innovations affect the applicability of the conceptualization (RQ2), the conceptual model was tested on a different organizational innovation 'Google', identified in an empirical study conducted at Google, known for its focus on continuous innovation. The test showed that the conceptual model was valid also for 'Google' and was useful in identifying both similarities and differences in the creation, diffusion, and sustainability of 'TQM'/'TPS'/'Lean' on one side and 'Google' on the other.

Keywords: innovation, organizational innovation, diffusion of innovation, creation of innovation, sustaining innovation, innovation management, TQM, Toyota Production System, Lean, Google.

Acknowledgements

List of appended papers

This thesis is based on a "kappa"[1] and four appended papers, described below. These are referred to in the text by Roman numerals.

Paper I
Alänge, S., Jacobsson, S. and Jarnehammar, A. (1998). Some Aspects of an Analytical Framework for Studying the Diffusion of Organizational Innovations, *Technology Analysis & Strategic Management*, Vol. 10, No. 1, pp. 3-21.

Paper II
Alänge, S. and Steiber, A. (2011). Diffusion of Organizational Innovations: An empirical test of an analytical framework, *Technology Analysis & Strategic Management*, Vol. 23, No. 8, pp. 881- 897.

Paper III
Alänge, S. and Steiber, A. (2009). The board's role in sustaining major organizational change – An empirical analysis of three change programs, *International Journal of Quality and Service Sciences*, Vol. 1, No. 3, pp. 280-293.

Paper IV
Steiber, A. and Alänge, S. (2012). A corporate system for continuous innovation: the case of Google Inc. Submitted to *European Journal of Innovation Management* in March 2012.

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[1]This "kappa" can be viewed as a fifth paper, including its own findings and conclusions. These findings and conclusions are mainly based on those in the appended papers. This "kappa" is therefore more than a traditional summary.

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Organizational Innovations: A conceptualization of how they are created, diffused and sustained

1 Introduction

Researchers from different disciplines and with different perspectives during the past half-century have explored innovation (Birkinshaw et al. 2008). As a result, a fragmented research portfolio on innovation has been developed (Fagerberg, Oxford Handbook of Innovation, 2005). Most of this research has focused on technical innovations, while research on organizational innovations has been conducted to a lesser extent (Birkinshaw et al. 2008). Organizational innovation is here defined as new organizational methods in a firm's business practices, workplace organization or external relations (OECD, 2007).

Organizational innovations are typically implemented in order to increase operational efficiency, employee satisfaction or a firm's innovativeness. Today there are several examples of organizational innovations, such as Divisionalization ('M-form'), Total Quality Management ('TQM'), Toyota Production System ('TPS'), 'Lean Production' ('Lean'), and Balance Scorecard that have led to competitive advantages for the firms that embraced the innovations (Womack & Jones, 2003; Liker 2004; Birkinshaw et al. 2008). Further, organizational innovations are usually necessary for technical innovations (Freeman, 1982; Leonard-Barton, 1988; Teece, 2007; Tushman & O'Reilly III, 1997). In spite of the fact that organizational innovations create long-term competitive advantages and are important for technical innovations, they "…*remain poorly managed and poorly understood*" (Birkinshaw & Mol, 2006). Especially the processes through which organizational innovations are created and sustained are relatively under-researched (Birkinshaw et al. 2008; Buchanan et al. 2005).

1.1 Purpose

The purpose of this thesis is, from a firm-level perspective, to contribute to our understanding of how organizational innovations are created, diffused, and sustained.

The main concepts studied in this thesis are the 'creation', 'diffusion', and 'sustainability' of organizational innovations. An analytical framework for the diffusion[2] of organizational innovations is therefore developed in Paper I. The analytical framework is then tested on the major organizational innovation[3] 'TQM' in Paper II. The roles of boards in sustaining three major organizational innovations 'TQM', 'TPS', and 'Lean' are explored in Paper III, and finally the characteristics and the creation, diffusion and sustainability of a fourth major organizational innovation, 'Google', are investigated in Paper IV. The aim in this "kappa" is twofold: to conceptualize the findings in Papers I, II and III into one conceptual model and to test this model on the major organizational innovation in Paper IV. Thereby the purpose of

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[2]In Paper I, the organizational innovation was found hard to separate from its diffusion.
[3]Major Organizational Innovation (MOI) is defined in the chapter 'Theoretical Framework'.

better understanding how organizational innovations are created, diffused and sustained can be fulfilled.

1.2 Historical outline of research

The thesis is the result of a learning process that stretches over 18 years, including a 10-year intermission in the private sector, working with business development in mobile telecommunication and professional services.

In this section, the outline of the research process will be presented in a chronological order, that is, the order in which the different research studies were conducted. The chronological order starts with exploring the diffusion of organizational innovations, goes through the role of a board in sustaining organizational innovations, and ends with examining the characteristics of the organization of an innovative firm in the Internet industry and how it was created, diffused, and sustained.

The first step in this research and learning process was to conduct a literature review of the diffusion of technical and organizational innovations to firms. The literature review revealed that research has been primarily focused on the diffusion of technical innovations and the diffusion of organizational innovations has been less studied. The question was therefore whether understanding of the diffusion of technical innovations could contribute to an analytical framework for studying the diffusion of organizational innovations. A comparison of intrinsic features of technical and organizational innovations showed that insights from previous research literature on the diffusion of technical innovations could be re-used when building an analytical framework for studying the diffusion of organizational innovations. However, there are some implications due to the different nature of organizational innovations and their diffusion[4] that need to be considered. One implication is that the analytical framework needs to cover both the inter-firm and intra-firm diffusion of organizational innovations (Paper I).

The analytical framework developed in Paper I was then tested and validated in Paper II. Two Swedish empirical studies were conducted on one manufacturing firm (Electrolux Storkök AB) and on one service provider (Mölndal Hospital). Suggestions for further development of the analytical framework were presented. An observation in Paper II was that major organizational innovations need considerable time to be implemented fully. Therefore a deeply committed CEO was crucial. However, a committed top management does not last forever, and a need for a "higher level of influencers" such as owners and the board was identified.

Hence, in Paper III, the focus was on understanding the role of boards in sustaining major organizational innovations. Three case studies were conducted: one on the service provider Mölndal Hospital and two on the manufacturing firms Fagersta Stainless AB and Scania AB.

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[4]Compared to the nature of technical innovations and their diffusion.

The common issue between the three cases was that they all had implemented organizational innovations such as 'TQM', 'TPS', or 'Lean'.

Papers I, II and III together resulted in an understanding of how organizational innovations diffuse to and within a firm and what role a board plays in sustaining an organizational innovation.

In Paper IV, the purpose was to explore organizational characteristics for continuous innovation in rapidly changing industries. The paper is based on literature reviews and an empirical study conducted at Google Inc. The empirical study identified the main organizational characteristics behind Google's innovativeness but also provided data on how this organizational innovation had been created, diffused[5] and sustained over time. The empirical study behind Paper IV thereby contributed to this "kappa" with data that could be used in testing a conceptualization of the findings in Papers I, II and III, which all are based on empirical studies of innovations such as 'TQM', 'TPS', and 'Lean'.

In summary, the different papers in this thesis are all focused on organizational innovations. Four organizational innovations – 'TQM', 'TPS', 'Lean', and 'Google' – have been used in order to study one or several of the concepts 'creation', 'diffusion', and/or 'sustainability' of organizational innovations. The first paper developed an analytical framework for studying the diffusion of organizational innovations. The second paper tested the analytical framework in an empirical study on the organizational innovation 'TQM'. The third paper examined, in an empirical study, what roles a board plays in order to sustain innovations such as 'TQM', 'TPS', and 'Lean'. Finally, the fourth paper investigated, in an empirical study, the characteristics of, as well as the creation, diffusion and sustainability of, a slightly different organizational innovation, 'Google'. 'Google' is used in this "kappa" for testing the conceptualization[6] of the findings in Papers I, II and III.

1.3 Research questions

Building upon the work represented in the appended papers, this "kappa" explores the following two research questions:

1. How can the creation, diffusion and sustainability of organizational innovations be understood and conceptualized?

2. How do the characteristics of organizational innovations affect the applicability of the conceptualization?

The thesis contributes to previous research by providing additional understanding of how organizational innovations are created, diffused and sustained.

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[5]The diffusion process was studied by exploring which of the organizational ideas in the current organization came from the outside that is had been diffused to the firm.

[6]The conceptualization is mainly built on findings from 'TQM' studies, and to a lesser degree on findings from studies on 'TPS' and 'Lean'.

In short, the main contributions from the papers are the following:

1. Interrelating theories on the diffusion of technical innovations with the diffusion of organizational innovations (Paper I).

2. Developing and empirically testing an analytical framework for studying the diffusion of organizational innovations (Papers I and II).

3. Identifying the board's roles in sustaining major organizational innovations (Paper III).

4. Investigating the organizational characteristics for continuous innovation in rapidly changing industries and providing data on how a highly innovative organization in the Internet industry was created, diffused, and has been sustained (Paper IV).

The main contributions from this "kappa" are:

1. A conceptualization[7] of how organizational innovations are created, diffused, and sustained.
2. A test on how characteristics of an organizational innovation affect the applicability of the conceptualization.

The thesis includes the "kappa" and the four appended papers, of which three are published (Papers I, II, and III) and one is submitted for publication (Paper IV). The succeeding chapters in this "kappa" focus on: theoretical framework, methodology, summary of appended papers, discussion, conclusion and suggestions for future research.

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[7]Each of Papers I, II and III has focused on one primary concept (the exceptions were Paper I and Paper II, in which the main focus was the 'diffusion' of organizational innovation, but where the 'innovation' and its 'diffusion' were viewed as two issues that were hard to separate). This means that no previous integration of the concepts 'creation', 'diffusion', and 'sustainability' has been made in the first three papers. The conceptualization conducted in this "kappa" therefore aims for integrating the findings in Papers I, II and III into one integrated and visualized model. The conceptual model is then tested on the organizational characteristics of 'Google', presented in Paper IV.

2 Theoretical framework

In spite of the fact that organizational innovations have been found important for firms' long-term competitive advantages, the creation and diffusion of organizational innovations are two areas where comparatively limited research has been conducted (Edquist, 1992; Birkinshaw et al. 2008). Further, how to sustain an implemented organizational innovation has so far also been little researched and there is no established research tradition in this area (Buchanan et al. 2005).

In order to better understand how organizational innovations are created, diffused and sustained, this theoretical framework consists of two main sections. First, organizational innovations as such will be defined and explored. Second, previous research found in regard to how organizational innovations are created, diffused and sustained will be presented.

2.1 Organizational innovations

An organizational innovation[8] is defined according to OECD (2007) as "…*a new organizational method in the firm's business practices, workplace organization or external relations. Organizational innovations can be intended to increase a firm's performance by reducing administrative costs or transaction costs, improving workplace satisfaction (and thus labour productivity), gaining access to non-tradable assets (such as non-codified external knowledge) or reducing cost of supplies."* With "*business practices*" we here include organizational elements such as leadership, culture, human resource management, management processes including business development, performance and incentive systems and mechanisms for learning, and external and internal corporate communication. Further, an organizational innovation could, in this thesis, also be intended to improve a firm's innovativeness.

Organizational innovation can refer to either 'new-to-the-state-of-the-art' or 'new-to-the-firm' (Mol & Birkinshaw, 2009). In this thesis the primary criterion used of these two is 'new-to-the-firm', as this could be assumed to be the most frequent case. This would mean that organizational innovations could be a result of existing diffused organizational ideas[9], but also of a more local process of inventions in a specific context (e.g. within a specific firm). The latter case could mean that the organizational innovation is not only 'new-to-the-firm' but potentially also 'new-to-the-state-of-the-art' (if the firm is the original inventor of the organizational innovation) [10]. Moreover, if a consulting firm, university or standardization

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[8]In this thesis the concepts of organizational, administrative and managerial innovations are used interchangeably.

[9]Diffused e.g. within a local institutional set-up, through "weak ties" (Granovetter, 1973) or between sub-units within the same corporate group. An organizational innovation is here assumed to be, most frequently, a result of a new combination of existing diffused ideas or a combination of existing and new ideas (Schumpeter, 1934).

[10]The standardization and communication of the new innovation could then be conducted by e.g. the firm itself, by a university or by a consulting firm (Book, 2006).

institute is creating and/or standardizing[11] an organizational innovation of a firm, or a combination of different organizational ideas from several firms, and then communicates this organizational innovation, the organizational innovation could be new to firms but could potentially also be 'new-to-the-state-of-the-art'. Later in this chapter we will see that organizational innovations are constantly re-invented, also after they have been first trialed and implemented. This makes the distinction between 'new-to-the-firm' and 'new-to-the-state-of-the-art' even harder, as the implemented innovation through a later re-invention could suddenly be not only slightly 'new to-the-firm' but also 'new-to-the-state-of-the-art'. However, as seen in the examples above, the criterion 'new-to-the-firm' is probably more frequently fulfilled than 'new-to-the-state-of-the-art'. Further, since an organizational innovation is hard to protect by a patent, it is also hard to evaluate whether the organizational innovation is truly 'new-to-the-state-of-the-art'. Instead it will be a question of translating, packaging, labeling and communicating an organizational innovation as 'new-to-the-state-of-art'. The property right then lies in the translation/packaging/labeling of the innovation rather than in a patent.

As a result, an organizational innovation is here defined as an organizational method in a firm's business practices, workplace organization or external relations that is new to the firm and intended to improve the firm's performance.

Organizational innovations can be more or less complex. Some affect a certain business process (e.g. re-engineering of the purchasing process), while others affect every single part of an organization. According to Hamel (2006, p. 74), an organizational innovation creates long-term competitive advantages if it meets one or more of three conditions: "*The innovation is based on a novel principle that challenges management orthodoxy; it is systematic, encompassing a range of processes and methods; and it is part of an ongoing program of invention, where progress compounds over time*". This would mean that the organizational innovation needs a certain degree of 'new-to-the-state-of-the-art' and/or corporate coverage in order to create competitive advantages long-term. Further, the organizational innovation is preferably part of a larger program of inventions[12]. An example of this kind of organizational innovation is Total Quality Management (TQM). TQM is built on a strong belief in the problem-solving capacity of employees, so the innovation introduced a high focus on the empowerment of employees. This "mental model" was quite different from the Tayloristic view where employees were to follow instructions and do repetitive tasks designed by specialists (Hamel, 2006). Further, it is an innovation that involves several parts of the organization, which together create the success of a firm. Finally, it is built up by sub-innovations such as Kaizen[13], Policy Deployment[14] Quality Circles[15], and can therefore be seen

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[11]By standardizing we mean translation, packaging/description, and labeling of an organizational innovation. One reason behind the standardization, specifically on a national/international level, is to be able to communicate and therefore diffuse the organizational innovation.

[12] Later in the section 'How to sustain organizational innovations' we will talk about an 'improvement trajectory' that could be viewed as a 'program of inventions'.

[13]'Kaizen', Japanese for improvement or change for the better, refers to philosophy and practices that focus upon continuous improvement of organizational processes (Shiba et al. 1993).

as an ongoing program of inventions, which increases a firm's performance over time. In this thesis, this kind of systematic organizational innovations based on a novel principle and progressing over time, will be called Major Organizational Innovations (MOI).

2.1.1 Characterization of some Major Organizational Innovations

Major Organizational Innovations (MOIs) exist in many forms. Organizational innovations such as: Divisionalization ('M-form'), Toyota Production System ('TPS') and Total Quality Management ('TQM'), mentioned by Birkinshaw et al. (2008), could be viewed as MOIs since they seem to fulfill the requirements of being based on a novel management principle, being systematic, and being part of an ongoing program of inventions aiming for increasing progress over time. For the same reasons, 'Lean Production' ('Lean') could be added to the list of MOIs. This would mean that the empirically studied organizational innovations 'TQM' in Paper II and 'TQM', 'TPS', and 'Lean' in Paper III could all be regarded as 'Major Organizational Innovations'[16].

As previous research has emphasized the need to clearly define an organizational innovation in order to study it (Alänge et al. 1998), the three major organizational innovations used in Papers II and III will be characterized below with the support of a selection[17] of past research.

As 'TQM' (early 1990s version), 'TPS' (early 2000s version), and 'Lean' (early 2000s version) are three MOIs that all are based on the "Toyota Way" and therefore are closely related, they will from now on be categorized into one category: 'TQM'/'TPS'/'Lean'. They are all characterized by a higher degree of standardization, known for their focus on quality and operational efficiency, and originally developed mainly in the automobile industry[18]. 'TQM', based on the Japanese organizational innovation 'TQC' and practices from Toyota, was characterized in Alänge (1994) by customer focus, visible leadership, total approach, process focus, continuous learning and standardization for creativity. TQM has since the 1990s been further developed but is still valid. For example, parts of the organizational

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[14] 'Policy Deployment' is a strategic planning/ strategic management methodology. It is devised to capture and cement strategic goals as well as flashes of insight about the future and develop the means to bring these into reality (Shiba et al. 1993).

[15] A 'quality circle' is a volunteer group composed of workers, usually under the leadership of their supervisor (although they can elect a team leader), who are trained to identify, analyze and solve work-related problems and present their solutions to management in order to improve the performance of the organization, and motivate and enrich the work of employees. When matured, true quality circles become self-managing, having gained the confidence of management (Shiba et al. 1993).

[16] Our assumption is that our findings on the creation, diffusion and sustainability of a MOI are valid also for less complex organizational innovations such as a re-engineering of a single process.

[17] The referred literature in the case of 'TQM', 'TPS' and 'Lean' should be seen as a good and well-known example of how each major organizational innovation was defined around the time it was studied. We are well aware that there exists much literature on each of the three MOIs and that the definition of each partly differs over time and within this body of literature.

[18] All three innovations have been further developed, so it is important to understand which "version" was used in the empirical studies. For example, MBNQA has described 'TQM' 2011/2012 with a number of new criteria, e.g. agility and managing for innovation, which could indicate that industries overall have become more dynamic and that the overall demand on companies to be innovative has increased.

innovation such as customer focus, visible leadership, total approach and continuous learning are still valid. However, 'TQM' in 2011 (MBNQA, 2011/2012) also emphasizes innovation and agility, which were not explicitly emphasized in the 1990s versions.

Similarly, 'TPS' (Liker, 2004) and 'Lean' (Womack & Jones, 2003), based on practices from Toyota, have been standardized into organizational innovations that are possible to diffuse in a powerful way to both large and small manufacturing firms. As a result of this standardization of 'TPS' and 'Lean', there is today basically one dominant paradigm in the automobile industry on how to produce cars and it is possible to find considerable agreement on the meaning of the two major organizational innovations. This category of well-standardized major organizational innovations (the 1990s version of 'TQM' and the early 2000s version of 'TPS' and 'Lean'), known for their focus on quality and operational efficiency, has been used in order to test the analytical framework for the diffusion of organizational innovations in Paper II and to explore the role of boards in sustaining major organizational innovations in Paper III.

'Google', studied in Paper IV, could be assumed to also be a MOI. The reason for this is that Google in recent years has been branded as a unique company with an innovative organization. Titles such as *"The Google Way: How One Company Is Revolutionizing Management As We Know It"* (Girard, 2009) and *"Googled: The End of the World as We Know It"* (Auletta, 2009) have supported the picture of 'Google' as a major organizational innovation.

Further, this MOI could be assumed to be different from the category 'TQM'/'TPS'/'Lean'. The reason is that 'Google' has developed in the much younger, software-based[19] Internet industry (here called the Internet Service industry). Further, it is not standardized and it is primarily focused on continuous innovation, rather than on quality and operational efficiency.

In order to explore whether 'Google' could be viewed as another kind of MOI, a presentation of organizational characteristics needed for continuous innovation in industries related to that of the Internet Service industry[20] is made below. In addition to exploring organizational characteristics for continuous innovation in rapidly changing, Internet Service- related industries the body of literature is from the same time period as that in which the major organizational innovation, 'Google', was created. This was not a criterion when the literature was selected, but rather an interesting observation after we had selected the literature, around

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[19]A distinction is made between the software-based and hardware-based Internet industry. Software can be assumed to have shorter development cycles than hardware. One reason for this is the faster process for testing software over the Internet on a large enough number of "users".

[20] Here defined as industries producing mainly software with a relatively short development cycle (< 6-12 months) and market life cycle (< 6-12 months). An important note is that in these rapidly changing industries, a potential monopolistic position (as some would call Google's position) is only temporarily possible. Further, a product such as 'Adwords' is not ONE product but rather a product that is continuously innovated in order to keep a market-leading position. Each sub-component of the product therefore needs to be re-invented frequently. Further, the product has been expanded to new channels such as e.g. Mobile, Social, and Television, which have demanded more radical innovations.

which later research has been clustered. The fact that the literature is from the time period when 'Google' was created, and conducted, by researchers who in several cases were living and working in Silicon Valley, might also provide some context[21] from which this MOI could have been inspired[22]. If later in the 'Discussion' it is found that there is a good match between the findings in this body of literature and 'Google', it will tell us primarily two things: in what degree 'Google' is a unique MOI, and whether a MOI like 'Google' was created through inspiration from outside (through a diffusion process) or through a local isolated innovation process. Further, by identifying the characteristics of 'Google' and matching these with identified characteristics from other rapidly changing industries, we would have an indication of whether the characteristics of 'Google' are relevant also for companies in other rapidly changing industries, and whether these characteristics are different enough from the characteristics of 'TQM'/ 'TPS'/'Lean' in order for a potential test of the conceptual model to be meaningful.

2.1.1.1 *Examples of key characteristics[23] for long-term competitiveness*

Researchers from different disciplines (e.g. Teece & Pisano, 1994; Brown & Eisenhardt, 1997 & 1998; Tushman & O'Reilly III, 1997; Chesbrough, 2003) have explicitly or implicitly explored organizational characteristics for long-term competitiveness in industries such as Information Services, Semiconductors, and Telecommunication services, that is, primarily software-based industries that all are rapidly changing. The selected researchers found that organizations in these industries need to be: adaptable and constantly renewable, support both innovations and operational excellence (be ambidextrous), and effectively tap opportunities in the external environment by being open.

2.1.1.1.1 Adaptability and renewal

Winners in the global market[24] have, according to Teece and Pisano (1994), been firms that can demonstrate timely responsiveness and rapid and flexible product innovation, coupled with the management capability to effectively coordinate and redeploy internal and external competences. Teece and Pisano (1994) refer to this source of competitive advantage as *dynamic capabilities*. Zollo and Winter (2002) found that these capabilities are originated from a learned and stable pattern of collective activities, and that firms differ in their dynamic capabilities partly because they implicitly or explicitly emphasize differently the strategic importance of change in the future. Zollo and Winter (2002) also argued, as did Eisenhardt and Martin (2000), that firms' dynamic capabilities differ because they are in environments

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[21]Theories of what were required for long-term competitiveness in rapidly changing, software-based industries in the time period 1996-2005. In addition, several of the theoretical ideas were "created" in a "Silicon Valley" context, the home turf of Google.

[22]We are well aware that Google might not have been inspired from the literature directly but by discussions going on at that time in Silicon Valley.

[23]The characteristics explored in this section are key characteristics identified in selected research literature focused on "what is demanded for long-term competitiveness in rapidly changing industries", rather than aiming to be theoretically comprehensive.

[24]Referring to companies in industries such as semiconductors, information services and telecom services.

with different rates of change. Eisenhardt and Martin (2000) argued that, depending on the velocity of the market the dynamic capabilities vary from being detailed, analytical and stable processes with predictable outcomes to simple, highly experiential and fragile processes with unpredicted outcomes.

