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Implementing Lean Startup Methodology in Large Firms
-Benefits, Challenges and Solutions
Master of Science Thesis in the Master Degree Programme
Management and Economics of Innovation

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Gothenburg, Sweden, 2012
Report No. 2012:008

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Abstract

The purpose of this thesis is twofold. First, it aims to investigate how large corporations attempt to create and support space for employee ideas that do not fit with the daily work (referred to here as New ideas or New projects). Second, this thesis aims assess to whether some key tenets of recent startup methodology can be adopted in a beneficial manner in a large organization. In doing so, it aims to identify some of the challenges that are associated with such implementation, and suggest ways to tackle those challenges. The study is qualitative and the data gathering has been conducted in two ways. First, semi-structured and unstructured interviews with R&D Managers and Innovation Directors of 14 multinational companies have been done. Second, the authors have been part of an innovation team at one multinational company for several months, where they have conducted a case study.

In addressing companies' approaches to supporting New ideas, two main models are found. The first and most common model involved the provision of an online portal and community, in which employees can post ideas, get feedback from colleagues, and get connected to project sponsors, experts and more. The second model relied on personal interaction between an idea owner and his or her manager. For initial support, the closest manager could typically grant limited funding and resources without any paperwork.

Companies' current approaches to supporting innovation are further assessed at three different levels; organizational level, project level and employee level. On the organizational level three approaches are found; separated R&D efforts on different time frames; creating multiple sources of funding and establishing dedicated groups for radical projects. On the project level, three topics are discussed; various funding processes, difficulties for employees to interact with potential customers and finally, the importance of quick communication and speed in innovative organizations. On the employee level, incentives, lack of time and manager's role are discussed. Based on the assessment, the authors argue that companies should consider to pursue projects outside the organization if the friction inside the organization is greater than the support. Further, companies should primarily separate New projects in two ways; physical (another location) and structural (employees report to the project instead of their line manager).

In addressing barriers to implementing Lean Startup practices, two main principles of Lean Startup methodology are in focus; pivoting/iterating and early customer interaction. For each of the two principles, three barriers to implementation in large companies are found. Starting with pivoting/iterating, the first barrier is that project sponsors in large companies are inflexible and are unwilling to change scope of projects. Second, communication is slower in large companies and third, projects sponsors focus on technology rather than team. Three barriers that large companies face when interacting early with customers when driving New Projects are also found. First, there is a lack of bandwidth with customers, access to which is often controlled by key account managers or equivalent. Second and third, there is a perceived risk of disclosing information and of damaging the company brand when sending untrained employees to customers.

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1. Introduction

In this section the background, the purpose, and a general outline of the thesis are presented.

1.1 Background

Innovation is today high up on the agenda of corporate management. Already in 1942 Schumpeter described how a process of creative destruction killed off products or companies that failed to live up to competition. At the same time, it gave life to those new products or companies that used for example new methods or materials to meet customer needs better (Schumpeter, 1942). Ever since, innovation management theory has highlighted the importance of innovation (see e.g. Tidd et al , 1997).

In the discourse, several challenges for companies that wish to innovate have been illustrated. For example, while executing a strategy of building core competencies as popularized by Prahalad and Hamel (1990), companies naturally fall victim to establishing core rigidities that prevent them from organizing around new opportunities (Leonard-Barton, 1992). A significant body of literature also notes that cognitive limitations in a mature business can prevent it from realizing and embracing opportunities in innovation simply because new projects may require new business models that are unfamiliar to management (see e.g. Tripsas & Gavetti, 2000 or Chesbrough & Rosenbloom, 2002). Many remedies or solutions to these problems have also been put forth in management literature. One area of literature revolves around building organizational structures that support innovation. For example, ambidextrous organizations have been suggested as a way for companies to focus on two conflicting goals; exploiting existing products while exploring opportunities for new ones (Tushman et al., 1986). The underlying understanding is that activities involved in exploiting existing products are very different from those needed for the explorative activities of innovation. Drawing on this notion, scholars have suggested focusing on creating separation between regular projects and innovative projects.

In a different stream of literature, it is argued that companies can avoid failing to innovate by understanding their customers well. For example, Hippel showed how users of a technology, rather

than then suppliers of the technology, can sometimes be very important in inventing new functionality. This is because the users have sticky information about their needs that is hard to extract. By really understanding the needs of their customers, it is argued, companies can deliver innovations more effectively. Lilien et al. (2002) showed that innovation developed by lead users has more sales potential and more frequently generate major new product lines than do innovations generated by traditional market research techniques.

Even though several solutions like the above have been suggested, implementing ambidextrous organizations or understanding underlying needs of customers in real life has proven difficult. It has been illustrated how large organizations continuously fail to produce disruptive innovations and fall victim to faster smaller firms (e.g. Tushman et al., 1997). It is therefore of interest to explore ways to enable large organizations to innovate like small firms.

Since small, entrepreneurial firms are the ones who sometimes challenge and overtake the large companies through innovation, it is natural to look at them for inspiration. Interestingly, the last decade has seen developments in theory on how startups can follow certain guidelines in order to avoid unexpected, expensive failures. This includes customer development (Blank, S., 2008), which focuses on iteratively developing an understanding of real customer needs, and to iteratively work towards a solution that serves those needs. It is argued that traditional New Product Development processes are unfit for startups, because the purpose of a startup is different from that of an established company. As expressed by Blank, "a startup is the organization used to search for a scalable business model" (Blank, 2010). Similarly, Crossing the Chasm (Moore, G.,1999) addresses the necessity to develop a product for early adopters before targeting a larger market. By doing so, a startup has the opportunity to use the interaction with advanced, early adopters to develop its offering before taking the product or service to a more mainstream market. Under the name of Lean Startup methodology, Ries (2011) argues that a set of lessons can be learned by startups to avoid wasting investors' and their own time and money. The key messages in the methodology include validating learning from customers, working iteratively and being prepared and open to change direction when needed.

Seeing that these relatively new developments in entrepreneurial theory are attracting a significant following in startup circles, while remaining relatively unexplored by established companies, it seems

intriguing to explore whether they could be used in established companies. Since there is not a significant body of literature treating the use of recent entrepreneurial/startup theory in large organizations, such a focus will hold an interesting opportunity to contribute to the field.

1.2 Purpose

The purpose of this thesis is twofold. First, it aims to investigate how large corporations attempt to create and support space for ideas coming from employees that do not fit with their daily work.

Second, this thesis aims assess to whether some key tenets of recent startup methodology can be adopted in a beneficial manner in a large organization. It also aims to identify some of the challenges that are associated with such implementation, and suggest ways to tackle those challenges.

Against this background, the following research questions were identified.

1. How do big firms support employees' ideas that do not fit in their daily work?
2. What are the barriers to implement lean startup methodology in big firms?

This thesis is structured as follows. Section 2 covers the literature review that helped identify key innovation management issues in large companies and key messages in recent startup literature. Section 3 addresses methodological choices made in the study and discusses the reliability and validity of the results. Section 4 presents the empirical results from the interviews and the case study. Finally, section 5 then revisits the research questions in relation to the results and relates findings to previous literature. More elaboration and interpretation of the results is made, and conceptual models are presented.

The theme of this thesis has been identified from a strong interest of the authors in entrepreneurship and the formalization of methods for startups. Through education and experience in entrepreneurship, through discussions with academics and the advisor for this thesis, the above opportunity was identified. A large multinational company had a strong interest in the topic and worked with the authors to specify research questions and created a setup in which the authors could conduct a case study at the company.

2. Literature review

2.1 Innovation in large organizations

In this section we outline some of the problems related to supporting innovations in mature organizations and review some of the measures that can be taken by organizations to do so. We choose to view these difficulties at three levels. In Dual Organizational Objectives we address top level organizational focus and direction, such as ambidexterity. In Creating Project Space, we address project level issues that are implied by the top level strategy. Finally, in Employee Participation, we review issues related to the individual, including HR structures and motivation. Each section covers first some of the relevant problems, then some of the solutions that have been put forth.

At this point it is necessary to mention a few dimensions along which innovation is often described, and to pinpoint what this study is about. Perhaps the most common distinction between different types of innovation is *radicality*. Galbraith (1992) provides a helpful spectrum of innovations ranging from incremental to radical, see Figure 1
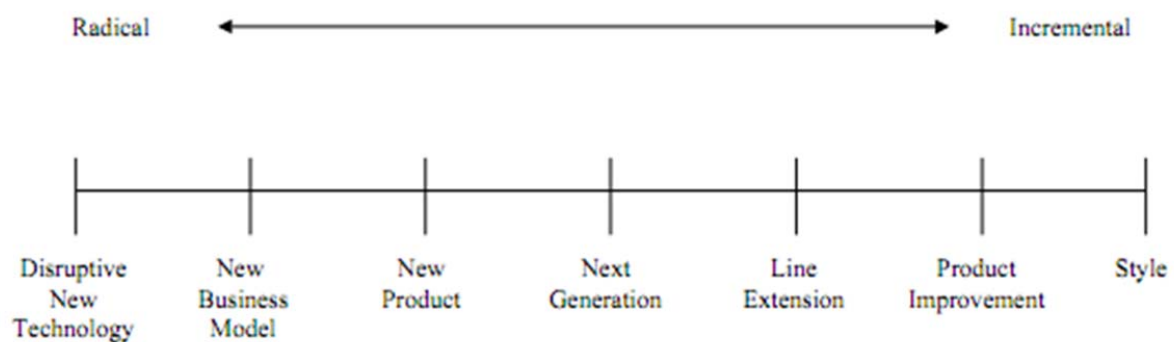
Figure 1 –Spectrum of innovations ranging from incremental to radical

Also, it is helpful to think about innovations as *sustaining* or *disruptive*. Christensen (1997) refers to the former as a company's response to evolutionary changes in its market, whereas the latter means a revolutionary change in the market. Finally, Tushman & Anderson (1986) distinguish between *competence enhancing* and *competence destroying* innovation. Using the definition of innovation as "*any new or substantially improved good or service which has been commercialized, or any new or substantially improved processused for the commercial production of goods and services*" (Rogers, 1998) we note that ideas or

inventions themselves are not innovations until they have been successfully brought to market. The focus of this thesis will on ideas and projects that are not yet innovations, i.e. that have yet to be commercialized. Further, the focus of this study is on ideas that do not fit in very well with the regular work and/or organization of the inventor. Throughout the thesis, we will refer to ideas or projects as *New Ideas* and *New Projects*. These ideas will generally be ideas associated with disruptive, radical, and competence destroying innovation, although that is not always the case.

2.1.1 Dual Organizational Objectives

This section reviews some of the motivation behind organizing for innovation in mature companies, what the challenges are in such efforts, and what some suggested solutions are.

The importance of innovation to achieve competitive advantage need almost not be argued for. Schumpeter (1942) describes how a process of *Creative Destruction* could give entrepreneurial firms temporary monopoly profits. Tidd et al. (1997) notes that there is a correlation between market performance and new products. He argues that new products help capture and retain market share, and help increase profitability in those markets. With ever shorter product life cycles, the notion of competing in time to replace products faster has become more important.

A stream of literature argues that incremental improvements or incremental innovation may not be enough to sustain a business over time. Tushman et al. (1997) argue that building core competencies and managing through continuous innovation seem insufficient for building competitive advantage. They illustrate how this can be the case by studying two companies, SSIH and Oticon, that each dominated their industry, quartz watches and ITE hearing aids respectively. Although both firms had the necessary resources and technology to innovate, smaller, more aggressive firms initiated change in the industries that eventually eroded the dominance of both firms.

