Organizing for the generation of radical innovations

How a software company can improve their potential for generating radical innovations

Master's Thesis in
Management and Economics of Innovation Programme
Quality and Operations Management Programme

MARKUS BOSTRÖM
SIMON BRAUN

Organizing for the generation of radical innovations

How a software company can improve their potential for generating radical innovations

MARKUS BOSTRÖM
SIMON BRAUN

Organizing for the generation of radical innovations
How a software company can improve their potential for generating
radical innovations
MARKUS BOSTRÖM
SIMON BRAUN
Department of Technology Management and Economics
Chalmers University of Technology

Abstract

Innovation management is a research domain that has been studied extensively and tends to be a challenge for many practitioners. Innovation is commonly viewed as a source of competitiveness and essential for survival. Whilst many scholars have generally engaged in incremental innovation, the significance of organizing for radical innovation has increased and captured the attention of academia and industry. The thesis has been carried out in collaboration with a software company labeled Company X. To collect data, the study used semi-structured interviews of Company X. Furthermore, a literature review was conducted of the theory of innovation and how it is practiced in prominent companies such as Google, Facebook, LinkedIn, Twitter, Tesla Motors, and Apigee.

The study aims to explore approaches that can improve the opportunity of generating radical innovations. The study contributes to academia by providing insights into innovation management with a focus on radical innovation and to practitioners wanting to enhance their radical innovation management. The three main components analyzed are culture and people, organizational structure, and the innovation process.

The analysis indicates that learning and acceptance of failure should permeate the culture. Recruiters should strive to employ people that display entrepreneurial qualities and empower them through ensuring psychological safety. To retain employees and improve the generation of radical innovations, Company X should provide incentives and rotate people in the organization to develop their knowledge. The structure should facilitate knowledge sharing between different business entities to capture insights from diverse sources, enabling more creativity in idea generation processes. Decision-making should be decentralized to enable employees to freely explore ideas without being limited by hierarchical relationships. Whilst the radical innovation process is difficult to measure, practitioners should use frameworks that encourage exploration of novel ideas, blending of different insights, and questioning of existing assumptions. It is advised that corporations target innovators and early adopters to facilitate the idea generation, additionally, if these customers are reputable they can enable the diffusion of the innovation.

Keywords: Innovation management, radical innovations, innovation process, innovation frameworks, innovation measurement, innovation and organization

Acknowledgements

It is finally summer in Sweden, the sun is shining and the European Football Championship together with ongoing vaccinations brings light in the tunnel after a special year with COVID-19 affecting everyone's life, creating a pleasant sensation as our time as students is reaching its end. Looking back at our years of study, we realize that it is more than just knowledge that we will bring with us from our time at the University. The experiences we have gained will be engraved in our minds as we embark on new voyages.

There are several people we would like to express our gratitude toward. To begin with, we are grateful for the support of our supervisor Johannes Berglind Söderqvist, the report would not have been possible without his guidance. Furthermore, we are grateful to Company X for the opportunity to conduct our thesis with them, for participating in interviews and contributing to a pleasant collaboration. Lastly, we would also like to express our gratitude to everyone who has supported us during our studies, especially family, friends and partners. This thesis has been the result of the combined equal efforts of the authors.

<div align="center">Markus Boström and Simon Braun, Gothenburg, June 2021</div>

Contents

1
Introduction

The competitive landscapes for firms are both complex and dynamic due to the rapid technological development and globalization, to stay competitive the capability to generate innovations is essential (Assink, 2006; Christensen, 2013; Hamel, 2002; Leifer, O'connor & Rice, 2001; Tushman & O'Reilly, 2002). This holds especially true for the software industry where technologies and business models are combined to create new commercial applications and the industry has experienced rapid growth with the market spending on enterprise software doubling between the years 2009 and 2019 worldwide (Steiber & Alänge, 2016; Gartner, 2021). This thesis will explore how software companies can organize to generate radical innovations in this environment and its insights should also be of value for companies in more rigid and slow-moving industries (Steiber & Alänge, 2013). Additionally, beyond the value for single companies, exploring this subject can provide valuable insights for reaching the United Nations' sustainable development goals, specifically Goal 9, "Build resilient infrastructure, promote sustainable industrialization and foster innovation" (United Nations, n.d.). It describes how innovation and technological development play an important role for identifying sustainable solutions that are both economical and environmental. This thesis will focus on how to generate radical innovations which could be an important factor for reaching the UN's ninth goal.

Innovation is a complex subject and it is often a challenge for firms to be able to manage both incremental innovations and more radical innovations, also described as disruptive or breakthrough innovations (Christensen, 2013; Hamel, 2002; Tushman & O'Reilly, 2002). While the subject of organizing for incremental innovation has been of interest for many scholars, radical innovation's significance has been emphasized by e.g. Christensen (2013), Tushman and O'Reilly (2002) but how to organize for generating radical innovations has not been as thoroughly examined (Leifer et al., 2001). Steiber and Alänge (2013) argue that there is a need for more empirical research to develop extensive organizational frameworks for continuous innovation, which they characterize as both innovations which adhere to previous technology, product or business model and improves them incrementally, and innovations which take a novel path from what previously existed i.e. radical innovation. Steiber and Alänge (2013; 2016) have by their empirical research initiated the development of a more extensive organizational framework for continuous innovation where multiple factors are considered. Radical innovation can be described as an innovation that uses novel technology in a new market, causing a disruption in current technology and market infrastructure (Garcia & Calantone, 2002), creating business opportunities for firms who can generate radical innovations. How to generate radical in-

novations is therefore a relevant question for firms to gain new opportunities. This thesis therefore contributes to the extensive organizational framework first initiated by Steiber and Alänge (2013; 2016), but with the focus on generating radical innovations, rather than continuous innovations, while maintaining a holistic perspective instead of limiting the research to solely focus on specific processes, capabilities, or other aspects.

1.1 Purpose

Many companies want to be first-to-market with unprecedented solutions, yet many struggle with the issue of how to translate this vision into practice, to be successful with radical innovations. Radical innovation is characterized by uncertainty, making it difficult to organize for. The purpose is to acquire a better understanding of how to organize for the generation of radical innovations. To achieve the purpose, the thesis aims to explore potential approaches to enhance the opportunity for generating radical innovations and therefore give valuable information for companies wanting to improve their radical innovation management.

1.2 The case

This master thesis has been conducted at a company hereafter referred to as "Company X". Company X is a multinational organization in the enterprise software industry i.e. engaging in business-to-business. It was founded in the late 1990s and has since then grown to be an organization that employs over 400 people with high continual growth. Company X has a relatively flat organizational structure and they are actively working with innovation endeavors.

1.3 Research questions

Based on the purpose of the study, the research questions have been divided into three main areas that were deemed as the most relevant after reviewing the literature and conducting initial interviews with representatives of Company X. Emphasizing and going in-depth into these areas could enable a deeper analysis of elements in a software company that influences the generation of radical innovations.

The first area examines the influence of organizational structure on the generation of radical innovations. The innovation literature describes different parts of the organizational structure, such as how knowledge is distributed throughout an organization; having flexible decision-making; and creating dedicated units working with innovations. Consequently, a research question was formulated to understand the impact that can be derived from the organizational structure on the generation of radical innovations.

- *RQ1: How does the organizational structure influence the generation of radical innovations in software companies?*

One of the most important aspects for generating radical innovation is culture and people (Steiber & Alänge, 2016). In particular, the literature states that the psychological safety of employees, as well as approach to innovation failure and learning are vital and should not be neglected (Edmondson, 1999; Ekvall, 1996; Baer & Frese, 2003). Based on this information, the second research question was molded to consider the influence derived from culture and people on the generation of radical innovations.

- *RQ2: How does the culture and people influence the generation of radical innovations in software companies?*

Finally, even if the organizational structure and culture are on point, the innovation process is still a key factor for the progression of ideas, from idea generation to the implementation of innovations (Galbraith, 1982). Additionally, it considers organizations' resource allocation to types of innovation projects, the risk of inertia, incentive systems and innovation measurement methods. As a result, the third research question was formulated to account for the influence of the type of innovation process on the generation of radical innovations.

- *RQ3: How does the type of innovation process influence the generation of radical innovations in software companies?*

1.4 Delimitations

While the purpose can be addressed in various ways, the study has divided it into research questions that focus on the impact from organizational structure, culture and people, and type of innovation process. This means that other topics outside of these areas will not be considered due to the scope.

While there are a diverse plethora of innovation typologies in literature, to mention some of them, breakthrough, major, and continuous innovations, this study has kept the numbers of distinctions of innovations low to facilitate comprehension. Innovations are basically divided into incremental or radical, but with the awareness of discrepancies between theory and practice of innovation. In reality it is difficult to categorize innovations binarily into these categories and many of them might have a mix of both incremental and radical tendencies.

2

Theoretical framework

A theoretical framework was developed as the basis for analyzing empirical findings. First a general overview of the innovation concept will be covered to give a base to build on. The difference between radical and incremental innovations is described and the importance of timing the market entry and the diffusion of innovations to different market segments. The literature of organizational structure is then reviewed to address how it affects innovation. The importance of knowledge sharing, self-managing organizations and creating a separate unit for innovation will be considered when investigating the influence derived from the organizational structure. The importance of organizational culture is also investigated to view how employees and culture affect innovation. In this theoretical framework, culture will cover the importance of people's characteristics, psychological safety, presence of hierarchical relationships, attitude towards failure and learning. Lastly, the type of innovations process will be described, it will cover different roles in the innovation process and how to optimize them to generate innovations. Another element of the innovation process that is covered is the optimal resource allocation for different innovations, as well as how to handle the risk of inertia in the organization when implementing innovations. Further, possible incentive systems that enable the innovation process, by retaining and attracting employees will be considered. Finally, the appropriate formalization of the innovation process, different frameworks, and measurement methods is covered.

2.1   What is Innovation?

Innovation can be illustratively contrasted to invention. The most prominent distinguishing features between inventions and innovations, according to Schumpeter, are that innovations are sprung out of the existing economic structure, emphasizing a commercial application of any developed idea (Ruttan, 1959). In contrast, Ruttan (1959) and Galbraith (1982) describe the prevalence of commercialization as non-existent when referring to inventions, depicting them as a construct derived from the process that enables discoveries in science, i.e. novel ideas disregarding economic impact. In summary, the main defining distinction between the two concepts lies within how the existing economic structure in the company is affected, an innovation has a significant impact on profits by commercializing new ideas, whereas an invention refers to new discoveries where the monetary implication is absent (Ruttan, 1959; Galbraith, 1982).

While various definitions of innovation overlap, the number and diversity have resulted in an ambiguous situation without any clear uniform definition of innovation (Baregheh, Rowley & Sambrook, 2009). Innovation is studied and practiced in multiple disciplines and has, as a consequence, been defined from different perspectives, making it difficult to create a general definition adaptable to these various disciplines (Damanpour & Schneider, 2006). Baregheh et al. (2009) comment that the disciplinary void, i.e. the absence of a common definition, undermines understanding of innovation.

Amongst the earliest of introducing the term innovation was Joseph Schumpeter (Baregheh et al, 2009). Schumpeter (1942) coined the term creative destruction which he describes as the process where new economic structures replace the old ones. Creative destruction is an essential part of the capitalistic system, where economic change is created through innovations.

''The opening up of new markets, foreign or domestic, and the organizational development (...) illustrate the same process of industrial mutation - if I may use that biological term - that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has to go live in.'' - Joseph Schumpeter (1942, p.83)

Hospers (2005) describes through his synthesis of Schumpeter's literature how Schumpeter views innovation not as many small changes added together but rather novel combinations of products, production methods, or organizational change which interrupts the current equilibrium of the economic system. This means that Schumpeter draws more to the radical side of innovation when he discusses innovation and does not view incremental innovation as innovation. Radical and incremental innovations will be described in section 2.1.1. The innovations are a creative process where entrepreneurs strive to capture a temporary monopolistic position where they can enjoy great profits by being the first movers. When this occurs, other economical actors join which creates a wave of innovative activities where imitations of the innovation emerge. These waves of innovation activities will erode the profits in the new economic change which together with the first initial boom creates an economic cycle, similar to the disruptive innovations described by Christensen (2013).

Damanpour (1996) elaborates with additional dimensions by linking innovation to organizational behavior e.g. viewing innovation as being a reactive response to changes in the external environment or as a proactive approach affecting the surroundings. Consequently, the description of innovation can also include new organization structure, process technology, and novel product or service since these are essential elements for managing change. Drucker (2002) shares a similar view on innovation, describing it as the efforts required to generate a purposeful change in a business' economic or social capability. Additionally, the principles of innovation are emphasized, mainly the importance of knowledge, ingenuity, and focused work.

To conclude, the plethora of definitions of innovation are permeated by diversity. Nevertheless, this study adopts a viewpoint that is congruent with the definition provided by Barageh et al. (2009) which conducted an extensive study that compiled various definitions of innovations made by different researchers.

''Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace". - Barageh et al. (2009, p.1334)

2.1.1   Incremental and radical innovation

Garcia and Calantone (2002) conducted an extensive literature review of innovation typology since there have been many ambiguous definitions in the new product development literature. Two central ideas that are relevant in this thesis are incremental and radical innovation. An incremental innovation is described as an innovation which improves the existing technology on an existing market through new advantages, application, processes or features (Garcia & Galantone, 2002; Ettlie, Bridges & O'Keefe, 1984; McDermott & O'Connor, 2002).

In contrast to incremental innovations, radical innovations are described as innovations that utilize novel technology in a new market, disrupting the current technology and market infrastructure (Garcia & Calantone, 2002; McDermott & O'Connor, 2002; Chandy & Tellis, 1998; Assink, 2006). This constitutes the main difference between radical and incremental innovations. One reason for making this distinction between radical and incremental innovations, is to ensure that a company works with both types of innovation and devotes resources to them respectively (Nagji & Tuff, 2012; Andriopoulos & Lewis, 2009).