Dynamic capabilities are important to consider in order for a firm to reconfigure and renew its organization. Brown and Eisenhardt (1997, 1998) found that firms[25] present in high-velocity industries needed to manage the demand for continual renewal, so they examined the aspect of "renewal" of firms further by using complexity and evolutionary theories as well as literature exploring the fundamental nature of change and evolution. As a result they developed a number of new concepts that all created a higher flexibility for a firm to adapt and re-configure as a result of external changes.

Their first concept, '*edge of chaos*', meant that firms should be only partly structured, and was built upon the intuition that "*change occurs when strategies and their related organizations are sufficiently rigid so that change can be organized to happen but not so rigid that it cannot occur.*" The concept captures the complicated, uncontrolled, unpredictable, yet adaptive behavior – self-organization – that occurs when there is some structure but not too much. So the critical management issue is to figure out both what to structure and what not to structure. The concept 'edge of chaos' consists of two building blocs: first, improvisation inside the organization, where the managers rely on a few key rules to innovate adaptively, while simultaneously and consistently executing products on time, on target and on budget. Key components are an adaptive culture in which people expect to change as conditions shift, a semi-structured organization that tracks a few important outcomes, deadlines and priorities but keeps much of the activity unstructured, and *ad hoc*, flowing, real-time communication focused on concrete operating information, including formal and informal, internal and external communication. Second, in order to capture synergies in the management of multiple businesses within the same firm, co-adaptation was found important.

The second concept is the '*edge of time*', which indicates that change requires thinking simultaneously about multiple time horizons: past, current and future. The critical management issue is how to manage all timeframes simultaneously without being trapped in any one. This concept also includes two building blocs that focus on tomorrow's businesses. First, regeneration that looks into how managers can utilize the past in order to gain advantages. Second, experimentation, which shows how managers can experiment with a wide variety of low- cost probes into the future to gain insight and strategic flexibility. Options and learning are central components, and constant but thin management is seen as a virtue.

The third concept, '*time pacing*' means that change is triggered by passage of time rather than by occurrence of events. The key management issue is then to pick the right rhythm and to choreograph transitions, e.g. from product generation to product generation.

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[25] Referring to companies in the computer industry.

Finally, the authors describe three leadership roles important for the renewal of the organization. The first role is that of the key strategist on business unit level, who is in need of juggling skills to deal with competing tensions. Second, a patching role on middle level, where the focus is on constantly realigning businesses to match continually shifting business opportunities – using modularity and patching. Patching involves two issues: size and content. The "patcher" needs pattern recognition skills. Third, a synthesizer of strategy is needed on a senior level, which articulates the semi-coherent pattern of strategies. This synthesizer needs to develop pattern synthesis and articulation skills.

2.1.1.1.2 Ambidextrous organization

A firm's ability to compete over time is rooted in its ability to be simultaneously efficient and innovative (Benner & Tushman, 2003). Further, according to Teece (2007, p. 51): *"The need for both exploration and exploitation is well accepted for adaptive systems."* According to Benner and Tushman (2003), ambidextrous organizational forms provide the contexts for both exploitative and exploratory activities to coexist. Ambidextrous organizations, and how best to manage the tension between exploitation and exploration, have therefore received attention among researchers within the areas of organization. Much of this research is inspired by March's (1991) article on learning and the need of, but difficulty in pursuing, both exploration and exploitation strategies.

Among scholars within this area, two main philosophies can be identified[26]. The first is that both explorative and exploitative activities can be managed in parallel in the same organization (Grove, 1996; Markides, 1998, Burgelman, 2002; Magnusson & Martini, 2008; Lawson and Samson, 2001). The second is that the two kinds of activities cannot be in the same organization but must be more or less separated (Teece, 2007; Kanter, 1989; O'Connor, 2008).

Tushman and O'Reilly III (1997) argued as well for the importance of simultaneously supporting both the ongoing operations that generate revenue and the new areas that might generate value for the future. They maintain that companies need innovation streams that run counter to forces for organizational inertia. According to them, managers need to create ambidextrous organizations that can celebrate stability and incremental change simultaneously with experimentation and discontinuous change. According to Stacey *(1992, p.19)*, "*Successful organizations – that* is, *continually innovative organizations – cannot choose between tight, formal control systems and structures on the one hand and loose, informal processes that provoke learning on the other… they…must have both at the same time*". This in turn requires, however, managers who can simultaneously handle several inconsistent organizational architectures and cultures and who can build ambidextrous organizations (Tushman & O'Reilly III, 1997).

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[26] One way of managing the tension between explorative and exploitative activities is to rely on "skunk works". However, this form of solution is not included in this section as it is viewed here more or less as a proof of unresolved tension between the two sets of activities.

2.1.1.1.3 Openness

A firm and its organization can be more or less open towards interaction with the external environment. If a firm is viewed as a system, system theories conclude that a closed system exhibits clear boundaries and is subject to entropy, moving toward disorganization or chaos until it fails, while an open system has semi-permeable boundaries that escape entropy by feeding on a continual flux of energy and matter to stay alive (O'Connor, 2008). In other words, if a firm is viewed as a system it must be open in order to survive long-term.

The idea of an open organization became increasingly popular when Chesbrough[27] in 2003 launched the concept "Open Innovation". According to Chesbrough (2003) there are a number of reasons why companies today need to become "open". First, there are new powerful ways to reach beyond the conventional boundaries of the firm and tap ideas from the external environment. Second, really smart people are not all working for the same company but are distributed all over the world in multiple institutions. Third, innovations in the interstices between different disciplines become more common. Fourth, the time to market becomes shorter and the products' life cycles become shorter, so companies need to speed up their development processes.

As a result, managers need to establish and manage external linkages to the surrounding environment. A high pace of technological change and a high intensity of competition might mean that firms to an increasing degree need to use these external linkages to complement their own internal capabilities with external capabilities. However, currently the theoretical guidance about how to design and manage these external linkages on a network level is relatively limited (Smart et al. 2007).

According to Trott and Hartmann (2009), many scholars of R&D management and innovation management have discussed the issue of open organizations for innovation over the last 40 years. The question can therefore be raised whether managers have ever viewed their own organizations as "closed" or whether this is only a concept used by researchers. More correct questions might instead be "in what degree the organization is open" and "how an organization can better utilize e.g. new technology and external networks in order to sustain its capability to constantly change, renew and innovate.

2.1.2 Summary
This section has not only defined organizational innovations but also presented three criteria, which if fulfilled could create long-term competitiveness for the inventing firm. Organizational innovations fulfilling one or more of these criteria were called Major Organizational Innovations, MOIs. The four empirically innovations studied in this thesis – 'TQM', 'TPS', 'Lean' and 'Google' – could all be viewed as MOIs as they could be argued to fulfill one or more of the three criteria. However, while 'TQM'/'TPS'/'Lean' were mainly developed in the automobile industry, are well standardized and are known for their focus on

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[27] Chesbrough (2003) primarily studied companies in the previously mentioned rapidly changing industries.

quality and operational efficiency, the MOI, 'Google', was originally developed in the much younger Internet Service industry, is not standardized, and is known for its focus on continuous innovation rather than on quality and operational efficiency. In order to better understand whether 'Google' could be viewed as a potential MOI and a different MOI compared to 'TQM'/'TPS'/'Lean', some key organizational characteristics for long-term competitiveness in Internet Service- related industries, such as Information Services, Semiconductors and Telecommunication Services, were presented. These key characteristics will be used in the 'Discussion' when discussing the characteristics of 'Google'.

The identified key characteristics were: adaptability and constant renewal, ambidextrous organizations, and openness. These three characteristics are different from the key characteristics in 'TQM'/'TPS'/'Lean'. For example, even if the three studied MOIs[28] 'TQM'/'TPS'/'Lean' in some degree do emphasize openness[29] they do not explicitly emphasize the importance of adaptability and constant renewal and of ambidextrous organizations. Instead the three MOIs emphasized issues such as process orientation and standardization[30], issues that were not explicitly emphasized in the presented findings from Internet Service- related industries. Finally, the presented key characteristics needed for long-term competitiveness in Internet Service- related industries were all from studies published in the same time period as when 'Google' was created. For this reason the literature might also provide some insights in regard to the context in which 'Google' was created.

2.2 The creation and diffusion of organizational innovations

Primarily four perspectives have been used when studying organizational innovations[31] (Birkinshaw et al. 2008, p. 827). These are the 'Institutional perspective' where institutional conditions influence the creation and diffusion of organizational innovations; the 'Fashion perspective' where "…*fashion setters continuously redefine both their and fashion followers' collective beliefs about which management techniques lead rational management progress*"; the 'Cultural perspective' where the organization's culture influences the creation and diffusion of organizational innovations; and finally the 'Rational perspective' where managers take on a role in creating and implementing organizational innovations. In addition to these four perspectives, a fifth perspective was used in Alänge et al. (1998). This is the perspective of Innovation systems[32], which in turn is partly influenced by the Institutional perspective (e.g. Lundvall, 1992).

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[28] We used the 1990s' version of 'TQM' and early 2000s' version of 'TPS' and 'Lean'.

[29] However, openness in the world of 'TQM'/'TPS'/'Lean' is according to us not the same as e.g. Open innovation (Chesbrough, 2003).

[30] The Japanese emphasized standardization in the 1990s (Shiba et al. 1993). However, the emphasis on "standardization for creativity" in Alänge (1994) was quite uncommon in the 1990s, even in Japan.

[31] Birkinshaw et al. (2008) use the concept 'management innovation'. We will here use it interchangeably with the concept 'organizational innovation'.

[32] Freeman coined the expression "National Innovation System" in his study of the success of the Japanese economy in 1987. The concept was later applied to regions and sectors. In an innovation system perspective,

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As a result, the research community has according to Birkinshaw et al. (2008) used one of these different perspectives, or a mix of them (e.g Kimberly, 1979; Birkinshaw et al. 2008), when studying organizational innovations. This thesis is based on a mix of primarily two perspectives, the 'Rational perspective' (Birkinshaw et al. 2008) and the 'Innovation systems' perspective (Alänge et al. 1998). The main reason for this is that we believe that managers take on a leading and rational role in the creation, diffusion, and sustainability of an organizational innovation and that the innovation systems perspective is useful when to better understand the three concepts, specifically so if the 'Innovation systems' perspective (most commonly focused on inter-firm diffusion of innovations) is complemented with literature dealing with intra-firm diffusion and change management in general (Alänge et al. 1998).

2.2.1 The creation of organizational innovations

Attempts have been made to explore the concept 'creation' of organizational innovations, e.g. the studies of Birkinshaw & Mol (2006) and Birkinshaw et al. (2008). Both these studies have focused on how management innovations are 'created'. However, while focused on the creation of organizational innovations, the studies also include mechanisms by which the new innovation is put into practice. Mechanisms for putting an organizational innovation into practice are in this chapter included in the section 'Diffusion of organizational innovations', since they are viewed as part of the intra-firm diffusion process. However, while the authors in both studies do include mechanisms for intra-firm diffusion as part of the creation process, they do not seem to include the body of research literature on diffusion of innovations. Birkinshaw et al. (2008, p. 825) consider this body of literature to be focused on diffusion of management innovations across industries or countries[33], and state that this literature has little to contribute to the understanding of the creation and implementation of management innovations. As will be presented later in this section, however, the 'creation' is hard to separate from both the inter-firm and intra-firm diffusion of the innovation. Still, let us start this section by presenting some findings from the study of Birkinshaw et al. (2008).

Birkinshaw et al. (2008) explored how a management innovation is 'created', a concept that has been under-researched (Kimberly, 1979; Birkinshaw et al. 2008). The core result of their work was a model[34] influenced by factors such as the environmental context, the organizational context, and external and internal change agents. The four influencing sets of factors are very briefly explored and do not give any detailed information on which mechanisms in the external and organizational context influence the creation of management innovations, or how change agents affect this concept. The environmental context is described such as: "…*the broad set of stimuli – exogenous to the focal organization – that shapes the management discourse and thereby influences the priorities and efforts of external change agents as they engage with organizations*". External change agents are considered to be

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innovation and technology development are results of a set of relationships among actors (e.g firms, universities, research institutes etc.) in the system.

[33] Here interpreted as 'inter-firm' diffusion.

[34] The model is based on one developed earlier by Birkinshaw and Mol (2006). However, this previous model separated the step "motivation" into two steps, dissatisfaction with the status quo and inspiration, which they claimed usually came from outside the firm. Further, the model did not include any step for implementation.

"…*management intellectuals, idea entrepreneurs, independent consultants, academics and gurus proactive in creating interest in, influencing the development of, and legitimizing the effectiveness and retention of new management practices (DiMaggio, 1991)*". The organizational context is the "…*administrative and social mechanisms that management can manipulate to shape the behavior of actors in the organization (Bower, 1970; Burgelman, 1983) and will have a direct impact (positive or negative) on the ability of internal change agents to pursue the core activities associated with management innovation*". Finally, internal change agents are considered to be "…*employees of the innovating company proactive in creating interest in, experimenting with, and validating the management innovation in question (DiMaggio, 1991; Howell & Higgins, 1990)*".

The model itself consisted of four steps: motivation, invention, implementation, and theorizing and labeling. The step "motivation" is concerned with factors that create the motives and thereby the desirability to change the organization. The next step, "invention", is experimentation "…*out of which a new hypothetical management practice emerges*". This step included activities such as developing a solution, thinking through the consequences of the new idea, linking it to empirical data and testing it in practice. The next step, "implementation", is "…*the technical process of establishing the value of the new management practice in vivo (a real setting)*". This step covers all activities after the test and until the new innovation is fully operational. Finally, the last step, "theorizing and labeling", "…*is a social process whereby individuals inside and outside the organization make sense of and validate the management innovation to build legitimacy*". This step aimed at building a rationale for why the innovation should be adopted, giving the innovation a name, and communicating the rationale and the innovation internally and externally. Building a rationale for the adoption of the innovation could be done by presenting a narrative for the employees in order to make sense of the planned change. A narrative as a change management tool is also emphasized later in this chapter when sustainability of organizational innovations is explored. The importance of a label or name of the innovation is high, according to Birkinshaw et al. (2008), as it is claimed to increase the acceptability of the innovation. Theorizing about and labeling the innovation were also conducted in order to be able to communicate the innovation, not only internally but also externally[35]. This is interesting as it could be disputed whether an innovation even exists if it is not communicated. However, this issue was not discussed in Birkinshaw et al. (2008).

Finally, Kimberly (1979) found that the first "release" of the innovation puts important constraints on later development of the organizational innovation. This finding would mean that the original innovation and later re-inventions of that innovation are path-dependent, i.e. the initial "release" of an organizational innovation will shape later releases of it.

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[35] Alänge et al. (1998) used instead the term "standardization", which included activities such as translation, packaging/describing, and labeling an innovation in order to be able to communicate and therefore diffuse it.

2.2.2 The diffusion of organizational innovations

The model by Birkinshaw et al. (2008, p. 832) is similar to the diffusion model of Jarnehammar (1995)[36], which focused on both the inter-firm and intra-firm diffusion processes of organizational innovations. The model of Jarnehammar (1995) included four steps in the diffusion process: 'Desirability', 'Feasibility', 'First-Trial', and 'Implementation'. 'Desirability', 'Feasibility', and 'First-trial' are covered in Birkinshaw et al.'s 'motivation' and 'invention' steps, while the 'implementation' step is similar between the two models. The only main difference between the two models is the step 'Theorizing and Labeling', which is not presented as a step in the model presented in Jarnehammar (1995) but covered by the term "standardization" that is done in the processes of creation, diffusion and sustainability of an organizational innovation.

The good match between the two models, which had different purposes, is perhaps not surprising as Birkinshaw et al. (2008) implicitly included thoughts of both 'inter-firm' and 'intra-firm' diffusion in their model, and since the innovation and its diffusion already in previous research on both technical innovations[37] (Rosenberg, 1976; Ehrnberg & Jacobsson, 1991) and on organizational innovations (Alänge et al. 1998) were assumed to be hard to observe in isolation as the innovation is constantly re-invented.

So what can be learned from studies on the area of "diffusion of innovations"? Previous studies on the diffusion of innovations focus largely upon the diffusion of technical innovations, while diffusion scholars have less frequently studied the diffusion of organizational innovations (Teece, 1980; Rogers, 1995; Lynch, 2007; Birkinshaw et al., 2008). This "gap" in research literature has therefore been emphasized as an area to be addressed (Lynch, 2007; Birkinshaw et al., 2008). Teece (1980) and Alänge et al. (1998) raised the question whether the diffusion of organizational innovations is characterized by the same considerations as the diffusion of technical innovations. If this would be the case it might be possible to re-use lessons from the area of diffusion of technical innovations to predict adoption patterns and speed of diffusion of organizational innovations.

For this reason we will now explore the work of Rogers (1995) and, below, an adapted version of Rogers' findings will be presented.

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[36]In Jarnehammar (1995) an adapted version of the model of Shapiro & Sokol (1982) was used to study the diffusion of organizational innovations. This adapted model included four steps in the diffusion process: Desirability, Feasibility, First-Trial, and Implementation. Howard Rush suggested in 1995 the addition of a fifth step, "maintenance".

[37] In previous research it has been found hard to separate the technical innovation from its diffusion process. Instead a central feature of the diffusion process is how an innovation changes in the course of the diffusion process (Rosenberg, 1976; Ehrnberg & Jacobsson, 1991).

2.2.2.1 The diffusion of technical innovations

The characteristics of the diffusion of technical innovations are well explored by Rogers (1995)[38]. He mainly studied the diffusion of technical innovations and defined diffusion as: "*…the process by which an innovation is communicated through certain channels over time among the members of a social system*" (Rogers, 1995, p. 10). In other words, there are four elements in the diffusion of technical innovations[39]. These elements are the innovation, communication channels, time, and the social system. By better understanding the specific characteristics of an innovation, channels most frequently used, the issue of time, and how the social system (here interpreted such as the external environment) affects the diffusion, the overall understanding of how technical innovations diffuse can be improved.

According to Rogers a technology usually has two components, a hardware component and a software component. The hardware component is the tool that embodies the technology as a material or physical object, while the software component could be coded commands, instructions and other information aspects of this tool that allow the user to use it. Rogers expected a technical innovation dominated by a software component to have a relatively lower degree of observability and thus a slower rate of diffusion, compared to technical innovations dominated by a hardware component. In relation to this, he identified a set of characteristics of the technical innovation that all, according to him, affected the rate of adoption.

First, relative advantage, that is, the degree to which an innovation is perceived as better than previously explored or adopted ideas, will affect the rate of adoption. Second, compatibility matters in the form of the degree to which an innovation is perceived as consistent with existing values, past experience and needs of potential adopters. Third, complexity as the degree to which an innovation is perceived as difficult to understand and use will affect the rate of adoption. Fourth, trialability as the degree to which an innovation may be experimented with on a limited basis will matter. And finally, observability as the degree to which the results of an innovation are visible to others will matter for the rate of adoption. As a result, Rogers found that innovations which are perceived by individuals as having greater relative advantage, compatibility, trialability[40], observability and less complexity are assumed to be adopted more rapidly than other innovations.

In addition to the characteristics of innovations, the diffusion process is influenced by the interdependence between innovations, diffusing at the same time (Rogers, 1995, p. 15). Rogers concluded that the adopter's experience with one innovation "*…obviously influences that individual's perception of the next innovation to diffuse through the individual's system*".

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[38]Rogers' first book on diffusion of technical innovation was published in the early 1960s. Since then, he studied the diffusion of technical innovations until his death in 2004. As technical innovations are not the focus of this thesis, we will delimit the description of the diffusion of technical innovations to the findings of Rogers (1995).
[39]These four elements for diffusion are here assumed to be valid also for organizational innovations.
[40]"Trialability" is the degree to which an innovation may be experimented with on a limited basis.

He further identified the issue of the boundaries around an innovation, i.e. where one innovation stops and another begins. He concluded that the potential adopters, who do the perceiving, determined the boundary between innovations. Finally, Rogers emphasized the importance of re-invention, defined as the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation. He concluded that a considerable degree of re-invention occurred for many innovations, and that certain innovations are more flexible in nature and therefore easier to re-invent during the diffusion process. Rogers (1995) therefore raised the question of how to separate the technical innovation from the diffusion of it.

Rogers (1995, p. 17) defined communication as "…*the process by which participants create and share information with another in order to reach a mutual understanding*". Diffusion of innovation is according to Rogers a particular type of communication in which the message content includes a new idea. The communication is between individuals and a communication channel is therefore the means by which messages get from one individual to another. Individuals' networks can therefore be assumed to be important for the diffusion of innovations. Ozman (2006) made a literature review of inter-firm networks[41] and innovation. He found that networks influence a firm's innovativeness and do so in several ways. First, networks provide knowledge spillovers. These are not only caused by formalized arrangements between firms, but rather a result of informal interpersonal communications between people working in different firms. Second, different firms have different resources and by interacting they can identify and access complementary resources. Third, networks may allow the firm to explore and exploit external knowledge bases, which in turn support the firm's organizational learning and ability to innovate. Fourth, firms can imitate the behavior of other firms[42]. Fifth, managers were strongly influenced in their decision-making by their social network[43].

Regarding the component "time", Rogers concluded that the time dimension was involved in the diffusion process in three ways: by which an individual passes from first knowledge of an innovation through its adoption, when discussing an individual's or unit's relative earliness/lateness with which an innovation is adopted, and with an innovation's rate of adoption in a system. Regarding the rate of adoption, the distribution curve is, according to Rogers, in the form of an S-curve.

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[41] In inter-firm networks he designated the firm as the node in the network and included linkages such as "…*informal relations, mergers, acquisitions, R&D alliances, know-how trading, licensing franchising or other types of interaction*". As individuals' networks could be assumed to be a foundation for communication in any of the above-mentioned "linkages", it is assumed that the findings from this study also are relevant for the discussion on individuals' networks.

[42] Rogers' (1995) conclusion was that imitation does happen but the transfer of ideas most frequently happens between two individuals who are similar (e.g. in beliefs, social status etc.), or in Rogers' words "homophilous".

[43] This finding is also identified by Rogers, who concluded that people depend mainly on a subjective evaluation of an innovation that is "...*conveyed to them from other individuals who have previously adopted the innovation*" (p. 18) rather than using more scientific studies of consequences.

Finally, Rogers defined the social system as a set of interrelating units that are engaged in joint problem solving to accomplish a common goal. He concluded that diffusion occurs within a social system and that the social structure, its norms, and opinion leaders/change agents of the system all affect the diffusion of innovations. In fact: "*individual innovativeness is affected both by individual characteristics, and by the nature of the social system in which the individuals are members*" (p. 26). He concluded, however, "*Compared with other aspects of diffusion research there have been relatively few studies of how the social and communication structure affects the diffusion and adoption of innovations in a system*" (p. 25).

2.2.2.2 *Intrinsic features of organizational innovations*

Organizational innovations, however, have some intrinsic features that are quite different from those of technical innovations. Before attempting to apply insights from the diffusion of technical innovations to the diffusion of organizational innovations, we will scrutinize how these intrinsic features differ and may impact the diffusion process of organizational innovations.

In Alänge et al. (1998), these intrinsic features have been listed along two dimensions, their effects on the market for organizational innovations and their effect on the search and implementation processes. Below, an adaptive version of the intrinsic features presented in Alänge et al. (1998) will be presented along the two dimensions.