What are some of the problems?
Several problems that companies face when trying to avoid this fate relate to an inability to see and organize around new opportunities. For example, Tushman et al. blame organizational complacency and inertia for the demise for the above companies, and argue that the firms were unable to renew themselves and proactively initiate new innovation streams. Similarly, the notion of core rigidities is used to describe a dangerous downside of core competencies (Leonard-Barton, 1992). Core rigidities

are deeply embedded knowledge sets that lead to organizational inertia and can actively create problems in projects, especially those designed to create new capabilities. For example, in a company with a high emphasis on one discipline, it may be harder to attract top people for the non-dominant discipline, as they know that they will represent a minority in the firm. Also, a project may be steered in a direction that builds upon well-known skills of co-workers, rather than on a more relevant market understanding.

While core rigidities to a large extent relate to the natural structure of a large organization, a different problem area relate more to cognitive limitations of the management of companies. For example, through a study of Polaroid, Tripsas & Gavetti (2000) argue that managers' strong belief in a well proven business model limited their ability to act on opportunities that relied on a different business model, despite attempts by newly hired employees to convince them otherwise. Similarly, Chesbrough & Rosenbloom (2002) show how the Xerox's initial business model was used to evaluate many subsequent business opportunities, thus limiting the search for a potentially stronger business model. They argue that managers need to make alternative business model experiments as important as technical experiments in the labs. Relating to the difficulty of foreseeing the viability of new business models, Christensen (1997) shows how focusing on current customers' needs and neglecting smaller, lower-performing technological solutions can be detrimental to powerful companies. He shows that it often seems to make sense to keep exploiting the same business model by serving the current set of important customers. However, sometimes new technology trajectories start out unimpressive and with a small special set of customers before becoming dominant. If a company neglects such developments, it can be left behind.

What are some of the suggested solutions?
A number of approaches to deal with the difficulties mentioned above have been put forth. Many of these revolve around building organizational structures for a dual focus, enabling activities to exploit the current business while also exploring new opportunities.

Putting emphasis on building organizations that can focus on different types of innovation, Tushman et al. (1986) argue that the organizational architectures required for incremental and discontinuous innovation are fundamentally different. Whereas incremental improvements need structured roles, centralized procedures and an efficiency-oriented culture, discontinuous innovation

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emerges in loose, decentralized structures with experimental cultures. The challenge is to manage an organization with such contradictions. This is done by creating an ambidextrous organization, in which the management team can host and reconcile the dual focus of the organization.

A different approach involves grouping projects of different types in portfolios. For example, by creating portfolios with projects ranging from *core improvements* through *logical extensions of the core business* to *new growth initiatives*, the balancing of exploitative and explorative activities can be facilitated Also, by creating consensus among management around what is desirable, discussable and unthinkable, clarifying boundaries can help focus efforts. (Anthony, 2008).

A third approach involves identifying new growth platforms at the intersection of three domains; (1) actual or potential capability set, (2) unmet customer needs and (3) forces of change in the broader environment (Laurie, 2006). Such platforms should then be given a high degree of freedom and strong top management support to be able to have a longer performance horizon and to step outside company culture and business model.

2.1.2 Creating Project Space

This section addresses the more practical issues related to supporting individual innovative projects in an organization. First, some problems are identified, then a set of solutions are presented.

What are some of the problems?

Three main issues related to allowing individual New Projects the necessary space have been observed. First, an idea or project with a new business model within an existing organization will be seen as a threat by the existing organization. Leaders of the existing business may try to destroy the new business and to prevent cannibalization of their own business. (Day et al., 2001).

Second, competing for capital, talent and commitment, a new business is often seen as insubstantial and does not get the necessary managerial attention (Day et al., 2001). Part of this unwillingness to put funding to a new project can often relate to the unpredictable and uncertain nature of the projects (Galbraith, 1992). Also, when trying to get resources in a large organization, a new project may have needs that are not well supported by established processes. For example, purchasing or hiring may be tricky if a new project relies on a different business model (Galbraith, 1992).

Third, the metrics that are used to evaluate and compare new projects with existing businesses are inherently inhibiting of innovation. Christensen et al. (2008) argue that traditional metrics inhibit

innovation efforts. First, using Net Present Value (NPV) and Discounted Cash Flow (DCF) results in underestimating investments in innovation projects. The method assumes that if the investment is not made, the company will nevertheless continue on its existing revenue trajectory. However, the most likely result of a do-nothing scenario is a non-linear in performance. Second, companies use fixed and sunk costs unwisely when they calculate the marginal cost for investments. When new capabilities are required for future success this results in that managers are biased leveraging existing assets that are likely to become obsolete. Third, earnings per share as become the metric for company performance. Managers' compensation is often linked to the share price, resulting in that they prioritize short-term gains at the expensive of long-term innovation projects.

<u>What are some of the suggested solutions?</u>
To the above mentioned problems, management literature suggest several solutions or remedies. In general these relate to separating new projects from the regular business in different aspects, the most important of which revolve around funding and metrics.

In terms of funding, it has been suggested that it can help to fund New Projects on a corporate level and not from the budget of existing businesses as corporate sponsors often have longer time horizons and have more receptiveness to radical innovations (Galbraith, 1992). To address the problem with using traditional metrics for both regular and new projects, the notion of discovery driven planning has been put forth by McGrath & MacMillan. The authors argue that new projects tend to get inflated numbers to pass certain gates in the regular company stage-gate process. To avoid this, reversing the logic of the typical stage-gate process is recommended. Instead of prompting new project teams to provide sales projections or other estimations that take them past a gate, minimal effort should be put into noting what the minimum acceptable revenue or cash flow statements need to be. Then, more importantly, put numbers on what needs to get done to meet such requirements. This will, argue the authors, help highlight the must-haves for success.
In an interesting attempt to separate ventures with different business models, target customers or radically different technology from existing divisions, Nokia created Nokia Venture Group (NVO). NVO was protected from the quarter-by-quarter thinking and was not under pressure to deliver immediate results as this often results in that leaders cut off new ventures too soon. Instead of relying on traditional financial measurements, NVO executives used a free-form and learning-orientated evaluation for NVO whereas they used a regular operational excellence approach for the

core business. Further, instead of evaluating individual projects, Nokia used a portfolio approach when analyzing NVO projects. They assessed ventures in terms of the different roles they could play within its project portfolio which consisted of four different project types: *Positioning Options*, *Scouting Options*, *Steppingstone Options* and *Platform Launches*. The funding of the ventures was made in a staged approach where success of the next stage had to look plausible before additional investments were made (McGrath, 2006).

In NVO, the importance of learning was emphasized. A task of the corporate wide business development board was to identify opportunities to transfer capabilities, intellectual property rights and knowledge across the organization. Further, leaders of discontinued ventures were invited to the training programs and talk about their experiences. An example is when a venture targeted a corporate segment that Nokia had not served in the past. Employees from that venture merged with other ventures to form what now is one of Nokia's new mainstream divisions. Interestingly, it was noted that more often than creating new business, ventures contributed with new technologies, capabilities and products that help the core business (McGrath, 2006).

Apart from funding and metrics, a few other ways to achieve separation of new projects are suggested, including *physical*, *structural* and *control systems* separation. *Physical* separation simply refers to how employees working with a new business are physically separated from the other employees, e.g. on another floor or in another building. *Structural* separation refers to employees reporting to the sponsor of the project instead of their line manager. The sponsor is not necessary in the same part of the organization and this structure enables a greater flexibility and freedom for the team. Finally, *control systems* are created in a company for the existing business to optimize it. Innovation on the other hand requires trial and error and deviates often from the current practices. A company might have rules regarding purchasing or hiring and this can create conflicts if a new business wants to use a different business model. A company must therefore allow the new business to have a different control system. (Galbraith, 1992)

The preceding discussion leads to the very important question of when, if and how much projects should be separated. Day, et al. (2001). argue that the more radical the innovation is, the more separation is needed between the existing and new business. However, while a separation of the new business can be desirable it can also easily go too far. In organizations that have a separate division

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focusing on new business opportunities, very senior managers are responsible for that division and for detecting new opportunities. They are already struggling to maintain contact with customers, market and employees and this new responsibility increases the information overload that they are facing. Another difficulty with separating a new business too much is the problem of integrating with existing business later on (Day et al., 2001).

As a basis for deciding whether to separate or integrate, two variables can be used by a company; (1) the nature of the conflict between the two business, and (2) how strategically similar the new business is perceived by the existing business. Plotting these two dimensions in a matrix gives four possible strategies (Markides & Charitou, 2004) in Figure 2:
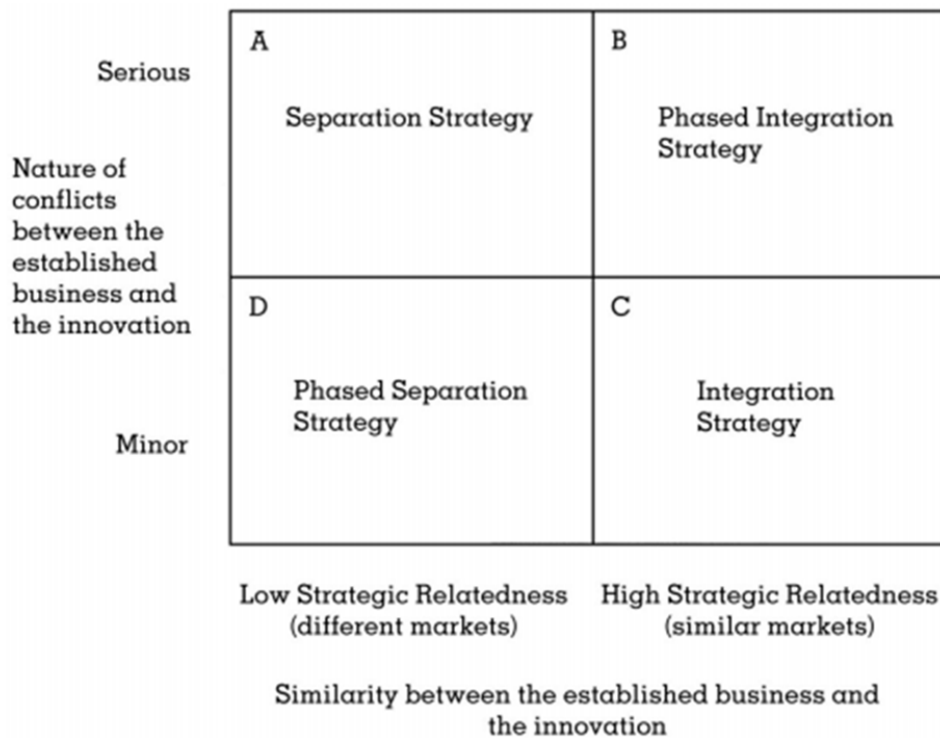
Figure 2 – Innovations should be integrated or separated depending on conflicts and similarities with existing business

The greater the conflict between the new and current business are, the better it is to separate the businesses and the more similar markets they have, the better it is to integrate. Two of the quadrants are relatively straight-forward: Separation is the preferred strategy when the conflict is great and the markets are not similar. Following the same logic, integration is to prefer when the conflict is low

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and the markets is similar. However, the two other scenarios are more interesting. When the conflict between the existing and new business is of serious nature but the markets is strategically similar, it might be better to separate them for a time and later on integrate them. If the there are few conflicts but the markets are ot similar, the preferred strategy is to first build the new business within the organization and afterwards separate it into an independent unit.

2.1.3 Employee Participation

This section looks at employee level issues that are implied by the above two sections. In particular, employee motivation and HR structures are treated.

What are some of the problems?