Whilst innovation can be divided into radical and incremental, Steiber and Alänge (2013) argue that this distinction is irrelevant. An innovation is generally not entirely radical or entirely incremental, but a synthesis of both, which renders the categorization of innovation redundant (Steiber & Alänge, 2013). Garcia and Calantone (2002) describe these innovations lying between incremental and radical innovations as really new innovations, which they define as having either a discontinuity on the technology or the market, but not both simultaneously.

As this study aims to address innovations of a more radical nature, the researchers have only made the distinction between incremental and radical innovations and not chosen to utilize the term really new innovations, rather the viewpoint of Steiber and Alänge (2013) has been used where innovations are described to lay on a spectrum between incremental and radical.

2.1.2 Open innovation

The term open innovation was coined by Chesbrough (2003) and can be defined as the integration of customers, suppliers, and other external parties into the company's innovation processes (Chesbrough, 2019; Wallin & Von Krogh, 2010). Previously, innovation was generally conducted internally and was a costly endeavor to undertake for a company. In addition to the expenditures, it was often characterized by a long time to market and was a pitfall for multiple organizations (Chesbrough, 2019). Adopting the open innovation practice can yield several benefits, for instance, reduced development costs, enhanced processes, shorter time to market, improved quality, as well as improved capability through the acquisition of external customer and supplier expertise (Wallin & Von Krogh, 2010). Chesbrough (2019) describes open innovation as follows:

''Open Innovation is based on the fundamental idea that useful knowledge is now widespread throughout society. No one organization has a monopoly on great ideas, and every organization, no matter how effective internally, needs to engage deeply and extensively with external knowledge networks and communities. Open Innovation will utilize external ideas and technologies as a common practice in their own business [...] and will allow unused internal ideas and technologies to go to the outside for others to use in their respective businesses." - Chesbrough (2019, p.35)

Many companies, for instance, Google, LinkedIn, Facebook, Twitter, Apigee, and Tesla Motors use some degree of open innovation in the form of external networks to facilitate their learning (Steiber & Alänge, 2016; Steiber & Alänge, 2013). These organizations regularly interact with external actors, often experts, that can provide a different perspective e.g. through major events where employees can engage with external experts, or through collaboration with universities.

2.2 Innovation and organization

In the past, companies could stay competitive by taking advantage of government regulations, licenses, monopolies, and more which made it hard for new entrants in the market to be competitive (Steiber & Alänge, 2016). To be competitive in the global arena, it is vital that firms can respond to changes by developing dynamic capabilities i.e. organization's ability to allocate, generate and integrate internal and external skills to respond to shifting business environments (Steiber & Alänge, 2016; Pisano & Teece, 1994; Teece, Pisano & Shuen, 1997). Teece (2007) describes how companies can accelerate their development of novel business models or products by constructing dynamic capabilities. Furthermore, dynamic capabilities are one of the necessary prerequisites for innovation since it entails an organization's ability to identify new possibilities and adapt to changing business situations . As an example, IBM was forced to invest in and develop its dynamic capabilities after discovering that its revenues were rapidly declining (Ibid.). Steiber and Alänge (2016) describe how dynamic capabilities permeate culture, people, organizational structure, and innovation process.

''Dynamic capabilities is about being able to thrive when the context is changing and new opportunities need to be identified and acted upon. However, in order to survive and develop for the future, a company also needs to manage the present simultaneously. The ability to focus on both time perspectives at the same time has been called ambidexterity.'' - Steiber and Alänge (2016, p.123).

2.2.1 Organizational structure

The structure of an organization is an important element for enabling innovation, however the form of the structure can vary between different organizations. This section examines different aspects that were emphasized during the initial literature review as important to consider when building the organizational structure for the purpose of radical innovations (Steiber & Alänge, 2016). The elements that will be described in detail are knowledge sharing, self-managing organizations and a separate organizational unit for innovation to investigate how the organizational structure influences the generation of radical innovations.

2.2.1.1 Knowledge sharing

Knowledge in organizations is considered to be a source of competitive advantage for firms and therefore a strategic resource (Ipe, 2003). Knowledge sharing will play an important role in how well organizations can capitalize on their knowledge and also how innovative ideas are spread throughout the organization, facilitating creativity and innovativeness (Armbrecht, Chapas, Chappelow, & Farris, 2001; Ipe, 2003; Wang & Wang, 2012). Knowledge is often distributed asymmetrically within organizations (Doz, Santos & Williamson, 2004; Tsai, 2002). Formal learning channels can facilitate knowledge sharing, but several sources indicate that it is through the informal settings knowledge is usually shared (Jones & Jordan, 1998; Pan & Scarbrough, 1999). Tsai (2002) provides results in his paper indicating that formal hierarchical structures, i.e. centralization, in large corporations with multiple business units affect knowledge sharing negatively. Conversely, decentralized organizations where business units compete for market share, but not company resources, show an increased positive knowledge sharing through informal lateral relations (Ibid.). Therefore to enhance the knowledge sharing within the organization and counteract the asymmetry, it is encouraged to have an approach where the hierarchical structures are reduced and social interactions between business units are increased (Doz et al., 2004; Tsai, 2002). Consequently, companies could transform their organizational structure into becoming more self-managing, empowering employees to manage themselves (Lee & Edmondson, 2017).

Successful innovation is derived from the synthesis of identifying global market insights and technical knowledge, by utilizing a diversity of knowledge sources (Doz et al., 2004). Furthermore, the innovation process can be improved by globalizing the integration of technology and market by promoting diversity and transcending local knowledge. Knowledge sharing across units can improve an organization's capabilities through collective learning and synergies acquired from an exchange of

information between units e.g. local expertise and know-how (Tsai, 2002). It should be observed that even if teams have diverse backgrounds but share the same geographical location this can still impede knowledge diversity (Doz et. al, 2004). Three main organizational challenges for globalized innovation are described: identifying relevant knowledge around the globe adds value to the innovation process, comparing the created value with the related cost, and enabling effective knowledge sharing (Ibid.).

2.2.1.2 Self-managing organizations

As a response to rapidly changing information flows and a dynamic market, an increasing number of companies are attempting to decentralize their organization to become more innovative (Lee & Edmondson, 2017; Thomke, 2020). More companies are promoting less hierarchical organizational relationships to address this issue by improving growth in knowledge-based tasks and shifting the perception of work and organization to become more personal (Thomke, 2020). Consequently, companies are moving towards becoming more self-managing (Lee & Edmondson, 2017). Self-managing organizations describe less-hierarchical firms that seize radical business opportunities through removing established hierarchical relationships that rely on reporting and enforce employees to manage themselves (Ibid.). Steiber and Alänge (2016) also emphasize the need of reducing hierarchical relationships and having a flat organizational structure to increase innovation. Furthermore, decentralized decision-making was viewed as encouraging employees to pursue their ideas (Ibid.).

The approach companies take to become self-managing organizations varies widely. For instance, the video game developer and distributor Valve constructed a business design that empowers total autonomy and flexibility of employees to pursue the games that they find most interesting, and the ability to approve projects and launch products (Baldwin, 2015; Foss & Dobrajska, 2015; Puranam & Håkonsson, 2015). Another company would be the shoe and clothing retailer Zappos, which eliminated managers and provided its employees with complete autonomy to how they would perform their roles by having formalized yet flexible role definitions (Bernstein, Bunch, Canner, & Lee, 2016). The tomato processing and packing company Morning Star took a different route by developing a self-managing system where individual employees engaged with other employees through bilateral contracts instead of having managers dictating work tasks (Gino & Staats, 2014). The contracts described the individual employee's tasks, responsibilities, objectives, and metrics for measuring performance (Ibid.). Furthermore, an elected committee managed conflicts and compensation between different employees.

2.2.1.3 A separate organizational unit for innovation

To become an innovative organization, companies face the dilemma of either devoting a separate part to innovation or allowing it to infuse the entire organization (Galbraith, 1982; Steiber & Alänge, 2016). Galbraith (1982) describes the advantages of concentrating innovation into a separate organizational component, using the term reservations to describe organizational units which are devoted to generat-

ing new ideas. The purpose of reservations is to create an environment where failure is accepted and seen as a learning process. This type of environment is deemed important for generating innovations and will be elaborated in later sections (Edmondson, 1999; Ekvall, 1996; Baer & Frese, 2003; Perrin, 2002; Rothwell, 1994; Kanter, 2006). The reservations can be both external and internal. Internal reservations can be R&D teams and are often of a permanent nature. Whereas external reservations like, e.g. consulting firms and collaborations with universities, tend to be more temporary. The open innovation concept described by Chesbrough (2019) resembles external reservations as described by Galbraith (1982) to a large extent. One reservation must consider operating and improving the current business. The second reservation should focus on future opportunities and issues by allocating their efforts to generating innovations. The innovations developed by the innovative organization reservation should then be transferred to the operational component for implementation (Galbraith, 1982). This approach is practiced by Google, which acquires smaller companies and integrates them into their business (Steiber & Alänge, 2016).

This can be viewed as similar to intrapreneurship, which according to Antonic and Hisrich (2003) can be described as entrepreneurship within a company, which is defined as emerging behaviors of a corporation that deviate from the common or generic practice and relates to the formation of new ventures and other innovative processes e.g. development of new technologies, services, products, and strategies (Antoncic & Hisrich, 2003). Intrapreneurship consists mainly of the individual intrapreneur, relating to the employee's characteristics, the construction of new business ventures, and the entrepreneurial features of the organization (Ibid.). Antoncic and Hisrich (2003) describe that the advent of intrapreneurship has increased the emphasis on new business creation by the formation of new ventures within existing corporations and emphasizes the creation of new entities, e.g. units, subsidiaries, or companies, that are autonomous or semi-autonomous. Organizations that promote intrapreneurship tend to grow more both in absolute and relative terms (Ibid.).

There exists a common risk of separating the organization into two components, which is the transition of an idea from the innovation reservation to the operating reservation (Galbraith, 1982). The issue becomes more severe depending on the degree of differentiation in the idea compared to the existing business, as opposition emerges from the operating organization which impedes the interunit transferral and inhibits implementation (Ibid.). This phenomenon occurs when the firm requires both innovation and transfer between organizational units. Galbraith (1982) postulates that this issue can be addressed by initiating the transition prior to completing the development process, as only a minor differentiation remains for implementation. Another issue that could occur is that employees outside of the innovation department will not voice their ideas or curiosity, resulting in the innovation process becoming limited (Thomke, 2020). Kanter (2006) and Richtnér, Brattström, Frishammar, Björk, and Magnusson (2017) also discuss the risk of focusing on separate parts rather than considering a holistic view of the innovation process, leading to suboptimization of individual projects at the expense of the innovation portfolio.

For instance, the company Gillette had a separate business unit for toothbrushes, a unit for batteries, and a unit for appliances in the 1990s, however, the company failed to realize the possibility of introducing a battery-powered toothbrush to the market (Kanter, 2006).

2.2.2 Culture and people

An organization's culture is recognized as an important factor determining the success of the company and its attractiveness as an employer (Steiber & Alänge, 2016). It is a key element to short- and long-term success when managed efficiently and can both offer a competitive advantage but also generate obstacles to change and innovation (Tushman & O'Reilly, 1996). Martins and Terblanche (2003) also describe how organizational culture can be a determinant for creativity within the organization and its innovativeness. Steiber and Alänge (2013) has through a case study of Google found that the employees ranked culture and people as the two most important factors for Google's innovativeness, ranking them higher than leadership; organizational structure, policies, and processes; performance and incentive systems; organizational learning; and external interaction. Qualified people who are passionate to make a difference and innovate in combination with an innovation-oriented culture has created a drive in Google's organization towards generating innovations (Steiber & Alänge, 2013). Since culture and people are important for organizations to be innovative, the role of human resources is emphasized to generate the right culture and attract, hire and keep the right people (Ibid.).

2.2.2.1 Culture

The definition of culture can be multifaceted and ambiguous, being depicted differently by different companies (Martins & Terblanche, 2003). In general, culture can be viewed as belief systems, where these systems consist of beliefs regarding the company and practices (Steiber & Alänge, 2016). Furthermore, culture affects how employees relate to colleagues, other departments of the company, external parties e.g. customers, suppliers, and stakeholders, and to the society where the organization operates. Martins and Terblanche (2003) support this view, describing the role of organizational culture as the impact it has on different processes and the functions of the organization. Thomke (2020) and Ambrecht and colleagues (2001) postulate that what limits a company's innovation and knowledge sharing is not necessarily the tools and technology, rather it is the culture consisting of shared beliefs, values, and behaviors and emphasizes the importance of constructing a culture of experimentation that encourages employees to test their ideas without management's permission to empower innovation. By incorporating experimentation in the everyday life of employees, companies can nurture their employees' curiosity and data should always be more valid than opinion (Thomke, 2020). Consequently, anyone in the organization regardless of their position should be able to conduct experiments.

Steiber and Alänge (2016) argue that many successful companies feature strong cultures. They have conducted a comprehensive study to determine the attributes of cultures in Google, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors located

in Silicon Valley. The study found that the companies have remained entrepreneurial despite being large corporations and they have seemed to find a way to stay competitive in a fast-changing market environment. Steiber and Alänge (2016) explain how these attributes were strikingly similar to each other in all the researched companies. Consequently, the recruitment of the right people is important, as they steer the direction of the culture. Companies should actively work to minimize the presence of hierarchical relationships, to develop a flat culture. Furthermore, culture should not only be flat, but decisions should be data-driven and decentralized, not revolving around people's ranks but on quantifiable data, and this type of environment enables rapid learning. Another element is the importance of an open and transparent knowledge sharing throughout the company by having accessible managers and often increased the nature of trust between employees. Additionally, open office designs were often used, where top management and the CEO sat next to their employees. It is also important to develop an ecosystem characterized by win-win relations to enhance business networks and sustainable competitiveness by collaborating with external parties. By investing in ecosystems and developing relationships with external parties, companies can empower and evolve their culture by interacting and growing with the business environment in which they operate. These behaviours were prevalent in the companies Google, Facebook, LinkedIn, Twitter, Apigee and Tesla Motors (Steiber & Alänge, 2013; Steiber & Alänge, 2016).