2.2.2.2.1 Effects on the market

First, organizational innovations are characterized by knowledge, which is of a more tacit nature than for technical innovations (Alänge et al. 1998). An adoption of an organizational innovation is an investment in knowledge, procedures, behavior and relations rather than in artefacts, which could make it harder to protect by patents and might create a lack of incentive to spend resources on developing organizational innovations (Teece, 1980). Second, as a result of this tacitness, organizational innovations are more difficult to observe, to define and to identify system borders for, than technical innovations (Alänge et al. 1998). Third, the costs and benefits of the organizational innovation are hard to evaluate for the potential adopter, since there usually does not exist a traditional calculation method[44] for this kind of innovation, and since trialability and observability could be assumed to be lower for organizational innovations than for technical innovations (Alänge et al. 1998). It is therefore difficult in advance to determine the direct effects of organizational innovations on organizational performance (Kimberly, 1981). Fourth, the marginal cost of production and selling is equal to the reproduction and transfer costs (Teece, 1980). While marginal costs are not zero (Teece, 1976) it is expected that the discrepancy between marginal costs and fixed costs to develop the knowledge is substantial, which could lead to a problem of pricing the innovation on a market (Alänge et al. 1998). Fifth, there is no traditional supplier industry or market in the

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[44]A traditional calculation method is here a financial method for calculating financial return on investment.

case of organizational innovations (Alänge et al. 1998). Consulting firms could however be regarded as some kind of "suppliers" of organizational innovations in their effort to conceptualize, advise, and implement organizational innovations (Bessant & Rush, 1995).

2.2.2.2.2 Search and implementation processes

First, as the market may not work well, the characteristics of the local search processes may be more important for organizational than for technical innovations, i.e. the search process and its conditioning factors are extremely important (Alänge et al. 1998). However, as firms do not usually have a position similar to an R&D manager for organizational innovations, this could mean a less conscious and systematic search process and not even towards explicitly stated goals (Alänge et al. 1998). Second, organizational innovations often affect a larger number of people than most technical innovations, which means that a greater number of people must support the innovation (Kimberly, 1981). Further, they typically involve organizational disruption, so a higher level of resistance and inertia towards the change could be expected for organizational innovations than for technical innovations (Teece, 1980). Third, due to the fact that many people commonly are affected by an organizational innovation, top management's role could be assumed to be of another magnitude compared with the case of implementing technical innovations (Alänge, 1992; Spenley, 1992). Fourth, as organizational innovations are more tacit in their nature, they are shaped by the subjective interpretation of the adopter. Early adopters are here assumed to have the largest influence and to some extent standardize the shape of continued internal diffusion (Alänge et al. 1998). Further, organizational innovations are assumed to continue to change while diffusing within a firm. Finally, there is a mutual dependence between organizational and technical innovations (Leonard-Barton, 1988). However, in the case of organizational change there is a need to consider not only the technical and social system but also the cultural and political system in a firm (Tichy, 1983).

2.2.2.3 *Implications for the diffusion of organizational innovations*

The comparison showed that organizational innovations are of a more tacit nature than technical innovations and that there is no traditional market for organizational innovations. Further, there is no traditional calculation model for calculating return on investment for organizational innovations, they commonly affect the daily work situation of many people in an organization, and companies rarely have a formal position or formal strategies for organizational innovations similar to an R&D manager and R&D strategies for technical innovations[45]. As a result, the market mechanisms function poorly, the search and learning processes may be less conscious and systematic, the standardization of the innovation is based

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[45]According to Birkinshaw and Mol (2006, p.87) firms can actively accelerate the management innovation process by making it more systematic. Their recommendations were for firms to: "*become a conscious management innovator*", "*create a questioning, problem-solving culture*", "*seek analogies and exemplars from different environments*", "*build a capacity for low-risk experimentation*", "*make use of external change agents to explore new ideas and become a serial management innovator*".

on subjective interpretations of early adopters, and top management commitment and the process of intra-firm diffusion of organizational innovations become more important than in the case of technical innovations.

In spite of the identified differences in intrinsic features, both Teece (1980) and Alänge et al. (1998) concluded that insights from studies on technical innovations could be applied with advantage to the study of the diffusion of organizational innovations. However, based on the knowledge of how technical innovations diffuse and the specific intrinsic features of organizational innovations, Alänge et al. (1998) draw a number of implications for the diffusion of organizational innovations. Table 1 below presents an adapted result of this work.

Table 1. Implications for the diffusion of organizational innovations (OIs)

Main implications	Comment
The nature of the innovation	
More difficult to observe, define and identify system borders for OI than for TI.	Due to the tacit nature of OI, subjective interpretations and continuous re-inventions of the innovation, there is a need to decide when to define the OI in the diffusion process and how to define the OI. Further, there is a need to define when an OI is considered adopted by the firm.
External context	
National systems of innovation are relevant for the inter-firm diffusion process.	The institutional set-up and its inertia and path-dependency, as well as factors influencing its unlearning/learning processes, influence inter-firm diffusion of OIs. In addition, national standardization processes need to be considered.
Other modes of transfer, substituting a traditional market.	The movement of key people between firms, user networks, consulting firms, the institutional set-up and formal and informal individual networks are important alternatives to a "market" for OI. Regarding networks, factors such as size, dual networks, compatibility of network participants, and the maturity of the network are assumed to play a role.
Internal context	
Path-dependent, cumulative and non-systematic search and learning processes.	The search and learning processes are not expected to be conscious and systematic. Further, considerable organizational inertia could be expected which tends to reinforce the cumulative character of OI. Path-dependency, the tendency to lock in to a particular organizational path, is therefore assumed to be stronger for OI than for TI. To break the path-dependency, firms need to unlearn, which in turn depends on user competence.
No traditional financial calculation methods. Alternative decision criteria are needed.	Alternative decision criteria could be: imitation of other successful firms, perceived crisis and/or a strong "belief".
High costs for transfer and implementation may contribute to delayed adoption of an OI.	Due to OIs' nature it is difficult and costly to imitate an OI. Further, the costs in terms of organizational disruption and specific firm adjustments are high. This, together with difficulties of estimating performance of an OI and inertia, is expected to lead to a delay in potential adoption and in extreme cases to entail a crisis.
Standardization of the OI's content and implementation may play a more important role than in the case of TI.	The standardization of content and implementation can make the innovation observable and testable, reduce inertia and reduce transfer and implementation cost. Further, it can influence the possibility of seeing a national impact from the OI. The standardization can be done by e.g. the firm, by national organizations or by consulting firms.
The role of top management is of another magnitude in the case of OIs.	Top management's user competence and commitment in the change process are more crucial for the diffusion of an OI than for a TI.
A need to look at the diffusion of OI in a wider context.	A wider context includes interdependences of innovations. In addition, the technical, social, cultural and political systems in a firm need to be considered when implementing an OI.

As was said above, insights from studies of technical innovations could be applied with advantages to the study of the diffusion of organizational innovations. However, due to organizational innovations' higher degree of tacitness, they are less observable and testable than technical innovations. If the organizational innovation is also a so-called major organizational innovation, the innovation could also be more complex to observe, interpret and test. In addition, organizational innovations affect a higher number of people compared with technical innovations and are harder to evaluate, as there is no traditional financial calculation method in the case of this type of innovation. As a result of these issues, the process of standardization, the top management's support, and its "belief" in the relative advantages and the compatibility between the new innovation and previously adopted innovations play an even more important role for organizational innovations than for technical innovations.

Further, the importance of interdependence between innovations, the subjective determination of boundaries around an innovation and the continuous re-invention of the innovation (and therefore the problem of separating the innovation from its diffusion) are all more relevant to consider compared with the case of technical innovations. Further, networks played an important role in both cases for the diffusion of the innovations. However, in the case of organizational innovations, interpersonal networks were the main channels for diffusion, as no traditional market existed. Due to the lack of a traditional market, the local institutional set-up, user networks, consulting firms, and movements of people all played an important role for the diffusion of organizational innovations.

According to Rogers (1995) the social system and the individual characteristics influence the innovativeness of a firm. This, fits well with the conclusions from Alänge et al. (1998) where the national innovation system and firm characteristics such as top management and their user competence play important roles for the diffusion of organizational innovations. However, in addition to the institutional set-up of the local innovation system, the importance of local norms and historical experience has been emphasized by Rogers (1995) and by researchers on national and regional innovation systems (Lundvall, 2010; Cooke, 2001, Saxenian, 1996). In fact, Saxenian (1996) indicated that not only the norms played a role in Silicon Valley's success, but also the decentralized regional network-based structure and the dynamic capabilities of the region. Since, according to Rogers, relatively few studies have been conducted on how the social structure affects the diffusion of innovations, the findings in Alänge et al. (1998) on the importance of the local institutional set-up, together with the findings from Lundvall (2010), Cooke (2001) and Saxenian (1996) on the importance of norms and historical experience of a nation and/or region, should be considered in a conceptualization of the creation, diffusion, and sustainability of organizational innovations[46].

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[46]This could be viewed as an additional sub-contribution in this "kappa".

2.3 How to sustain organizational innovations

As the innovation in itself is constantly re-invented, and since the term "sustainability of an organizational innovation" emphasizes the fact that a firm should stick to a particular organizational innovation for a certain time period, which could be a sign of inertia (Buchanan et al. 2005), the concept of sustainability has to be well thought through. A solution could be that found by Buchanan et al. (2005). According to the authors, the concept 'Sustainability' could refer to an improvement trajectory, rather than to a particular organizational innovation. This would according to the authors imply a more dynamic perspective on sustaining organizational change. The static view in form of sustaining a particular organizational innovation would then be only temporarily relevant.

After a review of the literature on sustaining organizational change, Buchanan et al. (2005) identified four sets of factors that all played a role. The four sets were: the 'internal context'; the 'external context'; the substance of change[47], the change process, and its timing; and finally organizational factors (factors that could be configured and interact in different ways). The relative importance of each set and of each factor within each set was not identified, but it was emphasized that the interplay between the factors played an important role. In Figure 1 an adapted version of the model developed by Buchanan et al. (2005, p. 202) is presented. Each set of factors will then be discussed.

Figure 1. Sustainability of an organizational change
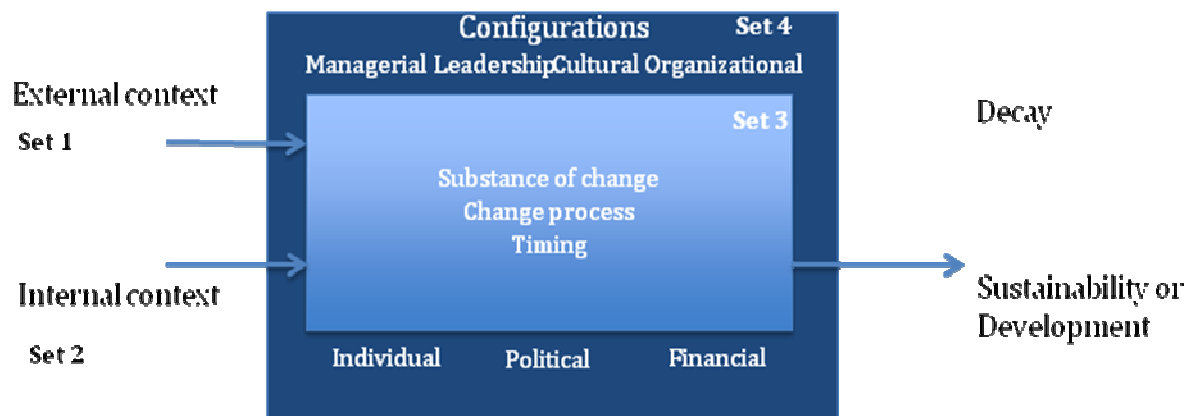
First, the sustainability of an organizational innovation is influenced by the firm's external context (set 1) and internal context (set 2). Factors such as the turbulence and uncertainty[48] in the external environment and a firm's history and therefore receptiveness to change were

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[47] Here interpreted as a particular organizational innovation.
[48] According to the authors, a high degree of external turbulence and uncertainty could risk the stability of internal changes.

emphasized here. Second, the substance of change (e.g. if it is perceived as important for the firm), the change process and its timing[49] (set 3) all affect, according to the authors, the sustainability of an organizational change. Third, seven organizational factors influenced the sustainability (set 4). These were managerial, leadership, cultural, organizational, individual, political and financial. The factors in the internal and external contexts were very briefly discussed by Buchanan et al. (2005) and did not contribute to a good understanding of how these two sets influence the sustainability of an organizational innovation. The same was valid for the set covering factors such as the substance of change, change process and timing. Further, the organizational factors in set 4 were not weighted in relative importance or discussed in depth; hence, this set also yielded little explanation of how to sustain an organizational innovation.

Interesting, though, is that the authors have identified a number of factors similar to those found in studies of the 'creation' and 'diffusion' of organizational innovations. The external context and the firm's inertia and path-dependency (as a result of a firm's history, i.e. internal context) seem to play a role in all three processes. In addition, the innovation's perceived importance for the organization and the timing of the innovation, matter in all three processes. Finally, most of the organizational factors have been identified as important also for the 'creation' and 'diffusion' of organizational innovation. What is partly new in the model of Buchanan et al. (2005) are two things: first, the change process as such, which was not discussed by Birkinshaw et al. (2008) and was discussed only indirectly as an issue of standardization in the step 'implementation' in Alänge et al. (1998). Second, the external turbulence and uncertainty was identified as an inhibitor for sustaining an organizational innovation. The latter finding is of interest, as it could mean that it would be harder for a firm to sustain a particular organizational innovation in a rapidly changing industry than in the case the industry is more matured. This would in turn mean that the focus on an improvement trajectory instead of a particular organizational innovation, could be of even higher relevance for firms in rapidly changing industries, which could fit well with the ideas of constant renewal necessary in rapidly changing industries developed by Brown and Eisenhardt (1997, 1998).

Regarding the improvement trajectory, it could be viewed as a number of synergistic and complementary organizational innovations, since the firm and its search and learning processes are path-dependent. For this reason, the initial innovation puts constraints on later development of the organization (Kimberly, 1979). In the event that a later implemented organizational innovation is not synergistic with and/or complementing the already implemented innovation, the new innovation might be seen as a start of a new improvement trajectory. Tools such as standardization, road maps and/or narratives could be used either to strengthen a certain trajectory or to communicate and make sense of a new trajectory (Wallin, 1994; Berendse et al. 2006)

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[49] The issue of timing here is not primarily about how early or late an innovation is adopted by a firm or about the overall innovation's rate of adoption in a system (Rogers, 1995). It is rather about when the timing is right for a specific firm to adopt and implement a particular organizational innovation.

Finally, the consequences in the model, such as decay, sustainability or development of an organizational innovation, do not all seem relevant when the concept 'Sustainability' refers to an improvement trajectory, rather than to a particular organizational innovation. The development of an innovation is then viewed as a natural part of the sustainability of an organizational innovation. Hence there might be only two alternative consequences: 'decay' (which could mean the start of a new improvement trajectory) or 'development' of the innovation in accordance with the improvement trajectory. Sustainability of a particular organizational innovation can only be temporal and seems to be less relevant in rapidly changing environments.

Standardization as a tool to sustain an organizational innovation has been discussed by e.g. Shiba et al. (1993) and Alänge (1994). Besides standardization, narratives have been discussed as a potential tool for sustaining organizational change by creating shared priorities and support for a change process (Bartel & Garud, 2009). One role of the narrative is to create sense in the change by connecting it to the past and to the future of the organization (commonly visualized in a "road map" (Wallin, 1994)). This might be of extra importance when the change is perceived as disrupting the historical path of the organization, and when a reinterpretation of the past might be necessary in order to make sense of future changes. The narrative could according to the authors be viewed as a tool to create an organizational memory of its innovations, which could also be generative for future ideas and changes. Berendse et al. (2006) also emphasize the importance of narratives in organizational change: "*Conceptualizing organizational life as story-making or organizations as story-telling systems contributes to our understanding of organizational change*". The authors viewed narratives as important sense-making devices and "…*they provide an important insight into the everyday processes of negotiating meaning among organizational actors*". Narratives, however, are not only important in a specific change process but could also be an important device to build a strong culture, which in turn could emphasize the importance of constant change. In this light, it can be speculated whether narratives are important for the organizational identity and thus for the identity of the people working in the organization. If this were the case, a narrative would influence not only the perception of employees, but also potentially the employees' behavior. A final note in regard to narratives is the importance of trustworthiness. In order for a narrative to be effective, that is, influence the perception and behavior of employees in a way planned by management, the narrative needs to be trustworthy. This is achieved, among other things, when the narrative is mirrored in the behavior and communication of management. If the narrative is not trustworthy, the effect can be quite destructive both for a single change process and for the company overall.

Finally, as was seen above, the role of management and leadership is important for sustaining an organizational change. However, an implementation of a major organizational innovation can take longer than the time a CEO on average stays in office[50]. For this reason there is a need for a "higher level" of influencers able to ensure the sustainability of the innovation or improvement trajectory. This higher level could consist of the owners and board. However, in

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[50]On average a CEO stays in office for six years in most parts of the world (forbes.com 2008).

the selected literature on the sustainability of, or creation and diffusion of, organizational innovations, the roles of the board or owners are rarely discussed. This might seem peculiar since the board can be assumed to affect investment decisions on any innovation, and specifically so for major innovations. Further, the board could provide access to resources and networks, and thereby facilitate inter-firm diffusion of ideas and enhance a firm's credibility and legitimacy (Bonn & Pettigrew, 2009). Finally, a board could ensure macro-stability when implemented major organizational innovations require many years to be fully implemented.

2.4 Summary

Organizational innovations can be 'new-to-the-state-of-the-art' or 'new-to-the-firm'. In this thesis the criterion 'new-to-the-firm' is used, since it can be viewed as the most frequently occurring of the two. Organizational innovation was therefore defined as: "an organizational method in the firm's business practices, workplace organization or external relations that is new to a firm and intended to improve the firm's performance".

In order for an organizational innovation to be long-term competitive, Hamel (2006) identified three conditions of which one or all must be fulfilled. These conditions were: "*based on a novel principle that challenges management orthodoxy*", "*systematic and encompassing a range of processes and methods*", and "*part of an ongoing program of invention where progress compounds over time*". The organizational innovations that fulfill one or more of these conditions are in this "kappa" called Major Organizational Innovations (MOIs). The empirically studied organizational innovations – 'TQM', 'TPS', 'Lean', and 'Google' – in this thesis do all fulfill one or more of the above three conditions, so they could be viewed as major organizational innovations. However, as 'TQM', 'TPS', and 'Lean' have mainly originated in the automobile industry, are relatively standardized, and are known for their focus on quality and operational efficiency, they are categorized in this "kappa" into one category, 'TQM'/'TPS'/'Lean', while the MOI 'Google' was viewed as a potentially different type of MOI. The reason was that 'Google' instead originated in the Internet industry, has not been standardized, and is known for its focus on continuous innovation. In order to better understand whether 'Google' could be classified as a different MOI compared to the other three focused on quality and operational efficiency, key organizational characteristics for long-term competitiveness in Internet Service- related industries such as Information Services, Semiconductors and Telecommunication Services were presented. Interestingly, the body of literature studying related industries was published in the years 'Google' was created[51] and could therefore potentially also bring some understanding to the context that might have inspired the company Google, and to what degree 'Google' as an organizational innovation is unique. The key characteristics for long-term competitiveness in Internet Service- related industries were found to be different from the key characteristics of the organizational innovations 'TQM'/'TPS'/'Lean'. These key characteristics could therefore be of interest to compare with the key characteristics of 'Google' so as to evaluate whether 'Google' could be used in testing an integrated conceptual model, based on studies of 'TQM'/'TPS'/'Lean', for the creation, diffusion, and sustainability of organizational innovations.

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[51]By researchers, of whom several were actively working in the Silicon Valley.

Organizational innovations are typically intended to increase a firm's performance by cutting costs, improving workforce satisfaction, gaining access to non-tradable assets or increasing the innovativeness of the firm. In spite of organizational innovations' identified value for firms, the creation, diffusion and sustainability of organizational innovations have been less researched (Edquist, 1992; Birkinshaw et al. 2008; Buchanan et al. 2005) than technical innovations. Of these three concepts, 'creation' and 'sustainability' of organizational innovations seem to be the two least researched areas of the three. In addition, each concept – 'Creation', 'Diffusion', and 'Sustainability' – has been explored in isolation by the selected research, and not in the light of an overall conceptual model. Interestingly, Birkinshaw et al. (2008), who focused on the concept of 'creation' of organizational innovations, included mechanisms by which the new innovation was put into practice. These mechanisms "for putting an organizational innovation into practice" could very well be viewed as part of an intra-firm diffusion process. Still, the authors did not seem to include, or reflect on, the body of research literature on diffusion of innovations. On the contrary, they considered this body of literature to be focused on 'inter-firm diffusion' and not of great value in order to contribute to the understanding of the creation and implementation of management innovations. In addition, since the areas 'Creation' and 'Sustainability' of organizational innovations have been little researched, the presented research on these areas was brief and did not provide any deeper understanding. The concept 'Diffusion' was explored to a greater extent in Alänge et al. (1998).

In regards to sustainability of organizational innovations, it was found that the concept 'sustainability' of an organizational innovation could refer to an improvement trajectory, rather than to a particular organizational innovation. The improvement trajectory could in turn be viewed as a number of synergistic and complementary organizational innovations, since the firm and its search and learning processes are path-dependent. For this reason the initial innovation puts constraints on later development of the organization (Kimberly, 1979). In the event that a later implemented organizational innovation is not synergistic with and/or complementing the already implemented innovation, the new innovation might be seen as a start of a new improvement trajectory. Tools such as standardization, road maps and/or narratives could be used either to strengthen a certain trajectory or to communicate and make sense of a new trajectory. Standardization was found by Alänge et al. (1998) to be an important mechanism for the diffusion of an organizational innovation. However, none of the other studies put any emphasis on standardization.

The three concepts Creation, Diffusion, and Sustainability were in turn affected by different sets of factors. The different sets were labeled a little differently between the authors, but together covered issues such as the external/environmental context, internal/organizational context/configurations, change agents, substance of change/nature of innovation, change process and timing for change. However, one factor that was not discussed by any of the authors was the role of boards in the creation, diffusion and/or sustainability of an organizational innovation. This might seem peculiar as the board could provide access to resources and networks and thereby facilitate inter-firm diffusion and enhance a firm's credibility and legitimacy, but also ensure macro-stability in the case of major organizational innovations requiring many years to be fully implemented.

Based on our understanding that the creation, diffusion, and sustainability of organizational innovations are less researched than technical innovations, and that a board, as an "influencing factor", has not been investigated by the selected researchers, three main focus areas for the empirical studies were decided upon. First, findings from literature on the diffusion of technical innovations were explored in Paper I in order to evaluate whether they could be useful for an analytical framework for studying the diffusion of organizational innovations. In addition, organizational innovations' intrinsic features were compared with those of technical innovations. The result in the form of a developed analytical framework for studying the diffusion of organizational innovations was then empirically tested in Paper II. Second, as the roles of boards have not been explored in the selected research, a board's roles in sustaining major organizational innovations were explored in Paper III. Finally, as the selected theories had focused primarily on one of the three concepts in relative isolation, the well-known innovative organization of Google Inc. was investigated in order to see how this organization had been; created, diffused and sustained, over its first 12 years and how it was characterized. In the next chapter, the methodology for the empirical studies will be presented.

Finally, as the three concepts – creation, diffusion, and sustainability of organizational innovations – have been researched in relative isolation from one another, this "kappa" contributes in two ways. Firstly it provides "a conceptualization" of how organizational innovations are created, diffused, and sustained". Secondly it "tests how characteristics of an organizational innovation affect the applicability of the conceptualization".