Having described some of the organizational and project level challenges that emerge in innovation efforts, we now turn our attention to employees' role in supporting both exploitative and exploratory activities in the company. Overall, problems associated with this revolve around incentivizing participation in New Projects.

A core challenge that companies face when building innovative capabilities relates to risk for employees (Anthony, 2008). In startups, entrepreneurs have a great potential upsides and downsides, whereas in companies intrapreneurs have smaller upsides and downsides. This makes it harder to incentivize entrepreneurial behavior within a large company.

A second challenge is to attract the right set of employees to new projects. As McGrath et al. (2006) show in their study of Nokia, when the venture group recruited they found that while enthusiasm was valuable, it did not ensure the right skills to build for the venture. Some volunteers applied because they were unhappy or performing poorly in their previous roles. This signaled to other employees that participating in ventures was not for top-performers.

A third challenge is to get employees' undivided attention to new projects. As Brown & Anthony (2011) argue, disruptive efforts require undivided attention, and they will suffer from team members being pulled away by other responsibilities.

What are some of the suggested solutions?

The solutions put forth for these problems relate primarily to creating HR structures that enable incentives for participation in new projects. Anthony (2008) for example, argues that companies need to develop HR structures that support risk-taking and participation in growth initiatives,

including creative ways of incentivizing innovation. Also, a company needs to have development paths in place that encourage high-potential employees to be part of growth initiatives. At Nokia, participants of new projects were provided an open door to senior management, which signaled that participants were groomed for more responsibility and often received promotions for their work. This increased the attractiveness of the venture group as a career destination or springboard (McGrath, 2006). To solve the problem of recruiting the wrong people to new projects, Nokia started to recruit those with prior entrepreneurial experience, who were team players and had good networking skills.

2.2 Lean Startup Methodology

This section describes an important understanding in recent startup literature; that the purpose of a startup is different from that of a mature company. Because of this, a startup should be occupied by different activities than a mature company. Two areas of such activities are examined; interacting early with customers, and iterating and pivoting.

In recent startup literature, Steve Blank's Customer Development and Eric Ries' concept and methods of the Lean Startup have been influential among entrepreneurs. The key concepts are reiterated on several widely read startup related blogs. Underpinning the methodology is the notion that "a startup is the organization used to search for a scalable business model" (Blank, 2010). Only after that has been done should a startup scale and execute the business model.

When discussing startup literature, it is relevant to understand when the temporary startup stops being a startup and becomes a mature company. While Blank states that finding a scalable business model is the end goal of the startup phase, another commonly used term in startup literature is Product/Market fit. Andreesen (2007) defines it as "*being in a good market with a product that can satisfy that market*". Similar to Blank, he argues that many startups fail because they never reach Product/Market Fit and they should do anything required to get there. This includes changing people, moving to another market or modifying products or services. The importance of reaching Product/Market Fit is illustrated in the pyramid, Figure 3, below by Sean Ellis (2011), who visualizes the importance of reaching Product/Market Fit before doing anything else. Ellis even quantifies product/market fit by stating that 40% of the users should say that they would be "very disappointed" without the product.
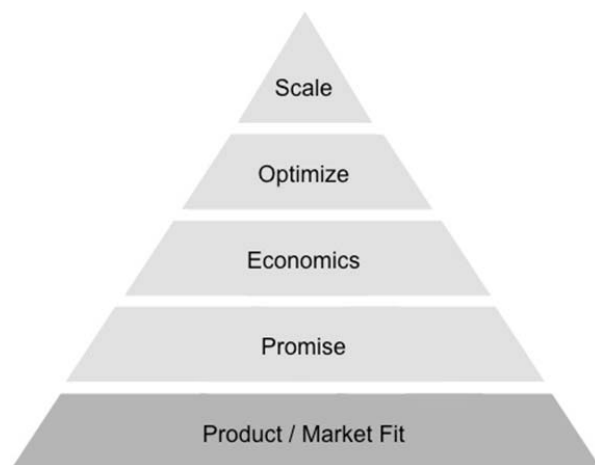
Figure 3 – The startup pyramid - A startup should get product/market fit before anything else

With the understanding that a startup has a different purpose than a mature organization, it is argued that the activities or methods employed by startup should be different from those of mature companies. For example, Blank proposes that traditional New Product Development practices do not fit a startup, as they assume a linear path between idea and production. He argues that following such practices may lead to pre-mature scaling because of a lack of product/market fit. To avoid this, startups can apply a hypothesis based learning to understand the needs of customers and to ensure that their product or solution fits a real need before scaling (Blank, 2006).

In the following, we will examine two areas of activities that recent startup literature highlights as vital to the success of startups in their search for a scalable business model. First, it is argued that early learning from customers will help startups moving in the wrong direction. Second, fast iterations and the changing of company direction are described.

2.2.1 Early Learnings from Customers

This section describes the value of engaging very early with customers instead of relying on market research until product launch. Earlyvangelists are described as the most attractive customers for a startup.

It is argued that many startups keep making progress in technology and features, but ultimately fail to identify a set of customers that accept the product or services. (Ries, 2010). All progress would then have been worthless. Based on this, Ries identifies the reduction of uncertainty and the understanding of customer needs as the primary mission of a startup. He argues that the unit of progress for a startup should be validated learning, rather than revenues or ROI etc.

Similarly, Blank (2006) emphasizes the need to "go outside the building", to expose ideas at an early stage to the users or buyers. He argues that a startup is based on a vision, and rather than collecting feature lists from a set of potential customers, the first goal of a startup should be to figure out where there is a market for the vision, very much like finding Product / Market fit described above. Upon identifying a set of potential customers, the startup then needs to validate that learning.

When learning about customers, whether regarding feature needs or sales potential, emphasis is put on getting valid data and not base decisions on traditional market research. Instead of simply asking "Would you like this product?" it is suggested that actual sales activities are tested, even when there is only a beta version or no product ready. Such a real sales process also doubles as a good way to build relations with potential customers, long before the product is good enough for that customer. For more complex products, Letters of Intents can be used as valid data on customer interest (Ries, 2009a). For smaller products, online split-testing can be used to gauge the difference in interest for two product versions from web site traffic (Ries, 2010). The idea of reaching out to a small set of customers early has similarities to Moore's Crossing the Chasm, where early adopters can help a company develop its offering before targeting a more mainstream market. (Moore, 1999)

When looking for the first customers as a startup, certain types of customers are more attractive. Blank uses the term earlyvangelists as the type of customers any startup should look for. Figure 4 illustrates the characteristics of earlyvangelists who can be found at level 4 and 5.
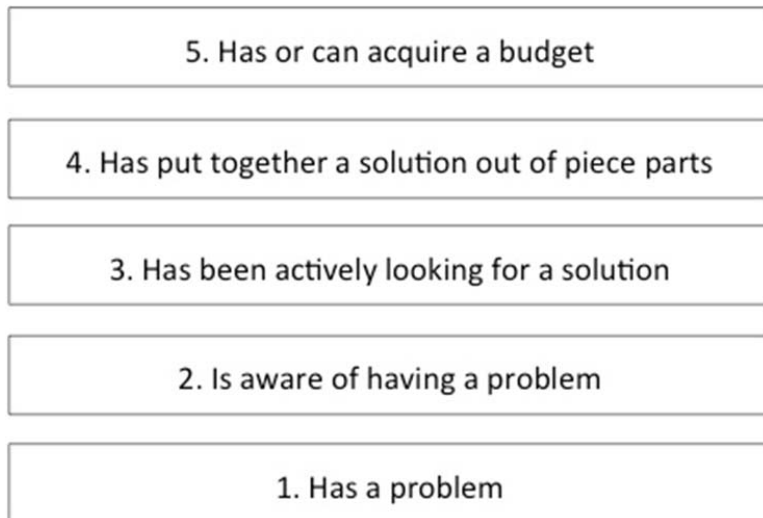
Figure 4 – A scale of customer pain and earlyvangelists are found on level 4 and 5

The notion of earlyvangelists bears much resemblance with lead users, as popularized by von Hippel. In his work, Hippel notes that users of products often innovate significantly, and that information on their needs is sticky and hard to simply ask for (von Hippel, 2005).

2.2.2 Iterations & Pivots

This section describes how working iteratively is emphasized in recent literature. The notion of pivoting is described, and it is argued that pivoting can be important for finding or creating opportunities.

In startup literature, Ries (2009b, 2010), Blank (2006) and others emphasize the value of progressing iteratively. The history of such reasoning is long, and draws on war strategy. Fighter pilot John Boyd developed the Observe - Orient - Decide - Act (OODA) loop as a war strategy for making decisions in unpredictable, and constantly changing environments. Boyd identified time as a scarce resource and argued that an entity that perform the loop quicker than its opponent will get an advantage. In the observe stage, decision makers gather information which they analyze in the orient stage. Based on this, they make decisions and take action. Applied to business, the OODA can be seen as a framework for creating competitive advantage (Marchisio, 2010).

Eric Ries modified the OODA cycle to fit lean startup development and developed the Build-Measure-Learn cycle (see Figure 5) which is one of five principles he proposes for lean startup (Ries, 2011). The goal is to minimize the total time through the loop, not the quality of each iteration, and

to do that one has to Build faster, Measure faster and Learn faster. Ries explores these three parts of the cycle and explains how to achieve higher speed in all three of them:
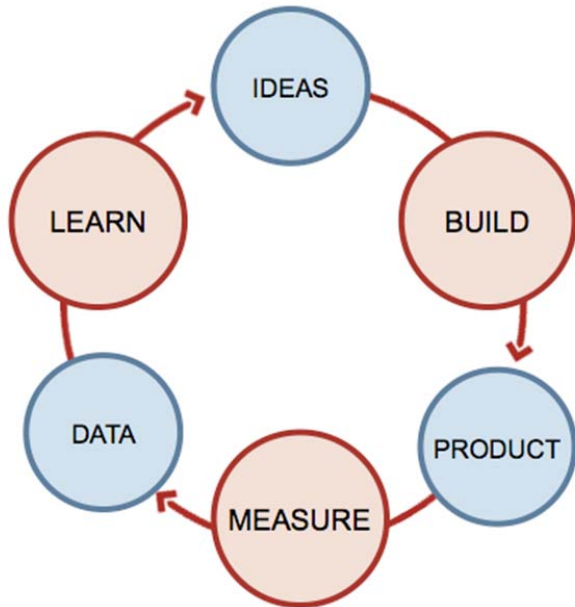
Figure 5 – Build - Measure - Learn cycle

To *build* faster, Minimal Viable Product (MVP) should be built. Ries, Eisenmann and Furr (2011) define MVP as "the smallest set of features necessary to secure the next round of validated learning". *Measuring* can be done through split-testing. By creating an MVP and comparing the result (e.g. number of purchases) of the new version with the old one, new features can be evaluated (Ries 2008). To improve and speed up *learning*, Ries suggests startups use Five Whys which is a problem-solving technique that can be used to identify the root cause of a problem. By asking why five times, the root cause of the problem can be found and solved, and not only the symptom of the problem. (Ries 2010)

Blank's and Ries' cycles bear resemblance with older marketing literature, where Lynn et al. describe another cycle, Probe and Learn, that can be used to manage the triple-headed uncertainties about the market, the technology and the timing. They suggest companies go to customers with an early version of a product to learn about the market, different applications and segments. The target customers are not known in the early stages and the probe-and-learn process can be seen as a way for identifying the target. Further, the authors suggest products should not have a single launch

event but rather several launches over many years where each launch leads to a modification of the target customer.