2.2.2.2 People

Schmidt and Rosenberg (2014) argue that for managers, hiring people is the most critical task they will perform. Galbraith (1982) and Steber and Alänge (2016) describe how certain people are more likely to come up with innovations, making the hiring of the right people an essential element for innovation. Galbraith (1982) describes these persons as having the ability to stand up for their unique ideas and not be mainstream. This can make people difficult to get along with since it requires a strong ego to be persistent. Galbraith (1982) also emphasizes how being a generalist is a desired attribute for generating innovations, if not selected in the recruitment process people can become generalists through a rotational program where they will get the chance to develop knowledge from different parts of the organization.

Stebier and Alänge (2016) highlight other, sometimes contrasting, attributes compared to the older literature by Galbraith (1982). To generate innovations Steiber and Alänge (2016) argue that firms should hire people that are passionate, adaptable, collaborative, entrepreneurial, and continuously question the status quo by nature. The issue of motivating them is minimized as these individuals are highly self-motivated by the result of their work. These five qualities are regarded as the cornerstone of success, and people who possess these characteristics are referred to as a special breed (Steiber & Alänge, 2016). This breed of people is unique and tends to be multidimensional by synthesizing technical depth and creativity with business competence. In the new internet era, where testing is easier through cheaper computer power and data, these people will help organizations excel and be innovative. However, the special breed tends to also be rare and mobile i.e. shift between firms. The challenge for many companies is not only preventing the employment of the

wrong people but also retaining the special breed of people within the organization (Ibid.). This perspective of the special breed was shared in Google, Facebook, LinkedIn, Twitter, Tesla Motors, and Apigee (Steiber & Alänge, 2013; Steiber & Alänge, 2016). Furthermore, all companies had also developed their leadership, culture, and organizational structure specifically to attract and retain these people. The investigated companies also deemed the hiring process to be strategically important, because of this some of the CEOs spend upwards of 25-30 percent of their time on the hiring process and organizational development. The majority of the companies also had a substantial part of the HR department actively searching for the perfect candidates instead of passively waiting for applications, much because of the limited supply of people with the desired traits and the high competition of their recruitment. The citation below highlights how specific Google is with the qualities they look for in candidates to join their firm.

''The company's [Google] hiring process is very selective. Each new employee is chosen after a long multi-stage evaluation. The individual is evaluated on four basic sets of characteristics: cognitive abilities, knowledge and expertise in the field he or she will be working in, "Googliness," and leadership abilities. Googliness means how well the individual's values and personal character fit with Google's culture. According to our interviewees in 2010 the company wanted employees who had excellent academic track records and were entrepreneurial [...], curious and questioning. Further, they should also be energetic, driven, nonpolitical, humble, and change-oriented self-starters who have a passion for the Internet and the mission of the company." - Steiber and Alänge (2013, p.248)

If an organization wants to generate innovations it is crucial to provide a suitable work environment to attract and keep this special breed of people (Thomke, 2020; Steiber & Alänge, 2013; Steiber & Alänge, 2016). Consequently, if the need of special breed is neglected, these employees will either abandon their entrepreneurial features, to blend in with the organization; keep their characteristics but attempt to circumvent rules; or quit (Steiber & Alänge, 2016).

2.2.2.3 Psychological safety for innovation

To succeed in a dynamic environment where innovation is critical, companies have to look beyond smart and motivated people when recruiting employees (Edmondson, 1999). Competent and skilled staff may not be able to communicate their knowledge, which can often be related to a feeling of uncertainty and fear of being wrong or criticizing the upper manager (Ibid.). The prevalence of psychological safety in workplaces is important for employees and the organization since a crucial element of innovation is the persons that are involved in the process (Edmondson, 1999; Ekvall, 1996; Baer & Frese, 2003). The definition of psychological safety is an environment where employees are comfortable with sharing ideas and taking risks e.g. voicing mistakes, concerns, asking questions, and trusting colleagues (Edmondson, 1999). Psychological safety is therefore essential for value creation in firms that operate in a dynamic and complex world (Ekvall, 1996). To encourage and stimulate innovation and performance, it is vital to ensure that the employees are free to express ideas and

experiment by hiring people that can collaborate and work well together (Edmondson, 1999; Newman, Donohue & Eva, 2017). Teaming is an important practice for enabling communication with different employees in various separate departments, statuses, or expertise. Consequently, psychological safety is quintessential for a functional collaboration, whether the employee is working with new colleagues or familiar ones. For instance, Newman et al. (2017) describe that in scenarios where the team members are dispersed across different geographical locations, meetings are generally conducted through virtual channels and can be difficult to coordinate. Newman and colleagues further describe multiple challenges with administering virtual teams e.g. time zone differences, shifting memberships, cultural diversity and communication through digital media channels. These issues can be mitigated by the presence of psychological safety since it facilitates the coordination of dispersed teams and members can experience reduced anxiety and improved communication (Edmondson, 1999). Martins and Terblanche (2003) state that psychological safety can be achieved by creating an incentive system that rewards creative behaviour, risk-taking and experimentation, e.g. by receiving recognition, enabling availability of resources and having a strong information infrastructure to facilitate communication and exchanging ideas. Enhancing the psychological safety of employees, also does not correlate with decreasing performance standards (Baer & Freese, 2003). The objective is to encourage openness, collaboration, and honesty to enable a work environment that contributes to increased effectiveness and performance. Facebook, Twitter, LinkedIn, Google, Apigee, and Tesla Motors have embraced these values to retain their employees (Steiber & Alänge, 2013; Steiber & Alänge, 2016).

2.3 The innovation process

The innovation process can refer to a process divided in three phases, the initial phase being exploration of ideas, followed by the innovation phase, where the innovation is developed, and lastly the diffusion phase, where the innovation is diffused on the market (Schmidt-Tiedemann, 1982). During the exploration phase, roles performed by employees, namely idea generator, sponsor and orchestrator, are necessary for innovation. The innovation phase entails the allocation of resources to initiated innovation projects, risks such as inertia and how incentives can be used to retain and attract important employees. The innovation process is also permeated by a degree of formalization to coordinate certain activities, for instance particular frameworks and measurement methods. Finally, the diffusion phase encompasses the timing for market entry and targeting of the customer segments.

2.3.1 Roles in the innovation process

Innovation is the result of a collaborative effort from employees who interact in different roles (Galbraith, 1982; Andriopoulos & Lewis, 2009). Galbraith (1982) states that there exist three different roles: idea generator, sponsor and orchestrator. All roles are necessary for innovation to occur. The idea generator is described as the inventor, someone who experiences an issue and develops a new response to address it. It is generally someone with low authority and influence. The second

role is the sponsor, often a top manager, who identifies the value of the idea and promotes it through various stages until implementation. The sponsor tends to work for the operating and innovating components of the organization and has to devote resources to the development and testing processes, to bring the idea closer to a commercial application. The final role is the orchestrator, also described as the product champion by Chandy and Tellis (1998), is responsible for protecting the idea from established antagonists who are struggling against the innovation due to its implications e.g. if the innovation has a destructive effect by cannibalizing existing products or requires resources from other projects. The orchestrator is often a top manager and has to ensure that the organization enables the opportunity of testing out new ideas and supporting ideas that were proven successful (Ibid.). In practice, orchestrators utilize rewards and processes e.g. creating incentives for middle managers to invest in new ideas. Consequently, orchestrators are responsible for designing the innovation component of the organization.

2.3.2 Promoting ideas and resource allocation

Many firms struggle in successfully managing and balancing the allocation of resources to different types of innovation projects (Nagji & Tuff, 2012; Andriopoulos & Lewis, 2009; Galbraith, 1982). Nagji and Tuff (2012) discusses transformational, adjacent and core projects. Further, they state that organizations that carefully balance the amount of transformational, adjacent, and core projects tend to excel in managing their innovation portfolio management. The core innovation activities consist of incremental changes to existing services and products, corresponding to what Garcia and Calantone (2002) describe as incremental innovations. The adjacent innovations can have similar features as core and transformational innovations, often focusing on leveraging existing capabilities in new business applications e.g. new markets with existing technology (Nagji & Tuff, 2012), similar to the innovations which are not purely incremental or radical (Steiber & Alänge, 2013). Finally, transformational innovations emphasize high-risk opportunities and develop new offers to address new markets and customer needs (Nagji & Tuff, 2012), which resembles radical innovation (Garcia & Calantone, 2002; McDermott & O'Connor, 2002; Chandy & Tellis, 1998; Assink, 2006). It is advocated that companies should distribute resources by a 70-20-10 percentage ratio respectively between improving core offerings, adjacent and transformational opportunities. That is, the allocation of resources should consist of 70 percent core improvements, 20 percent adjacent opportunities, and 10 percent transformational opportunities. This allocation pattern is commonly shared amongst the firms outperforming their peers in the S&P 500 index (Ibid.).

Idea generation in the company can be improved by increasing the networking opportunities throughout the organization where sponsors and idea generators have greater odds of connecting (Doz et al., 2004; Galbraith, 1982). As an example, 3M has an annual fair where sponsors can connect with idea generators exhibiting their ideas (Galbraith, 1982). Another case would be Google, where its employees are encouraged to devote 20 percent of their working hours to developing their own ideas,

however, there is no strict distinction between radical and incremental innovation (Steiber & Alänge, 2016). A manager that does not approve of a particular idea or project is only capable of delaying the initiation of an employee's independent work. Employees can pitch their ideas to their peers which can join them in working with their project with 20 percent of their work time. In short, Google employees can decide to proceed with the development of an idea through internal herd-decision regardless of the manager's opinion. The manager adopts the role of a facilitator to support the process whether or not they see any potential. Facebook has a tradition of using hackathons to come up with new ideas, which then can be developed further (Ibid.).

Galbraith (1982) describes with his term blending ideas that it is more likely for innovation to spur through the mind or minds of a single person or a group of as few people as possible who has a combined knowledge of both the technological side and the user requirements. When ideally a single person can couple the essential knowledge from different parts of the organization the resulting inventions will likely be able to become innovations. Companies can encourage the possibility by giving certain individuals knowledge from different parts of the organization or promote interactions between individuals with meshing knowledge as well as having multiple sponsors that can be approached by any idea generator for funding (Doz et al., 2004; Galbraith, 1982). To be successful in allocating resources to new ideas, companies should have a 70-20-10 resource allocation model (Nagji & Tuff, 2012). In scenarios where the idea is not located within current business areas, venture groups should be accessible to the idea generator to receive support (Galbraith, 1982).

2.3.3 The risk of inertia

Another important element to consider during idea generation and selection is the risk of inertia, which can be described as resistance to change (Cooper & Kleinschmidt, 1986; Tushman & O'Reilly, 1996). When an organization identifies a comparative advantage in a market it will lead to success which in turn is likely to make the organization larger and older as it stays competitive in the market (Tushman & O'Reilly, 1996). Tushman and O'Reilly (1996) state that this fosters inertia against change in the organization, both with regards to the culture and the organizational structure. If the market is stable this will not be an issue, but if the market shifts in any way, because of e.g. a new technological breakthrough, the path dependency and inertia in the organization will make it difficult for the organization to adapt to the market change and stay competitive (Ibid.). To manage the market shifts a willingness to cannibalize current business is essential (Chandy & Tellis, 1998; Tushman & O'Reilly, 1996). In contrast with previous literature emphasizing an organization's size as a determining factor for the potential to create radical product innovation in order to stay competitive when markets shift, Chandy and Tellis (1998) argue that the willingness to cannibalize is more important. This endeavor is depicted in Niccolo Machiavelli's statement in his work *The Prince* (1532/1992) composed approximately half a millennia ago:

"There is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful in its success, than to be a leader in the introduction of changes. For he who innovates will have for enemies all those who are well off under the old order of things, and only lukewarm supporters in those who might be better off under the new". - Niccolo Machiavelli (1532/1992, p.13)

Chandy and Tellis (1998) describe three factors that will increase the willingness to cannibalize, namely internal markets, product champion influence, and focus on future markets. Internal markets refer to an organization where business units have an internal competition against each other and the autonomy of the units is high. The presence of an internal market will therefore encourage business unit managers to switch to new technologies in order to be competitive against other internal business units. The product champion, described as the orchestrator by Galbraith (1982), influence refers to the person in that role having greater possibilities to influence the organization to follow suit for the push of the new innovative product (Chandy & Tellis, 1998). The focus on future markets refers to the organization being open to look beyond their customers' current needs and attempting to predict their future needs instead, this focus will make the organization aware of new and different technologies, market trends, and shifts in their competitors or customers behaviors. Tushman and O"Reilly (1996) also advocate for the benefits of daring to be proactive in the changes of businesses, before a decline in performance is registered.

2.3.4 Incentive systems

Many operating organizations have some form of established incentive system that is of an extrinsic or intrinsic nature (Galbraith, 1982; Bénabou & Tirole, 2003). Galbraith (1982) describes the necessity of adopting this practice in the innovating reservation to motivate and encourage innovation behavior. Furthermore, the system should fulfill three criteria to be effective: attract innovative people to the firm and ensure that they remain; motivate idea generators to devote the necessary efforts to innovate; reward successful performance. Additionally, the incentive system should be directed to both idea generators and sponsors (Ibid.). The systems can be composed of a combination of internal motivators for innovating performance, for instance, direct monetary compensation, recognition, promotions, and the opportunity to pursue one's own ideas (Galbraith, 1982; Cooper & Kleinschmidt, 1995). There are, however, prevalent risks associated with implementing an incentive system e.g. perceptions of unfair treatment resulting in internal polarization between units, employees quitting, and dissatisfaction from the operating reservation (Ibid.).

Employees with multidimensional competencies tend to be motivated by intrinsic value e.g. feeling that they are making progress in work tasks that are perceived as meaningful (Steiber & Alänge, 2016). Managers should therefore nourish progress e.g. through recognition, respect, encouragement, and support, and become aware of what actions might enhance or deteriorate the motivation of the employees. An example of this would be Google, which encourages managers to embrace its eight

good habits of great leaders by communicating these and providing constant feedback on each manager's behavior. Furthermore, the company supports its employees to develop their knowledge by offering various courses and training opportunities, as well as actively encouraging self-experiments (Steiber & Alänge, 2016).