3 Methodology

This thesis is based on four papers and a "kappa". The first paper was published in 1998. The second paper was based on empirical data from 1993-1996 but also on retrospective interviews conducted in 2006 and 2008. An early first version of this paper was presented in Jarnehammar (1995) and a revised version, now including new data collected in 2006 and 2008, was published in 2011. The reason for this delay was that the author's Ph.D. process paused between 1995 and 2006 due to a career in the private sector. In 2006, the Ph.D. process was started again, in parallel with a regular manager position. This led to one published paper in 2009 (Paper III) and one published paper in 2011 (Paper II)[52]. In 2010, the project 'Google' was kicked off. The project was conducted in Silicon Valley, California. The temporary move to California was important in order to truly understand the Google culture and mindset as well as the unique environment that Google originated in. The result of this project was a conference paper presented at the 9th International Triple Helix conference at Stanford University, July 2011 and Paper IV, which has been submitted for publication in 2012. Finally, the "kappa", with its own two research questions, was written in 2011/ 2012 and is primarily based on the findings and conclusions in the four papers.

This chapter provides a description of the research design and methods used in each paper. The chapter starts with presenting the underlying scientific perspective used by the author. In the second and third sections of this chapter, the method employed in the different papers and the details on data collection, sample selection and analysis will be presented. Finally, the last section discusses the validity and reliability of the employed method and data collection, and provides reflections on the overall research process.

3.1 Scientific perspective

The primary perspective used in this thesis is the firm-level perspective rather than the perspective of an innovation system, of a team, or of single individuals. The firm-level perspective is further represented by: board members, top management[53] and other employees.

In addition, the underlying scientific perspective used in this thesis is that an understanding of the social world is created through an examination of the interviewees' interpretation of that world[54]. According to Bryman & Bell (2011) this is a quite common perspective within the

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[52]Important to note is that only 'TQM' was studied in Paper II, while 'TQM', 'TPS', and 'Lean Production' were studied in Paper III. This means that the framework for diffusion of organizational innovations is based on the study of TQM alone. However, in the study of boards' roles in sustaining major organizational innovations (Paper III), data on how the studied innovations 'TQM', 'TPS', and 'Lean' were created and diffused was indirectly provided; hence, findings on how organizational innovations are created and diffused were also found in Paper III.

[53]It could be argued that the board and top management of the firm are "teams" so that the analysis could include two levels, the level of the firm and the level of teams. However, none of the included papers have explicitly studied the composition and group dynamics of the board or management teams, and thus the level of analysis most correctly is the firm.

[54]This means that the collection of knowledge was mainly influenced by an interpretative discourse. An interpretative discourse regards sense-making individuals as active participants, as co-creators of social structures, using ethnographic and hermeneutic methods to establish local meanings grounded in social and organizational practices (Buchanan & Bryman, 2007).

area of qualitative research, compared with quantitative research, which is influenced by a natural-scientific notion of what counts as acceptable knowledge. The perspective is further that the interviewees, due to their unique experience, expectations and position in the firm, will contribute with slightly different information. By interviewing a critical number of interviewees it is therefore possible to create an interpretation, which represents the social world of the firm. This collective interpretation is then used as the researcher's understanding of the firm and its social world. The collective interpretation is experienced to exist either as a result of a sample size decided already at the beginning[55], or when each new interview provides only marginally new information. Both approaches put demands on size and design of the sample. If the primary unit for analysis is the firm and the goal is to receive a collective interpretation that represents most employees' interpretation of their social world, the sample has to be large enough and consist of relevant but diverse individuals, representing different functions and different levels of the firm.

When the collective interpretation was revealed, the researchers considered this as an accurate picture from the perspective of the interviewees. The interview notes were not validated later through a "respondent validation" (Bryman & Bell, 2011). The main reason behind this decision was that we did not want to give the interviewees a chance to regret more strategically or politically sensitive information they had provided and thereby to withdraw these important data from the interview material. In the case of Google, though, we plan to validate and further develop our findings through a future workshop in which the findings will be presented and discussed.

In the event that the involved researchers interpreted certain data differently, a converged view was developed through a discussion or by turning back to key informants and asking for a clarification, or even an interpretation.

The language and terminology used when asking questions and collecting data are in most respects the language and terminology used by the participants. However, as people are assumed to potentially have different reasons (political, public relations, etc.) for their choice of answers to interview questions, issues such as tonality, body language, and surrounding context were also considered when building the case story. In this way, the participants' version of their social world could be both better understood and critically screened by the researchers.

In order to check the validity and reliability of a specific case, there is however a need for a health-check of empirical findings with previous research. The specific social world of a firm is therefore viewed through the lenses of both practitioners (the interviewees) and academics (the researchers) and is in this way validated from two sides. The transfer of knowledge between these two worlds is not always easy, and misinterpretations can be assumed if the researchers do not have enough experience from both worlds. This competence was secured through the choice of fellow researcher. The author chose to work with a senior researcher

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[55]In some cases, the size of the sample is decided by the company, by the funder or designer of the project or by time limits on the project.

with a high degree of academic experience in the area of management and organization, supplemented with academic experience of areas such as innovation systems, open innovation and organizational behavior/sociology. Further, the senior researcher had long experience of conducting qualitative studies. In addition to academic and methodological experience, the senior researcher had also a good understanding of the public and private sectors, mainly through many years of consulting. By supplementing the senior researcher's broad portfolio of academic and business knowledge and experience with the author's own, academic knowledge and extensive practical experience from the business sector, the social world of a firm could be better understood through both an academic and a practical lens.

However, the interpretation of information is based not only on the researchers' portfolio of knowledge and experience but also on their own beliefs and view of the social world. The firm is viewed in this thesis as rational, and management (or the board) introduces and sustains organizational innovations with the goal of making its firm more effective and competitive. The employees are regarded as intelligent and always striving to do the best for the company. In addition, the firm is assumed to be part of an environment and is influenced by its environment. The firm and its top management are assumed to be able to affect, manage and control not only their company but also parts of their external environment.

3.2 Choice of method

The method selected for each research study should optimally be the proper method for the research topic. However, there are usually several other issues influencing choice of method. According to Buchanan & Bryman (2007), these issues are organizational (size, location etc.), historical (experience, traditions etc.), personal (preferences, competencies, relationships etc.), political (negotiated objectives, layered permission, stakeholder demands etc.), evidential (different audiences such as academic, management etc.) and ethical (heightened scrutiny, codes of practice etc.). The selection of method in this thesis was influenced by most of the above issues. The choice of method was based on the experience and preferences of the research team, the final permission from involved companies, and the historical tradition within the faculty[56]. Further, the primary contact persons and these individuals' contact network within the selected firms or organizations affected the size and content of the sample.

3.2.1 Selected method

The purpose of Paper I was to explore the extent to which the more recent literature on technical innovations and their diffusion could contribute to a useful analytical framework for studying the diffusion of organizational innovations. For this reason, the chosen method was a literature review.

Papers II, III and IV, however, were based on a qualitative method. The reason behind the choice of a qualitative method was that Papers II-IV were exploring complex phenomena with uncertain correlations between sub-elements and with limited previous research to use for

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[56]The faculty conducts mostly explorative studies and therefore commonly uses qualitative methods.

guidance. A qualitative method enables a refined description, as it can provide "…*richness and holism, with strong potential for revealing complexity*" (Miles and Huberman, 1994, p. 10).

As all three papers have an exploratory character, the research design chosen was a case study approach. Case studies can impose constraints upon generalizability of findings, but are useful when trying to develop new theory rather than testing existing theory (Eisenhardt, 1989). A case study approach was therefore chosen since it enables the kind of nuanced documentation that is required in order to address the previously mentioned research questions.

3.3 Data collection and analysis

The data collection and analysis related to each paper will now be described, but first some words on how the theory in each paper was built up.

In order to build up the theory an abductive approach (Dubois & Gadde, 2002) was used. According to Dubois & Gadde (2002, p. 559) an abductive approach is used in theory development rather than theory generation. The research team therefore started the research project by conducting a literature review and developed a first skeleton for a framework. This framework was used when developing focus areas and questions in the questionnaires. However by using coding and categorization of empirical findings, the original framework was successively developed during the research process. The framework was also developed by new literature reviews, triggered by empirical findings.

3.3.1 Paper I

The purpose of Paper I was to explore the extent to which the more recent literature on innovation and diffusion, with a prime focus on technical innovations, could contribute to a useful analytical framework for studying the diffusion of organizational innovations.

During the 1980s and 1990s, various researchers, including Rosenberg (1976) and Freeman (1987), developed the theoretical view of technical innovations and their diffusion. During this time, however, research on organizational innovations and their diffusion had not witnessed a similar development. For this reason it was of interest to learn whether more recent literature on technical innovation and diffusion could contribute to the shaping of an analytical framework for studying the diffusion of organizational innovations. As a consequence a literature review was conducted on technical innovations and their diffusion (e.g. research done by Thirtle and Ruttan, 1987; David, 1988; Dosi, 1988, Cohen and Levinthal, 1990; Edquist, 1992; Lundvall, 1992; Carlsson & Jacobsson, 1994). In addition, a literature review was performed on research on the diffusion of organizational innovations (e.g. Teece, 1980; Kimberly, 1981; Leonard-Barton, 1988).

After reviewing the selected literature, intrinsic features of technical and organizational innovations were compared. Finally, it was explored what the identified differences in intrinsic features may mean for an analytical framework specially developed for studying organizational innovations. Paper I was published in 1998.

3.3.2 Paper II

The purpose of Paper II was to empirically test the analytical framework developed in Paper I. The organizational innovation chosen was Total Quality Management ('TQM'), and the sample of case studies chosen consisted of a Swedish manufacturing company in the private sector, Electrolux Storkök AB in Alingsås and a Swedish service-producing organization in the public sector, Mölndal Hospital in Mölndal. The rationale behind the choice of the two cases was that they represented different industries and products and that they were known to have an ongoing implementation of 'TQM'.

The data were collected in several steps. First, data were collected in 1993 on the organizational innovation 'TQM'. The definition of 'TQM' used in Paper II was derived from empirical data drawn from a number of companies considered to be early adopters of the TQM approach in Japan (Toyota, Minolta and Fuji Xerox), the U.S. (Motorola and Xerox Corporation) and Europe (Rank Xerox, Pitney Bowes UK and ABB Sweden). The empirical data were collected through face-to-face interviews with people on various levels and in various positions in the companies. An open-ended questionnaire, focused on different elements such as leadership, processes and customer focus, was used. The empirical data were supplemented by a review of definitions and core values used by quality awards (e.g. Malcolm Baldrige and European Quality Award) and a literature review on total quality (e.g. Ishikawa, 1985, Imai, 1986; JUSE, 1987; Garvin, 1988; Oakland, 1989; Womack et al. 1990; Bergman och Klefsjö, 1991; Kenney & Florida, 1991; Alänge, 1992; Spenley, 1992; Tenner and DeToro, 1992; Monden, 1993). The data on 'TQM' were then analyzed with the aim of identifying and integrating common components of 'TQM' found in the literature and in our case studies. The common components identified were then organized into a descriptive model of 'TQM' developed through the use of an affinity diagram. Six main categories were found: customer focus, visible leadership, total approach, continuous learning, process orientation, and standardization for creativity (Alänge, 1994).

Second, data were collected in 1994 on a case level. Data were collected through tape-recorded face-to-face interviews and a questionnaire. In the case of Electrolux, the production department was chosen as the main area of study, supplemented by interviews with managers in Marketing, Finance and Product development. In total, 16 employees on different levels (CEO, Director, Manager, work leader and shop-floor worker) were interviewed. In the case of Mölndal Hospital two clinical departments were chosen as the main areas of study. Supplementary interviews were made at a number of service departments. In total 26 employees on different levels (CEO, head of quality, head of clinical department, physicians, nurses and different kind of support personnel) were interviewed. In both cases and on all levels below top management, one strong believer and one disbeliever were chosen as interviewees after suggestions from the managers of the different levels. The questions were open-ended and divided into two parts. One part concentrated more on the factors influencing the inter-firm and intra-firm diffusion processes, while the other part tried to find out how far the company had come in the implementation of 'TQM'. Each interview lasted between one and three hours. For the purpose of minimizing the sources of error, all interviewees in the same occupational position within the organizations were asked the same questions. In addition, a questionnaire was handed out to the top management and quality officers. This

questionnaire was mainly based on the questions developed for the EQA, European Quality Award. The purpose of the questionnaire was to support the personal interviews in order to get as clear and correct a picture as possible regarding how far the company had come in their implementation of 'TQM'. In addition, eight retrospective interviews were conducted in 2006 and 2008 with interviewees who had been part of the Mölndal Hospital case. Two of the interviewees in these retrospective interviews had also been interviewed in 1994.

Each interview was transcribed and read by both researchers. The two cases were documented and then analyzed according to two analytical strategies. First, according to a descriptive framework in the form of a diffusion model. The model chosen was a diffusion model, inspired by Shapero and Sokol (1982), who argued that the perception of desirability and the perception of feasibility are different steps that help determine the actions seriously considered and the actions taken. The diffusion model therefore ended up with four phases: the perception of desirability, the perception of feasibility, first trial and implementation. The division between first trial and implementation was made for analytical reasons, in order to distinguish between single trials of the innovation and a broad-based internal diffusion process. Second, the case studies were analyzed according to our tentative analytical framework. By using the analytical framework in the comparative analysis, we could investigate both whether the different concepts of the framework were relevant and when, in which phase in the diffusion model, the concepts were valid.

The cases and findings were presented in a paper in Jarnehammar (1995). In 2010 a major revision of the original paper was accepted for publication (Alänge & Steiber, 2011).

3.3.3 Paper III

The purpose of Paper III was to investigate the board's role in sustaining major organizational innovations. First a literature review was conducted, focused on management and organization, the diffusion of organizational innovation, and corporate governance. As a second step three cases were selected, based on the criterion that they all had implemented a major organizational innovation. The organizations included in the study were three Swedish companies: Mölndal Hospital, Fagersta Stainless AB and Scania AB. They represented different industries but had all adopted and implemented major organizational innovations such as 'TQM', 'TPS' (Scania Production System), and 'Lean'. One reason for selecting Mölndal Hospital and Fagersta Stainless AB was that in-depth research data on major organizational innovations inside these organizations had been collected from previous Ph.D. students' research (Jarnehammar 1995 and Book 2006). However, although the CEOs had been interviewed in these studies, the board level had not previously been researched. Through these studies we were aware that in both organizations the CEOs had been replaced after a period of 5-6 years. Hence, Scania AB was primarily selected as an example of a company where the CEO had remained over a longer period of time (20 years).

Data were collected through individual interviews. Each interview was around one hour and was conducted either face-to-face or over the telephone. The interviewees selected were board members, CEOs, and key employees that had insights on the diffusion of the firm-specific organizational innovation, how the board worked, and the relationship between the board and

CEO. In total 18 individuals were interviewed, of whom five were chairmen of boards, four were board members, four were CEOs, and five were key employees. Interview guides were developed and used. The initial literature review and Paper II were used in order to identify relevant and critical questions, but also to identify questions that have not been asked in previous literature. Three interview guides were designed, all with open-ended questions. One was for the CEOs, one for the chairman of the board and other board members, and one for key employees.

The process for analyzing data was conducted in three main steps. First, each interview was transcribed, read by both researchers and analyzed. Second, each case was documented. The description of the case included a description of the diffusion and sustainability of the firm-specific organizational innovation (here the descriptive framework developed in Paper II was used) and the roles taken by the board and the CEO. Third, each case was carefully read and analyzed by both researchers and findings were identified jointly in a series of meetings, primarily over the telephone. Finally, the empirical findings were related to findings made by previous researchers within the areas of corporate governance, diffusion of organizational innovations and management and organization. Paper III was published in 2009 (Alänge & Steiber, 2009).

3.3.4 Paper IV

The purpose of Paper IV was to explore organizational characteristics for continuous innovation in rapidly changing industries. Literature reviews and a single-case, empirical study at Google were conducted. According to Yin (1994), a single case is valid if the case has a unique character. In this case, this was the first empirical study of this kind conducted at Google, so it was regarded as having a unique value.

First a literature review was conducted. Previous research was collected on "innovation management", "innovation capability," "literature review and innovation", "sustaining innovativeness," and "sustaining innovation". The aim was to identify research literature that had focused on firms' innovativeness and on organizational characteristics for continuous innovation and/or long-term competitiveness. As a result, the literature review was not conducted within a specific discipline or area but more guided by the "research topic". Secondary data on Google were used if Google themselves had distributed it. Examples of these data were YouTube clips, press releases, IPO letter etc. Previous research articles or books about Google, such as Iyer and Davenport (2008), Girard (2009), and Auletta (2009), were however not included in the first collection of secondary data, as the intention was to research the company from the perspective of its employees and not through the interpretations of other researchers or consultants.

Second, the collection of primary data was conducted over an eight-month period in 2010. The study included face-to-face interviews with 28 selected Google employees. The 28 interviewees were selected through a three-step-process. First the research team created a list of requested "interviewee characteristics". These characteristics were geographical region, function, position, product, and gender. In addition, the candidates from product management and engineering were to have experience with established products as well as with newly

developed ones and from successes and relative "failures". Further, the interviewees were to hold certain tenure[57] in the firm and to have worked with, or expressed an interest in, innovation. As a second step, the Google sponsor for the research project identified employees who matched the requested characteristics. A list of potential interviewees was created, and the research team selected the final sample of interviewees. Finally, the sponsor scheduled time for an interview with each selected employee. Most of the 28 interviewees were at a director level (directors account for fewer than five percent of the total employees) but the sample also included two non-managers and two vice presidents. Seven interviewees were women (25 percent). Collectively, the interviewees covered several regions (Europe, USA, Asia, etc.) and most functions. They also covered product areas such as Search, Geo, Mobile, Chrome, Social networking, AdWords and AdSense and External Developers.

The interview guide was semi-structured with open-ended questions. Each interview lasted approximately one hour and was tape-recorded and later transcribed. In addition to the semi-structured questionnaire a framework consisting of seven organizational elements was used in the end of each interview. The interviewee was asked to rank the seven elements in order according to their relative importance in explaining Google's innovativeness. Each of the seven elements had been mentioned in previous research literature as potentially important for a firm's innovativeness. The interviewees were also given the opportunity to add new elements to the list, although none of the interviewees chose to do so. However, the interviews did disclose that corporate communication and brand might play an influencing role on the firm's innovativeness. Because of this, the last two interviews included questions concerning corporate communication and brand.

After the interviews had been transcribed, the two researchers who had jointly conducted most of the interviews read them independently. Based on this reading, the information in the interviews was coded independently and then transferred to Post-its, which were then used to build sub-categories through an affinity technique. The two researchers conducted this grouping process jointly. These sub-categories served as a basis for writing an in-depth case study, which was organized around the identified areas that influenced and sustained the firm's innovativeness.

Finally, a second literature review was conducted, on the one hand in order to analyze and validate empirical findings and, on the other hand, to provide additional insights about organizational characteristics, on a firm level, important for a firm's innovativeness long-term in rapidly changing environments. The second literature review therefore focused on previous research, which had aimed at exploring, on a firm level, aspects of an organization that could explain and sustain a firm's innovativeness, primarily in rapidly changing industries. The selected research studies were either directly focused on the topic "innovativeness" or strongly related to this topic (e.g. long-term competitiveness).

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[57]The interviewees that had been in the company almost since its start were asked questions on where organizational ideas originally came from, who were the influential people in the process of creating the organization, and how the organization has been re-invented over time.

3.4 Reliability and validity

There has been a discussion of whether terms such as reliability and validity are correctly used in the case of qualitative research. Some researchers believe that the terms are relevant but their meanings need to be altered. Other researchers suggest totally new criteria, e.g. trustworthiness and authenticity (Bryman & Bell, 2011). In this thesis, the first strategy will be used, that is, the two terms are viewed as relevant but will be slightly adjusted due to the qualitative nature of the studies.

3.4.1 Internal and external reliability

Internal reliability in a qualitative study exists when more than one researcher, as members of the research team, agree about what they see and hear (Bryman & Bell, 2011). The research team in the three empirically based papers consisted of two researchers. The two researchers conducted most of the interviews together and shared the same; secondary data, transcribed interviews and selected previous research. Usually the two researchers did have a common perception on key findings from different sources of data. In the case where the two researchers did not agree on findings, the topic was discussed thoroughly and, if necessary, the researchers went back to the original source of the data or in some cases returned to ask key informants at the companies.

External reliability can be defined as the possibility to replicate the study. A perfect replication is almost by default a rare phenomenon: "*This is a difficult criterion to meet in qualitative research, since, as LeCompte and Goetz recognize, it is impossible to freeze a social setting and the circumstances of an initial study to make it replicable in the sense in which the term is usually employed*" (Bryman & Bell, 2011, p. 395). The difficulty of "freezing" the social setting is also valid for the organizational innovation 'TQM'. Even if the researcher does find a case where 'TQM' is implemented, and although it is a rather standardized innovation, 'TQM' still exists in different variants ('TQM' in the 1990s was defined slightly differently than in the 2000s) and it can be perceived slightly differently by different organizations. However, the external reliability can be increased somewhat if the researcher, replicating a qualitative study, adopts a role similar to that which was used by the original researcher, and tries to select an object and characteristics of a case study, similar to the object and characteristics of the original study. Further, a complete record held of all phases of the research process would increase external reliability. In this thesis, all material used in Papers I-IV was stored. Examples of this material were secondary data, internal company documentation, questionnaires, interviewees (name, company and position), transcribed interviews, and personal notes on reflections made during interviews or during analysis of primary and secondary data.

3.4.2 Internal and external validity

Internal validity refers to how well the collected data match the reality that they seek to represent. According to Bryman and Bell (2011) qualitative research has a strength compared to quantitative research, due to the prolonged participation in the social life of a group over a relative long period of time. This might not be the case for the qualitative studies mentioned in Papers II, III and IV, as the participation in the company and its social life only took place

more or less at the time of the interviews. However, since face-to-face interviews provide an opportunity to ask follow-up questions, and provide information not only through what is said but also through body language and through observation of the social context around the interviewee, the data might better match reality than would a collection of data through a quantitative study. There are, however, ways to increase internal validity – such as triangulation, which is the use of more than one method or source of data (Bryman & Bell, 2011; Yin, 1994), and respondent validation, whereby the researcher provides the interviewees with an account of his/her findings. In all three qualitative studies, multiple sources of data have been used. Further, each study aimed for having a sample that consisted of at least 15 interviewees and was broad in that it included different functions, levels, genders and products/services, geographical locations and opposite opinions (the last three if they were applicable). By using a quite broad sample, internal documentation and, when feasible, observations, the internal validity could be increased. Another approach was to compare collected data with existing literature (Eisenhardt, 1989). Such comparisons and contrasts were made in all four papers.

One dilemma in all qualitative studies is the fact that both the interviewer and the interviewee may be biased. The interviewer is biased by his/her values and experiences (Flick, 2006) but also by the goal of the research and of the project. Two approaches were chosen to try to minimize this form of bias. First, all interviews were digitally recorded, transcribed word-by-word and shared between the two researchers. Second, no hypotheses or detail assumptions were formulated and decided early on in the study. The research question, in contrast, was broad on purpose. In addition, the findings were built on detailed case descriptions, which in turn were built up by interview data that had been coded and categorized by the researchers. Another dilemma is that the interviewee, besides being biased regarding personal values and experiences, is afraid of being subject to undesired repercussions. This risk was limited by writing Non-Disclosure Agreements, and in many cases by promising the interviewees total anonymity.