Pivot – A Needed Change of Direction

An implication of iteratively trying to learn about customer needs is that startups will sometimes learn that they may be on the wrong path. Ries (2009b) notes that such understanding can be very hard on a team, and leave them with a sense of wasted effort. However, he uses the notion of pivoting as a change in direction where a startup stays grounded in its past learning. "*By pivoting, we honor all the effort by recognizing that learning would have been impossible without the work [...]*". He notes that too little pivoting may leave a startup waiting for a breakthrough indefinitely, while too much pivoting may prevent any real learning to take place before the next shift in direction.

It is noted by Maurya (2010) that pivoting or course correction tends to be the result of bold experiments before reaching Product/Market fit. Such early experiments are designed to maximize learning. By contrast, after a Product/Market fit has been found, experiments should be aimed at refining the business model and gain efficiency.

While pivoting may intuitively sound like failure or backtracking, there is research that imply that an openness to changing directions may benefit entrepreneurs. Recent work by Marmer et al. (2011) shows that startups that pivot once or twice times raise 2.5x more money, have 3.6x better user growth, and are 52% less likely to scale prematurely than startups that pivot more than 2 times or not at all. In a well-cited study by Chesbrough (2002), all of six reviewed spin-offs from Xerox PARC pivoted and changed their business model before the demonstrated their viability.

In studying the behavior of entrepreneurs, Sarasvathy (2004) has found that successful entrepreneurs are inherently more prone to pivoting, because they use effectual reasoning. With effectual reasoning, entrepreneurs start with the means available to them (e.g. contacts and skills) and imagine several possible goals based on their means. This stands in stark contrast to managerial thinking, where a set of means are used to reach one pre-defined goal.

Sarasvathy (2005) then argues that new markets can be found through a transformation process, in which effectual steps are taken to transform current realities into new possibilities. Underlying these ideas is the notion of bounded cognition of any rational creature. By interacting with other

stakeholders in the world, actors can act with local search and bounded cognition, and expand their resources to form new markets or artifacts. Through effectual commitments of actors, opportunity gets produced through a process that continually transforms current realities into new markets. Expressing a similar notion, Silberzahn (2005) argues that a firm does not have to be defined in terms of products or market, but rather through a process of learning and organizational development that allows the firm to respond to market uncertainty.

3 Method

This section describes the process that was used in researching and authoring this thesis. It outlines the methodological choices that were made, and discusses the validity and reliability of the results.

Figure 6 gives an overview of the steps that constituted the research and writing of this thesis.

Research Plan — The purpose and scope of the thesis were set. An overall plan was made.

Literature Review — Databases, blogs, and videos were used to review start-up methodology and identify core tenets. Also, innovation literature for mature organizations was reviewed.

Data Collection — Semi-structured and unstructured interviews with 14 large multinational companies. A case study at one multinational company were the authors were part of an innovation team for several months.

Results — Results from interviews and the case study are presented under several topics.

Discussion — The results are discussed in relation to previous literature and the research questions.

Conclusion — A set of lessons learned are presented and advice is given on the implementation of selected innovation related processes in large companies.
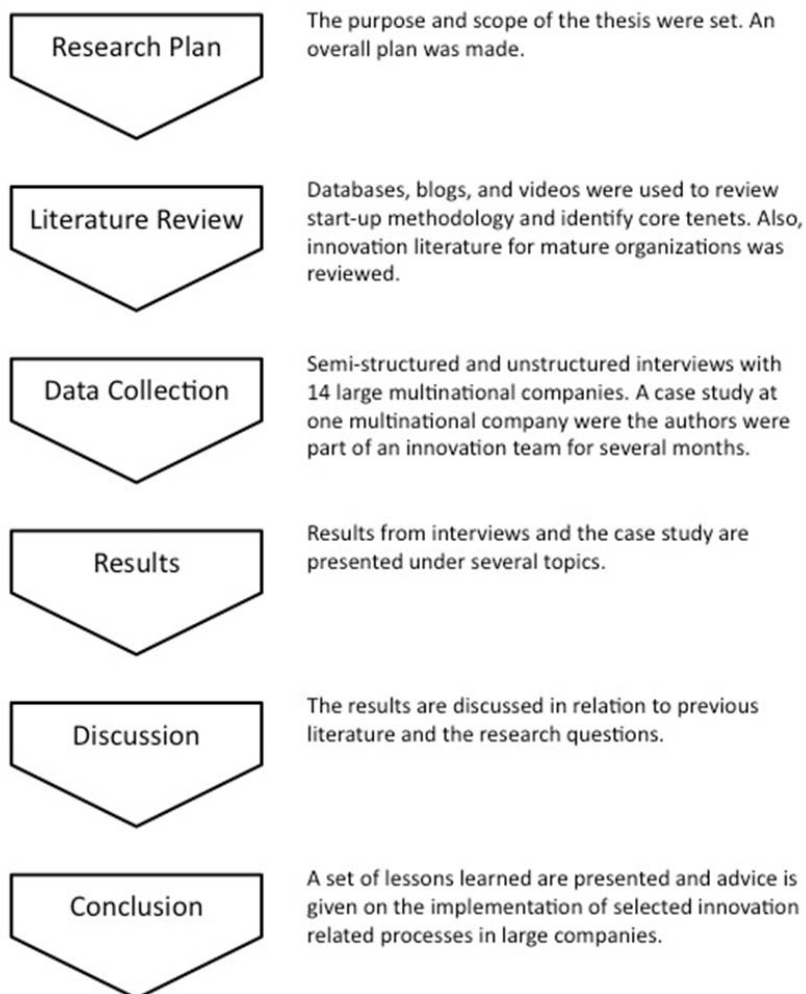
Figure 6

25

3.1 Research Strategy

Two main approaches to research are available according to Bryman & Bell (2007), quantitative and qualitative. While it is uncommon to conduct research that is purely one of the above, researchers should weigh the pros and cons of both before making a decision. A quantitative study of often chosen to statistically validate a hypothesis created or held by researchers. As such it suits deductive studies where theories are tested and then re-written. However, a quantitative study makes it harder to accommodate or account for social factors like organizational politics and culture. For this thesis, a qualitative study was therefore deemed more suitable. A qualitative study better suits an inductive research approach that aims to identify or develop new theories from observations. It serves better the needs in this thesis to understand the situation of actors studied.

3.2 Research Design

A research design helps set a framework for the collection and analysis of data for a study. Bryman & Bell (2007) identify five different research designs; case study, comparative, cross-sectional, longitudinal and experimental design. This study has employed the case study design and comparative design. A case study design is appropriate because it allows in depth examination of questions of the type "How?" and "Why?" These are important in this thesis when trying to examine how a set of methods could be applied in an organization.

The comparative design has been useful in recognizing factors that influence the success of innovation related activities in large organizations. As Bryman & Bell (2007) note, observing different contexts through the same lens can facilitate the identification of otherwise too subtle phenomena.

3.3 Sample Selection

The selection of these companies was done using a non-probability sample. That is, there was no attempt made to sample according to a sampling technique that enabled statistical inference of the results to a particular population of companies. Instead it relied on convenience sampling and snowball sampling. For example, the sample contains a majority of Swedish firms due to their openness to Swedish students, and in some cases companies have been identified through information from previous interviewees. The reason for using a non-probability sample was the

explorative nature of the thesis where the aim has been to identify phenomena rather than statistically confirm their existence to some certain extent. The only criteria for the interviews have been to identify (i) persons with a good overview of innovation programs or equivalent activities in (ii) large, multinational companies.

3.4 Data Gathering

Data for this thesis has been collected through several methods and in two distinct settings. First, a series of 14 interviews have been conducted with mainly R&D managers or Innovation Directors at multinational companies. The interviews were done over the phone in almost all cases and took on average just over one hour. One interviewer was responsible for driving the interview and one for transcribing the answers during the conversation to ensure correctness of information. A semi-structured interview technique was used to fit the needs of this thesis. As Bryman & Bell (2007) note, a semi-structured interview allows flexibility in terms of leaving out irrelevant questions for some participants and to use follow-up questions when the respondents leave intriguing answers. This has proved suitable when interviewing respondents from highly different corporate settings. The second setting of data collection has been a case study where the authors have had a unique opportunity to be part of an innovation team of a large multinational firm. In this setting the authors have been participating in daily operations and planning activities for three months. Over the course of this period, the authors have had the opportunity to informally interview a dozen team members on their opinions and experience. Also, they had the opportunity to initiate and follow discussions in the team on the startup methodologies that are in focus in this thesis. In research methodology terms, this means using unstructured interviews and participant observations. Unstructured interviews allow in depth exploration of people's view of their environment, and can be looked upon almost as a conversation where the respondent is allowed to respond rather freely one broad question or topic. Participant observation is more likely result in information that respondents take for granted and would not think of mentioning. The participant observation for this thesis can be said to be both overt and covert. It was overt in the sense that all people under study knew that the authors were doing research on innovation. However, in most settings the people under study were acting primarily as team members and were obliged to take the same actions that they would have regardless of the authors' presence.

3.5 Data Analysis

When data had been collected, it was analyzed by grouping observations or statements by interviewees under several themes. These themes were modified slightly over the course of the thesis work to better fit the structure of the thesis. The grouping was done by reviewing the interview transcripts statement by statement to make sure relevant observations were covered in the results. Such reviews of interview transcripts were made right after each interview, and at least once after all interviews were done.

3.5 Reliability & Validity

The reliability of a study relates to the repeatability of the results, i.e. could the study be replicated and generate the same results. In qualitative studies, reliability is generally lower due to the nature of data collection. That is true also for this thesis. For the series of interviews conducted with R&D managers and Innovation Directors at 14 companies, the reliability could have been fairly high, given an interview guide was used and the majority of information gathered was in response to that set of questions. However, since respondents have been left anonymous in this thesis, the possibility for other researchers to replicate the study must be deemed low. For the case study, the replicability is naturally very low, given that the setting for much of the observations and open interviews has been within a specific time period in a particular organization. Therefore, it is likely impossible to replicate the study.

There are several types of validity that are relevant for this thesis. First, the *internal validity* relates to the demonstration of causal relationships between variables. In this thesis, internal validity is deemed to be generally high, with some risk of wrong causal inferences being drawn. For example, the authors have mostly been able to observe clearly the reasons for a certain behaviors in the organizations studied. However, in some cases it is possible that other, less obvious, phenomena have been the underlying cause for the observed behavior.

Second, external validity of this thesis is regarded as medium, given the non-probability sampling and explorative nature of the research. On the one hand, it is possible that some specific phenomena observed in this study are unique to one or a few Survey Companies or to the Case Study Company. However, for most of the conclusions the reasoning will likely apply to many large companies.

Finally, it is also of importance to gauge the extent of which respondents have been giving correct information in interviews. For the interview series, it is believed that there is a low amount of incorrect information. The interviews have been relying on mostly neutral questions aiming to map the existence of certain innovation infrastructures in companies. However, in terms of addressing negative issues with companies' innovation programs, it is possible that some respondents took on a role of company representative, thus avoiding criticizing aspects that are looked upon as problematic within their own company.

4 Results

This section presents the results from the series of interviews and case study that form the empirical basis for this thesis. First, an overview of two main models for supporting radical ideas is given. Then, companies' approaches to supporting innovation is discussed at three different levels, following the same order as in the literature section; Dual Organizational Objectives, Creating Project Space and Employee participation.