2.3.5   The degree of formalization

Innovation is considered a necessity for competitiveness and survival; however, there exist several challenges related to the degree of formalization in the innovation process that needs to be addressed (Andriopoulos & Lewis, 2009; Galbraith, 1982; Cooper & Kleinschmidt, 1986). It is possible to increase the produced innovation by planning and coordinating for it (Kanter, 1988; Galbraith, 1982). Kanter (1988) argues that the structure should enable flexibility, rapid response, and the creation of constellations due to the uncertain, fragile and political nature of innovation. Galbraith (1982) also states that coordination can be improved by formalizing processes, incentives, practices, or roles that increase the production of innovation. While companies that refrain from planning for innovation still can innovate, the point is that firms that actively construct formal processes and roles might have a higher probability of generating innovations (Galbraith, 1982; Kanter, 1988). In contrast, Steiber and Alänge (2016) and Kanter (2006) advocate for companies to be wary of instituting processes that can inhibit the entrepreneurial qualities in the organization and impede innovation. 3M as an example terminated its formal Six Sigma program because it impeded the implementation of novel ideas by creating a lot of steps the ideas needed to pass (Steiber & Alänge, 2016). Google is another example of a firm wary of letting processes act as obstacles for entrepreneurial creations in the firm (Steiber & Alänge, 2013). The company pursues an anti-bureaucratic culture, encouraging employees to search for possible bottlenecks and proactively avoiding or solving them. The anti-bureaucratic culture is also found in the other companies, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors examined by Steiber and Alänge (2016). They all strive for having minimal bureaucracy and having it built into the culture to strive for this state.

2.3.6   Innovation frameworks and measurement methods

Innovation is generally depicted as a process characterized by complexity and constant change, and there exists no uniform consensus of how to measure innovation (Mankin, 2007). The number of used performance measurements should be limited since too much measurement can impair the innovation process (Mankin, 2007; Richtnér et al., 2017). Mankin (2007) advocates for adopting measures that view innovation through a synthesis of different performance measures depending on the nature of the organization.

2.3.6.1   Measurements

To monitor and benchmark innovation, managers tend to apply quantitative performance measurement indicators, where some emphasize outcomes or results, whereas others look at processes and amount of projects, the number of ideas, or portfolios

(Richtnér et al., 2017; Cooper & Kleinschmidt, 1995). Furthermore, it can be difficult to not only identify an adequate measurement but to discover what underlying issue that the innovation measurement will solve for the firm and to adjust it to fit with the organizational needs. The design of an innovation measurement framework has to generate value and be of practical use for the organization (Ibid.). That is, it is essential to refrain from putting too much value on data and, consequently, jeopardize the innovation process by inhibiting it through an abundance of measures. The objective of innovation performance measures is to support the innovation process rather than be determinants of its performance (Ibid.).

Richtnér et al. (2017) and Kanter (2006) discuss challenges with performance metrics. While a certain degree of measurement of innovation enables managers to monitor the innovation process, excessive measuring can have a contradictory effect and be harmful due to the uncertain nature of innovations, making it difficult to accurately measure and add any value by doing so (Kanter, 2006; Richtnér et al., 2017). In contrast, companies, where measurement is absent, tend to postulate that any kind of innovation measurement would inhibit and damage creativity. Richtner et al. (2017) also discuss the political impact when developing or altering an innovation measurement process, where different units can have different objectives or expectations and that changing or creating a measurement may result in some objectives becoming more prioritized than others. Consequently, the alteration or creation of an innovation measurement can spawn political arguments. Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors have data-driven decision-making where data is quantified through performance measurements (Steiber & Alänge, 2016). In instances where data can not be quantified, which can be the case of most radical innovations because of their uncertain nature (Christensen, Kaufman & Shih, 2008), employees are expected to use objective reasoning (Steiber & Alänge, 2016).

2.3.6.2 Compatibility between measurement methods and innovation

Using performance measurements when evaluating innovations can have undesired implications and should therefore be considered carefully (Perrin, 2002). When evaluating the innovation process a common practice can be to use a mean score of relevant parameters e.g. success rate of different innovations (Perrin, 2002). Using a mean evaluation method like success rate has drawbacks, with innovations being naturally uncertain and risky but with the possibility to have great impact if successful, it is to be expected that most innovations will fail (Kanter, 2006; Perrin, 2002). But all the failures can be outweighed by the few that are successful, much like how one or two investments for a venture capital firm can stand for the majority of the firm's returns (Perrin, 2002).

Perrin (2002) suggests that performance measurements can be used as an indicator at a macro level, to monitor the process, achieve consensus and gain political support in an organization. However, these innovation measures or indicators are not viewed as suitable for evaluating the impact due to the nature of innovation being permeated by uncertainty and unpredictability, making it difficult to identify

pertinent targets or objectives in advance (Christensen et al., 2008; Perrin, 2002). Additionally, the assessment is characterized by a reactive nature, which can be harmful to innovation and people that explore unknown terrain. Consequently, performance indicators mainly reward safe, known, short-term activities and can act as a deterrent to those that are pursuing innovative ideas. In short, the implementation of innovation performance measures can result in a system that empowers safe and mediocre projects while creating a systematic bias against innovation (Ibid.).

2.3.6.3   Organizational learning by innovating

Assessments should be used to identify learning opportunities from past attempts and determine implications for future endeavors rather than the success of a project (Perrin, 2002; Rothwell, 1994). Rothwell (1994) and Perrin (2002) state that a corporation can improve itself not only by learning from what has worked successfully but also from what has failed. Kanter (2006) also points out that to reach more success organizations must accept an increased number of failures. The labels of success and failure are dependent upon the performance that was assessed and can therefore be ambiguous, especially in scenarios where there is a lack of a clear target (Rothwell, 1994; Perrin, 2002). A learning approach that emphasizes the improvement of future effectiveness would not only render the need for labeling a project as success or failure redundant but act as a supporting process for identifying and distributing crucial information of what has and has not worked, to prevent unnecessary reinvention of the wheel (Ibid.). A critical element of the learning process is the range of innovations pursued, as having a wider range generates more knowledge for the organization (Perrin, 2002). Consequently, the organization should reward experimenting with new ideas regardless if these ideas worked or not, i.e. the criteria for measuring success should shift to the exploration of new ideas and identified opportunities for learning instead of only focusing on success rate.

Google as an example proposes that learning will occur both for the organization and the employees by having an experimental approach with fast project cycles that empowers rapid and continuous learning (Steiber & Alänge, 2013). For instance, once an idea or feature has been developed, it is tested and modified iteratively which facilitates continuous learning through these compressed learning cycles. In line with this, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors share short learning cycles and data-driven decision-making as a critical objective to remain competitive (Steiber & Alänge, 2016). These companies also facilitate the possibility of having spontaneous discussions since the interactions can help with the development of new ideas and learning within the organization (Ibid.).

2.3.6.4   The Stage-Gate process framework

Cooper (1990) and Christensen et al. (2008) describe how a common approach to the innovation process is to utilize a stage-gate process for deciding which projects get the resources and the funding. It is common to have three main stages: feasibility, development, and launch, where gatekeepers need to approve projects at the gates for them to move forward from one stage to another, otherwise the projects

need additional work or get killed (Christensen et al., 2008). Cooper (1990) states that the stage-gate process facilitates transparency and the understanding of what is required of a project for it to progress to the next stage of its development. An implementation of the stage-gate process creates a structure to the innovation process and enables better decision-making, fewer failures, and a quicker development process (Ibid.). It is inherently more difficult for the radical innovations to pass through a stage-gate process since the initial revenue potential is smaller and might not grow substantially for the first initial years (Christensen et al., 2008). The stage-gate system is still used to assess radical innovations since it is difficult for managers to see other legitimate alternatives to the approach, but the discovery-driven planning process could be the alternative to make more successful decisions with regards to the innovation process (Ibid.).

2.3.6.5 Discovery-driven planning framework

The discovery-driven planning framework is intended to support investments in future company growth to increase the success rate of innovation projects (Christensen et al., 2008; McGrath & MacMillan, 1995). In contrast to the stage-gate process, discovery-driven planning emphasizes minimizing expenditures and maximizing learning by discovering the underlying assumptions behind identified expenses prior to undertaking irreversible commitments (Ibid.). When encountering new situations, there arises an issue when a company has to make decisions based on assumptions, without knowing if the assumptions are correct. The correlation between made assumptions and present knowledge at a particular time constitutes the so-called assumption-to-knowledge ratio (McGrath & MacMillan, 1995). As the degree of uncertainty and lack of knowledge increases, more assumptions are necessary to make which in turn requires more delicate self-critical assessment to ensure that the organization is learning what assumptions are valid and which ones need to be revised (Christensen et al., 2008; McGrath & MacMillan, 1995). The problem in the assumption-to-knowledge ratio is that due to the nature of humans, the cause for making an assumption tends to fade into oblivion, making it difficult for people to remember why they made the assumption. Consequently, it also makes it more challenging to understand how changing an assumption in one business part can result in a major impact on the company's entire business model. In short, assumptions that are not documented and reviewed tend to be misinterpreted as facts (McGrath & MacMillan, 1995). The discovery-driven planning approach can be viewed as a reverse income statement, the required profits will be stated and then everything leading up to the profit is examined in the reverse order compared to beginning with revenue and then deriving the profits in the end. The expenditure-related assumptions are questioned by framing, benchmarking, translating operations, assumption testing, and managing learning to milestones (Christensen et al., 2008; McGrath & MacMillan, 1995). Discovery-driven planning consists of eight major steps (McGrath & MacMillan, 1995).

Table 2.1: Illustration of the eight steps in discovery-driven planning, adapted from McGrath and MacMillan (1995)

Discovery-driven planning	Description
1. Specification of frame	Focuses on setting a clear frame for each project that is included in the plan. The frame specification should consist of tangible objectives for profits, resource utilization, and profitability.
2. Specification of profit model	The predicted profit model has to be specified and clear regarding revenue sources, customer segment, price segment, and replacement ratio.
3. Develop reverse income state	The reverse income statement should be developed while accounting for profits, return on assets and return on sales.
4. Define deliverables specifications	The description of deliverables specifications should entail how the objectives of profits and returns will be achieved.
5. Documentation of critical assumptions	Ensuring that the most critical assumptions are documented.
6. Construct a document of milestones	Develop a document for milestone events for the projects and ensure that each milestone will trigger delicate testing of the documented assumptions. Additionally, the milestones should be structured sequentially to minimize expenditures while still achieving the milestones.
7. Map assumptions behind milestones	As all milestones require the testing of assumptions and there are no assumptions without a milestone to test them, it is critical to map the assumptions to the milestones.
8. Revise the plan continuously	It is important to continuously revise the plan and therefore important to avoid creating a plan that is too rigid and static.

Finally, discovering being wrong in assumptions is not viewed as a failure but rather the failure lies in being erroneous without being aware of why (McGrath & MacMillan, 1995; Christensen et al., 2008; Rothwell, 1994). In addition, failure lies in devoting resources prior to validating critical assumptions, as well as reluctance from the organization to learn from past mistakes.

2.3.7 Timing of market entry and the diffusion of innovation

A critical, and often decisive, factor for successful innovation is the timing of market entry (Teece, 1986). The timing of an innovation can impact reputation, costs, risks, market position, and profitability (Lilien & Yoon, 1990). The entrants to a new market can be classified as either pioneers or followers, where each type is characterized by different benefits and risks. Lilien and Yoon (1990) describe the advantages of improved reputation and flexible cost capitalization, but disadvantages e.g. risks and costs as distinctive traits of the pioneer category. The timing of market entry affects the potential market share and it can be difficult to predict the market demand at the early stages in the innovation and development process. (Lilien & Yoon, 1990; Rogers, 2005).

Rogers (2005) pioneered the diffusion of innovation theory which tries to describe how new technologies and ideas spread on the market. Rogers (2005) argues that people have different tendencies to adopt innovations which leads the innovations to diffuse through a similar pattern dependent on four main elements which make up the theory of diffusion of innovations, the innovation, communication, time, and the social system.
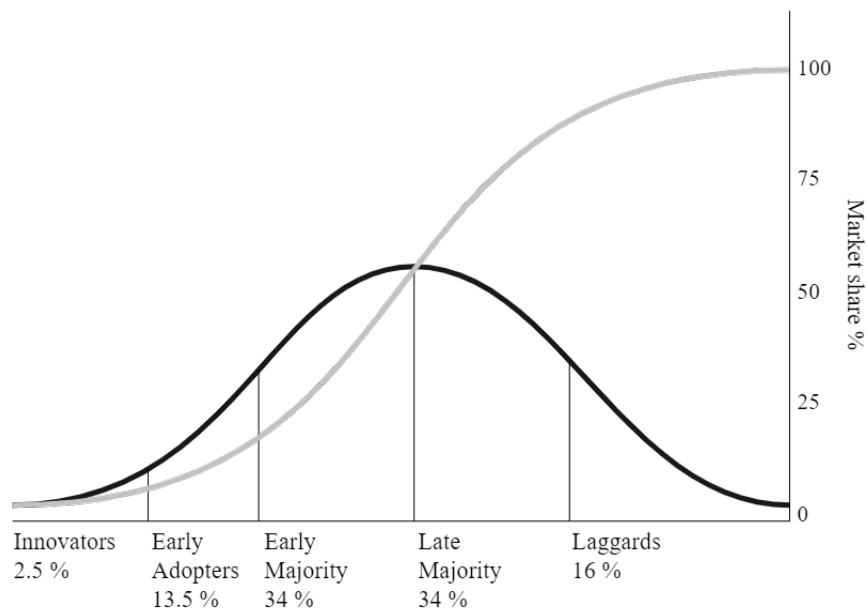
Figure 2.1: Diffusion of Innovation (Rogers, 2005).

In this theory, Rogers (2005) divides individuals, the adopters, into five different groups with the corresponding population shares: innovators 2.5 percent, early adopters 13.5 percent, early majority 34 percent, late majority 34 percent, and laggards 16 percent. As the successive groups of adopters, illustrated by the black line in Figure 2.1, the market share will follow an S-curve, illustrated by the gray line.