The external validity can be defined as the possibility to draw general conclusions from the conducted research, or in the words of Bryman and Bell (2011, p. 395), "…*the degree to which findings can be generalized across social settings*". It is often argued that case studies impose constraints upon the external validity of findings given the explicit focus on a certain event and the fact that qualitative research usually uses small samples[58] (Yin, 1994; Bryman & Bell, 2011). The argument for choosing case studies in Papers II-IV was that all papers were explorative in their character. According to Eisenhardt (1989) case studies can be motivated when little is known about the phenomenon and existing theories seem inadequate or

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[58]The fact that the sample of cases in all three studies was limited, varying between only one and three, may lower the external validity of the research. The choice, however, was between number of cases and depth of each case. As the studies were explorative in their character, we chose to increase the depth in each case, rather than increase the number of cases.

insufficient. However, in order to decrease the risk of low external validity, all cases were in a first version produced as thick descriptions that can "…*provide others with a database for making judgements about possible transferability of findings to other milieus*" (Bryman & Bell, 2011). Further, the cases were related and compared with other relevant research, i.e. previous research acted as a health-check of whether findings seemed reasonable and relevant for the research community.

3.5 Reflections on the research process

The purpose of this thesis is, from a firm-level perspective, to contribute to our understanding of how organizational innovations are created, diffused, and sustained. However, as was described in the introduction, the research process has not been perfectly structured and linear but rather formed as a result of a learning process. The findings in Paper I therefore affected the focus for Paper II and so on. This might be seen as natural, and particularly if it had been within the same area of research, e.g. diffusion of innovations. But when exploring topics in totally new areas such as corporate governance, the consequence was that each new study was conducted in parallel with an extensive learning process for the researcher. One example of this was the finding in Paper II that boards might be important to include in the analysis when studying the diffusion of organizational innovations. In order to be able to explore the roles of boards in sustaining organizational innovations (Paper III), not only literature on the diffusion of organizational innovations and management and organization had to be penetrated but also a totally new area, corporate governance. This might be positive as it broadens the understanding and perspective of the researcher and of the research community. Yet it might also affect the level of analysis and even lead to wrong conclusions. In this case the benefit with the scope might affect the quality of the analysis and can result in unrealistic or wrong conclusions. In order to limit this risk in Paper III, the findings and conclusions were tested on two sub-groups within the research community. The first presentation was conducted at EUROMA in 2009 and the second at the 12th International QMOD Conference in 2009. Further, the paper went through a peer review process before publication in 2009.

When studying a complex phenomenon such as innovation and a firm's innovativeness, many lenses are needed in order to fully understand the phenomenon. The limitation in this thesis is the lack of knowledge from many disciplines that would be of value for understanding a firm's innovativeness. Examples of disciplines that are not covered in this thesis are human resource management, psychology, entrepreneurship, and deeper knowledge in areas such as system theories, evolution and chaos theories, and organizational behavior.

In addition, the study in Paper IV did not explicitly include organizational elements such as corporate communication and IT. One finding from this study was that corporate communication affected the firm's innovativeness. This finding was a result of the interviews, rather than an element included from the start in the case study. As a consequence the research team tested this element only in two interviews; hence no valid findings could be presented in the final documentation. IT, which could be considered important for real-time communication, sharing of lessons learned, short development and test cycles etc., was implicitly covered by being part of the corporate system at Google, but was not explicitly

investigated as a separate organizational element. A reason why neither corporate communication nor IT was covered in the study could be that the focus of the researchers was more on general organizational elements.

The researchers involved in the four studies were focused on applied research rather than on highly theoretical research. This could be beneficial, as practitioners hopefully can then use findings and conclusions to improve the competitiveness of their businesses. However, it may also be a risk, as the researchers' interest is not primarily to do ground research, which might be important for creating truly new innovative insights, but to focus more on research that rather quickly can be applied and used in the industry. The risk that a researcher searches for knowledge that can have a value on a more or less short-term basis can be enforced if the researcher has been working in the industry for many years and has been trained to think as a practitioner. Peer reviews in connection to publication in research papers were however used in securing scientific value and quality of research.

In addition, the new findings and conclusions are influenced by some overall role models within a certain research area, and by the role models for an individual researcher. Even if there is an intention to search broadly for relevant articles and books on a subject, the references selected are usually to researchers who are well known and well cited or have become favourites for the researcher. The advantage of this kind of literature is that it probably has high quality and has been peer-reviewed by many researchers, so that potential faults or limitations should have been identified and noted. The risk is that we all are victims of inertia and follow a few tracks to what is accepted knowledge.

Related to this is how old the data are when published. In many cases the publication process takes years, and then the book or article may include data that at the publication date are 3-4 years old. One way to get around this problem is to supplement the literature with personal or telephone interviews with selected researchers in order to identify the most "up-to-date" insights[59].

Finally, the case studies, with the exception of Google, were Swedish firms. The issue of the national culture and its potential effect on the phenomenon of study was not analyzed or discussed in the studies. This weakness in Papers II and III was partly managed by selecting Swedish cases with an international presence (except Mölndal Hospital) and by comparing findings in Papers II and III with findings in Paper IV, in which the issue of regional/national culture is considered. However, in retrospect it might have been better if case studies included in the same study, had been in different countries.

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[59]The data and findings in Papers I and II were approximately 12 years old when Paper II was finally published in 2011. For this reason a follow-up literature review on the area "diffusion of organizational innovations" was conducted in the period 2006-2008 (before publication) in order to conduct a novelty check and external validation of the findings in Paper II. The result from the follow-up literature review was that the findings in Paper II still were quite novel and relevant for the research community.

4 Summary of appended papers

This thesis includes the "kappa", three published and one submitted paper. The papers are appended in full at the end of the thesis. This chapter will present a brief summary of each paper.

4.1 Paper I: Some Aspects of an Analytical Framework for Studying the Diffusion of Organizational Innovations

The objective of this paper was to explore the extent to which literature on innovation and diffusion, with a prime focus on technical innovations, can contribute to a useful analytical framework for studying the diffusion of organizational innovations (Alänge et al. 1998).

Research literature on the diffusion of technical and organizational innovations was reviewed, and intrinsic features of technical and organizational innovations were compared. It was then explored what these differences may mean for an analytical framework specifically developed for studying organizational innovations.

The initial answer was that the characteristics affecting the innovation and diffusion of technical innovations are valid also when studying the diffusion of organizational innovations. Key issues valid for both types of innovation are that the innovations are to a varying degree tacit in nature, and their diffusion depends on a learning process where user competence, unlearning and interrelatedness between innovations matter. Due to the tacit nature, innovation and diffusion cannot be distinguished in a meaningful way, but the diffusion curve should be seen as an envelope curve, superimposed by a number of minor diffusion curves. Firms build upon an existing knowledge base when they search for new opportunities. Learning and innovation are therefore path-dependent and largely local in nature. The technological or organizational distance and the spatial context influence the search process as well as the firm's absorptive capacity. Increasing return also applies to the process of innovation, and initial specialization tends to be reproduced and strengthened. Further, a local market is important. The role of the market is to diffuse information, provide access to new products or solutions, collect feedback from customers, change the price/performance ratio etc. In addition, top management's involvement plays a role for both types of innovation. And finally, there are complementarities of technical and organizational innovations – i.e. a change of both technology and organization is beneficial. However, there are also important differences that affect the diffusion process for organizational innovations and lead to a number of implications.

First, organizational innovations are characterized by knowledge bases, which are of a more tacit nature than for technical innovations. This fact makes it difficult to observe, define, and protect the innovations. It might create ownership problems and possibly a lack of incentive to develop organizational innovations for a market. Further, a traditional supplier industry is non-existent. Consulting firms and universities may be regarded as some kind of suppliers. The market in a traditional sense, therefore, does not exist. In addition, as organizational innovation refers to the creation of knowledge and therefore the marginal cost of "production" and selling is equal to the reproduction and transfer costs, it is expected that the discrepancy

between marginal costs and fixed costs to develop the knowledge is substantial. This would lead to problems with pricing, where price is clearly expected to be far above marginal costs. The implication of not having a traditional market for this type of innovations is that other non-market modes of transfer have to be considered. As a result the local institutional set-up, together with consulting firms, user networks, and the movement of people, could all be important modes of transfer.

Second, organizational innovations are more difficult to observe beforehand and to experiment with than most technical innovations. This means that the cost and benefit of the organizational innovation are hard to evaluate for a potential adopter. Further, the organizational innovation can be assumed to change even more during the diffusion process, and the early adopters inside an organization could be assumed to have the largest influence on the standardization of the innovation for continued internal diffusion. The implication is that the organizational innovation must be defined at the time of the initial adoption decision, but also when it is continuously being modified during the intra-firm diffusion. The internal standardization process, both of the content and of the implementation process, needs to be studied.

Third, organizational innovations often affect a larger number of individuals than most technical innovations. A greater number of people must therefore support an organizational innovation before it is adopted and implemented. Moreover, a major organizational innovation typically involves organizational disruption in that it is associated with a major reassignment of tasks. Taken jointly, this may mean that organizational innovations meet greater internal resistance than technical innovations. Hence there is a need to supplement the theoretical framework for technical innovations, primarily focused on inter-firm diffusion, with a focus also on the intra-firm diffusion.

Fourth, organizations are not assumed to have specialized units, analogous to an R&D function for technical innovations. This could be assumed to lead to a less conscious and systematic search for organizational innovations. The implication should be that factors, which condition the search and learning processes are essential to analyze, including the impact of organizational distance. User competence is critical and unlearning is central to include.

Fifth, while top management can serve an important function in the decision to adopt technical innovations, in the case of organizational change the importance of top management involvement and visible support in order to implement and sustain organizational innovations is of another magnitude. The implication is that the role and behavior of top management and potentially also other leaders are essential to focus on.

Sixth, for technical innovations it could be assumed that there is a routine and a calculation method to be used before making an investment decision. Organizational innovations concern humans, as mentioned above. Changes in behavior, attitudes, and work processes are so-called intangible assets, which makes it harder to calculate costs and benefits of an organizational innovation. The difference between the marginal and fixed costs for an

organizational innovation, the difficulty of observing and trying out an organizational innovation, and the adjustments of the innovation according to subjective interpretations, all contribute to the fact that it is harder to calculate costs and benefits. The implication is that there is a need to find alternative decision criteria.

Finally, studies on organizational change, developed from an organizational development perspective, have emphasized the need to consider simultaneously not only technical and social systems, but also political and cultural systems. The implication is that a broad set of factors needs to be considered in order to understand the diffusion of organizational innovations. Technical, social, but also political and cultural factors should be taken into account.

To sum up, research literature on diffusion of technical innovations can contribute to shaping an analytical framework for studying the diffusion of organizational innovations. However, due to unique characteristics of organizational innovations some modifications are required. In particular the role of factors inside the firm and of non-market mechanisms for transfer of organizational innovations needs special attention.

4.2 Paper II: Diffusion of Organizational Innovations: An empirical test of an analytical framework

The objective of this paper was to examine the validity of the analytical framework developed in Paper I. For this purpose, a qualitative study of two companies, Elextrolux Storkök AB and Mölndal Hospital, were carried out on the diffusion of the organizational innovation 'TQM' (Alänge and Steiber, 2011).

A comparative analysis between the two cases showed that the framework was valid and that central issues emphasized in the framework were highly relevant. The key concepts included were all relevant for analyzing both cases and the framework was found to be useful for distinguishing and discussing similarities and differences between the two cases. However, the analysis of the two cases also indicated areas where further research was needed in order to develop an in-depth understanding of the diffusion of organizational innovations.

As organizational innovations were considered as more tacit than technical innovations in Paper I, it was assumed that the implementation would meet greater resistance and inertia due to limited possibilities to observe and test the innovation and the assumed effect it would have on employees' work context. The assumption of higher internal resistance and inertia, however, was not supported in the study. One explanation for this was the standardization of the innovation on a national and a firm level, the use of pilot studies of sub-components before any broader internal diffusion took place, and the emphasis on communication from top management all the way down the organization. The barrier to change rather depended on the specific character of the innovation and the interdependence between parallel and sequential innovations. However, the diffusion of 'TQM' in both cases was a cumulative and path-dependent learning process, and each company initially focused on sub-components that were more familiar to it.

The search and learning processes were affected by the organizational distance and interdependences with other organizational innovations. The organizational distance was found to influence in two ways. First, a large organizational distance blocked the initial perceptions of desirability and feasibility. Second, an organizational distance on a process level negatively affected the diffusion of the innovation during first-trial and implementation. Further, the assumption that search for and learning of organizational innovations was not done in a conscious and systematic way was proved to be incorrect, as one of the cases had developed a separate department for searching, learning and guiding in the inter-firm and intra-firm diffusion of the innovation.

In both cases, the national and regional context influenced the search and learning processes. However, both cases also searched for information and knowledge on an international level. There was, however, no traditional market for 'TQM'. Instead, non-market diffusion channels such as the local institutional set-up, consulting firms, user-networks (other organizations at, most commonly, a short organizational distance) and the movement of people played an important role. As a consequence, a deeper understanding of the role of individual networks in the diffusion process would therefore be of interest to develop. The non-traditional suppliers of the organizational innovation 'TQM', transferred knowledge and experience, created a social legitimacy and provided support. Further, top management's user competence was found to be critical for the diffusion process. In both cases, the managing directors were strong believers in total quality and laid the foundation, which facilitated the continued search for a feasible path towards the introduction of total quality. However, both cases also indicated that the forces above influenced top management, e.g. top management of the whole group, owner and/or the board of directors. One conclusion was therefore that there is a need to include this "higher layer" of influencers in future analysis.

Further, costs and benefits for implementing TQM were not calculated; alternative decision criteria were used in both cases. Examples of factors that influenced the decision were: demand from top management and/or market, perceived crisis, fads, national bridging institutions, user-networks, the CEO's previous experience and personal beliefs, and previously adopted organizational innovations. Finally, the analysis of the two cases did not include, in a systematic way, a model for considering the importance of the technical, social, political, and cultural systems. It was therefore concluded that it would be of interest to add this filter to the analysis in order to investigate how the diffusion of organizational innovations is affected by these subsystems in a firm.

To sum up, the analytical framework proved to be valid but there were some assumptions that proved wrong (e.g. the assumptions of higher internal resistance and inertia, difficulties for a firm in observing and testing an organizational innovation, and that the search and learning processes for organizational innovations are not systematic and conscious). The study also identified a number of areas for future research. These were: individual networks and "higher-influencers" roles in the diffusion process, the importance of the environmental context (international, national and local) and the importance of adding a "filter" in the framework that deals in greater detail with the interdependences between innovations and the technical, social, political and cultural subsystems in a firm.

4.3 Paper III: The board's roles in sustaining major organizational innovations

The purpose of Paper III was to analyze how boards affect the sustainability of major organizational innovations (Alänge and Steiber, 2009).

After a review of research articles within the area of management and organization, diffusion of organizational innovations and corporate governance, a number of initial observations could be made. First, the research literature that focused on organizational change brought up the importance of top management clearly and frequently. But the role of the board and its responsibility as regards decisions concerning implementation and sustainability of major organizational innovations had not, with a few exceptions, been discussed. This discussion was also lacking in research literature within the areas of diffusion of organizational innovations and corporate governance.

Second, the dominant theory within the field of corporate governance proved to be the Principal-Agency theory, which is built on the assumption that there is a divergence in goals and risk preferences between the principal (the board) and the agent (the CEO). The objective is therefore to reduce agency cost by imposing internal control. This is commonly done in two ways: by establishing financial incentives that aim at aligning the interests of the principal and the agent, and a governance structure where boards of directors keep potentially self-serving managers in check by performing audits and performance evaluations. By using the Principal-Agency theory as the underlying theory, the relationship between the board and the CEO could be viewed as based on mistrust, and the main task of the board is to monitor and control the CEO. This in turn was assumed to affect the roles of the board and the cooperation between the board and the CEO. Two other comparable theories, the Stewardship theory and the Resource Dependence theory, depict the CEO as collectivist, pro-organizational and trustworthy (Stewardship theory) and depict the board as active and responsible for seeking necessary resources, reducing environmental uncertainty, and developing links and arrangements with different organizations in the environment (Resource Dependence theory).

Third, the focus in corporate governance research literature has been on issues such as the structure of the board, the board's composition, and primary tasks of the board such as monitoring, advising, and counseling top management. It is only during the past few years that there has been an increasing interest in more pro-active and externally oriented roles such as strategy involvement and resource provision.

Fourth, the currently used business-report system leads to a lack of information about investments in more intangible assets among board members. There has been a development towards enhanced business reporting (EBR), but these initiatives have not been harmonized and no standard has been developed. This means in turn that a board must actively ask the CEO for data on investments in more intangible assets, such as an investment in a new organizational innovation.

The second step in the research process was to conduct a qualitative study of three companies. The companies included in the study were: Mölndal Hospital, Scania AB, and Fagersta

Stainless AB. The three organizations were all different in regard to industry, products delivered and corporate government structure. The organizational innovations chosen were 'TQM', 'TPS' and 'Lean', all viewed as major organizational innovations. A comparison between the three cases, looking at similarities and differences across the three organizations, provided insights into several issues that were important in order to create board commitment for sustaining major organizational innovations. These issues were: board competence and experience; board meeting dynamics; the board as a provider of critical resources; and the board as responsible for the process of replacing CEOs. The research indicated, however, that the roles, which the board chose to take, were affected by the underlying theory of how to best govern a firm. The dominant theory, the Principal-Agency theory, was assumed to hinder the board in taking on more collaborative and active roles. In contrast, the Stewardship and Resource Dependence theories were assumed to raise both the degree of collaboration between the board and the CEO and the level of board commitment to being an active part of the development of a firm.

Therefore, in order to sustain a major organizational innovation, a number of board responsibilities were identified. First, the board needs to have (or develop) enough insight to understand how its chosen roles affect a firm's innovativeness. Second, a board must view itself as an organizational body that can and must provide critical resources to a firm. As a consequence, a board must proactively gather knowledge about the firm and its industry, and create an effective board group and work processes, based on norms that support a strategic, collaborative, innovative and open environment within the board and between the board and the CEO. Finally, a board needs to take the responsibility to create a process ensuring long-term success of major organizational innovations in the replacement of CEOs (Paper III).

To sum up, there are board-related issues that do affect the sustainability of major organizational innovations. These issues were: board competence and experience, board meeting dynamics, and the board as provider of resources and replacement of CEO. These board issues in turn influenced how proactive a board was in the strategic development of the firm. Further, the board's roles are affected by the underlying theories of how to govern the firm. A change from the Principal-Agency theory toward the Stewardship and Resource Dependence theories would affect how the board viewed its own mission and roles. The Principal-Agency theory was not assumed to support the desired identified board roles that were needed in order to sustain major organizational innovations.

4.4 Paper IV: A corporate system for continuous innovation: the case of Google Inc.

The purpose of this paper is to explore, from a firm-level perspective, organizational characteristics for continuous innovation in rapidly changing industries. The paper is based on an in-depth empirical study of Google complemented by literature reviews on organizational characteristics for continuous innovation.

Twenty-eight Google employees were asked to give their view on what influenced Google's innovativeness[60] and how to sustain this ability over time. The interviewees were also asked to rank, in relative order, seven different organizational elements' influence on Google's innovativeness.

In addition to an improved understanding on how different organizational elements influenced Google's innovativeness, the empirical study also provided insights on how Google's organization for continuous innovation was created, diffused and sustained. This data will later be used in this "kappa".

4.4.1 An open and dynamic corporate system

Google's organization for continuous innovation can be viewed as a dynamic and open corporate system for innovation, involving the entire organization and supported by an innovation-oriented top management and board. The system is visualized below in Figure 2, as consisting of five main building blocks: key drivers, facilitators, hygiene factors, external interaction, and the foundation. Each block includes organizational characteristics important for Google's continuous innovation.

Figure 2. Google's corporate system for continuous innovation

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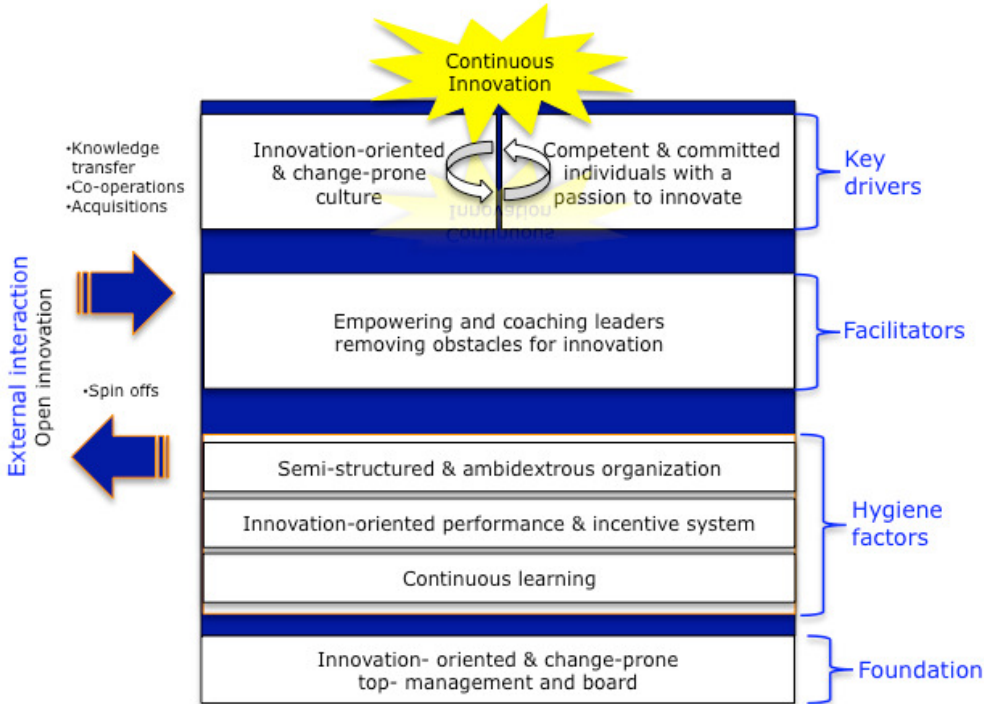
[60] Innovativeness or the ability to continuously innovate is a central concept in this study. Innovativeness includes being successful on the market launching new product and business models, but it does not necessarily mean that a company needs to be successful in all market launches. No failures could as well indicate risk aversion, and subsequently be an indicator of a less innovative firm. Also an ability to learn from mistakes and of closing failed attempts relatively early on could be signs of innovativeness (Alänge & Miconnet, 2001).

The first six organizational characteristics (an innovation-oriented & change-prone culture; competent & committed individuals with a passion to innovate; leaders that empower, coach and remove obstacles for innovation; a semi-structured and ambidextrous organization; innovation-oriented performance and incentive systems; and continuous learning) play different roles such as drivers, facilitators, and more or less necessary hygiene factors. The seventh organizational characteristic is the long-term commitment of the innovation-oriented and change-prone top management and board that was the foundation upon which Google has built its corporate system for continuous innovation. The eighth characteristic is that the corporate system was open enough in order to embrace good ideas and innovations from everywhere.

4.4.1.1 The key drivers of innovation

This building block consists of two organizational characteristics: a culture that is focused on innovation and continuous renewal, and competent and committed individuals, eager to innovate. The strong innovation-oriented culture, together with creative and smart individuals with a passion to change the world and to innovate, created a strong drive towards continuous innovation. This drive was further increased by a strong peer effect among individuals at Google. As the culture also emphasized a constant renewal, the individuals were constantly prepared for change. This need for constant renewal was based on top management's mindset and then realized through the change-prone culture (that in turn affected e.g. the organizational structure, management processes, and employees' expectations). The importance of culture and individuals meant that Human Resources had a more active role in creating, diffusing and sustaining the right culture and talents.

4.4.1.2 Top management as the foundation and leaders as facilitators

The founders and other members of the Operating committee and the Board had tenure, were innovation-oriented and change-prone. They created the very foundation for Google's continuous innovation by strongly influencing the culture, the organizational design, but also all other organizational elements as well.