While no company has the same setup for supporting radical ideas, two main models have dominant in the surveyed companies. The first and most common model involved the provision of an online portal and community, in which employees can post ideas, get feedback from colleagues, and get connected to sponsors, experts and more. We shall call such a system an Idea Support System.
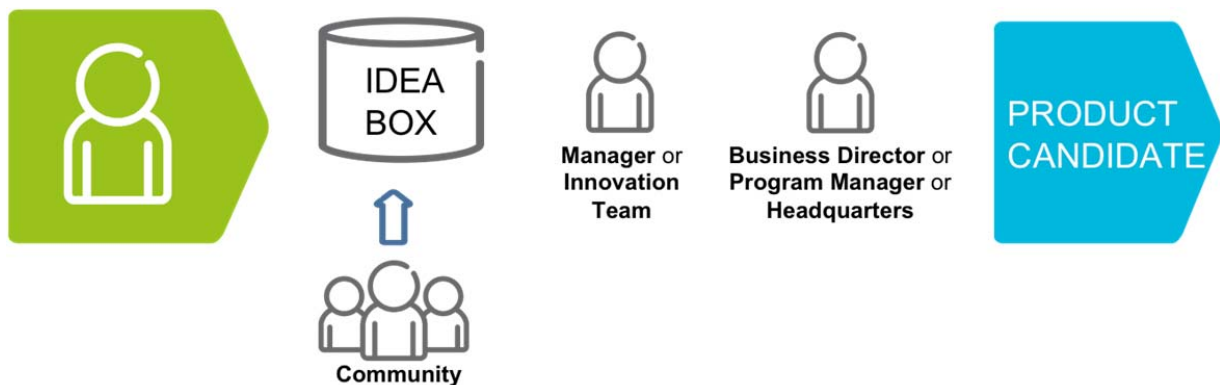
Figure 7 - Typical design of an Idea Support System in the surveyed companies.

Idea Support Systems

Several companies had very similar Idea Support Systems, for which the basic model is illustrated in Figure 7 and described in the following. Employees post a brief summary of their idea and wait for feedback. In some systems, they assign the idea to a particular department, in others that is done manually by administrators. After an idea has been posted, other employees can view the idea and comment or contact the idea owner with suggestions etc. The idea is then evaluated by an employee or team of the chosen department. Typically, the employees responsible for the evaluation have been selected based on a broad knowledge of the company and its offerings. If an idea is deemed interesting, the accepting person or team will take action to *support* or *drive* the early development of the idea. In most companies the idea owner was expected to drive the project, whereas in one company so called Idea Takers took on the role of running with the idea. The majority of companies had established processes for feeding new ideas into existing stage-gate processes, for example by

letting a development unit adopt a New Idea and treat it as any regular development project. More radical or unrelated ideas were treated in an ad hoc manner, for example by establishing a temporary team or reaching outside the company for partners or licensees.

Among the companies with Idea Support Systems, more than half had made the system available only to R&D departments. The Case Study Company had first deployed its system in one R&D organization, and as it was franchised to other parts of the company the conscious choice was made to keep the systems disconnected. The reason was to establish a sense of closeness and ownership in both the management and the employees. As the Innovation Director noted;

> *"The last thing we want is for engineers to feel like they send their ideas off to an unknown office with an opaque process of selecting ideas".*

All companies did however make the system available regardless of the geographic location of offices. All companies experienced difficulties in driving participation in online communities. A Director of Innovation at a Survey company expressed it clearly;

> *"It is very easy to build a grand system with elaborate processes, social tools and what not, but to populate and keep the system active is a real challenge".*

One company allowed not only ideas for solutions to be posted in its system, but also encouraged employees to post problems or needs that they had in their work. Although the option was very visible inside the online tool, very few employees had used it.

Two Survey Companies published challenges or problem areas for which they requested ideas. Such challenges were sometimes fairly local and specific, and sometimes more broad and all employees. One R&D manager that regularly posed challenges had discovered that the best challenges were not very specific, but not very broad. That way it focused people's attention, yet allowed for creativity. Another R&D manager half-jokingly claimed that *"engineers are pretty stupid until they get a problem to solve".*

The companies that run this first type of system, Idea Support System, identified three main benefits. First, all believed there was a spillover of technology and ideas from a large group of R&D staff that could be tapped and turned into profitable products or businesses. By providing an outlet for ideas and knowledge, they increase the likelihood of that happening. Also, all companies viewed

such a separate outlet as vital to the success of many radical ideas, as various forms of organizational resistance made progress difficult. Second, there was a general belief that having such idea support systems would make the company a more attractive workplace. As such, it would better retain current employees, but also better attract new recruits.

Idea Support through Personal Connections

The second model relied on personal interaction between an idea owner and his or her manager. For initial support, the closest manager could typically grant limited funding and resources. For promising projects that needed more funding outside the allocated budget, the first manager then turned to a higher manager, and in some cases an idea needed to be escalated even higher.

An R&D manager of a Survey Company saw one major drawback and one main strength with the model compared to building and maintaining an idea support system. The drawback, he said, was the risk of valuable ideas getting shut down for lack of interest by a manager who was approached. Often times, radical ideas would not give any benefits to that particular department or product line, and if it did, maybe not any time soon. The benefit of relying on direct interaction with a close manager was the speed of feedback and action. Also, he noted that relying on the support of a manager meant less orphaned ideas.

4.1 Dual Organizational Objectives

This section reviews how organizations from a high level can create an organization that is efficient yet explorative. Three solutions are presented; Separate R&D Efforts, Multiple Sources of Funding, and Dedicated Groups for New Projects. Finally, the use of metrics to track, develop, and motivate innovation efforts is described.

Separate R&D Efforts

Several of the companies surveyed had several R&D organizations focusing on different time frames. A typical division meant R&D time frames of 1-2 years, 3-5 years and 5-10 years to market, see Figure 8 below. These R&D organizations had not only different time frames, but also put focus on different levels of the product architecture. Whereas the 1-2 years group built complete products, the 3-5 years group focused more on components and technology. Finally, the 5-10 years groups had focus even further away from ready products. They would engage more in basic or applied research, exploring unproven concepts and technologies that could potentially constitute new growth

platforms and business areas. The work was related to multiple or all product areas of the companies.

The 1-2 years groups worked closely with product lines to build the upcoming products already sold, or just about to be sold. The 3-5 years groups focused on delivering technology that enabled the next generation products, and aligned their effort fairly closely with one or more 1-2 years groups. Finally, the 5-10 years group was more distant from the product lines, 1-2 and 3-5 years groups.
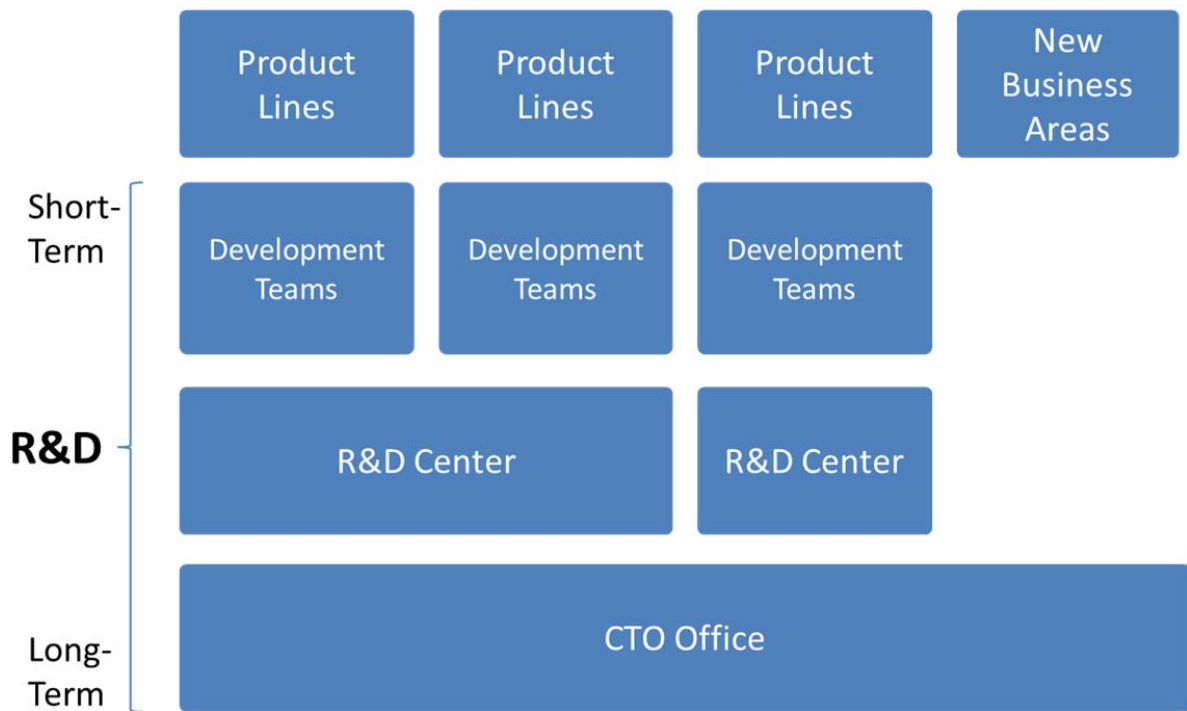
Figure 8 - A typical R&D structure in a high-tech company

Two Survey Companies had special divisions that focused exclusively on new market spaces. As such, they did not work for a particular product line or portfolio, and held expertise in evaluating new market spaces. Compared to the above companies with different time frames, the future markets divisions worked with a relatively short time frames and a fairly clear idea of the resulting products, similar to the 1-2 years groups.

Multiple Sources of Funding

In addition to grouping R&D activities according to time frame as described above, another means of directing R&D spending to disruptive innovation was particularly clearly at the Case Study Company. At the company, several sources of funding were available for any given innovative project. These sources of funding came from different levels of the organization and were often associated with a purpose, or some boundaries. In some cases, the purpose and boundaries were well understood, but in other cases it was necessary to "understand the politics" behind a particular source of funding.

An example of such an unclear purpose was the Case Study Company's budget for projects showing Technology Excellence. While it was understood by some interviewees that only somewhat disruptive and high visibility projects were potential candidates for the funding, it was not well understood what level of risk was allowed or expected. For example, one interviewee said he needed to figure out whether a project funded by the budget "*absolutely had to succeed*" or whether his team could "*try out a cool idea and fail*".

A direct result of the availability of different sources of funding was the uncertainty of *where* a project was to be run. In some cases, it took significant time, networking and negotiation to sort out where a project best fits. Although each sub organization did have its own processes for evaluating and prioritizing projects, orphaned projects were treated in an ad hoc manner, with no structured way of evaluating the relative fit in any organization.

Dedicated Groups

A third category of activities seen in several of the surveyed companies was the establishment of groups dedicated to radical innovation. In the first case, ideas of one business were funded and given limited time to develop into more serious prospects that could then receive more funding. In the second case, a venture group was created to support promising ideas through investment and professional management and advice. In both of these setups, a relatively clear understanding of the purpose was established in the organizations.

A program manager at a Survey Company did not see a need for a separate innovation program targeting disruptive products as disruptive products were coming from the regular product development which included user behavior studies and rapid prototyping. The program manager

said that the initiative had created several new product concepts that were directly competing with existing product lines.

Metrics

To motivate and manage supporting infrastructure for radical innovation, all surveyed companies use some forms of metrics. The metrics relate to either innovation programs as a whole, or to individual innovative projects.

For the four companies with dedicated idea generation communities and management systems, several simple metrics were used to track participation. All four tracked numbers of ideas, comments and the progress of ideas. In some cases these metrics were shared publically and used to encourage more participation from employees. In some cases managers made the conscious choice not to ask for or share these metrics in fear of encouraging quantity rather than quality. Explicitly or implicitly, all four companies tracked the quality or ideas, by either manually evaluating the quality of ideas, or by studying the ratio of ideas that progressed to later stages. For all programs except one, the use of metrics was used mainly to understand the performance of different parts or aspects of the programs. For example, it was used to identify what teams or departments did or did not contribute with many ideas, or to study what kind of ideas progressed.