Moore (1999) has built on the theory of Roger's diffusion of innovation and argues that the difference between early adopters and the early majority is big enough to make it difficult for the early majority to accept the product if it is presented the same way as for the early adopters. This will create what Moore (1999) calls a chasm between these two groups. Goldenberg, Libai, and Muller (2002) have been able to observe empirical data validating that this chasm existed within the observed cases in the consumer electronics industry where 33 - 50 percent of the cases experienced a slowdown in sales which affected the diffusion process after it had started. Moore (1999) describes early adopters as visionaries who are fairly easy to sell to but more difficult to please since they are essentially buying a dream. In contrast, the early majority are described as pragmatists, they care about what company they buy from, the quality, supporting infrastructure, and service reliability. Customer relationships and references are essential to be able to sell to the early majority, they want the selling company to be an established actor (Ibid.).

3

Method

This chapter will outline the methodology used in the study. The process is divided into five sections: research design, data collection, data analysis, quality of research and limitations.

3.1 Research design

The research design defines the activities to take when gathering and analyzing data (Bell, Bryman & Harley, 2019). The study was developed in collaboration with Company X to gain a better understanding of how to organize for the generation of radical innovations. Due to the exploratory nature of the study, a qualitative research approach consisting of an exploratory case study focusing on a single organization was selected to address the purpose of the thesis. The motive for selecting a qualitative research approach was that it enabled an explorative research orientation, where the interpretation of the social context influences the analysis and understanding of a company (Bell et al., 2019). Furthermore, a single-case study enabled an extensive gathering of data and analysis of Company X by conducting interviews with employees, using an interview template. The interview template consisted of general questions for all interviewees, but also tailored questions for the specific role of the interviewee. While the study emphasizes a particular company, it also considers other companies, based on the literature review for comparison with Company X, especially the Steiber and Alänge (2013; 2016) articles on Google, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors.

This study has adopted an abductive approach, which enables logical inferences and the development of theories based on the observations of the world (Bell et al., 2019). An abductive research approach can be viewed as a mixture of both inductive and deductive approaches, but also exceeds the limitations related to inductive and deductive research (Dubois & Gadde, 2002). Deductive reasoning is characterized by the emphasis on strict logic and theory-testing, yet is unclear as to how the theory should be selected (Dubois & Gadde, 2002; Bell et al., 2019). In contrast, the inductive research method relies on the empirical findings to enable the construction of theory. This study strives to identify and explain the conditions regarding how to organize for the generation of radical innovations through an iterative interaction with the theoretical framework, the case company and world. The abductive research approach was selected since it is more aligned with the nature of a single case research study and enables the simultaneous development of theoretical framework,

empirical findings, and analysis of the case company (Dubois & Gadde, 2002).

3.2 Data collection

Data regarding Company X was collected from interviews from both the headquarters and foreign offices. The interviews were semi-structured and were carried out with thirteen representatives from different parts of Company X. The interviewees' roles and the number of interviewees per role were six managers and seven employees.

Level in the organization	Number of interviewees	Time per interview (min)
Management	6	30-60
Employees	7	30-60

Table 3.1: The table illustrates the number of interviewees and their respective levels in Company X.

The purpose of the interviews was to investigate how the subjects perceived innovation, what the organizational capability was, and how the interviewees view Company X's innovation work, as well as factors that they believed facilitated or impeded innovation in the organization. The interviews were semi-structured. When performing the semi-structured interviews, the questions were not closed and followed a specific structure, rather they were open to encourage interviewees to steer the trajectory of the interview and emphasize topics that they deemed interesting. Consequently, the content and topic differ between interviews, however the direction of the interviews still converged in that they focused on topics that related to innovation. The initial interviews consisted of general questions to learn more about the company and identify possible areas of interest. The template questions were adjusted continuously as a better understanding of Company X was acquired as well as how they worked with innovation. The questions were also tailored to the individual interviewee to elicit their specific insights. An example of the used templates can be viewed in the Appendix. Using an interview structure consisting of open questions while also focusing on specific topics, as well as revising questions based on collected data is encouraged by Easterby-Smith, Thorpe, and Jackson (2015) since it enables more relevant questions to be asked during interviews.

The initial interviews were conducted with two employees that were part of the radical innovation team at the time. These two employees were also the organization's supervisors of this study. After finishing the interviews, they were asked what other employees they would recommend as interview subjects at different parts of Company X. This type of approach is referred to as snowball sampling and occurs when existing study objects recommend future subjects based on their acquaintances (Emmel, 2013; Bell et al., 2019). Expanding the sampling scope by enabling data collection from diverse sources throughout the company can enrich the study since it enables multiple different perspectives to be acquired (Eisenhardt & Graebner, 2007). When conducting the interviews, one interviewer used an interview template to ask questions to the interviewee and asked clarification or follow-up questions

based on the response, whilst the other interviewer took notes. Prior to starting the questions, each subject was asked for consent regarding recording and informed about the nature of the study. All interviews were anonymous to prevent harm to the employees and the company. Furthermore, all interviews were recorded and transcribed. The benefits of recording and transcribing the interview is that they enable the interviewer to go through the interview again and possibly revise misinterpretations, resulting in more reliable and accurate data (Bell et al., 2019; Easterby-Smith et al., 2015).

3.3 Data analysis

To facilitate the analysis of the collected data, it was divided into three steps, namely coding, familiarisation, and reflection (Easterby-Smith et al., 2015; Bell et al., 2019). After completing the interviews, the audio recordings were transcribed. Following the transcription, the researchers began coding by reading through each transcript, identifying recurring patterns in the data, and adding comments in the documents to describe which areas of interest the different sections in the transcriptions adhered to. This enabled the researchers to become more familiarised with the data and reflect on its content. The compilation of the empirical findings were then based on the different commented sections from the transcribed interviews. The different areas of interest, which at the highest level are the three research questions, and at the lower level correlates to what are now the different sub chapters, were formed continuously throughout the data analysis but also during earlier stages, such as when the theoretical framework was constructed and interview questions were written. The finalized areas covered in this study is therefore a fusion of valuable insights which could be combined from the theoretical framework and the empirical data.

Concurrent to the analysis, the researchers examined existing literature to complement gaps in the analysis in order to be able to use the literature to assess the insights. This was especially true for the section innovation process, where new information was researched to facilitate the analysis of the organization.

3.4 Quality of research

There exist various quality criteria that should be considered when conducting research (Bell et al., 2019). The quality in all stages of the study, spanning from purpose, data collection, theory, and analysis has to be ensured (Easterby-Smith et al., 2015). When conducting qualitative research, commonly used criteria are credibility, dependability, transferability, and conformability (Bell et al., 2019).

Quality Criteria	Description
Credibility	The credibility of the empirical findings, by examining if the research is conducted in a way that is congruent to good practice when collecting data in a qualitative study.
Dependability	The trustworthiness of the study. Often achieved by documenting the research procedure to enable others to view the process.
Transferability	The description of the research problem under investigation and the study's capability of transferring the results to different contexts.
Conformability to objectivity	The importance of being as objective as possible by ensuring that the study is not affected by the researchers' personal or theoretical convictions.

Table 3.2: Description of selected quality criteria based on Bell et al. (2019).

To satisfy the credibility quality criteria, the study used a triangulation of methods, consisting of interviews and literature. Furthermore, respondent validation was also ensured by probing or clarifying statements. To ascertain that interpretations of data were accurate, the researchers had a dialogue with supervisors at Company X. The dependability criteria were ensured by taking notes of how data was collected and interpreted and documenting the steps in the study. Additionally, dependability was achieved by describing the purpose, selection of data sources, methods, and research process. To fulfill the transferability criteria, the researchers provided a detailed explanation about the participants, the organizations, and used methods, as well as describing their contextual background. The degree of transferability depends on the context, which can change over time as companies that are viewed as innovative now may not be perceived as such in the future. In short, there exist changes that can impede the transferability of the study.

By not premeditating possible solutions to the research question before analyzing the data, as well as ascertaining that other criteria, i.e. credibility, dependability, and transferability, were fulfilled, the study was also able to achieve the conformability criteria. This criterion can not be completely achieved since the interviews are formulated by the researchers and interpretation of the interviews (Bell et al., 2019).

3.5 Limitations

A qualitative research approach was adopted for this study, more specifically, a single-case study of Company X was selected. Consequently, interviews were only conducted with the selected company. Information regarding other companies was only collected from literature. The COVID-19 pandemic forced the researchers to conduct all interviews through virtual meetings and there were no physical interactions with any representative of the company. It would have been interesting to observe how employees interact when physically present at the office, a phenomenon such as culture can be difficult to interpret without this possibility.

4

Compilation of empirical findings

Referring back to the initial research questions, the empirical findings derived from interviews and conversations with Company X's are divided into three distinct parts in this chapter, organizational structure, culture and people, and type of innovation process.

4.1   Organizational structure

Company X is composed of three levels: clusters, sectors, and teams. All sectors are constituents of clusters, where there is at least one R&D team in every cluster to support that cluster's clients with product development. Additionally, there are innovation boards in each cluster that support employees that have ideas by offering feedback. Above the clusters is the board of directors. Top management explains that offices work across national borders by having blended teams from different offices and providing support in three different time zones.

Several interviewees state that the organization has categorized its innovations into incremental and radical. To manage the innovation and identify the next breakthrough at Company X, a separate innovation sector was created. In this sector constituted by multiple teams, a specific team of four persons was dedicated to radical innovation whilst the remaining teams focused on incremental innovation. The purpose of the innovation sector has been to identify the next growth curve for the company by using innovations that have little or no connection with current business and products.

Interviewees stated that despite developing a separate sector for innovation, they experience that the organization encourages all employees to actively work with innovation. All offices, both foreign and domestic, were unilateral in their description of Company X's organizational structure, depicting it as flat and empowering decentralized decision-making through autonomous teams. The autonomous nature of teams is viewed as Company X's foundation and decisions are made on the team level through consensus, or by a top manager according to interviews with multiple employees. Complex or major expenditure projects tend to be decided by top management. Most interviewees displayed aversion toward formalization and described Company X as anti-bureaucratic. For instance, top management tends to debate the balance of having too much formal structure or lacking structure. If management detects excessive formalization they remove it, whilst if they believe formalization is

insufficient they will create more processes to guide people and increase productivity.

Several interviews with both management and employees state that the clusters also communicate between themselves to facilitate knowledge transition between different units and reduce redundant work that may have already been conducted in similar projects previously. This approach enables a more symmetric knowledge distribution across the organization according to the employees. Furthermore, it was mentioned by interviewees that Company X enables knowledge sharing through the usage of blended teams across national borders where the members are dispersed among different geographical nations and regions. Consequently, top management argues that knowledge therefore will flow throughout the organization almost automatically. There are several channels for knowledge sharing between different offices and the entire company e.g. learning management system, an internal wikipedia, and team sessions. However, despite the information sharing channels, interviewees at foreign offices responded that they were not aware of ongoing innovation projects in the Swedish region and only learned about them just before market release. The interviewees speculated that it might be due to the difficulty for foreign employees engaging in natural informal discussions happening at the headquarters.

Conflicts are generally resolved through discussions according to employees and managers, for instance different views between sectors and top management are discussed until a mutual consensus is reached. Some of the interview subjects noted that while they feel it is positive that there are discussions rather than one-sided dictations from top management, the discussions can extend over long periods and take unnecessary time.

4.2 Culture and people

Interviewees described the few available formal positions in Company X as one of the distinctive traits of the culture. Fewer formal positions make them more dynamic, and employees are encouraged to shape their careers towards areas of interest and are not restricted in what they can undertake within the firm. Several employees also explained how they themselves are the only ones that are limiting what they can do at Company X.

For the employees to be able to think freely and spur ideas, management has attempted to create a culture of safety. The top management has tried to instill in the organization that failure is acceptable by incorporating it into the values of the company, depicting failure as something worth striving for because of the learning and insights which come from it. The company encourages its employees to produce ideas and is actively engaged in developing their innovative capabilities, for instance by providing education and workshops. A team, and its consisting members, are free and encouraged to explore innovations, being allowed to dedicate time and resources to pursue ideas. Furthermore, this is reinforced by Company X's salary model, where the individual is compensated for their performance, team performance, and the initiatives that the individual has made to improve the company e.g. the number of

idea suggestions. This incentive system is described by management as a motivator and a contributing factor for encouraging innovation. Finally, Company X also hosts annual conferences where employees that excel are encouraged to share their accomplishments.

Openness is depicted by interviewees as a cultural trait of Company X. The organization has been viewed as flat from the beginning and has remained that way while it has grown, according to several employees. This enables employees to easily communicate and discuss ideas with each other regardless of their hierarchical level, having casual discussions with the executives by the coffee machine is a common occurrence as mentioned by multiple interviewees. Throughout the interviews Company X has also been described as being able to change orientation rapidly and pursue what employees believe will be the best path forward, this is depicted as something positive but people have also pointed out potential drawbacks, e.g. some new processes or ideas might not receive enough time to be thoroughly evaluated or tested before they are abandoned.

Several interviewees informed that Company X emphasizes the recruitment of the right personality profiles. Top management is actively involved in the recruitment process, where a blend of diverse personalities, experience, and skills are pursued. The objective of this recruitment process is to identify persons that encourage discussions rather than unanimous consensus. A crucial characteristic is to be curious and not be satisfied with the status quo. The top management expressed that they are looking for entrepreneurial and intrapreneurial personalities. There is a prevalent preference towards graduates directly from the university, constituting 90 percent of the new employees because they are viewed as more open-minded, able to make decisions for themselves. Company X is also described as interacting with potential employees by collaborating with universities and hosting different events where students are encouraged to participate. To retain its employees, they have higher salary increases and they have a lower turnover of personnel compared to the industry, according to many interviewees.

4.3 Innovation process

During the interterviews, it was stated that Company X has made a distinction between radical and incremental innovations. When asked about the interviewees' definition of radical innovations, the responses shared a close resemblance. Radical innovations were described as something new which transforms the way of doing business and possibly changes the structure of the industry. Incremental innovations are instead described by the interviewees as small changes happening continuously throughout the organization, improvement of existing practice, activities, processes, products, and services. These are often customer-driven at Company X when there is a demand from the customers to slightly change the systems or develop them with added functionality.