Leaders in general acted as the main facilitators for innovations. Leaders directed their teams and encouraged innovations by acting as facilitators, connectors and cultural ambassadors in the firm. Google's leadership was described as a "*bottom-up leadership in parallel with an overall direction provided from a top management perspective*". In order to encourage and sustain innovations, leaders were carefully selected, both during the hiring process and through the internal promotion system. The role of the leader had received an increased focus internally during the last years.

4.4.1.3 The hygiene factors for innovation

Organizational structure, performance and incentive systems, as well as organizational learning were found important to design correctly in order to positively affect Google's innovativeness. These three elements seem to encourage innovative behavior if correctly designed but also inhibit innovations if incorrectly designed. Because of this, they are referred

to as "hygiene factors." The Google case strongly emphasized the importance of a semi-structured, non-bureaucratic organization with the mindset of a small company. In this organization, innovative ideas were believed to come from anyone and everywhere through a bottom-up process. In parallel with ideas coming from the bottom up, clear goals and priorities came from the top down.

The performance and incentive system rewarded innovative behavior, both financially and by recognition. Google's employees also emphasized the importance of intrinsic motivation generated by a challenging mission, smart colleagues and a technical infrastructure that allows scalable solutions.

Finally, organizational learning was a natural part of Google's mindset and was encouraged by the value of "*openness*" and the rule of "*share as much as you can*". The use of heuristic rules to guide and speed up the innovation processes indicates that Google utilizes previous learning by formulating rules of thumb.

4.4.1.4 External interaction and open innovation

Google's senior management had chosen to establish specific units with responsibility for external screening and sourcing. They have in other words taken measures to complement their internal innovation processes. This has allowed the company to better sustain its ability to be innovative by utilizing innovations that originate both internally and externally. Therefore, Google's corporate system for innovation could be viewed as an open system. This, however, does not necessarily mean that the whole organization was open. Instead, parts of the organization were found quite "closed" as they strove to focus mainly on their own ideas or solutions in order to be able to create new major innovations. This might be one reason why this element was ranked low, as most of the interviewees did not work in the externally oriented units. Another reason could be how the questions were asked. Also the influence from Silicon Valley was perceived as not very important for explaining Google's innovativeness. Still, a number of norms in the Valley were similar to those at Google, so the Valley seems to have influenced Google potentially more than the interviewees themselves realized.

4.4.2 Comparison to selected research

During the last decades, there are a number of researchers that from a firm-level perspective have sought to identify organizational characteristics for continuous innovation. However, even though these studies have used a firm-level perspective (rather than a process, team or individual perspective), the studies have aimed to answer different questions. For example, a number of studies have focused on capabilities required in order to remain competitive in rapidly changing industries (Leonard-Barton 1992; Teece et al. 1997; Teece 2007; Eisenhardt & Martin, 2000; Zollo & Winter, 2002; Wang & Ahmed 2007). Others have studied what it takes to simultaneously manage exploration and exploitation (Tushman & O'Reilly III 1997; Tushman et al. 2010). Some studies have explored how to capitalize on internal and external technologies (Chesbrough, 2003). Others have explored characteristics needed for continual renewal and innovation (Brown & Eisenhardt 1997, 1998), and yet others have explored

factors for sustaining corporate success (Matzler et al. 2010[61]) or how managers can affect innovation success (Lawson & Samson 2001). Only a few studies have expressed ambitions to describe or create comprehensive organizational models for continuous innovation (some studies that have explicitly tried are: Tidd et al. 1997[62]; O'Connor 2008; and Garud et al. 2011). While the above research studies focused on the organizational characteristics for continuous innovation in fast-moving industries, Kalling (2007) used a different approach. He instead looked into the obstacles (organizational and institutional factors) for continuous innovation in a mature and more slow-moving industry. However, several characteristics identified are identical, although these characteristics that would have been conducive for innovation were missing. Similarly, Danneels (2010) used the case of Smith Corona, failing to renew itself, in order to empirically contribute to dynamic capability theory. By observing the managers' lack of understanding of their perceived key resources, he concluded that 'resource cognition' would be an important addition to the theory.

A comparison between this previous research literature and the Google case provided several insights. First, previous research findings on continuous innovation in rapidly changing industries are relevant and useful when discussing and analyzing Google's organization for continuous innovation. The comparison however, identified a need for further integration of previous findings into an organizational framework for continuous innovation. Insights from Google could provide additional understanding of how a corporate system, conducive to innovation, is to be designed. It is also clear that some issues of this organizational framework need further investigation, e.g. whether continuous innovation and continuous improvement could be managed in the same organization or not. Finally, the comparison identified that there is a need to emphasize and better understand factors such as culture and individuals, and how these influence a firm's ability to continuously innovate. Data from Google indicate that culture and individuals are decisive for continuous innovativeness and that an important leader role is to facilitate and contribute to creating/sustaining an innovation culture. The importance of individuals and culture might in turn create a need for a change in managers' mental model of how to best run and therefore organize a company for continuous innovation, including how to select and develop people, not least for leadership roles.

To sum up, the organization behind Google's innovativeness could be described as a dynamic and open corporate system for continuous innovation. The organizational elements in the corporate system were mutually dependent and well aligned towards common corporate goals. Further, they played different roles for continuous innovation. While some were key drivers for innovations, others were more or less hygiene factors. Further, the corporate system was characterized by eight organizational characteristics. During the last decades, there are a number of researchers that from a similar firm-level perspective have sought to

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[61] The objective of the study was to identify the driving factors behind corporate success in what the researchers assume to be an increasingly fast-changing environment. The study covered a wide range of industries. No information is given on which industries are included.

[62] Tidd et al. (1997) partly build their findings on data from companies like Apple, Google, and Microsoft. However, they also base their findings on literature that is not specifically focused on rapidly changing industries, e.g. the work of Mintzberg (1979) and Pfeffer (1998).

identify organizational characteristics for continuous innovation in fast-changing environments. A comparison between these findings and the findings from Google provided a number of important insights, e.g. that previous findings could be used in the analysis of Google and its organization; that the Google case indicates a need for a further integration of previous findings into one organizational framework for continuous innovation; that some issues of the framework need further investigation; and that factors such as culture and individuals need further attention by innovation researchers.

4.5 Summary of empirical findings from all papers

A number of empirical findings were identified in each paper. Below, the concluding findings from all four papers will be summarized.

First, findings in literature with a prime focus on the diffusion of technical innovations were seen in Paper I to be useful for studying the diffusion also of organizational innovations. This was despite a number of considerations[63], which suggested that the diffusion pattern might be different for organizational innovations. In Paper II it was shown that the search and learning processes for organizational innovations were both conscious and systematic (contrary to what was assumed in Paper I). Further, the search and learning processes were cumulative and path-dependent, and each company initially focused on sub-components that were more familiar to it. This created a form of inertia through interdependences with earlier or parallel organizational innovations. The search and learning processes were affected by the local and national contexts, but there were indications in Paper II that the search and learning process was also to a certain degree international. On local, national and international levels, the perceived organizational distance affected the search and learning processes. Organizational distance was found to be influential in two ways. First, a large organizational distance blocks the initial perceptions of desirability and feasibility. Second, a large organizational distance on a process level hinders diffusion during first- trial and implementation. Further, the problem of separating the innovation from the diffusion process was even more relevant in the case of organizational innovations than for technical innovations.

The problem of observing and testing the tacit organizational innovation was managed through a certain degree of standardization – of both the innovation itself and its implementation. The standardization process of the organizational innovations was done on several levels, such as the national and firm levels. On the firm level, early adopters influenced the initial standardization of the organizational innovation. The organizational innovation was later adjusted to the local context based on experiences from pilot tests and the implementation process. In addition to lowering the transfer and implementation costs, the standardization also decreased the resistance towards the change among the organizational members. Further, due to organizational innovations' specific nature, non-market-mediated

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[63]Examples of these considerations were: a higher degree of tacitness; lack of a traditional market; problems in calculating costs and benefits of the investment; a higher degree of organizational disruption; and lack of a traditional R&D function for organizational innovations.

interpersonal contacts were one of the primary channels for diffusion of the studied organizational innovations. Examples of these contacts were user networks (parallel organizations implementing the same organizational innovation), the local institutional set-up, and the movement of people between firms. An additional important channel for diffusion of organizational innovations was consulting firms.

Traditional calculation methods were not used in the decision to invest in organizational innovations. Instead, top management was influenced by issues such as demand from the managers and/or market, perceived crisis, fads, national bridging institutions, the CEO's previous experience and personal beliefs, and previously adopted organizational innovations. The actual decision seemed to be more or less based on a belief in the organizational innovation. Finally, it was found that in the diffusion of organizational innovations, not only top management's commitment was crucial, but also the commitment of "higher layers of influencers".

Second, major organizational innovations, such as 'TQM', 'TPS', and 'Lean', demand several years of implementation (according to Paper III, between 5 and 10 years). Paper II identified the need for a more long-term view in order to sustain major organizational innovations, a view that goes beyond the time that the average CEO stays at the helm. This observation pointed to the importance of including boards in studies of organizational innovations. A number of board issues were identified in Paper III in order to create board commitment for sustaining a major organizational innovation. These were: board competence and experience; board meeting dynamics; the board as a provider of critical resources; and the process for replacing CEOs. However, the underlying theories (e.g. the Principal-Agency theory, Stewardship theory and Resource Dependence theory) on how to best govern a firm were found to affect boards' perception of their mission and main roles (Paper III). The dominant theory, the Principal-Agency theory, was assumed to negatively affect boards' involvement and commitment for sustaining a major organizational innovation, while the two other theories were assumed to enable both a closer relationship between the board and CEO and more active board roles such as e.g. the role as a resource provider. Therefore, in order to sustain a major organizational innovation the board must have insight into how its roles affect the sustainability of implemented major organizational innovations. Further, a board must view itself as an organizational body that can and must provide critical resources to the firm. As a consequence, a board must proactively gather knowledge about the firm and industry and create an effective board group and work processes, based on norms that support a strategic, collaborative, innovative and open environment within the board and between the board and the CEO. In addition, a board must take the responsibility to create a process ensuring long-term success of major organizational innovations in case the CEO is replaced. Finally, it was found in Papers II, III and IV that boards also influenced the creation and diffusion of organizational innovations (not only their sustainability).

Third, the major organizational innovation in Paper IV could be viewed as a dynamic and open corporate system for continuous innovation. The corporate system could in turn be visualized as consisting of five main building blocks: key drivers, facilitators, hygiene factors, external interaction, and the foundation. The key drivers were identified to be: an innovation-

oriented & change-prone culture, and competent & committed individuals with a passion to innovate. The facilitators are leaders that empower, coach and remove obstacles for innovation. The hygiene factors are: a semi-structured and ambidextrous organization, innovation-oriented performance and incentive systems, and continuous learning. The foundation of the corporate system is the innovation-oriented and change-prone top management and board. Finally, the corporate system is open enough to embrace good ideas and innovations from everywhere. In a comparison with previous research on continuous innovation in rapidly changing industries, it were found that previous research findings need to be further integrated into one organizational framework for continuous innovation. It was further found that some issues of this framework for continuous innovation need further investigation and that the importance of factors such as culture and individuals might need a change of managers' mental model on how to best organize for continuous innovation.

In the next chapter, the empirical findings in Papers I, II, and III will be discussed in the light of the findings in the theoretical framework. As a result, a conceptual model for the creation, diffusion, and sustainability of organizational innovations will be presented. Key characteristics of 'Google' will then be discussed in the light of previous research findings on organizational characteristics for continuous innovation in rapidly changing industries[64]. By doing this, we will get some understanding of 'Google's degree of uniqueness. Further, we will assess whether 'Google' is sufficiently different from 'TQM'/ 'TPS'/'Lean' to be useful in a test of the presented conceptual model. Finally, we will test the conceptual model by using data from the empirical study behind Paper IV. These data contribute additional insights on how Google's organization for continuous innovation was created, diffused and sustained.

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[64] This research is presented in the theoretical framework.

5 Discussion

Two main research questions were asked in the beginning of this "kappa":

1. How can the creation, diffusion and sustainability of organizational innovations be understood and conceptualized?

2. How do the characteristics of organizational innovations affect the applicability of the conceptualization?

This chapter aims to discuss these two research questions. First a conceptualization will be conducted of the previously isolated and limited researched concepts: 'creation', 'diffusion', and 'sustainability' of organizational innovations. In addition to the integration of those three concepts, three main sets of influencing factors (Set 1 = External context and diffusion channels, Set 2 = Internal context, and Set 3 = Characteristics of innovation) will be discussed on a level of detail that has not occurred in previous selected research, and then embedded in the conceptual model. The conceptual model for the creation, diffusion, and sustainability of organizational innovations will thereafter be visualized in the end of the first section. The conceptual model is primarily based on insights from Papers I, II and III but also includes two issues: sustainability of an improvement trajectory, rather than of a particular organizational innovation (Buchanan et al. 2005), and the external influence of "local norms" (Lundvall, 1992)[65].

Second, the major organizational innovations 'TQM'/'TPS'/'Lean', studied in Papers II and III, are to a large extent developed in the automobile industry[66], are well standardized and are known for their focus on quality and operational efficiency. The conceptual model developed in the first section will therefore be tested on an organizational innovation labeled 'Google', originally developed in the younger and rapidly changing Internet Service industry. This innovation is not standardized and is focused on continuous innovation, rather than on quality and operational efficiency. The purpose of this test is primarily to be able to answer research question 2, i.e. "How do the characteristics of organizational innovations affect the applicability of the conceptualization". However, before this test is conducted, the major organizational innovation 'Google' will be discussed in the light of previous research findings on organizational characteristics for continuous innovation in Internet Service- related industries. The main reasons for this are to answer a number of sub-questions such as whether 'Google' is a unique major organizational innovation, and whether the characteristics of 'Google' are different enough from the characteristics of 'TQM'/'TPS'/'Lean' to motivate a test of the conceptual model.

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[65]In Paper I, Lundvall (1992) was referred to and included in the development of a framework for analyzing the diffusion of organizational innovations. However, the importance of local norms as such was not explicitly highlighted or emphasized, so this issue is brought up as an issue presented by research other than our own.

[66]Another industry that acted as a pioneer was the steel industry. We included Fagersta Stainless AB in Paper III, as one case from this industry.

5.1 How can the creation, diffusion, and sustainability of organizational innovations be understood and conceptualized (RQ1)

In this section the three, concepts: 'Creation', 'Diffusion', and 'Sustainability', previously explored in isolation, will be discussed. Further the three sets of influencing factors: External context and diffusion channels, Internal context and the characteristics of the innovation will be discussed in more detail than was done in previous selected research. Finally, a conceptual model that integrates the key findings in Papers I, II, and III will be presented.

5.1.1 The creation and diffusion of organizational innovations

5.1.1.1 The creation of organizational innovations

As with technical innovations (Rogers, 1995) the creation and diffusion of organizational innovations were found in both Paper I and Paper II to be two intertwined concepts, which made it hard to study the creation of organizational innovations separately from their inter-firm and intra-firm diffusion[67]. This is especially true when an organizational innovation is adopted from external sources and by default is diffused and locally adjusted to the adopting firm.

Previous research has explored the concepts 'creation' and 'diffusion' more or less in isolation. The exploration of the 'creation' of management innovations in Birkinshaw et al. (2008) did not, therefore, discuss the dilemma that the two concepts are intertwined. In fact, their model includes a number of logical oversights. First, they defined management innovations such as 'new-to-the-state-of-the-art' rather than 'new-to-the-firm'. This meant that an innovation could be either a result of a local isolated innovation process (no diffusion of external ideas being necessary), or a result of a totally unique combination of diffused ideas, or a unique mix of diffused and own ideas (which ironically would indicate that creation and diffusion are intertwined). However, since they did not reflect on whether the two concepts are intertwined, the option of a local isolated innovation process must have been their main focus for the study. This is peculiar, as they refer in the same study and model to an external context and external change agents, which probably influence a firm with external ideas. Second, they stated that the literature on inter-firm diffusion had a limited value for explaining the creation of management innovations, so this literature did not seem to be included in their theoretical framework. This would mean that the process of creating management innovations more or less starts at the border of the firm, rather than in e.g. the local institutional set-up. Yet that again is illogical since, as was mentioned above, they discussed the importance of the external context and external change agents.

The finding is instead that the creation of organizational innovations is a result of inter-firm and intra-firm diffusion processes, in which existing external organizational ideas are

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[67]In Paper I it was found that the innovation and diffusion cannot be distinguished in a meaningful way, but the diffusion curve should be seen as an envelope curve, superimposed by a number of minor diffusion curves.

combined with potentially new firm-specific ideas. Their combination is either 'new-to-the firm' or both 'new-to-the-firm' and 'new-to-the-state-of-the-art'. An organizational innovation is then constantly re-invented and adjusted after implementation due to internal and external changes. 'Creation' and 'Diffusion' are therefore two concepts that cannot be separated and analyzed in isolation, but are highly intertwined, not only before but also after implementation.

5.1.1.2 The diffusion of organizational innovations

Regarding organizational innovations' diffusion, it was clear from Paper I and Paper II, that insights from the diffusion of technical innovations could be used when studying the diffusion of organizational innovations. However, when testing the developed analytical framework for studying the diffusion of organizational innovations, a number of theoretical assumptions proved wrong and new findings were identified. Below, the empirical findings in Paper II about the diffusion of organizational innovations will be presented and discussed. Factors influencing the diffusion of organizational innovations will be structured and discussed according to three main areas[68], namely the characteristics of the innovation, the external context and primary diffusion channels, and finally the internal context.

First, due to the tacit nature of organizational innovations, two aspects were found important in regard to **the innovation** itself. First, the *separation* between the innovation process and the diffusion process was, as assumed in Paper I, even less relevant for organizational innovations than for technical innovations. Second, organizational innovations were ***re-invented (Rogers, 1995) and standardized (Alänge et al. 1998) while diffusing***. The organizational innovation was therefore continuously re-invented through the inter-firm and intra-firm diffusion processes. The standardizations of the innovation were primarily done on a national and on a firm level. Bridging institutions played an important role in the work of standardizing (or re-standardizing) the organizational innovation on a national level, while early adopters influenced the initial standardization of the innovation on a firm level. Interestingly, the finding that standardization processes matter for the diffusion of organizational innovations was only identified in Alänge et al. (1998), not in any of the other studies explored in the chapter 'Theoretical framework' in this "kappa".

Second, the **external context**, or in Rogers' (1995) words "the social structure", influenced the rate of diffusion of organizational innovations. The ***institutional set-up***, the existence of international and national ***fads***, the existence of new ***market needs*** (such as ISO 9000), the presence of ***consulting firms, user networks*** (commonly organizations at a limited organizational distance that had adopted the innovation) and ***movement of people***, all influenced the rate of diffusion of a major organizational innovation. However, the ***inertia and path-dependency*** of the external context itself also influenced the rate of diffusion. Further, the institutional set-up, consulting firms, user networks and the movement of people, all **substituted for a traditional market**. As a consequence, individuals' networks with e.g.

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[68]See Table 1.

standardization/industry organizations, companies that already had adopted the innovations and with people with experience of the innovation played a profound role in the case of organizational innovations (Rogers, 1995; Paper II).

Third, the **internal context** was influential in several ways. To begin with, the characteristics of the *search and learning processes* for organizational innovations were indeed cumulative and path-dependent but also conscious and systematic, and affected both by the local environment and by international so-called "weak ties" (Granovetter, 1973)[69]. The facts that the search and learning processes were conscious and systematic, and both local and international, were contrary to the original assumption in Paper I. Further, *organizational distance* was found relevant and to exist on two levels: a surface level affecting steps such as desirability and feasibility in the diffusion process,[70] and a process level influencing steps such as first-trial and implementation. Moreover, *inertia and resistance* towards the organizational innovation constitute an influencing factor, but were not found to a larger extent than in the case of technical innovations. Some explanations for this were the commitment and communication from top management and the use of pilot studies of sub-components. Such use of pilot studies contradicts Teece's (1980) assumption that an incremental implementation is less likely for organizational innovations. In addition, due to the possibility of observing and testing the innovation or part of it, the *transfer and implementation costs* were perceived as manageable.

On the other hand, *decision criteria* for investing in an organizational innovation were not discussed in the selected theoretical literature. However, based on the empirical findings in Paper II, the assumption that there is a lack of more traditional calculation models for investments in organizational innovations seemed correct. The decision to invest[71] was instead influenced by a number of triggers during the different steps in the diffusion process[72]. For example, desirability was influenced by perceived crises, fads, market demands, national bridging institutions and user networks, while perceived feasibility[73] was influenced by e.g. user networks at a low organizational distance (e.g. Toyota's influence on Scania), previously adopted organizational innovations, the CEO's previous experience and national bridging institutions. The final decision to test and later implement the innovation was then based more or less on the CEO's belief in the benefits of the organizational innovation. This belief had to be sustained in order to sustain the innovation. In all three papers, the top management's belief was sustained over time, but theoretically this belief could also have been negatively affected by the same triggers as those that created the desire and feasibility for the innovation, or by unreasonably large internal inertia. Finally, the importance of *top management* involvement and visible support in order to implement organizational innovations is of greater

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[69]The importance of "homophilous" elements (Rogers, 1995) for the diffusion of organizational innovations could be assumed to be valid also for organizational innovations, but was not tested in any of the papers.

[70]Referring to the different phases in the diffusion model used in Paper II.

[71]Referring to the cases in Paper II and Paper III and their decision to invest in major organizational innovations.

[72]Referring to the diffusion model used in Paper II.

[73]As has been described earlier this phase was characterized by, a conscious and systematic search and learning process, on both a national and an international level.

magnitude than for technical innovations. In the case of organizational innovations, where a major organizational change takes years to implement and affects a large number of people within the organization, top management commitment was empirically identified to be crucial (Papers II and III). Top management commitment was not enough, though. The need for a more long-term view could instead be thought to go beyond the time an average CEO stays at the helm. This observation pointed to the importance of including *owners and boards*, which was a finding that has not been emphasized in earlier research.

5.1.2 Sustaining organizational innovations

According to the literature review on sustaining organizational change conducted by Buchanan et al. (2005), a portfolio of different factors was identified as influencers on the sustainability of organizational innovations. These factors were categorized into four sets, but could logically belong to only three – namely the *external context* (set 1), the *internal context* (Buchanan et al. (2005) set 2 & 4), and the *innovation* and its change process and timing (set 3). What is then clear is that the identified sets of factors are almost the same as those influencing the creation and diffusion of organizational innovation. Further, it was established that the concept 'sustainability' could refer to an improvement trajectory, rather than to a particular organizational innovation in order to provide a more dynamic perspective on the concept. This made sense, as organizational innovations are constantly re-invented, even while being 'sustained'. The consequence would be that an organizational innovation such as 'TQM' develops over time in the form of several "releases" along a trajectory. Each new release is affected by inertia and internal path-dependency, so that new sub-organizational innovations complement and support initially implemented organizational innovations, rather than challenging and supplementing them. For this reason, the organizational innovation at a specific time, X, will probably look different at another time, X+10 years. At certain points in time, influenced by external and internal changes, it could be assumed that a given trajectory is partly (or totally) broken and therefore partly/fully exchanged with a trajectory with a new goal and therefore direction, e.g. if a firm changes focus from cost-cutting to innovations or needs to react to a discontinuous technological change.

The 'creation', 'diffusion', and 'sustainability' of an organizational innovation can therefore be viewed as three concepts that are *intertwined*. The separation of the three phases is therefore of more theoretical than practical value.