The one company that did not use these metrics for studying the program, instead only used the number of ideas as a historical benchmark that indicated roughly how many patents would result, which in turn very roughly indicated potential new product development. The R&D manager of one department said that knowing the number of ideas gave a sense of confidence that innovation was happening at a satisfactory level. In cases when it did not, engineers were simply prompted to contribute more, and workshops were held on particular problem themes.

The more advanced companies used more complex measures of performance of innovation programs or innovative projects. The R&D department of one Survey Company managed innovative ideas as a portfolio of projects. To track the performance of the portfolio, each project was regularly evaluated and assigned a value based on expected future value. This value was in turn based on market assessments made by the sales department. Both radical and incremental ideas were managed in the same portfolio.

Similar to the R&D department above, a different Survey Company used even more complex tracking of project values, including expected project values throughout the lifecycle of a project, strategic fit, probability of technical and market success and more. In addition, the company tracked realized values after product introduction to be able to assess the return of all investments in innovation.

Finally, several companies tracked sales of new products as part of total sales in their innovation efforts, although there generally was no distinction between radically new products and incrementally new products with new product names.

4.2 Create Project Space

This section reviews problems that New Project Teams can encounter regarding funding of the projects and meeting customers.

A common challenge among surveyed companies has been the establishment of safe havens, or protected project spaces in the organization. Creating such spaces was seen as necessary by all interviewees because radical ideas often get killed in organizations if they have not yet established a track record or developed enough technology or information. Two main problems have been seen in the surveyed companies. First, New Projects can fail to attain necessary funding. Second, New Projects face difficulties meeting both new and existing customers. These two problems will be further described and examples of how project spaces or safe havens were set up across the companies will be presented in the following.

Funding

This section explores how the funding structure can help or break New Projects in an organization. First, five examples of how firms fund New Projects differently than regular projects are presented. Second, we describe how funding affects the freedom to change direction in a project.

A Variety of Funding Procedures

In the most straight forward example, a Survey Company in the manufacturing industry allowed employees to work with innovative projects between other projects when the employees were less busy than usual. Depending on size of the project employees could work with on it from a few hours up to a couple of days. When needed, they could use the regular lab equipment to build prototypes and run tests. The company used no formal process for such early stage projects, but

rather let employees and managers informally agree on when such activities were suitable. Once a project was deemed promising, it was escalated on a case-by-case basis by upper management that had access to bigger budgets.

The Case Study Company established a certain legitimacy to innovative ideas by providing some of them with quick funding based on only the expression on the idea online. In addition to funding, the innovator was also given an "allowance" of one week to focus on the idea and take the necessary steps towards more funding. By providing the funding in the form of a personal credit card that could be used instantly by the innovator, the company circumvented otherwise slow purchasing procedures and created a "special" environment that reminded innovators that rules were different. Although it required significant effort to set up and manage the program in this unique manner, it was regarded as highly important to keep the program different and attractive.

In one Survey Company that had established a venture group, project space was created by establishing a group function management team for the group and disallowing any team members from being part time line organization, part time venture. By doing so, the company hoped to prevent under-prioritization of venture projects.

At another Survey Company, pre-funded challenges were used as a means of securing the necessary support for a project. By identifying internal sponsors of ideas in a particular problem are, the company sought two main benefits. First, employees could be encouraged to innovate more focused on things that mattered to at least someone in the organization. Secondly, once interesting ideas were put forth, there was already a level of legitimacy of the project and fewer ideas were believed to become orphaned due to a lack of support.

In one Survey Company, a new technology was put in a completely new and separate division. Given the high uncertainty of the new technology, the division was given significant freedom to change direction as new learnings were made. The interviewee said this would not have been possible under the funding structures in the normal divisions of the company. Before building factories for the products, the division was able to make important changes to the product and review what its first target market should be.

One of the sources of funding for product development described in 4.1.1. is the product management who orders development from the R&D department. The product management is

responsible for an existing product line and when they want a new product or an improvement of a product, they put together a list of requirements that the development team works towards. In development projects, the requirement list is used as a base for the plan of the project. For example, one Survey Company gave employees one week to write a project proposal for a 6-24 months project, for which fund could then be allocated. If a New Project team realizes over the course of the development work that the product should be changed in a radical way, this change must be discussed and confirmed with the product management since they are funding the project. Obviously, the product management is more inclined to fund product development projects that will strengthen their own product line and is not as interested in funding projects that belong to other product lines in the company. Therefore and due to set requirements, it is often very difficult to radically change a product development projects. Doing that would be seen as a confirmation that the project has not met expectations and thus is a failure.

In an interview for this thesis, serial entrepreneur Steve Blank said he believed that it is much easier for start-ups to do major changes in projects than for people in large firms. He argued that investors in start-ups know that it might be necessary to change direction as the initial business model often shows to have some wrong assumptions. For example, it can be the product, revenue model or some other part of the business plan that is shown to be wrong that makes it necessary to modify or replace some parts of one's business plan. On the other hand, in a corporate setting it is much more difficult to radically change direction. As described, when the product management fund the development of a new product, it has a list of requirements of the new product. Blank stated that VCs to a larger extent look at the team when evaluating investment opportunities in start-ups while large firms evaluates development projects more depending on the product and not the team members.

However, it is not necessarily the funding itself that is the problem but rather a lack of other resources. When asked about the needs of an entrepreneur inside a company, the owner of one idea in a large company stated that funding and manpower are the two vital assets in an early project. He explained that in his organization, the two were very different in terms of difficulty to obtain. Manpower was the hardest problem, with two main solutions. Either the entrepreneur could get ask colleagues to unofficially spend some time on the project in parallel to their own work, or to get their manager or project leader to accept a dedication of a small percentage of their work on the new project. While the second option theoretically did not pose any big difficulty, it often proved

difficult for any employee to get out of current projects. In one case of the interviewee, he had gone to great lengths to arrange for an intern to work on the project, since other manpower was unavailable.

Customer interaction
This section reviews difficulties for team members of New Projects to interact with customers and how some companies have tried to solve it.

An important aspect of customer development and lean startup is to interact with (potential) customers very early in the life of an idea, product or service. While the value of such interaction is easy to understand, the practicalities involved may be daunting, both for a single entrepreneur or startup, and for a large corporation. A serial entrepreneur interviewed for this thesis described how it takes courage to step out in front of a potential customer with a half-baked product. It also takes hard work to get in front of the right person at any potential corporate customer. Often it is necessary to identify a certain project leader or engineering group to be able to attract interest from a large company. Once the right person is identified, expectations need to be managed to prevent that a valuable learning experience turns into a sales call focusing on numbers. In large corporations these problems exist and are further complicated for several reasons.

First, in several of the surveyed companies almost all interfaces with customers was through sales organizations. In the sales organizations, customer accounts were owned by key account managers, whose teams were primarily concerned with selling the existing product line. In their interaction with customers, they were granted limited bandwidth with customers and wished to use that bandwidth in a way that benefited them the most. Because of this, owners of new, radical ideas experienced difficulties in getting face time with customers. Among the interviewees, it was generally perceived as out of the question for idea owners to bypass the sales organizations to interact with customers.

In addition to limited bandwidth, a second concern of the sales organizations was the risk of exposing critical information to customers. Most emphasized was the risk of exposing future upgrades or research areas that would potentially risk the customer's commitment to buying the current generation of products.

A third concern that was voiced by one company was the brand risk associated with having inexperienced employees represent the company at customers' sites. The fear included basic

professionalism in the interactions with customers, but also more serious issues as making false promises or sending messages inconsistent with the company brand or strategy.

When meeting potential customers, Steve Blank argued in an interview for this thesis that it necessary to lower expectations for what the meeting meant. He argued it can help to *"…say you are a low-level employee from some non-important part of the company"*. He deemed it often undesirable to meet a very senior representatives and thought it can be better to meet a regular employee who knows the daily routines. By contrast, a manager at one of the Survey Companies, argued that it is a good thing if even the CEO shows up since it proves that it is a serious meeting.

Despite the difficulties of interacting with customers for early feedback, several companies did have processes for doing so. The R&D department of a Survey Company set up regular meetings with customers where new technology was discussed. For such meetings, expectations were set beforehand so that no current or shortly upcoming products were to be discussed and that it was no sales call. At a different Survey Company, the customer base was unknown and the process of getting in front of the right audience at a potential customer often required several meetings with the "wrong" customer representatives.

Another Survey Company required any investment in a new research project to be preceded by an expressed customer interest in the resulting technology or product. Throughout the life of a research project, the company re-valued the project based on expected added customer willingness to pay as a result of the technology or product.

As noted in the Literature section, the aim of customer interaction is primarily to learn about their needs by proving or dismissing hypotheses. In general, idea support systems or equivalent activities in the surveyed companies do not accommodate for learning in this way. While there is a consensus among interviewees that there needs to be a protected space for radical ideas to gain strength, little consideration is given to the need to test assumptions early. In one company, several escalations of a new idea included writing more elaborate and thought-out project proposals to higher management to request larger amounts of funding. Often, these escalations and were done with no additional testing of assumptions, neither technical nor customer or market related assumptions. According to the R&D manager, when trying to obtain funding from higher up in the organization, it was simply more effective to tweak powerpoint slides than to include more test results.

Looking at how teams form in large companies compared to in start-ups, an important difference is obvious. As expressed by Steve Blank, a start-up is a temporary organization that exists to identify a viable business model. In the companies surveyed in this study, that notion is not easily applied. The main problem that was observed was the lack of space for seemingly non-value adding activities of talking to customers early. One interviewee saw a gap between what information decision making managers saw, and what the intrapreneurial team saw. There were natural reasons for this, argued the interviewee. For any team in the organization, the best way to move forward was not to carefully and wisely spend little money on testing the business model, but rather to "*scream as loud as you can*" and spend any money fast.

Communication and Speed

One aspect that has been notably impacting projects at the Case Study Company has been the speed at which they progress, and how that can be dependent on connections with other parts of the company. A larger and more complex organization not only slows down the speed of a New Projects but it will also be difficult for employees to have a thorough understanding of existing projects. This means that a project can be started without knowing if there have been similar projects before from which employees can learn or similar projects with which one can cooperate. While it was obvious and mentioned by several interviewees that better information could help through experience, potential collaboration etc., another side of finding other related projects in the organization was observed. In one case, finding out about another project in the organization proved restricting to the project team. Having started the project in one direction, the team later found out about the company's activities in the area, and only then understood that their choice of business model would meet insurmountable barriers.

A larger organization also has complex communication structures. In the Case Study Company, to solve issues, projects needed input from people in many functions such as legal and controlling which took several weeks. It was also common that they were spread out in several countries, which made the process even more extended. Several employees said that a big problem is that people often do not response to emails until several days after they have received it and it was not uncommon that emails were never replied to.

4.3 Employee Participation

This section presents factors on an individual level. First, different incentives for employees in New Projects is presented and is followed by an overview of how lack of time affect New Projects. The section ends with an presentation of the manager's role in New Projects.

None of the surveyed companies had monetary incentives for employees working with a venture in the company. The employees continued with the same salary and his/her actions in the venture would not affect him/her financially. An employee at the Case Study Company said *"the risk and reward incentives that you would have in start-ups are impossible to implement in our company"*. However, most of the companies had monetary rewards for employees who applied for and were granted patents. The monetary sum was connected to the how many countries the patent was granted for. Most companies argued that recognition incentives were better than monetary and they used one or several ways to reward innovative behavior. For example, awards were given to the innovator of the year and he or she was recognized in company magazines as well as on corporate events. In several companies, successful innovators were invited to an annual dinner with the upper management. Finally, an appliance company had an annual big and important event where innovative designs were awarded. It is interesting to note that although some of these companies had theoretically the same recognition for innovation, those events or publications had very different impact or visibility in the companies.