Even though interviewees mostly expressed a clear difference between the defini-

tions of radical and incremental innovations, it became clear that in reality, it is much harder to categorize innovations in one of the two types. Many interviewees responded that in practice the innovations were laying on a spectrum between incremental and radical and they were uncertain whether a project leaned more toward one innovation type or the other. The interviews indicate that Company X's innovation process is constituted by: idea generation, sponsoring, and performance measurement.

4.3.1   Internal idea generation

The ideas generated at Company X come from mainly three different sources according to interviewees: the innovation sector, top management, and customers. In the innovation sector, the radical innovation team's idea exploration stage is depicted as an iterative process, starting with research, followed by testing, and then more research and testing.

While there is a sector devoted to innovation, interviewees respond that there is no defined structure for generating ideas, rather it occurs randomly where employees have ideas and present them to colleagues or management. It is emphasized by top management that the innovation sector does not have a monopoly on innovating, but rather it acts as a support for those that want to explore ideas. Several ideas, some even of a more complex and radical nature, have occurred outside of the innovation sector e.g. two major radical innovations. In this situation, the ideas were generated by employees who possessed specialized expertise within a specific domain, and rather than having the competence of conceptualizing or assessing and driving their idea to implementation, they instead had a conviction. They are described, by the interviewees, as typical innovators and the organization should not organize who should be the innovator but rather organize how to handle ideas from different directions.

There exist different constellations depending on the type of innovation that is being pursued, where employees can receive feedback on their ideas or be connected with experts within a relevant field. Interviewees explained that for incremental innovations, there are product boards, consisting of different members, that provide support. Employees that are investigating ideas that are characterized as more radical and complex can turn to top management for guidance since these ideas generally require more resources and sponsoring. At present, there appears to not be any radical innovations that have sprouted from any of the foreign offices, and one of the managers stated that the firm needs to improve the capture of ideas from foreign offices.

A critical aspect for generating or capturing ideas at Company X is data according to all interviewees. Without the necessary data regarding technical feasibility, the idea will not receive resources. Interviewees described instances where they had presented new ideas to their colleagues, only to discover that those colleagues had had the same or similar ideas earlier but dropped them due to insufficient data. Ideas

that are scrapped because they are viewed as premature e.g. due to the current state of the market, are brought to the surface when the circumstances have changed and they are more attractive or their insights can be reused later according to several interviewees. In other words, extensive data research is an important element and an objective when working with innovation at Company X, but it does not act as a strict gate for continuing the innovation.

Employees that develop ideas are encouraged to be involved in their ideas by devoting some work time or at least kept informed according to interviewees. Interviewees expressed that it was difficult to manage since there is a risk that the idea is neglected if an innovator prioritizes other work tasks or is not located in the right team for realizing the idea. Some of the main problems related to innovation were listed as the number of ideas to invest in, how to select ideas and how the process should be formed to account for any idea according to management and employees. When it comes to the innovations that have become more radical, the idea generator takes part in the whole innovation process including the implementation phase. The same applies to incremental innovation. A senior employee responded that if they were to remove the possibility of being part of realizing one's own idea, they would harm the motivation underlying idea generation. During the transition of innovations from the development team to the sales team, there can sometimes occur mixed reactions, however, there is rarely an idea that does not contribute value to any customer.

During the interviews, it was noted that top management was concerned about how uncertainty was approached and managed by employees with ideas. Many employees tended to await approval before proceeding with their idea and were often unwilling to pursue ideas by themselves. The bottleneck is that a lot of unnecessary time is spent on waiting, which also inhibits the number of ideas that can be explored. Top management wants to develop an approach where employees decide for themselves based on whether they would invest their own monetary resources on their ideas. While Company X attempts not to be limited by their skills in-house, the internal capabilities are still a part of the decision-making process regarding what innovations to undertake. According to interviewees, it is generally preferred to leverage available competencies and targeting ideas that are perceived as low-hanging fruits so that these can be experimented with.

4.3.2 External idea exploration

Several interviewees stated that Company X has a strategy where they target large customers who are considered to be innovators or early adopters to increase the commercial attractiveness of their products according to innovation diffusion theory (see section 2.3.7). The thought behind this is described as if they can provide services and their products to these companies, they will be able to capture the large majority of customers which then accumulates as the diffusion of the innovation occurs. These actors, which are considered innovators or early adopters, are prone to challenge the status quo and become pioneers in the industry. When Company X targets these actors they will be challenged to be at the forefront of technology

development and gain the benefits themselves from also being pioneers. Typically these actors will ask Company X to develop some specific service or product for them. Some ideas are pursued jointly with customers and these partnerships have in some instances resulted in a radical innovation. Multiple employees and managers described that they look for partnerships with customers for Company X, to solve challenges together. In addition to working as partners and developing novel solutions based on the customer's drivers, Company X also pursues innovations in partnerships even if the customer is not compensating for them in some instances. If Several interviewees believe that the innovation will yield a return in the future, they will fund the development project themselves and add it to their solution if it contributes to their competitive advantage. In practice, the sales teams search for opportunities that their customers have that are relevant for Company X.

One of the ways Company X distributes their innovations from the early adopters to the early and late majority is described as hosting customer conferences where new innovations are launched, reference customers can share their experiences of Company X and their products, and people working with sales can demonstrate the products.

In the interviews, it was stated that Company X's approach to radical innovations on the market can be described as searching for something that is boring to other actors but not for Company X, otherwise other firms would already have done it. They are attempting to detect market gaps i.e. problems that need to be solved and that Company X would be good at solving. The market is depicted as a difficult and harsh environment and it is therefore preferred to initiate innovation projects where Company X can utilize existing knowledge to acquire an advantage over other competitors. If there is pre-existing capital in the form of competence or products, then it is easier to gain market shares.

The interviewees describe adequate timing as vital and it is believed that an innovative idea is unable to blossom in a market that can not perceive any value in it and, consequently, is unwilling to pay for the idea. A market is deemed as attractive depending on the number of potential customers i.e. market penetration. For instance, if 50 percent of a targeted segment expressed interest in a new product in a market survey, then managers and employees at Company X view it as ready. However, if 100 percent of the respondents display an interest then that product probably already exists and has been developed elsewhere i.e. Company X looks at how many actors are competing about the same segment and how aware the market is of the product. That is the core of Company X's radical innovation process, attempting to stay ahead of the market and introduce products that only a few segments are aware of but not the majority of the market because when the majority realizes the value it will be too late due to increased competitiveness.

4.3.3   Final remarks on idea generation

Based on the interviews, there appears to not be a clear and tangible process for innovation, rather it is quite informal and the aim appears to be continuous relevance i.e. always remaining relevant to customers and not being satisfied with the status quo. A new innovation tends to start with a hypothesis and is followed by testing it repeatedly. If the concept proceeds from the testing stage, it is scaled up. Furthermore, multiple interviewees stated that when initiating an innovation project, approximately 80 percent of the project team consists of new personnel. The motive for undertaking such an approach is to not impede the solution with previous work efforts, and being experienced in a field where you are attempting to innovate is believed to be both a blessing and a curse. Consequently, employees with an interest in the new technology and without knowledge of how the problem was addressed earlier, are preferred since they would often develop new solutions. Over time, as the solutions reach a more mature state, more experienced employees with previous knowledge would be switched into the team so that they could compare the new product with the old one and identify similarities and discrepancies. On some occasions, involving new personnel has resulted in the same solution being reinvented. This approach toward innovation permeates the entire company, where employees without previous awareness work with an issue and develop a product according to interviews. For the innovation teams, it is possible to communicate with different departments to acquire input e.g. sales teams to receive information about market demand, product forums for input on product features.

4.3.4   Screening and sponsoring of ideas

While the interviews describe Company X's organizational structure as flat and the idea generation as decentralized, the sponsoring process differs depending on the type of innovation that is pursued. Regardless of where the idea originates or what type of innovation it is, the idea generator has to promote and sell the idea to colleagues and stakeholders at so-called feasibility checkpoints. These feasibility checkpoints are depicted as strict formal gates where it can be difficult to have acquired enough information about an idea and have the right timing and several interviewees describe these as exhausting.

The stakeholders tend to vary depending on the type of innovation project that is pursued according to the interviewees. For incremental innovation, there are product boards and customers that can be viewed as stakeholders. In innovation projects of a more radical nature, top management are the main stakeholders. Many interviewees responded that to receive sponsoring for a project, five percent depends on the idea while the remaining 95 percent relies on the person's ability to promote it. Additionally, it was observed that some interviewees perceived it as a frustrating process to undertake, that many may have brilliant ideas but not the conviction to pitch it for decision-makers. Several interviewees expressed concern that ideas would not survive without a certain conviction and that some employees even experienced fear of sharing their ideas too early due to the risk of losing control of it.

On some occasions, ideas are declined due to the presence of other ideas that are perceived as more relevant and given priority, which in turn requires the employees to work on those projects instead of initiating their own. One interviewee describes how Company X can be fast and agile when implementing ideas in some cases, but sometimes when there exist different opinions regarding ideas they tend to be down prioritized due to insufficient time to implement them, creating a bottleneck in the implementation stage where only the ideas with the highest potential might pass through, potentially leaving good ideas unimplemented. An example of this would be the company's radical innovation team which was recently disbanded due to the initiation of two new radical innovation projects. The purpose of the radical innovation team is to spot major business opportunities and once those have been identified they are deployed on it. Consequently, this also means that it is difficult to generate new radical innovations once a project has been initiated since the resources are reallocated.

As mentioned earlier, incremental and radical innovation turns toward different sponsors. Whilst innovators can turn to innovation boards for sponsoring and support, radical innovators engage with top management according to interviewees. It is in general very difficult to receive approval without data since the decision-making is often data-driven. In different interviews, it was clear that getting in contact with the right people is easy once there is an idea, the issue lies in obtaining a sufficient amount of data. There have been discussions about deploying a team for validating or criticizing ideas. However, managers and employees are afraid that it might damage rather than facilitate the innovation process since this strategy assumes that everyone can constantly produce ideas, which is not always possible. There have also existed teams who work in three weeks sprints where they research and assess their idea, and each third week they have a demo for top management. In the demo, the teams present their findings, their reasoning, and their plan.

4.3.5 Formalization and measurements

Interviewees state that Company X attempts to avoid having too much formalization and administration. Many employees state that excessive formalization can be detrimental to innovation and reduces the motivation for innovating. Employees stated that there exist different frameworks and feasibility checkpoints for projects; however, these are not followed strictly. Interviewees in the innovation sector described that they had a framework for the idea development. The framework consists of multiple stages. The first phase is explorative where research and different insights are combined to specify a specific problem. Then ideas are generated which could potentially solve this problem, they are conceptualized and then have to pass through a feasibility checkpoint where the radical innovation team and top management act as gatekeepers. If the idea passes the checkpoint an evaluation phase is started where the potential of the idea is measured, followed by an analyzing phase and then a decision to hand over the idea to a product development team or not.

The interviewees responded that there are no formal performance measurements

prevalent in the innovation process since it is difficult to make economical assessments of things that are yet to occur. However, when pursuing ideas a certain amount of time will be invested by the idea generator, but it is not viewed as a formal performance measurement. Finally, when screening ideas, innovation boards, and top management demand data for decision-making, without the necessary data the idea will generally be dropped or placed in a backlog.

Top management described that they are continuously attempting to improve their existing solutions in unprecedented ways. Several interviewees depict Company X as a pioneer in the fields they operate or when addressing issues, neglecting competitors and their offerings to instead focus on developing new innovations. In an instance, the company developed a software product to solve problems that their customers had, but later they reinvented the solution using new technology.

5

Discussion

5.1 Organizational structure

The organizational structure relates to how the company should develop its structure to facilitate innovation. Company X consists of different constellations with different levels, where employees are distributed in different geographical regions. Teams are depicted as autonomous and self-managing, which is also empowered through decentralized decision-making. The decision-making appears to depend on the nature of the innovation that is being pursued. Projects that are viewed by employees and managers as more complex and radical, usually need to be approved by top management at some stage in the process to receive the resources needed. This raises the question if the teams still can be described as autonomous and the culture as flat, and contradicts Lee and Edmondson (2017) and Thomke's (2020) findings which advocate for decentralized decision-making and self-managing teams without exceptions. Lee and Edmondson (2017) and Thomke (2020) argue that less hierarchical self-managing organizations can more easily seize radical business opportunities in a dynamic environment. Furthermore, it is proposed that authority should be decentralized throughout the organization. Companies such as Valve, Zappos, and Morning Star developed a system for removing hierarchical relations and offered their employees complete autonomy and flexibility to pursue any projects that they found interesting (Lee & Edmondson, 2017). Another company that adopted this approach was Google, which allows its employees to pursue projects they find interesting regardless of the managers' opinion (Steiber & Alänge, 2013).

While interviewees described that Company X promotes innovation as something that should permeate the entire company, one of these constellations is entirely dedicated to innovation, and within this innovation constellation, there was a team deployed for generating and pursuing radical innovations whilst being separated from the rest of the organization by not being involved in everyday operations. This pattern of creating a separate unit of innovation is similar to what was proposed by Galbraith (1982) to facilitate innovation. The radical innovation team was recently disbanded due to the launch of new radical innovation projects and had to engage in these new projects, making it difficult to measure any significant effect the team might have had on the organization. Furthermore, it was also stated during interviews that two radical innovations originated outside of the innovation constellation. This finding might undermine the assumption that innovation has to be separated into a particular team or constellation. Other companies such as Google

have not constructed separate units for managing innovation nor made any distinction between incremental or radical innovation, rather any innovation is encouraged wherever it originates (Steiber & Alänge, 2013).