Interestingly, the selected research in the theoretical framework on sustainability of organizational innovations has not considered the *role of a board*. In fact, very little is written overall about boards' roles in the creation, diffusion and sustainability of organizational innovations. The empirical finding in Paper III, however, was that boards could affect the sustainability of major organizational innovations. Findings in Paper III indicated that boards could have a very important role to play in the creation, diffusion and sustainability of

organizational innovations[74]. In Paper III, a number of board responsibilities were identified. First, the board needs to have insight into how its chosen roles affect a firm's innovativeness. Second, a board is an organizational body that could provide critical resources to the firm. As a consequence, a board must proactively gather knowledge about the firm and its industry. The board also needs to create an effective board group and work processes, based on norms that support a strategic, collaborative, innovative and open environment within the board and between the board and the CEO. Finally, a board needs to take the responsibility to create a process ensuring long-term success of major organizational innovations in the replacement of CEOs. These board responsibilities in turn demand a slightly changed mental model, among board members, for how a board best can provide long-term value to a firm. However, a board's mental model of its own mission and main responsibilities is affected by the underlying theory on how to best govern a firm. It was assumed that a board's commitment in sustaining an organizational innovation would be negatively affected by the now dominant theory, the Principal-Agency theory. However, as a result of increased emphasis on more active and involved boards (Hillman et al. 2008), in addition to the development of new alternative or supplementary theories such as the Stewardship and Resource Dependence theories, boards can be expected to be more involved in the diffusion of major organizational innovations in the future.

5.1.3 A conceptualization of the creation, diffusion and sustainability of organizational innovations

To sum up, the creation and diffusion of organizational innovations were argued to be two highly intertwined concepts. However, due to the assumption that the innovation continues to change also while being 'sustained', all three concepts are intertwined and should not be explored in isolation.

Therefore, in order to study the creation, diffusion and sustainability of an organizational innovation, a conceptual model including five steps[75], which in turn are influenced by three sets of factors, could be useful. The five steps are: Desirability, Feasibility, First-Trial, Implementation and Sustainability, and the three sets of influencing factors are the external

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[74]A board's potential impact on the diffusion of organizational innovations might be quite obvious in the light of the importance of interpersonal contacts and individuals' networks. The board with its board members could be assumed to be an important center for interpersonal networks that could be used in searching and evaluating ideas and innovations and in getting advice, resources and facilitation in the trial and implementation of an organizational innovation.

[75]The five steps are based on the model in Paper II, the exploration of the work of Birkinshaw et al. (2008) and the work of Paper III. The step "theorizing and labeling" in the model of Birkinshaw et al. (2008) needs to be further explored and is not included as a step in the conceptual model developed in this "kappa". Instead the translation, packaging/description, and labeling of the organizational innovation are included in the term "standardization" of the organizational innovation. Further work on translating a major organizational innovation in the inter-firm diffusion process has been done by other scholars such as Book et al. (2006), and could potentially be of value for a future framework. In addition, none of Paper II, Paper III or Birkinshaw et al. (2008) included a step for "unlearning" organizational innovations, which might be a sixth step in a future framework.

context and diffusion channels, the internal context[76], and the characteristics of the innovation itself. The role of a board was found in Papers II and III to be important for all three major innovations. A board thus acts as both a diffusion channel and an important trigger for the creation, diffusion and sustainability of organizational innovations.

To draw the conceptual model as a static two-dimensional linear model creates a dilemma, since the creation, diffusion and sustainability of organizational innovations are not linear concepts[77] but highly intertwined, since the innovation is constantly re-invented. For this reason, it is therefore necessary to add a dynamic perspective to the model. Below, the conceptual model is presented.

Figure 3. A conceptual model for the creation, diffusion and sustainability of organizational innovations

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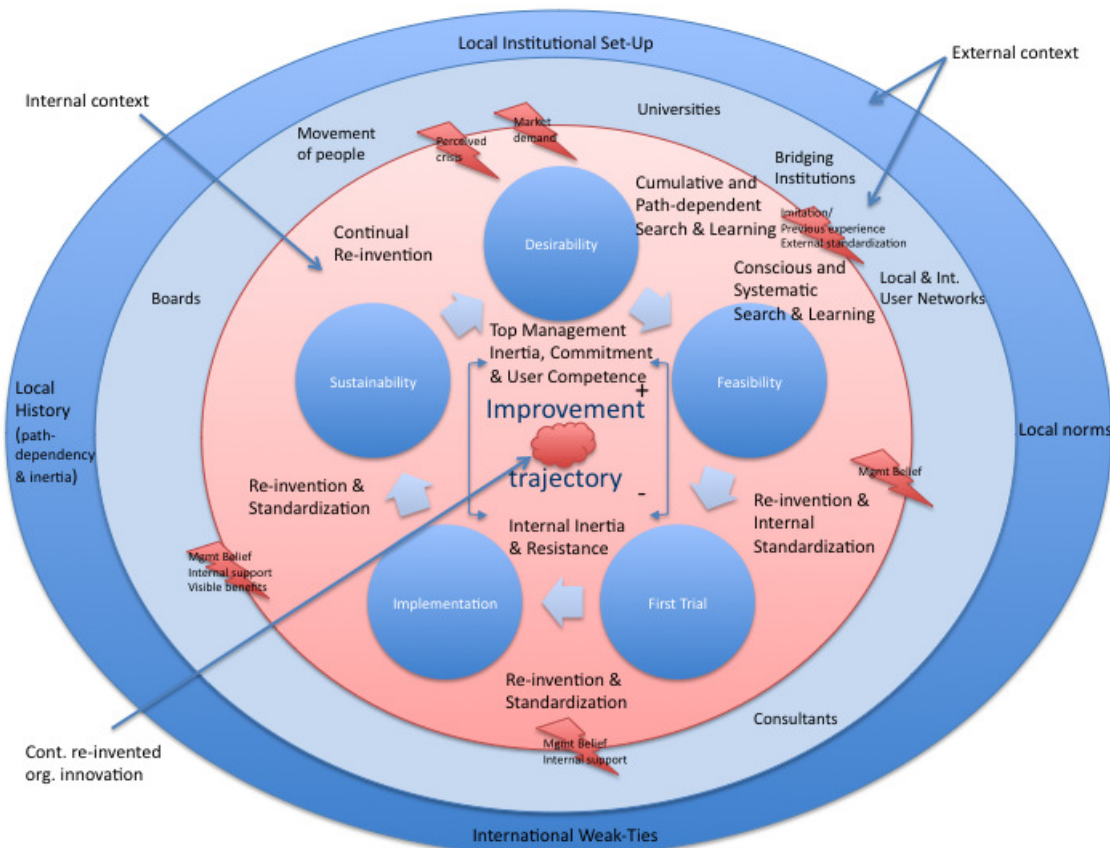
[76]In addition to these sets of factors, there might be a need to add a set including factors such as the design of the search and learning processes and programs/processes for first-trial, implementation and sustainability, highlighted as important by both Birkinshaw and Mol (2006) and Buchanan et al. (2005). The design of the search and learning processes, as well as the processes for first-trial, implementation and sustainability of an organizational innovation, could therefore be an important part of the diffusion process and a potential subject for future research.

[77]Also Birkinshaw et al. (2008) found that the concepts were not linear. Related could be the finding by Phelps et al. (2007) that the assumptions behind the life-cycle perspective (growth is, among other things, linear and sequential) have been argued not to be true for organizations. Instead, they held that periods of stability were followed by periods of crisis and that each crisis meant that the organization had to change discontinuously. This in turn required most probably both a capability of being creative and a desirability of new, or partly new, diffused organizational ideas.

The model includes five steps: 'Desirability', 'Feasibility', 'First-Trial', 'Implementation' and 'Sustainability'. However, since the organizational innovation is constantly re-invented and therefore re-standardized (visualized as a red fluffy cloud in the middle), specifically in the initial first-trial and implementation as well as in the step 'sustainability' (e.g. by complementary, substituting, or competing innovations), the five steps are not linear but have been visualized as a circle. Here it should be noted that the re-invention of the innovation is path-dependent and cumulative due to internal inertia among top managers and employees, so the circular model is affected by the historically chosen organizational innovations, which fits well with the findings of Kimberly (1979). In cases where a follow-up innovation is substituting for or even competing with an implemented organizational innovation, it could be a question of either new knowledge about how to better reach improvements along a current improvement trajectory or the start of a totally new improvement trajectory. The concept 'sustainability' is therefore not referring to a particular organizational innovation but to an improvement trajectory (Buchanan et al. 2005). This improvement trajectory is as well influenced by the firm's inertia and path-dependency, and therefore affects the search and learning processes for future organizational innovations.

The pink area in the visualized model represents the internal context in a firm. Here the top management, as well as the board, is crucial for sustaining an improvement trajectory and therefore for making the five-step process run smoothly. Top management's own inertia, user competence and commitment to the innovation and the improvement trajectory are also important in order to limit the internal inertia and resistance towards change. Here top management could use communication, e.g. in the form of narratives as a tool, limiting internal inertia and resistance. Further, the search and learning processes are cumulative and path-dependent but could break potential inertia by becoming more conscious and systematic in the "Desirability" and "Feasibility" steps. Bridging institutions and user networks could here play an important role to "show" and "prove" what is desirable and feasible. The 'triggers'[78] for the five-step process (visualized as flashes) could be valid for one or several steps. Examples of triggers are: a perceived crisis, a new market or owner demand, imitation of other companies in e.g. a user network, knowledge transfer from consultants, standardization work done by e.g. bridging institutions, clear internal support for the innovation and/or visible benefits of the innovation, and previous experience of the innovation. An example of a trigger that influences several steps is 'imitation'. It could be a trigger for "Desirability", "Feasibility", and potentially even "First-trial". An example of a trigger that was found more related to one step was consultants, who were commonly involved in the step "First-Trial" but not so much in earlier or later steps[79].

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[78] This could be viewed as a decision criterion.

[79] Interestingly, Scania AB trained external consultants in order to give them the right knowledge and tools necessary for conducting a first trial of "Scania Production System".

The blue areas represent the external context. The darker blue area represents the external environment in the form of institutional set-up, local norms and history, and existing weak ties that the organization has through its employees with networks active outside the local context. The light blue area represents the diffusion channels such as movement of people; user networks; bridging institutions; consultants; and boards.

5.2 How do the characteristics of an organizational innovation affect the applicability of the conceptualization? (RQ2)

The conceptual model for how organizational innovations are created, diffused and sustained, discussed above, is mainly a result of an investigation of the creation, diffusion and sustainability of the major organizational innovations 'TQM', 'TPS' and 'Lean'. All three innovations were mainly developed in the automobile industry, are well standardized, and are well known for their focus on quality and operational efficiency. The question is therefore how well the conceptual model is applicable for organizational innovations characterized by slightly different characteristics.

In order to use the case in Paper IV for testing the conceptual model developed in previous sections, three sub-questions need to be asked and answered. First, is 'Google' unique or created through a diffusion process of existing ideas (as we claimed in the section 'Creation of organizational innovations')? One way to find this out is to compare 'Google' with some relevant research on organizational characteristics for continuous innovation in Internet Service- related industries, such as: information services, semiconductors, and telecommunication services. Second, do the key characteristics of 'Google' differ from those of 'TQM'/'TPS'/'Lean'? Third, is the conceptual model valid also for the organizational innovation 'Google' in the case where the key characteristics of 'Google' are different from those of the other innovations?

In the next section, we will start by discussing the key characteristics of 'Google' and whether other researchers who have explored related industries identified these characteristics. We will also discuss whether these key characteristics of 'Google' are sufficiently different from those of 'TQM'/'TPS'/'Lean'. Finally, in the second section, we will discuss the applicability of the conceptual model to the major organizational innovation 'Google'.

5.2.1 The uniqueness of 'Google' and the difference from 'TQM'/ 'TPS'/'Lean'

The empirical findings in Paper IV indicated that Google has a quite complex organization that can be described as a dynamic and open corporate system for continuous innovation.

Below, the main characteristics of this organizational innovation will be discussed with support from research findings on continuous innovation in related[80] industries.

First, the organization strove to build a capability to change and renew itself constantly according to changes in the external environment, as a result of new opportunities and/or as a result of internal demand from the employees. The capability to change constantly was supported by senior leaders' mindset, a change-prone culture, semi-structured organization, and the use of heuristic rules instead of formal processes, which together allowed a high degree of flexibility. Further, in order to adapt quickly and wisely, decision-making was pushed down to the leaders with most up-to-date relevant knowledge and experience about the issues behind the necessary change. The same was valid for strategies that were built from the bottom up. The way senior leaders emphasized the strategic importance of change, and the way the whole organization was designed in order to handle constant changes, could imply that Google strove for having dynamic capabilities as described by Teece and Pisano (1994). As the senior management seemed to be aware of the need for constant change already from the start, Google's dynamic capabilities might also have been a result of learned and collective activities (Zollo & Winter, 2002). Further, Google's choice to have a change-prone culture, a semi-structured organization, and heuristic key rules instead of many formal processes, and finally to push down decisions to leaders who have the most up-to-date knowledge, have been identified by Brown and Eisenhardt (1997, 1998) as characteristics of organizations that are able to renew themselves constantly in rapidly changing industries. However, the prominent position of culture in the case of Google was not reflected either in the work of Brown and Eisenhardt (1997, 1998) or in the majority of other studies explored in Paper IV[81]. The only exception was Tushman & O'Reilly III (1997) who claimed: "*Managing culture is the most neglected, and highest leverage tool for promoting innovation and change*" and provided both tools for analyzing culture and approaches for shaping innovation cultures.

Second, the employees were viewed, together with customers, as the most important asset of the firm. The focus was on attracting and selecting the right individuals, who had high social and cognitive capability as well as an entrepreneurial mind, and who shared the values of the firm. The organization was then designed around the individuals in order to facilitate and reward them in their work of making innovations in parallel with operational excellence. The organization allowed individuality, diversity, openness/transparency, small teams and flexibility, but also required employees to be able to self-organize and to be innovators. In this way each employee could maximize his/her value to the firm. As a result of the emphasis on employees and their capacity, the HR department took on a more strategic role. The

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[80]These were defined in the theoretical framework of this "kappa" as industries producing mainly software with relatively short development cycles (< 6-12 months) and market life cycles (< 6-12 months).

[81]Studies explored in Paper IV were e.g.: Leonard-Barton (1992); Tidd et al. (1997); Teece et al. (1997); Tushman & O'Reilly III (1997); Brown & Eisenhardt (1997, 1998); Eisenhardt & Martin (2000); Zollo & Winter (2002); Teece (2007); O'Connor (2008); Garud et al. (2011); Lawson & Samson (2001); Matzler et al. (2010).

individuals in the case of Google, together with the culture, were perceived internally as being the primary drivers of innovation. This primary position of individuals, like that of culture, was not found in either the majority of selected research used in Paper IV, or the research literature in the theoretical framework of this "kappa". One exception in Paper IV was again Tushman & O'Reilly (1997) who, in the context of shaping organizational culture and building a comprehensive system for social control, outline a system of rigorous selection and intensive socialization of people. However, there are other researchers who have emphasized the need for an increasing focus on and investment in employees. For example, Hamel (2009)[82] identified the need for investing in and caring about entrepreneurial genius (people management)[83] as one of the three main management challenges for the future. Another instance is Tidd & Bessant (2009) [84], who claim that there is a strong correlation between people management and business performance and that the relationship is positive and cumulative. The authors argued that in a knowledge economy, people are the most important asset and the management challenge is how to go about building the kind of organization in which such innovative behavior can flourish: "*The most innovative companies are organized like a river, with a clear path that flows much faster than one full of obstacles and tributaries. They have simple and focused structures and processes (that can be broken) that are there to free people, not to get in the way*" (Tidd & Bessant, 2009, p. 135). Further, they emphasized the importance of all employees being potential innovators, the importance of self-organization of employees and the role of diversity in a firm.

Third, the emphasis on and trust in employees and their capacity demanded a certain leadership style. The leaders' main tasks at Google were to be good coaches and empower their employees, to be good ambassadors for the firm, communicate vision/mission, goals and

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[82]The findings in Hamel (2009) were identified as a result of a 2-day conference in California, debating the future of management. The conference included a diverse mix of e.g. well-known academics (Eric Abrahamson, Chris Argyris, Yves Doz, Linda Hill, Tom Malone, Andrew McAfee, Henry Mintzberg, Jeffrey Pfeffer, C.K. Prahalad, Peter Senge, Hal Varian, Steven Weber, Shoshana Zuboff) and representatives from three companies (UBS, Google, Whole Food). They found a number of "needed" characteristics of "the future organization". First there is a shared vision that will emotionally affect the employees and thereby direct their focus. Second, leaders become "*social architects, constitution writers, and entrepreneurs…the leader's job is to create an environment where every employee has the chance to collaborate, innovate and excel*". In addition, leaders trust their employees, extend the scope of employee autonomy and are strongly committed to constant innovation and change in parallel with securing operational excellence. Third, the degree of formal hierarchy in a firm is limited and the firm enables employee diversity, flexibility and self-organization, the formation of smaller organizational units and "*communities of passion*". Fourth, the responsibility of setting goals is distributed to the employees who have the best knowledge and insight. Further, decision-making is based on facts and not on positional biases. Fifth, the systems for promotion and follow-up on performance consider and reward both short-term and long-term performance and rely more on peer review than top-down control and supervision. Finally, management has the mindset and tools for an open organization, building and shaping value-creating networks and ecosystems and information systems that create a democracy of information, which in turn stimulate the employees to work for the best of the firm.
[83]Interesting to notice is that the 2011/2012 definition of TQM in MBNQA has been adjusted, compared with the version existing in 1994, and today also emphasizes issues such as agility, management for innovation, and valuing workforce members.
[84]Tidd and Bessant (2009) is a textbook where the authors have had the ambition to integrate their own and others' research findings into a comprehensive view of innovation management

priorities for their team and then facilitate their team members to reach goals and priorities, but also for removing obstacles for innovation. The leaders' responsibility was to balance the tension between innovations and operational excellence. The selected research in Paper IV emphasized the role of leadership in managing change and innovations (e.g. (O'Connor 2008, Tushman et al. 2010, Matzler et al. 2010). However, the focus Google put on sustaining the culture by investing in development and training of current and potential leaders has not received the same attention in either the selected research in Paper IV, or the selected research in the chapter 'Theoretical framework' in this "kappa". Nevertheless, according to Hamel (2009) a new leadership is necessary in the future due to a higher pace of change, higher demands on innovation and higher dependence on employees and their contributions to the firm. His exploration of this "future leadership" matches well with the leadership that today is required at Google and the leadership Google wants to sustain by educating and training current and potential leaders.

Fourth, the organization aims at managing both innovations and operational excellence. This was, as mentioned, part of the leaders' roles but needed more support than that. The balance between the two focus areas started at the top with the board and the top management (e.g. the 70-20-10% rule) and was then an integrated part of the culture, structure (e.g. the 20% time) and performance & incentive systems. In addition, top managers expected, challenged and inspired employees to think "big". Finally, the allowance of subcultures seemed to make innovation possible in parallel with operational excellence. For example, by allowing engineering and sales to have different time horizons, engineering could focus on more long-term issues, while sales focused on short-term issues. The focus on "thinking big" in parallel with requiring operational excellence indicated that Google aimed for developing and sustaining an ambidextrous organization in which activities for both processes are performed side by side in the organization. Potentially this could support the findings from Grove (1996), Markides (1998), Burgelman (2002), Magnusson & Martini (2008), and Lawson & Samson (2001).

Fifth, Google was an "open system" and a process of acquiring externally developed technical innovations, together with co-operation with leading universities/researchers, and investing in external technologies through an own venture capital business, supported the internal process for more radical technical innovations. While Google did not have any traditional R&D function, the leads on what to search for came primarily from top management (mostly the founders), product managers, and/or from external sources. The organizational units 'Corporate Development', 'Google Venture' and 'University Relations' at Google were then responsible for the active search, cooperation, investment, and/or acquisition of externally developed technologies. However, Google also developed specific products such as platforms and application interfaces (APIs) in order for external developers to build products and services on Google's platforms and APIs. Finally, Google cooperated with larger clients and suppliers in order to improve existing or future planned products. Technical ideas were also transferred through specific forums and tech talks where knowledge was exchanged between external and internal technical experts, and from lead customers and suppliers to internal resources. Google could therefore be viewed as applying the philosophy behind "open innovation" (Chesbrough, 2003). Chesbrough also emphasized the possibilities that firms

have with licensing out patents and IP rights. This might be relevant also for Google in the future, partly as a result of the acquisition of Motorola and other companies, and partly as a result of its own internally developed patents.

However, in the case of organizational innovations, the organization was adapted as a result of top management requirements, customer feedback, the yearly employee survey, and data collected in specific internal projects by HR[85]. In this case the organization could be speculated to be less open at the time of the study, since primarily internal sources were used for triggering organizational changes. But this was not the situation during the first years of the development of Google, when the company adopted several externally developed organizational innovations and did not systematically collect data from its own organization. It could therefore be speculated whether "openness" in regard to organizational innovations might be more dependent on the organization's specific phase in its lifecycle, compared to technical innovations. This makes sense if the development of 'Google' is viewed in the form of a trajectory instead of as one specific and quite static organizational innovation. The innovation 'Google' 2010 could therefore be viewed as a result of an improvement trajectory, which would mean that 'Google' has existed in several "releases". In the early days when the initial release was created, the founders seemed to have a big impact on the design. Yet as the organization grew and the next release(s) was/were developed, there seemed to have been an increased desire[86] to learn from other successful and innovative companies such as 3M and P&G. Around 2004, the company invested in the HR department's (People Operation) analytical power, with the aim to consistently analyze and improve the organization in order to reach overall goals, including motivated and innovative people. At the same time, the organization had recruited many highly talented people (more than 800 employees: Google home page January 2012). At this time, it could therefore be speculated that the organization started to become more introverted and potentially also a victim of inertia. It may also be realistic to believe that if the company encounters a future situation where big internal changes are needed, the desire to learn from companies outside might once again increase.

To sum up, Google has consciously or unconsciously striven for building a capability to change and renew itself constantly as a response to external changes, as a result of new opportunities, and/or due to internal demand from the employees. This capability could be viewed as "…*dynamic capabilities*" referred to by Teece and Pisano (1994)[87]. Further, Google's semi-structured organization, minimal number of formal processes, use of heuristic rules, and push-down of strategy development and decision-making to people with the most relevant and real-time knowledge, are all well reflected in the work of Brown and Eisenhardt (1997, 1998). In addition, Google is human-centric and has built its organization in a way that will promote employees' creativity and performance, in a way similar to that described by

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[85]Google regularly performed internal studies of employees. An example is a study of the relationship between employees' personality and historical background/experience and their performance in the firm. By using this data, Google could adjust and improve its organization.

[86]This desire seems in turn to have been affected by the board at this time.

[87]For example by moving into the Mobile, Social network, Display, and TV businesses, all of which were a result of new market trends and required a re-location of internal resources.

Tidd and Bessant (2009) and Hamel (2009). Google also manages the tension between innovations and operational excellence in one and the same organization, a strategy that was found important by e.g. Lawson and Samson (2001) and Stacy (1992). Finally, the organization was open, and more so in regard to technical innovations than for organizational innovations, which seemed to be based more on necessity and internal resources. Google could therefore be called open in the world of Chesbrough (2003). Two things did, however, differ between the findings at Google and those of other selected research in the chapter "Theory framework": the integration Google seemed to have done of previous research findings into one corporate system for continuous innovation and the prominent positions of both culture and individuals for innovation. In the case of Google, culture and individuals were perceived as the main drivers of innovation, a status that none of the other selected researchers emphasized. Finally, due to the similarity between the characteristics found in research literature on related industries and the characteristics found at Google, the major organizational innovation 'Google' could only be viewed as unique in the integration of its own and others' ideas (though perhaps thought-leading ideas).