In the Case Study Company, several interviewees explained that they were very busy all the time. They had to work with their day-to-day task all day and did not have time working on innovative projects. A manager said *"All people are told to put their nose to the grindstone and get the product out"*. Project managers were said to be very reluctant to allow people in their project working on other innovative projects, as this would increase the risk of delaying the current project. A manager said: "*If one person in a team of four is going to work on an innovative project for a week, the three others still have to deliver the same results*". To add to the shortage of time, creative employees who submit innovative ideas are often even busier as they usually are involved in several other projects. As a result of this, employees often found it difficult to take time to pursue an experimentation week and work on a project. In fact, only a third of the employees that have been awarded an experimentation week have actually taken time off and done the week. To solve this problem, the company will appoint full-time dedicated team members that will only work with these kinds of projects. A senior manager said "*it is very*

important that the members do not work with anything except this project in order to be able to fully focus on the project and not be pulled back to regular day-to-day work".

One of the Survey Companies also created a separate team to work with more innovative projects. The team members were either internal or external. The internal hires temporarily leave their regular position to work in the venture and their line managers are reimbursed to be able to fill the vacant position. That company also emphasized the importance of letting the team members work full time in the venture and that they do not work part-time in their line role.

At a manufacturing company, when an employee submitted an idea, the first screening was made by a matchmaker who assigned an idea taker to the idea. The idea taker then became a significant driver in the project and was then responsible for refining the idea and move the project forward. This takes away the need to arrange for inventor to leave home organization and potentially lose career traction. On the flip side, several people in other companies argued that an idea needs a committed owner and that only a driven inventor can fill that role.

Not surprisingly, many employees expressed concerns with working on innovative projects if their managers did not support it. They were more likely to focus on their day-to-day work if this would increase their chance of getting promoted. This was especially important during difficult times. At one site in Europe where the Case Study Company had been laying off people, the number of submitted ideas has fallen rapidly. One interviewee described that during difficult times employees want to strengthen their position in the company by working on projects that their manager thinks are valuable and not on disruptive ideas that potentially will be valuable in the future. He also noted that, in tough times, employees tend to want to conform to the organization by working on regular projects and not on innovative projects as this would make them stand out in the organization which can increase the risk of getting laid off.

Another difficulty with letting people work on an innovative project for some time is when the employee is coming back to their previous role. A manufacturing company envisioned that the employees would want a different (and better) job after such a project but the company would not probably be able to offer that. The result would therefore be that the company lost an employee instead of becoming more innovative.

5 Discussion

The discussion first addresses the innovation infrastructure of the studied companies in 5.1. This follows the same structure as the Section 2, namely Dual Organizational Objectives, Project Space and Individual Level. Then, in 5.2, we discuss how two categories of Lean Startup Activities may or may not fit into the existing innovation infrastructure of large companies; Pivots & Iterations in 5.2.1, and Early Customer Interaction in 5.2.2.

5.1 Innovation Infrastructure in Large Companies

In this section we examine some of the problems that inhibit innovation at three different levels in Dual Objectives, Project Space and Individual Level. For each of these topics, we highlight weaknesses that we argue inhibit innovation activities. We also provide possible efforts to improve the situation.

5.1.1 Dual Organizational Objectives

This section argues that the surveyed organizations mostly have top management support for innovation programs but sometimes lack vital middle management support, which is detrimental to innovation efforts. Culture and hardwired innovation programs are suggested as possible solutions, but they both require consensus on what New Projects are wanted. Finally, it is argued that the amount of internal friction and support should impact what types of New Projects are pursued within an organization.

Looking at top level of support for innovation infrastructure in the sample companies, it was found that there exist a strong interest in innovation and a willingness to build innovative capabilities in the management of the surveyed companies. The majority of companies had dedicated innovation programs for supporting radical ideas. This is well in line with literature on ambidextrous organizations, new growth platforms, etc., where (top) management support is regularly listed as a vital component in successfully supporting innovation programs or individual ideas.

However, what seems to have been failing in some of the organizations is a lack of consistent support of such programs or activities. For example, although an innovation program is strongly supported from top management that grants resources to the creation and management of the program, it may also require resources from other management levels or departments. When one or several of these vital supporters are missing, the success of the program may be severely limited.

We see two different paths to addressing this issue. First, as we have seen in one company, culture seemed to enable innovation projects to be pursued side-by-side with regular activities, by employees staying in their regular positions. Time was taken in between regular projects to pursue innovative projects and little organizational politics seemed to be impacting the behavior. Vital to this approach was the availability of time. In other companies, this approach was viewed as impossible, given the pressure to execute. By building a culture where spending time and resources on odd ideas and risky projects is viewed positively, we believe that companies can facilitate the coexistence of execution and innovation in one organization.

Second, we have seen partly successful programs and activities in companies where an "innovation infrastructure" has been hard-wired into the organization. By hard-wired, we mean that positions have been created, budgets have been set aside, and processes have been put in place for the support of innovative programs. These programs have the benefit of actively reaching out to the bulk of employees by providing simple activities to engage in innovation, and marketing those activities to everyone. The downside or difficulty of successfully establishing such programs is the need for processes to be built across multiple departments and management levels. While theoretically possible, in practice it proves difficult for organizations to "think of everything". That is, as mentioned above, if a program lacks the support of one vital stakeholder, e.g. a middle manager, it is risking failure. Also, if a program is to be built on processes, those processes need to support all projects that are run through them. An important understanding in building processes to support innovative projects is that no two projects are alike, and inflexible processes risk providing more friction than support to projects that differ from the set of projects that was used to model the processes.

Finally, for both cultural acceptance or hard-wired programs for innovation to be successful, we agree with Anthony's view (described in Section 2.1.1) that a consensus among management around what is desirable, discussable and unthinkable, is vital. We argue that a consensus among management is not enough, but needs to be established across all levels in the organization. For example, in the majority of companies' idea support systems, only R&D departments were given access. It was then many times hard to get product departments on board with a particular idea. Building a common system and vision that was spread throughout all departments could, we argue, help bring consensus and support for New Projects. If consensus cannot be reached and

communicated, effort will be wasted, and speed will be lost on driving unwanted projects, or avoiding initiating projects out of uncertainty.

This discussion leads us to the important question of what projects should be taken on within the innovation efforts of a company. While essentially a question about overall business and corporate strategy, desired risk level, and the need for new products, this study has indicated that the decision should also take into account the level of friction that a large organization creates on an innovative project. Throughout the companies surveyed, various forms of organizational friction was part of any new project's life, including, for example, the need for clearance to talk to customers about a new idea. Some companies managed to lower such friction by building a smarter innovation infrastructure or maintaining a supportive culture. Also, in any one organization, different projects were subject to different types and amounts of friction. On the flip side of organizational friction, New Projects can also get substantial support and resources from its organization, which helps motivate pursuing such projects in house. This implies that for any given project an organization should consider (a) to what extent the project will meet friction and (b) how much support and resources the project can draw from the organization. When the former outweighs the latter, the argument is stronger (ceteris paribus) to pursue the project outside the organization, by spinning out a team, selling or licensing a technology, see Figure 9 below.
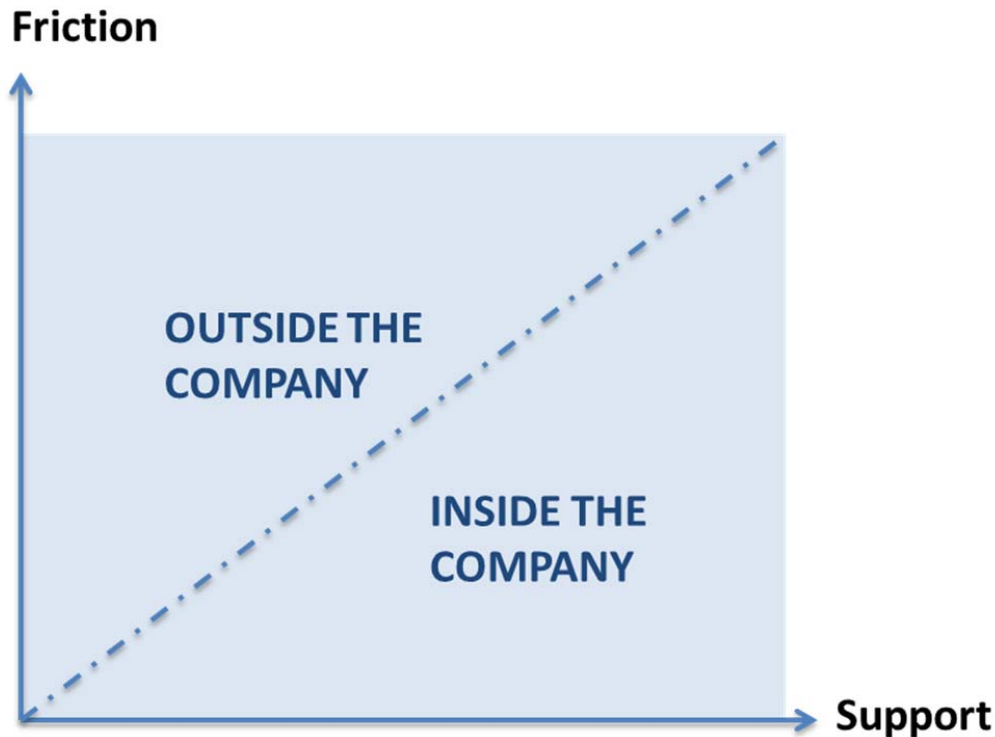
Figure 9 – Whether a company should pursue a project inside or outside the company depends on the degree of friction and support the project gets.

5.1.2 Project Space

This section argues that surveyed companies could benefit from increasing Physical and Structural separation of New Projects from the regular organization.

Turning our focus to how companies create project space for individual projects, our results indicate that companies are struggling to provide enough separation between regular activities and innovative projects. As noted in the literature review, a company can provide different kinds of separation for innovative projects. Looking first at *Physical* separation, none of the surveyed companies had any dedicated spaces for working on innovation projects. In terms of *Structural* separation, elaborate organizational charts and processes for idea support systems gave the impression in several companies that employee's normal managers had little to do with innovative projects. That is, on the surface it seemed like a very different temporary hierarchical structure was in place for innovative projects. However, in the case study, it was obvious that employees' day-to-day commitments to line managers and project managers were greatly overshadowing any innovative project opportunities.

Funding separation seems to have been less of a problem as most companies had dedicated programs with budgets or access to other funding sources. Finally, a need for project specific *Control Systems* was not seen in most of the surveyed programs as ideas were still early phase and not subject to control systems.

We believe companies can benefit most from increasing two types of separation; physical and structural. Physical separation would, we argue, help emphasize the independence of project teams from the existing business. It would prompt a team to take many steps independently, rather than relying on the participation of busy employees in the line organization. By doing so, teams can move projects forward more promptly, and reduce the risk of falling into the default behavior of the organization. This reasoning resonates with Leonard-Barton's illustration of how core rigidities can actively create problems in projects. Also, from the case study, it seems physical separation would practically prevent team members from being pulled into meetings, asked for help etc. On the flip side, the team could miss out on skills and resources from the organization. Physical separation could be accomplished by as simply means as a separate room, in a far away corner of the office building, or by providing an off-site location for teams to focus on a project.