An important part of the structure is the sharing of knowledge between different instances and even if the knowledge sharing is expected to occur automatically through e.g. spontaneous interactions, it is still beneficial to structure it to increase employees' awareness of ongoing projects or processes and encourage them to exchange ideas with each other. In the case of Company X, knowledge management is viewed as important by top management. However, it was discovered that there appeared to exist discrepancies between top management and employees located at different foreign offices. The top management believed that knowledge sharing occurred naturally due to having blended teams with members from diverse regions. However, employees at foreign offices expressed that knowledge sharing sometimes could be improved, possibly indicating that blended teams can be a blunt tool. It was stated that they were sometimes not aware or informed of ongoing innovation projects or during project start at the headquarter, but rather learned about them in their late stages. It was also speculated that the difficulty of partaking in informal discussions at the headquarter could be one of the influencing factors. Consequently, these interviewees responded that they felt that their insights regarding their local markets were not captured by the company. While the literature review supports the notion that knowledge sharing usually occurs through informal interaction, it also emphasizes the importance of establishing formal learning channels to prevent asymmetric knowledge distribution (Doz et al., 2004; Tsai, 2002). Doz et al. (2004) mention three major challenges for acquiring the benefits of globalized innovation: finding the knowledge, assessing the value, and enabling knowledge sharing. Interviewees have described that there is valuable knowledge at the foreign offices, Company X could therefore harvest the benefits of a more diversified knowledge pool in the innovation process if they were to enable efficient knowledge-sharing channels. The innovation process could be improved by developing the knowledge-sharing systems to integrate more diverse and global knowledge in the innovation process and possibly encourage more informal communication across offices.

5.2 Culture and people

When comparing the ten common attributes describing the culture at Google, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors in the study by Steiber and Alänge (2016) with the culture at Company X, most of them have appeared to be present at Company X. Employees have described Company X as a flat organization that emphasizes openness, with few formal positions which in turn makes the organization more dynamic. Top management seems to be aware of the positive impacts of creating a culture of safety, where failure is considered something positive which you can learn from, and top management is engaged in the recruitment process where a blend of different personality profiles are targeted and entrepreneurial qualities are preferred. A similar approach was observed in all companies studied by Steiber and Alänge (2016) and supports the assumption that idea generation is facilitated by

recruiting people that display these characteristics and are willing to explore their ideas. It is hard to measure cultural traits, but throughout the interviews and talks with employees, it seems like the openness could be further improved between the headquarters and the international offices. Even if interviewees describe Company X as relatively flat, there are sometimes feelings during decision points regarding radical innovations that the top management has the final say. This contradicts the literature, which advocates for decentralized and flat decision-making in organizations (Lee & Edmondson, 2017; Thomke, 2020; Steiber & Alänge, 2013; Steiber & Alänge, 2016). This could indicate that even if an organization strives to have a flat organizational structure with minimal hierarchy, the desire for control by the top management can thwart the decentralized decision-making facilitated by the flat organizational structure. This will inhibit the self managing teams that can increase innovation (Steiber & Alänge, 2016). Company X could therefore review the influence of top management proportional to the employees in innovation projects.

Company X has a relatively low turnover of personnel which in turn could help generate radical innovations since employees have more time to gain insights from different parts of the organization and could foster novel ideas (Galbraith, 1982). With culture and people being relatively soft factors, it can be hard to measure how well they are fulfilled but being aware of them and their importance will probably go a long way. In the end, all organizations are made up of individuals, and creating a culture that encourages them to utilize their entrepreneurial qualities could likely improve the overall innovativeness (Ibid.).

5.3 Innovation process

5.3.1 Idea generation

One of the most prominent distinguishing features of Company X in comparison to other companies such as Google, Facebook, Twitter, Apigee, LinkedIn, and Tesla Motors, is their decision to categorize innovation projects as either radical or incremental, where sponsoring and decision-making differs depending on the type that is pursued. Interviewees described that the distinction was made to facilitate and empower both types of innovation by devoting a certain amount of resources into each one, but also ensuring that the company worked with both innovations actively. This approach is unorthodox in comparison to other investigated companies e.g. Google, Facebook, LinkedIn, Twitter, Tesla Motors, and Apigee. Steiber and Alänge (2013) argue that it is not relevant to make a distinction between radical and incremental innovation, as innovation tends to be a synthesis of both radical and incremental enhancements. The potential benefits yielded by Company X's approach are difficult to measure, and it was observed that employees were not always aware of the distinctions between these definitions, viewing innovation projects as being on a spectrum in between the two innovation types.

In the empirical findings, it was observed that employees that pursue radical ideas have to promote them to the radical innovation team or top management, at feasi-

bility checkpoints. Using the theoretical framework, these roles can be divided into idea generators and sponsors (Galbraith, 1982). The interviewees describe that the idea generators can be anyone in the organization. While exploring an idea, the idea generator has to go through different checkpoints e.g. feasibility checkpoints where the radical innovation team and top management decide whether the idea should receive sponsoring and therefore they adopt the role of sponsor. There are few alternatives to these sponsors making it difficult to explore ideas if they are not approved by them. In regards to the incremental innovations, interviewees explain that decision-making and sponsoring are often made by managers, which indicates that there are still some hierarchical structures in place, this in turn contradicts their self-depiction as a flat organization to a certain extent. Top management encourages testing of ideas and supports innovation projects that have been approved at feasibility checkpoints, thereby embracing the orchestrator role in Company X's innovation process according to Galbraith (1982).

Another contradiction between Company X and the literature was how ideas are sponsored and promoted. While some companies, e.g. Google, have incorporated decentralized decision-making and sponsoring for idea generators where employees can circumvent their managers if necessary, Company X uses either product boards, middle or top management for deciding whether an idea should be pursued despite employees' description of Company X having a flat culture and structure. Without the approval of these stakeholders, the employee is unable to proceed with their idea.

The idea generation at Company X is affected by their approach to the market, where the company applies a strategy based on the innovation diffusion theory to target innovators and early adopters and encourage collaborations (Rogers, 2005). Collaborating with external constellations enabling a similar variant to open innovation. Through this approach, Company X can innovate through internal capabilities and also through external parties, and capture the ideas of companies at the forefront of technology development. Other organizations e.g. Google, Tesla, LinkedIn, Facebook, and Apigee have also integrated open innovation with external parties to acquire additional perspectives on their innovation projects (Steiber & Alänge, 2016).

The innovation process can be coordinated in different ways to enable more ideas to sprout. It is important to have several different instances for sponsoring ideas and it may also be helpful to facilitate rotation of employees to have them acquire different skills at different parts of the organization to generate better ideas from the gained knowledge from different parts of the firm while also improving the lack of communication between offices (Galbraith, 1982). This was proven in the case of Company X where a couple of radical innovations originated from people with experience from specific areas and it can be difficult to generate ideas without possessing the insights from the different areas. Furthermore, based on the study of Company X and Steiber's and Alänge's studies (2013; 2016) of Google, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors it appears to be beneficial to involve external actors or targeted specific market segments in the innovation process to improve the

idea generation.

5.3.2 Performance measurement and organizational learning

Interviewees stated that Company X does not use any specific performance measurements when working with radical innovation. Company X's allocation of resources for innovation is similar to the optimal distribution described by Nagji and Tuff (2012). Interviewees have described how Company X has frameworks and feasibility checkpoints for assessing ideas and deciding whether they should proceed to the next step. Whilst not stated explicitly, this process of feasibility checkpoints resembles the stage-gate process that describes different stages where a project has to pass through different gates (Cooper, 1990). Company X's existing approach emphasizes exploring new concepts and combining insights when working with innovation. While this approach can be used to assess radical innovation, Christensen et al. (2008) and McGrath and MacMillan (1995) suggests the discovery-driven planning framework, which in essence focuses on questioning existing assumptions, validating assumptions, and enhancing learning for future innovations. It would be possible to either adopt the discovery-driven planning framework, or synthesize elements of this framework with the current approach of Company X to improve the generation of radical innovations by critically reviewing assumptions in existing solutions.

All interviewees had a unison consensus in terms of their view on formal processes, frameworks, and performance measurements; they seem to strongly dislike and actively work to eradicate any prevalent elements of formalization, but there still exists some elements like the feasibility checkpoints. Facebook, Google, LinkedIn, Twitter, Apigee, and Tesla Motors also share an anti-bureaucratic culture and search for them actively (Steiber & Alänge, 2016). The presence of formalized procedures is viewed as an inhibitor of innovation and creativity across these companies, and they constantly struggle to remove these structures as the company size increases. The top management of Company X responded that while they perceive formalization as bureaucratic and engage in anti-bureaucratic processes, they attempt to find a balance between having excessive and lacking formalized structure regarding documenting processes; however, this does not extend to performance measurement. Mankin (2007), Perrin (2002) and Christensen et al. (2008) advocate for a balance of measuring innovation, but limiting the number of performance measures since innovation tends to be permeated by uncertainty and describe it as a delicate balance and that excessive measuring will impair creativity and innovation. A complete void of measurements can result in more innovation failures (Richtnér et al., 2017). Regardless of the outcome of the innovation, interviewees describe how Company X emphasizes the importance of learning new insights from innovative ideas. Several employees stated in the interviews that failure is acceptable and that Company X encourages employees to test out ideas, challenge the company, and possibly fail and learn from them. Furthermore, the company empowers the employees to enhance their innovative capabilities by offering workshops and education. Rothwell (1994) and Perrin (2002) share a similar view on improving an organization by testing to

identify learning opportunities and describe that organizations should incorporate incitement systems to reward exploring and experimenting with ideas whether or not that idea worked. Interviews indicate that Company X has an extrinsic and intrinsic incentive system for encouraging the learning of its employees. The company has adjusted its salary model to consider individual performance, team performance, and individual initiatives to improve the company in the form of ideas, similar to what was proposed by literature (Bénabou & Tirole, 2003; Galbraith, 1982). Furthermore, there also exists an annual conference where employees that have excelled are praised, recognized for their efforts, and share their accomplishments with the rest of the company, and employees can explore their own ideas. Another company that has adopted this practice is Google which, according to Steiber and Alänge (2013), promotes an experimental approach with rapid testing and short learning cycles. Additionally, Facebook, LinkedIn, Apigee, Twitter, and Tesla Motors also share short learning cycles to develop the organization and employees (Steiber & Alänge, 2016). This pattern of learning from experimentation regardless of the outcome appears to be a common practice at Company X and throughout the above-mentioned companies.

When initiating an innovation project that addresses issues that have been solved by existing solutions, interviewees explain that Company X creates constellations that consist of 80 percent new members, where these employees are unaware of the previous solution. Having ties to the previous solution was viewed as a blessing and a curse by interviewees at Company X, as some employees can foster inertia against change while at the same time possessing valuable insights. The market environment is continuously changing due to the advent of new technological breakthroughs and Company X involves employees with an interest in the latest technology to facilitate relevant innovation. This approach facilitates cannibalization of current products since the new developers will not be as biased toward current offerings and empowering cannibalization can enable Company X to stay competitive when the requirements change (Chandy & Tellis, 1998).

The use of formal processes and performance measurements is a factor for improving innovation (Mankin, 2007). In general, many companies have some formal structure to be successful in their innovation but might neglect the negative impact it can have on creativity and motivation to innovate. Attempting to excessively measure an innovation process might result in a rapid decline of innovative ideas (Richtnér et al., 2017). This is especially true in the scenario for radical innovations, where it can be difficult to conduct performance measurements and where they should be managed with experience and validation from innovative customers (Christensen et al., 2008). To improve the measurement of an idea or assumptions in different stages, it would be interesting to use a discovery-driven framework that combines the exploration of new concepts, synthesizing insights, and reconsidering current assumptions regarding existing products to contribute. Finally, it is important to integrate elements to facilitate cannibalization to prevent existing offerings from being exceeded by competitors to enable innovation, i.e. adopting a proactive approach to change and not be afraid to pursue innovations which other actors could consider boring.

5.3.3 Innovation strategy

Interviewees explain that Company X's market strategy is focused on targeting large customers who are considered to be innovators and early adopters and actors who want to drive the change within the industry. Targeting these customers has given Company X valuable innovation ideas straight from their customers which have both been radical and incremental. Gaining valuable market insight from actors considered as innovators and early adopters has most likely also helped Company X getting a market feel for their internally developed ideas. Interviewees have described how important the timing of implementing ideas is, where they deem it to be optimal timing if some but not all see the potential value in an idea. Lilien and Yoon (1990) and Teece (1986) also emphasize the importance of timing the market entry to be successful with innovations. In contrast to other actors who target the early and late majority, Company X who targets early adopters will probably be able to time the market more effectively with their market insights.

Moore (1999) describes the potential chasm between early adopters and the early majority and highlights how references and relationships are essential to get the interest of the early majority. Company X seems to be handling this well by having large reputable customers, often categorized as early adopters, acting as references during customer conferences helping to close the chasm for the attending early majority. The strategy of Company X focuses on large customers who can be considered innovators and early adopters, both generating innovations as well as helps diffuse the innovations to other customers. In other words, how progressive a customer is can act as a very important role for driving innovation in this type of strategy.

6

Conclusion

The purpose of this thesis was to gain more knowledge regarding how the generation of radical innovations could be organized for. Furthermore, the thesis also strived to contribute with valuable insights to sustainable solutions for achieving the UN's ninth goal by examining how to organize for the generation of radical innovations. The purpose was pursued based on the three research questions. Initially, a short answer to each of the research questions will be given, followed by more elaborative answers and a proposal for future research. To answer the first research question: How does the organizational structure influence the generation of radical innovations in software companies? The organizational structure should facilitate the sharing and exchange of knowledge between different business entities to capture different insights from a diversity of sources, enabling more creativity in the idea generation process. Decentralized decision-making allows employees to freely explore ideas without being obstructed by hierarchical relationships. To answer the second research question: How does the culture and people influence the generation of radical innovations in software companies? The culture should emphasize learning and accept failures. Entrepreneurial qualities should be sought after in people and empowered through psychological safety. The right culture and incentives can keep people employed for longer, enabling positive effects on innovation through knowledge gained from people rotating in the organization. Lastly, to answer the third research question: How does the type of innovation process influence the generation of radical innovations in software companies? Radical innovations are inherently difficult to measure due to their uncertain nature, but companies should use frameworks that encourage the exploration of new ideas, blending different insights and questioning existing assumptions. Targeting innovators and early adopters could facilitate the sprouting of new ideas, and large and reputable customers can act as positive references for diffusing innovations to the early and late majority.