Hence, are the key characteristics of Google different from those describing 'TQM'/'TPS'/'Lean'?

The answer is both yes and no. The emphasis on constant renewal of the organization and the need to manage continuous innovation were not as explicit in the organizational innovations 'TQM'/'TPS'/'Lean' as in 'Google'. This has as a consequence that 'Google' is avoiding "process orientation" and "standardization", emphasized in the three other major innovations, and instead embraces a semi-structured organization with as few formal processes as possible. Regarding the focus on employees, empowerment and a leadership that coaches employees rather than dictating what they must do are two characteristics that are partly covered in 'TQM'/'TPS'/'Lean', but the levels of empowerment and self-organization of employees seem to be even higher in the case of 'Google'. Finally, openness is partly covered in 'TQM'/'TPS'/'Lean'. However, openness in these three organizational innovations from the 1990s and early 2000s primarily meant openness towards customers and suppliers, not exploring possibilities in the whole ecosystem[88] of which the firm was part.

In summary, the characteristics of 'Google' are by us viewed as different "enough" to be used in testing the applicability of the conceptual model developed previously in this chapter.

5.2.2 The applicability of the conceptualization

As was said above, the conceptual model for organizational innovations is based on findings from studies of major organizational innovations mainly developed within the automobile industry. Further, those innovations have been well described in numerous books and articles, and have been the object of standardization on international, national, and firm levels. In comparison, the major organizational innovation developed and sustained at Google has been

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[88]However, "Total approach" in Alänge (1994) could be viewed as a kind of early "ecosystem approach" since the firm's responsibility for external partners and environment was included.

developed within the rapidly changing Internet Service industry and has so far not been standardized, even though some journalists and researchers have written about the company. It was, however, found that many of the organizational characteristics present at Google had been identified by selected research on Internet Service- related industries such as semiconductors, information services, and telecommunication services. This could mean two things. First, the major organizational innovation 'Google' is a combination of existing and firm-specific organizational ideas. The assumption that organizational innovations are most commonly not developed in local, isolated processes (mentioned in the section "Creation of organizational innovations" above) seems therefore correct. Second, the characteristics of 'Google' are not firm- specific and specific to the Internet Service industry, but actually relevant and valid for other firms active in other rapidly changing industries as well.

In order to discuss the applicability of the conceptual model, we will first discuss the common factors and then the differences between the two cases ('TQM'/'TPS'/'Lean' on one side and 'Google' on the other) of major organizational innovations and how this could affect the conceptualization discussed above. The test of the conceptual model is in the form of the analysis below.

Let us start with a discussion of some common factors between the case of 'TQM'/'TPS'/'Lean' and the case of 'Google'. First, both cases have been affected by the **external context**. In both cases the *institutional set-up* has played a role in the first two steps "Desirability" and "Feasibility". In the case of 'TQM'/'TPS/'Lean', bridging institutions on both the international and national levels influenced the degree of desirability and feasibility by standardizing the innovation, and by inspiring, educating and encouraging the innovation in local firms and organizations. In the case of 'Google', the institutional set-up in Silicon Valley seemed to influence the firm by e.g. its *local norms* on how to organize, as well as by having access to knowledge via local universities such as Stanford and Berkeley and to capital via a knowledgeable VC industry. Desirability and feasibility of the innovation, in the case of 'TQM'/'TPS/'Lean', were also affected by user networks and by an international and national *fad* of total quality, and by market demands on ISO 9000 certification. In the case of Google, the founders were driven primarily by perceived global opportunities facilitated by the development of Internet. However, they were also driven by an ambition to develop a dynamic 'innovation engine' – a goal that could be speculated to be more common in Silicon Valley than in many other places in the world – but also issues that were discussed by other firms such as 3M and by researchers in the Valley in early 2000 (e.g. firms' capabilities to renew themselves by Brown & Eisenhardt (1997, 1998), and the need to speed up the degree of innovativeness through "Open Innovation" by Chesbrough (2003)). Today, one may wonder whether there is a strong fad of innovation, which would increase the desirability and feasibility of innovation-oriented organizational innovations (Abrahamson, 1996).

Second, a traditional *market* for organizational innovations such as: 'TQM'/'TPS/'Lean' or for 'Google', has been non-existent. In regard to diffusion channels substituting for a traditional market, there seem to be a high similarity between the cases. In both cases external ideas came primarily via *top management movement* and the *board*. Interesting to notice, however, is that the founders at Google during the first years preferred employees who did not

have any long track record in the business sector; hence relatively few ideas based on real business experience could have come from this group. The reason was that the founders wanted to build an organization that was free from what they perceived as bad behavior that existed in the business sector at this time. Instead they valued their own ideas as more feasible in order to build the organization they desired. In 1999/early 2000, the founders' negative perception of business experience started to change, and the recruitment of board members such as John Doerr and Eric Schmidt (later the CEO) contributed new organizational ideas. In addition to movement of senior people and the use of board members' experience and networks, all our cases used highly experienced *experts/consultants* when developing the organization and/or doing a first trial. In the case of Google, the top management team in mid-2000 regularly used the support of "The Coach" (Bill Campbell) in creating a good management team and in building an organization that could accomplish both innovation and operational excellence. In the case of 'TQM'/'TPS/'Lean', experienced experts/consultants were in several cases used in the step "First-Trial". Further, as was discussed above, the local institutional set-up played a role as a source of norms, ideas, and/or resources.

Third, in regard to **internal context**, the final *decision criteria* used in both cases seemed to have been a strong belief in the benefits of the organizational innovation. In the cases in Paper II and Paper III, the top management teams in the adopting firms were convinced of the benefits of 'TQM', 'TPS', or 'Lean'. In some cases the belief was there from the very start and did not need a step of "Desirability" to be developed (e.g. the case of Mölndal Hospital), while in other cases external information and education together with imitation created a desire and a sense of feasibility and therefore a belief in the innovation (e.g. the case of Electrolux[89]). In the case of Google, the founders' belief in how to best design an organization for innovation was there from the start. The two founders were convinced that in order to foster innovation they had to invest in a strong innovation-oriented culture, in the right people, and in a structure that was flat, open and transparent and allowed a lot of communication between employees. Traditional calculation models were not used in these decisions. Interesting, though, is that Google over time has become very data-driven also in their HR decisions. Google, therefore, since 2004 has based its decisions for re-invention of the organization on data collected through internal projects on employees' attitudes and behavior. Google's request for data underlying an organizational change could be viewed as some kind of "calculation model". In order to be able to conduct these studies and analyses in a more correct way, experienced Ph.D.s in organizational development were hired in 2004 and later. In addition, top management involvement was crucial for the first trial, implementation and sustainability of both 'TQM'/'TPS/'Lean' and 'Google'. In both cases, *top management* was clearly committed to the change(s). In the case of Google, top management was not only committed but the primary driver of change. Top managers in this case were the main creators of the organization. However, *the board* also played an important role in both cases. For example, in Paper III the boards in two of the cases were actively involved in the diffusion and sustainability of 'TQM' and 'Lean' respectively. This was

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[89]In the case of Scania AB the top leadership had access to numbers showing a potential of more than doubling productivity. These numbers came from a comparison between Toyota and a Swedish car manufacturing plant.

achieved by providing top management ideas, training and resources in the areas of 'TQM' and 'Lean'. In the case in Paper IV, the board played an important role in steps such as "Desirability", "Feasibility" and "Implementation" by contributing ideas and support in implementation, e.g. of 20% time and of the OKR system. In addition, the consistency of board members over time might mean that the board also played an important role in the step "Sustainability". Still, a board can also hinder the creation, diffusion and sustainability of an organizational innovation by not sharing the vision of top management, by not understanding the organizational innovations and the benefits of it, and by not making sure the innovation is sustained in the case of a change of CEO.

Finally, the need to look at organizational innovations and their creation, diffusion, and sustainability in a dynamic and *wider context* was found in Paper II, Paper III, and Paper IV. Both 'TQM'/'TPS'/'Lean' and 'Google' were continuously re-invented, which was partly path-dependent as it was based on previously developed or adopted and implemented ideas. Further, both cases of innovation affect every part of an organization and could therefore be viewed as major organizational innovations affecting several subsystems, such as the social, technical, cultural and political subsystems.

We have now discussed a number of similarities between the two cases 'TQM'/'TPS'/'Lean' and 'Google'. However, there are also a number of differences between the two cases that will now be discussed in order to further test the conceptual model.

The differences are found primarily in regard to the innovation itself and to factors in the internal context that are affected by Google's different nature. If we start with discussing differences in the innovations, it is clear that all three innovations are tacit and more or less corporate-wide by nature. They are also a result of several minor organizational innovations that together form the comprehensive organizational innovations, which are in focus here. For these reasons, they were all labeled major organizational innovations and thus contribute to long-term competitive advantages (Hamel, 2006). Yet there is a big difference between 'TQM'/'TPS'/'Lean' on one side and 'Google' on the other. 'Google' is by nature even more tacit. The reason is that in order to encourage and sustain dynamic capabilities as well as ambidexterity and a human-centric organization, the organization has been designed as flat and semi-structured, where the number of formal processes and policies is minimized, and where empowerment and self-organization are encouraged[90]. In fact, Google does not even have an organizational chart to show to its employees or external people. There is thus no blueprint of the organization. For this reason, the imitation and therefore diffusion of such innovation have to be conducted primarily through the movement of people who have deep knowledge of the organization. In addition to an increased level of tacitness, there does not exist any dominating design today for this kind of organizational innovation, i.e. an

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[90]These characteristics are today partly covered in the 2011/2012 version of TQM, but were not emphasized in the 1990s version of TQM or the 2000s version of TPS and Lean Production, which were studied in Paper II and Paper III. The fact that the 2011/2012 version of TQM includes parts of these characteristics could mean that these organizational characteristics might be required also in industries that today are known to be less dynamic than the industries related to the Internet Service industry.

organizational model fulfilling key organizational characteristics for continuous innovation in rapidly changing industries. No standardization of this kind of innovation has been created either by international or national bridging organizations or by consultants or firms. Some of the pieces start to come together, but a dominant design is still not there (Barsh, 2008, p. 3; Tidd & Bessant, 2009, p. 132). As there does not exist any dominant design and standardization of such organizational innovation, a number of internal factors are negatively affected. First, not only the imitation is hard but also the search and learning processes for companies suffer. The desire to become more innovative is present in many firms, but as no dominating design exists, the firms' search and learning processes can become less systematic and efficient. At best, sub-components of the innovation are observed, interpreted and potentially imitated from different companies, and every adopter then has to build the "model" by trial and error of an integration of the different sub-components. The alternative is that a consulting company suggests a solution for the firm. The risk of failure is high in both cases. In fact, according to Skarzynski & Gibson (2008), two management consultants focused on supporting firms in building a higher innovativeness: "…*the reason why so few organizations have so far succeeded at building a deep, ongoing capacity for innovation is that most of them only dipped their toes into the water, initiating piecemeal activities here and there and hoping that by throwing some money at these initiatives they would somehow bear fruit. They never dived into innovation in a serious and systemic way*."

Further, as the major organizational innovation is **hard to observe and test**, the **time for implementation** and the **transfer and implementation cost** could in this case be expected to be higher than in the case where the innovation is standardized in some degree. In addition, as 'Google' is built on certain values, the adopting firms might **need to unlearn** in a way that is not according to the firm's historical management tradition (inertia) or top managers' personal values, or could threaten their political status (that is, create mental and/or political filters for adoption (Jarnehammar, 1995)). Moreover, the semi-structured organization might not be feasible in certain industries, e.g. industries developing products that are more capital-intensive and require many years of development. For these reasons, all firms might not easily adopt 'Google'. Finally, the role of **top management and the board** could be speculated to be of even more importance than in the case of e.g. 'TQM'. For example, sustaining an organizational innovation that constantly needs to balance between chaos and structure, allow empowerment and self-organization of employees, and quickly and constantly adapt according to external changes, could be assumed to be more challenging than sustaining an organization which is built up around a clearly fixed structure and formal processes. Finally, due to Google's tacit nature, the possible degree of standardization of this kind of innovation might be lower than in the case of 'TQM'/'TPS'/'Lean', which in turn could affect a diffusion of 'Google'. Regarding a "standardization" of 'Google', it was clear that Google itself had adopted a number of quite well standardized organizational innovations that today are sub-components of the corporate-wide organizational innovation. Examples of these were the OKR system and 20% time. However, 'Google' as a corporate-wide organizational innovation in itself has not been well standardized and is not even visual in an organizational chart (blueprint). In parallel, to our current knowledge, no international or national bridging

institute has communicated any standardization work around this kind of innovation[91]. Today, however, there are examples of work done by some researchers and consultants on identifying characteristics of highly innovative and fast-paced companies in Internet Service- related industries. There has also been work done on standardizing methodologies in the area of e.g. "Agile software development", which among other things promotes adaptive planning and rapid and flexible response to change. Therefore, there could be a possibility to standardize components of 'Google', but potentially also the overall major organizational innovation, thereby affecting the diffusion rate of components and the major organizational innovation.

To sum up, the conceptual model developed in this "kappa" seems useful both for analyzing similarities and differences between the two cases: 'TQM'/'TPS'/'Lean' on one side and 'Google' on the other. For example, the influencing factors in the external context such as the local institutional set-up, local norms, user networks, and fads were all relevant for the diffusion of 'TQM'/'TPS'/'Lean' and 'Google'. In addition, a traditional market was non-existent for both cases, so that interpersonal diffusion channels were highly relevant. Decisions on how to develop the organizational innovation were mainly based on top management or board members' experience and "beliefs". Both cases of innovations also affect several subsystems within the organization. However, the innovation 'Google' is more tacit than 'TQM'/'TPS'/'Lean', and not as standardized; thus several factors in the internal context such as search and learning processes, inertia, transfer and implementation costs, but also costs for sustaining the innovation could be assumed to be negatively affected, which in turn could slow down a diffusion of the innovation. Nonetheless, some researchers and consultants have done some work on standardizing either organizational components or more complete organization-wide solutions, for continuous innovation in fast-changing environments. Therefore, a standardization of 'Google' as a major organizational innovation might be possible, which in turn will positively enhance its diffusion rate (Rogers, 1995).

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[91]MBNQA has however described TQM 2011/2012 with a number of criteria which are identified in research on rapidly changing industries, such as Information Services and Telecommunication Services, and which are also partly reflected at Google.

6 Conclusions

In the previous chapter, two research questions have been discussed: "How can the creation, diffusion and sustainability of organizational innovations be understood and conceptualized?" (RQ1) and "How do the characteristics of organizational innovations affect the applicability of the conceptualization?" (RQ2). As a result of the discussion of RQ1, a conceptual model for the creation, diffusion, and sustainability of organizational innovations was visualized as a five-step process influenced by three main sets of factors – the characteristics of the innovation itself, the internal and the external context together with diffusion channels.

Since the conceptual model was primarily based on empirical findings in Papers I, II and III, in which 'TQM' was studied in Paper II, and 'TQM', 'TPS', and 'Lean' in Paper III, the conceptualization was tested on a partly different major organizational innovation, 'Google'.

Before we tested the conceptual model, three sub-questions were answered. First we explored in what degree 'Google' was a unique organizational innovation. The answer was that each characteristic of the innovation 'Google' was not as unique as might at first have been imagined. However, the combination of existing organizational ideas, and the application of it, could be viewed as unique. Further, the fact that 'Google' well reflected findings from other rapidly changing industries supported the assumption in the 'Discussion' that organizational innovations are primarily created through a combination of existing/new ideas rather then through an isolated innovation process. Second, we wanted to understand whether 'Google' was different from 'TQM'/'TPS'/'Lean'. The answer was that 'Google' was sufficiently different to be useful for testing the conceptual model.

The test showed that the conceptual model was valid also for 'Google' and was useful in identifying both similarities and differences in the creation, diffusion, and sustainability of 'TQM'/'TPS'/'Lean' on one side and 'Google' on the other. One observation made in the analysis was that 'Google' by its very nature is more tacit than 'TQM'/'TPS'/'Lean', why it was questioned in what degree this kind of highly tacit organizational innovation is possible to standardize. There are, however, examples of standardization work performed by some researchers and consultants, so it could be assumed possible to standardize at least some components of the innovation.

Below, the main conclusions for each research question will be presented.

6.1 How can the creation, diffusion and sustainability of organizational innovations be understood and conceptualized? (RQ1)

A number of interesting conclusions can be drawn from the 'Discussion' chapter. The main conclusions regarding organizational innovations' creation, diffusion and sustainability are as follows.

Conclusion 1: The creation, diffusion and sustainability of organizational innovations are three intertwined concepts rather than three separate and sequential ones. For this reason it does not make sense to speak of or study each concept in isolation.

Conclusion 2: As an organizational innovation is constantly re-invented, the creation, diffusion and sustainability of an organizational innovation are concepts that recur in a non-sequential pattern and are directed by a firm's improvement trajectory, regardless of whether this was consciously decided by the firm or was mainly a response to external and internal demands and pressures.

Conclusion 3: The concept 'Sustainability' of organizational innovations refers to a firm's improvement trajectory, rather than to a particular organizational innovation. A major organizational innovation such as 'TQM' exists therefore over time in several "releases" in an adopting firm. Each release is valid only temporarily, since it is constantly re-invented[92] as a result of continuous external and internal changes.

Conclusion 4: The conceptual model for how organizational innovations are created, diffused, and sustained can be visualized as five steps in a circular pattern, circling around a firm- specific improvement trajectory. The five steps are in turn influenced by three main sets of influencing factors: the characteristics of the innovation itself, the internal context, and the external context together with diffusion channels.

Conclusion 5: A board of directors plays important roles as both a diffusion channel and as a trigger for all five steps in the process of creation, diffusion and sustainability of major organizational innovations. Boards and their roles must therefore be highlighted and included in future studies on organizational innovations.

6.2 How do the characteristics of organizational innovations affect the applicability of the conceptualization? (RQ2)

The main conclusions regarding research question 2, "How organizational characteristics of organizational innovations affect the applicability of the conceptualization", are as follows.

Conclusion 6: The conceptual model, based on studies on 'TQM'/'TPS'/'Lean', is applicable also for studying the different major organizational innovation 'Google'.

Conclusion 7: The conceptual model was useful in identifying both similarities and differences between the creation, diffusion, and sustainability of 'TQM'/'TPS'/'Lean' on one side and 'Google' on the other hand.

Conclusion 8: The conceptual model proved also useful in identifying issues that could negatively affect the creation, diffusion and sustainability of an organizational innovation, e.g. 'Google'. The identified issues are:

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[92]Conducted by e.g. the adopting firm. However, the innovation is also re-invented by standardization institutes, industry organizations and/or consulting firms on a national or international level. Further, closely related to the constant re-invention is a constant re-standardization of the innovation. While the adopting firm most probably conducts standardization of specific ways of working, the standardization institutes, industry organizations and/or consulting firms, aim for standardizing also company-wide major organizational innovations.

- First, the major organizational innovation 'Google' is more tacit[93] than the previously tested innovations 'TQM'/'TPS'/'Lean', which make it harder to standardize the innovation 'Google'.
- Second, there is a lack of explicit and well-communicated firm, national and international standardization processes[94] for this organizational innovation. However, some researchers and consultants have done some early work, which could be used for future standardization of at least parts of this organizational innovation.
- Third, internal factors such as the search and learning processes, inertia, transfer and implementation costs, as well as costs for sustaining the innovation, are all negatively affected due to this organizational innovation's more tacit nature and due to the current lack of standardization processes.
- Fourth, because of the semi-structured organization and higher focus on self-organization and empowerment of employees, the role of top management and the board can be assumed to play an even more important role for this type of organizational innovation than in the case of 'TQM'/'TPS'/'Lean'.

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[93]The degree of tacitness is here based on observations such as the degree of semi-structured organization and the existence of organizational blueprints and standardizations of the complete innovation or of parts of it, rather than on a quantitative measurement along a developed numeric scale.

[94]The Internet industry is much younger than the automobile industry. This could be argued to be the reason why there are no formal standardization processes for this type of organizational innovation.

7 Suggestions for future research

There is a need to further develop and test the conceptual model for the creation, diffusion and sustainability of organizational innovations that has been developed in this "kappa". One part of future work could be to add a concept of "unlearning" an organizational innovation. To "unlearn" means that a firm needs to break away from the old way of doing things. This capability, according to Alänge et al. (1998), is dependent on the competence of the users and their capability to "unlearn". It would also be of interest to further explore the issue of program design, for instance in the search (e.g. more structured and conscious) and implementation of an organizational innovation. In addition, the search and learning processes overall, the role of formal and informal individuals' networks both external and internal to the firm, and the role of boards in the conceptual model would be of interest to investigate more fully.

The issue of standardizing (including activities such as translation, packaging/description, and labeling) the innovation in the creation, diffusion, and sustainability processes also needs to be further investigated. In relation to this issue, it would be of interest to investigate in what degree (and which components) of 'Google' it is possible to standardize, and to explore whether standardization is important for increasing the rate of diffusion. For example, while the specific organizational characteristics could be thought possible to standardize, the way they are implemented in each firm and organization is probably harder to standardize.

In addition, it would be of value to further explore the specific organizational characteristics needed for continuous innovation in rapidly changing industries and whether these characteristics are part of an "organizational innovation" needed only for this kind of industries or whether they are needed more generally in today's fast-changing world, e.g. due to technology and consumer behavioral changes.

In addition, it could be of great interest to further explore the usefulness of referring the concept 'Sustainability' of organizational innovations to an improvement trajectory, rather than to a particular organizational innovation. For example, how should an improvement trajectory be defined and when does it start and end? Moreover, what happens if two improvement trajectories are merged, e.g. if Google is to implement Lean Production? Will this mean a totally new improvement trajectory that can result in both operational efficiency and innovations in a fast-changing environment, or will it just be a new "release" of 'Lean' for a specific context, or will it be a totally impossible assignment?

Finally, the usefulness of the term 'new-to-the-state-of-the-art' in regard to organizational innovations could be of interest to explore further. This issue could also be relevant to study in combination with examining communication and standardization processes for organizational innovations, as the intellectual property rights are largely part of the communication and translation/packaging/description/labeling of the organizational innovation.

Suggestions for future research are therefore:

1. Develop further the conceptual model for studying the creation, diffusion and sustainability of organizational innovations.
    a. Explore a potential new step in the conceptual model, labeled 'Unlearning'.
    b. Explore whether and how to integrate the factor "program design" of e.g. search and learning processes, first trial, implementation, sustainability and unlearning.
    c. Further explore the search and learning processes for organizational innovations, and specifically the importance of individuals' networks.
    d. Further explore the roles of boards in the conceptual model for the 'creation', 'diffusion', and 'sustainability' of organizational innovations.
2. Explore the importance of a standardization of this kind of very tacit organizational innovations, and to what degree it is possible. Further, explore what parts of the organizational innovation make sense to standardize.
3. Further investigate the assumption that there are specific characteristics necessary for rapidly changing industries, and whether these characteristics are valid and necessary for future firms overall due to changes in technology and society.
4. Explore the usefulness of referring to an improvement trajectory, rather than to a particular organizational innovation when exploring the concept 'Sustainability' of organizational innovations. In addition, explore the consequences if two organizational innovations, previously part of different 'improvement trajectories', merge.
5. Explore the usefulness of the term 'new-to-the-state-of-the-art' in regard to organizational innovations. Further, explore the importance of standardization and communication in order to create and protect a 'new-to-the-state-of-the-art' organizational innovation.

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