To return to how culture influences the generation of radical innovations, culture and people are deemed as necessities since they are core elements of organizations and management should be aware of them and develop a culture that emphasizes learning and acceptance toward failure. Such a culture could enable employees to utilize their entrepreneurial characteristics to enhance innovation without fear of repercussion i.e. empower employees by instilling a sense of psychological safety. The sprouting of ideas and learning could be facilitated by rotating employees at different parts of their company to develop new skills. The idea generation could also benefit from extending outside of the organization i.e. by involving external parties or specific groups of interests in the innovation process. Especially targeting

innovators and early adopters seems to facilitate idea generation and additionally if these customers are reputable and large they can act as positive references for diffusing innovations to the early and late majority.

Addressing how the organizational structure affects the generation of radical innovations, the innovation process should be supported by setting up an organizational structure that facilitates the sharing and exchange of knowledge between different offices or business units. By having an efficient knowledge sharing system that permeates all offices throughout the organization, different insights from a diversity of sources can be captured, and in turn enable more creativity in the idea generation process. The process of knowledge sharing should not solely rely upon informal interaction, but also be actively planned for.

There were some discrepancies to how decision-making for sponsoring was made in the companies, where Google used decentralized decision-making whilst Company X pursued an approach with more hierarchical elements present. To empower innovation, it is recommended to have some degree of decentralized decision-making i.e. allowing employees to freely explore ideas within certain boundaries. It is also advised to involve external actors which enables internal and external idea suggestions as well as valuable market insights. Consequently, these market insights could also indicate whether the timing is suitable for the launch of a particular product. Even if an organization strives to have a flat organizational structure with minimal hierarchy, the desire for control by the top management can thwart the decentralized decision-making facilitated by the flat organizational structure. Company X could therefore review the influence of top management proportional to the employees in innovation projects.

Regarding how the innovation process influences the generation of radical innovations, the use of formal processes and performance measurement should be prevalent to some degree in the innovation process. However, an abundance of these structures could stifle innovation. There was a distinct prevalent behavior that was unanimously shared by Company X, Google, Facebook, LinkedIn, Twitter, Apigee, and Tesla Motors; all companies actively engaged in activities to either reduce the presence of formalized processes that were perceived as bureaucratic. This indicates that companies that want to pursue innovation should refrain or limit the use of performance measurement. Radical innovations are inherently difficult to measure, due to their uncertain nature but if companies decide to use frameworks in the pursuit of them, it is recommended to use those that encourage exploration of new ideas, blending different insights, and questioning existing assumptions. To ignite and retain the motivation, incentives were used to reward and empower employees that pursue ideas.

For future research, it would be interesting to investigate how performance measurements could be used in radical innovation. Additionally, it would be beneficial for the practitioners and the research community to research if the innovation rate is affected by creating a separate unit or working with innovation without any specific

structure. It would also be interesting to investigate how the diffusion of innovation is affected by targeting early adopters who are well-reputed large corporations.

Bibliography

Antoncic, B., & Hisrich, R. D. (2001). Intrapreneurship: Construct refinement and cross-cultural validation. *Journal of business venturing, 16*(5), 495-527.

Antoncic, B., & Hisrich, R. D. (2003). Clarifying the intrapreneurship concept. *Journal of small business and enterprise development.*

Armbrecht, F. M. R., Jr., Chapas, R. B., Chappelow, C. C., & Farris, G. F. (2001). Knowledge management in research and development. *Research Technology Management, 44*(2), 28-48.

Assink, M. (2006). Inhibitors of disruptive innovation capability: a conceptual model. *European journal of innovation management.*

Baer, M., and Frese, M. (2003). Innovation is not enough: Climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior, 24*(1), 45–68

Baldwin, C. Y. (2015). In the Shadow of the Crowd: A Comment on 'Valve's Way'. *Journal of Organization Design, 4*(2), 5-7.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management decision.*

Bell, E., Bryman, A. & Harley, B. (2019), *Business Research Methods.* Oxford University Press. 5th Edition

Benabou, R., & Tirole, J. (2003). Intrinsic and extrinsic motivation. *The review of economic studies, 70*(3), 489-520.

Bernstein, E., Bunch, J., Canner, N., & Lee, M. (2016). Beyond the holacracy hype. *Harvard business review, 94*(7), 8.

Chandy, R. K., & Tellis, G. J. (1998). Organizing for radical product innovation: The overlooked role of willingness to cannibalize. *Journal of marketing research, 35*(4), 474-487.

Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology.* Harvard Business Press.

Chesbrough, H.W. (2019). *Open Innovation Results Going Beyond the Hype & Getting Down to Business.* Oxford Press

Christensen, C. M. (2013). *The innovator's dilemma: when new technologies cause great firms to fail.* Harvard Business Review Press.

Christensen, C. M., Kaufman, S. P., & Shih, W. C. (2008). Innovation killers: How financial tools destroy your capacity to do new things. *Harvard Business Review, 86*(1), 98-105

Cooper, R. G. (1990). Stage-gate systems: a new tool for managing new products. *Business horizons, 33*(3), 44-54.

Cooper, R. G., & Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management: An International Publication of the Product Development & Management Association, 12*(5), 374-391.

Doz, Y., Santos, J., & Williamson, P. (2004). Is your innovation process global. *MIT Sloan Management Review, 45*(4), 31-37.

Drucker, P. F. (2002). The discipline of innovation. *Harvard business review, 80*(8), 95-102.

Dubois, A., & Gadde, L. E. (2002). Systematic combining: an abductive approach to case research. *Journal of business research, 55*(7), 553-560.

Easterby-Smith, M., Thorpe, R. and Jackson, P. (2015). *Management & Business Research.* Sage Publications. 5th Edition.

Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350–383

Eisenhardt, K. and Graebner, M. (2007). Theory Building from Cases: opportunities and challenges. *Academy of Management Journal, 14*(4) 532–550

Ekvall, G. (1996). Organizational Climate for Creativity and Innovation. *European Journal of Work and Organizational Psychology, 5*(1), 105-123

Emmel, N. (2013). *Sampling and choosing cases in qualitative research: A realist approach.* Sage.

Ettlie, J. E., Bridges, W. P., & O'keefe, R. D. (1984). Organization strategy and structural differences for radical versus incremental innovation. *Management science, 30*(6), 682-695.

Foss, N. J., & Dobrajska, M. (2015). Valve's Way: Wayward, Visionary, or Voguish? *Journal of Organization Design, 4*(2), 12-15.

Galbraith, J. R. (1982). Designing the innovating organization. *Organizational dynamics, 10*(3), 5-25.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management: An international publication of the product development & management association, 19*(2), 110-132.

Gartner. (April 7, 2021). *Information technology (IT) spending on enterprise software worldwide, from 2009 to 2022 (in billion U.S. dollars)* [Graph]. In Statista. Retrieved May 28, 2021, from https://www.statista.com/statistics/203428/total-enterprise-software-revenue-forecast/

Gino, F., & Staats, B. (2014). The Morning Star Company: Self-management at work. *The Morning Star Company: Self-Management at work. HBS No* (Vol. 13). 9-914.

Goldenberg, J., Libai, B., & Muller, E. (2002). Riding the saddle: How cross-market communications can create a major slump in sales. *Journal of Marketing, 66*(2), 1-16.

Hamel, G. (2002). Innovation now! (It's the only way to win today). *Fast company*, (65), 114-114.

Ipe, M. (2003). Knowledge sharing in organizations: A conceptual framework. *Human resource development review, 2*(4), 337-359.

Jones, P., & Jordan, J. (1998). Knowledge orientations and team effectiveness. *International Journal of Technology Management, 16*(1-3), 152-161.

Kanter, R. M. (1988). When a thousand flowers bloom: Structural, collective, and social conditions for innovation in organizations. *Knowledge Management and Organisational Design, 10*(1), 93-131.

Kanter, R. M. (2006). Innovation: The classic traps. *Harvard business review, 84*(11), 72-83.

Kaplan, R. S., & Norton, D. P. (2005). The balanced scorecard: measures that drive performance. *Harvard business review, 83*(7), 172.

Kaplan, R.S. and Norton, D.P. (1996), *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press.

Lee, M. Y., & Edmondson, A. C. (2017). Self-managing organizations: Exploring the limits of less-hierarchical organizing. *Research in organizational behavior, 37*, 35-58.

Leifer, R., O'connor, G. C., & Rice, M. (2001). Implementing radical innovation in mature firms: The role of hubs. *Academy of Management Perspectives, 15*(3), 102-113.

Machiavelli, N. (1992). *The Prince.* Dover Publications.

Mankin, E. (2007). Measuring innovation performance. *Research Technology Management, 50*(6), 5.

Martins, E. C., & Terblanche, F. (2003). Building organisational culture that stimulates creativity and innovation. *European journal of innovation management.*

Maxwell, J. A. (2013). *Qualitative research design: an interactive approach.* SAGE Publications. 3rd Edition.

McDermott, C. M., & O'Connor, G. C. (2002). Managing radical innovation: an overview of emergent strategy issues. *Journal of Product Innovation Management: an international publication of the product development & management association, 19*(6), 424-438.

McGrath, R. G., & MacMillan, I. C. (1995). *Discovery driven planning.* Philadelphia, PA: Wharton School, Snider Entrepreneurial Center. Harvard Business Review

Moore, G. A. (1999). *Crossing the chasm: Marketing and selling high-tech products to mainstream customers* (Rev. ed.). HarperBusiness.

Nagji, B., & Tuff, G. (2012). Managing your innovation portfolio. *Harvard Business Review, 90*(5), 66-74.

Newman, A., Donohue, R., and Eva, N. (2017). Psychological safety: A systematic review of the literature, *Human Resource Management Review, 27*(3), 521-535

O'Connor, G. C., & DeMartino, R. (2006). Organizing for radical innovation: An exploratory study of the structural aspects of RI management systems in large established firms. *Journal of product innovation management, 23*(6), 475-497.

Pan, S. L., & Scarbrough, H. (1999). Knowledge management in practice: An exploratory case study. *Technology Analysis and Strategic Management, 11*(3), 359-374.

Perrin, B. (2002). How to—and how not to—evaluate innovation. *Evaluation, 8*(1), 13-28.

Pisano, G., & Teece, D. (1994). The dynamic capabilities of firms: an introduction. *Industrial and Corporate Change, 3*(3), 537-556.

Puranam, P., & Håkonsson, D. D. (2015). Valve's way. *Journal of Organization Design, 4*(2), 2-4.

Richtnér, A., Brattström, A., Frishammar, J., Björk, J., & Magnusson, M. (2017). Creating better innovation measurement practices. *MIT Sloan Management Review, 59*(1), 45.

Rogers, E. M. (2003). *Diffusion of innovations.* Free press. 5th Edition.

Rothwell, R. (1994). Towards the fifth-generation innovation process. *International marketing review.*

Schmidt, E., & Rosenberg, J. (2014). *How Google works.* New York: Grand Central Publishing.

Schmidt-Tiedemann, K. J. (1982). A new model of the innovation process. *Research Management, 25*(2), 18-21.

Schumpeter, J. A. (1942). *Socialism, capitalism and democracy.* Harper and Brothers.

Steiber, A., & Alänge, S. (2013). A corporate system for continuous innovation: the case of Google Inc. *European Journal of Innovation Management.*

Steiber, A., & Alänge, S. (2016). The Silicon Valley Model. In *The Silicon Valley Model* (pp. 143-155). Springer, Cham.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research policy, 15*(6), 285-305.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic management journal, 28*(13), 1319-1350.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal, 18*(7), 509-533.

Thomke, S. (2020). Building a culture of experimentation. *Harvard Business Review, 98*(2), 40-47.

Tsai, W. (2002). Social structure of "coopetition" within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization science, 13*(2), 179-190.

Tushman, M. L., & O'Reilly III, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California management review, 38*(4), 8-29.

Tushman, M. L., & O'Reilly, C. A. (2002). *Winning through innovation: A practical guide to leading organizational change and renewal.* Harvard Business Press.

United Nations. (n.d.). *Infrastructure and Industrialization – United Nations Sustainable Development.* United Nations. Retrieved June 20, 2021, from https://www.un.org/sustainabledevelopment/infrastructure-industrialization/

Wallin, M. W., & Von Krogh, G. (2010). Organizing for open innovation: focus on the integration of knowledge. *Organizational dynamics, 39*(2), 145-154.

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert systems with applications, 39*(10), 8899-8908.

Voelpel, S. C., Leibold, M., & Eckhoff, R. A. (2006). The tyranny of the Balanced Scorecard in the innovation economy. *Journal of intellectual capital.*

A
Appendix 1

A.1 Interview template

- Can you give us some background information on your role at Company X and what you have done during your employment?

- How would you describe Company X's service?

- How has Company X's vision/mission changed over the years? (Purpose)

- How has the business of Company X changed over the years? (Product, Process, Organizational structure) Why did you feel the need to change?

- Before we start, how do you define these concepts within innovation: radical, incremental, open?

- How has Company X worked with innovation (different stages, brainstorming etc.)?

- What has been the general goal with your innovation process? Different for radical/incremental?

- What were the main obstacles that impeded innovation before you decided to separate the innovation team and make it independent?
  How were they addressed? Have they remained, or are there new obstacles?

- Do you spend time with external actors e.g. competitors, clients? How much time?

- Does Company X have a budget for innovation?

- Have you conducted any radical innovations?

- How are you monitoring the development of your competitors and customers?

- With incremental innovations has any performance measurement been used and what is the rationale behind them? Decision points on proceeding/pivoting/stopping?

- With radical innovations has any performance measurement been used and what is the rationale behind them? Decision points on proceeding/pivoting/stopping?

- How has the innovation portfolio changed over time? Do you have any measurements tied to this?

- Which stakeholders are the decision makers in the innovation process? Has it changed?

- How do you encourage innovation at Company X? How has the corporate culture changed e.g. has it always been flat?

- With regards to processes and frameworks, do you follow these strictly if you have them or can you sometimes disregard them?

- Is there anything else that you would like to add or elaborate on regarding your innovation process or on the topics that we have touched so far?