By increasing structural separation, companies can decrease the risk of team members prioritizing "real work" and thus slow projects down. Such structural separation has been a major difficulty for companies in the study, and should not be taken lightly. While incorporating innovation projects into individual performance measures is a complicated undertaking, we believe such a component is necessary. Such performance measures are necessary not only for employees expected to take part in innovative projects, but also for managers and project leaders that will have to account for their absence in regular projects.

5.1.3 Individual Level

This section describes how there are two views on how much responsibility a company should lay on idea owners. It is argued that ideas that face complex organizational or market barriers need the support of a professional commercialization team, whereas ideas with mainly technical uncertainty can be pushed by a less experienced idea owner.

The amount of separation, and the setup of innovation programs or activities will have an impact on what requirements the organization sets on the initial idea owner. In our study we have seen companies strongly promoting that idea owners take a leading role in driving their project. The reasoning is then that "ideas are a dime a dozen" and if the person with the idea will not push it forward, then who will? Other companies argue that "not everyone is an entrepreneur" and try to build supporting roles that will help or take over the idea.

We argue that both of these views have merit, depending on the type of idea that is discussed. In cases with high barriers to implementation within the organization or complicated market conditions, a more professional team should be involved in driving the project. When solving a technical problem for which the solution easily finds its customer internally or externally, more responsibility can be put on the idea owner. If a company is to expect the active engagement of idea owners, such risk-taking must be coupled with benefits for the employee. As mentioned in literature and as seen in our results, the support of managers and a positive career development are vital for incentivizing intrapreneurial behavior.

5.2 Barriers to Implementing Lean Startup Methods

Having discussed the innovation infrastructure in large companies, we now turn our focus to Lean Startup activities and barriers to implementing them in large companies. First, three challenges of allowing more iterations and pivots are discussed. Then, three barriers to increasing early customer contact in new projects are presented.

5.2.1 Pivots & Iterations

This section outlines three barriers to allowing iterations and pivots within large companies; inflexible project sponsors, slowness of communication and focus on technology rather than team.

As described, an essential part of Lean Startup methodology is pivoting and iterating. Our results showed that there are three main factors that hinder large firms to pivot and iterate.

First, in the companies surveyed, New Project teams often get the funding for their work based on a plan which has been agreed upon with the project funders. The development teams work towards that goal and it is difficult to change. Digressing from the plan or failing to reach the goal is

synonymous with failure, and likely means that the project will not get continued funding. A key understanding here is that the sponsor of a project is likely not benefitting (as much) from anything that is outside the initial plan, because it will likely not align with current product lines.

This goal driven way of working is in stark contrast with effectual reasoning where one start with the available means and imagine several possible goals. In the beginning of a project it is not possible to see all possible actions one can take. After working in one direction for a while, new possibilities, better than the previous ones, might come up. These new possibilities would not have been visible if the project had not gone in that direction and hence it can be necessary to take a leap of faith in a direction although it initially does not seem right. Imagine being in a valley and you want to climb the highest mountain in the area, see Figure 10 You are the first person ever there so there are no maps, a truly unknown environment. You see two mountains, A and B and you can clearly see that A is higher so you begin to ascend A. You will completely miss C, a third mountain which is the highest of them all.
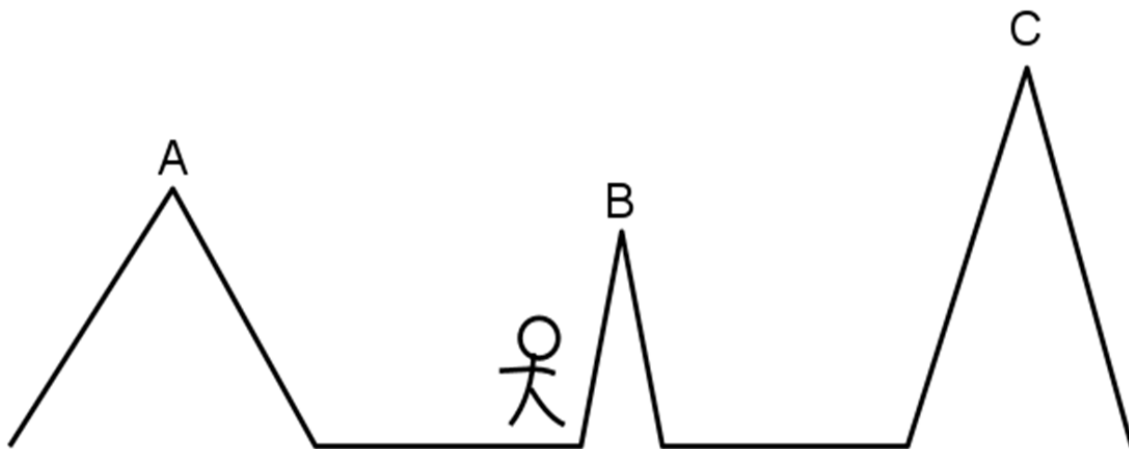
Figure 10 – Choosing current suboptimal opportunities may be necessary to discover more and better opportunities

Second, communication in big firms is generally slower than in start-ups. There are more people involved in an arbitrary project in a large firm compared to in start-up. This leads to a higher number of communication links which adds the amount of communication at the expense of pure efficient work in a project. This has a negative effect on the speed in a team. It is also common in large firms that team members are geographically dispersed which can slows down projects even

more. Another factor that slows down projects is long response time between team members when one team members needs input from someone else. One reason for slow response times is if the team members have several projects running in parallel. Then they might not be able to spend time on a task if they have not planned for it. They will therefore do the task later than would be the case if they did not have several projects. Another reason for slow response times is not a structural problem as the first one but concerns the culture in the company. Even if the team members have time to respond they sometime choose not to do it or wait much longer time than reasonable.

Long lead times of internal communications like described above not only leads to longer product development processes than necessary but also makes rapid iteration impossible. As Ries notes, the goal in Lean Startup is to maximize the speed of the iterations and not the quality of each iteration. This is especially important in fast-changing industries where the environment might have change even before the actions that were based on the environment have been taken. Existing product development processes in large firms are built to maximize the output from one cycle and do not tolerate several iterations which makes it impossible to implement rapid iteration. Whereas the issue above concern the communication within team projects, there can also be problem between teams and an information asymmetry can emerge. Bigger companies and more activities results means it is more difficult to keep track of all things going on. Projects can be started without knowing if similar or adjacent projects have already been done and thus learnings from other projects might not be taking into consideration. However, an increasing awareness of other projects in the company can also have a downside. The authors have seen employees who after realized restrictions in e.g. business model or customers relationships changed their projects to better fit with the organization. These limitations might force them to change products to be similar to existing ones and lose their uniqueness.

Third, our results also show that project funders in large firms are less willing to allow pivoting and iterating in project than VCs for startups. One explanation is, as described, is that project funders set a requirement list that the development team work towards. They fund a development project if they want the product, not because they believe the team members will come up with something valuable. VCs, on the other hand, invest in startups to a greater extent based the team. Currently, when employees want to get funding for a project they put together a proposal with expected outcome and required funding. Obviously, projects with a higher ROI have a higher probability to get funding and thus forecasts can be exaggerated to improve the chances. If project teams would

use a Lean Startup approach and not forecast the financial outcome but instead emphasize how they would do carful testing and iterating, it would probably be difficult for them to get funding. To compete against other project proposals that include optimistic quantitative estimations, explanations how many times you would iterate will not be enough. If not all projects in the company change to this testing approach simultaneously, it will not work.

5.2.2 Early Customer Interaction

This section argues that large companies face three barriers to interacting early with customers when driving New Projects. First, there is a lack of bandwidth with customers, access to which is often controlled by key account managers or equivalent. Second and third, there is a perceived risk of disclosing information and of damaging the company brand when sending untrained employees to customers.

Another essential part in Lean Startup methodology is to early interact with customers and learn from them. It is common for entrepreneurs in start-ups to interact with potential customers, suppliers and competitors in early stages of the company. For project teams in large firms, however, it is more common to do internal evaluations if the product is attractive to develop or not. Because of this, engineers rarely meet customers and they can't interact with potential users or ask question about usage, pain points, need etc.

Three major reasons for the absence of customer meetings were identified. First, it was common that sales people that are responsible for customer contact are not willing to let other people spend time on non-selling activities with the customers. In companies where the sales organization was separated from development teams, it could also be a matter of simply engineers not being personally familiar with anyone with regular customer contact. Without a personal contact, reaching out to key account managers or others was a barrier. Second, from sales people' perspective, it is believed that engineers might disclose classified information, when they to engage with customers. For example, by hinting that a new technology was about to go on sale, a customer may postpone the current purchase to the dismay of the sales representative. Third, engineers that are not trained in how a company interacts with customers may act in ways that are not in line with the company profile. There is therefore a perceived brand or relational risk associated with such customer contact.

Three actions that can encourage and facilitate engineers to meet customers were found. First, understanding that sales people are incentivized to sell current and upcoming product lines, we believe it is necessary to provide incentives to also grant research staff access to customers, even when such visits do not lead to any near term sales increase. This could be done either by providing cash rewards for visits, or by introducing such a metric in performance reviews or in bonus systems. Second, companies can create workshops in which engineers from the company and the customer can meet in an organized manner to focus on New Projects rather than potential near term sales agreements. Such workshops can be facilitated by establishing a template or format that will simplify legal matters and reduce the effort for both companies. In our experience, arranging meetings between two companies in an unfamiliar manner requires a significant amount of administration. Third, companies can leverage existing customer visits to create Q&A session between customers and company engineers. Although this will not provide an interface for any individual New Project, it will increase the overall understanding for customers' needs and pains and provide inspiration for improvements or new products.

6 Conclusions

This report has aimed to assess (1) how big firms support employees' ideas that do not fit in their daily work, and (2) what barriers there are to implementing lean startup methodology in large firms.

In our assessment of companies' innovation infrastructure for supporting New Ideas, we have seen that there exists a strong ambition in all levels of the surveyed companies. However, several of the efforts that companies have put in place are associated with side effects that are not easily identifiable prior to establishing processes or initiatives. For example, while several companies managed to build functioning Idea Support Systems, few had foreseen the "maintenance cost" of driving traffic to the community, marketing and encouraging new idea contributions, pulling resources into projects etc. Similarly, some companies successfully established multiple sources of funding to ensure a certain amount of radical innovation spending. However, such structures were associated with politics, project ownership issues and uncertainty as to the proper way to go about driving a project. Finally, individual incentives to pursue innovation proved difficult for companies

to establish. In cases where employees where officially granted time to pursue New ideas, those employees still had trouble leaving their teams to complete the same task with one member missing.

These three examples show that companies should carefully consider the implications of establishing processes in support of innovation. Once processes are in place, they should be studied to understand what unwanted implications they may have.

In assessing the barriers to implementing Lean Startup methodology, we saw that in some aspects large companies should be better equipped that startups, whereas in other aspects they face serious hurdles. For example, for iterations or pivots to help steer an idea to the right business model, the slowness of a large organization proves inhibiting. Whereas a startup can quickly regroup and start in a new direction based on new insights, such decisions will need inputs and clearances from other parts of a large organization. For a large organization to reap the benefits of rapid iteration, it should focus on enabling a faster environment for New Ideas. When it comes to early customer interaction, companies can be better equipped to get access to potential customers that would otherwise be hard to reach for a startup. However, if a large company wants to benefit form such early interaction, it needs to overcome problems of bandwidth, ownership conflicts and risks associated with customer contacts.

While statistical inferences cannot be drawn from this study, it is likely that many issues described here are commonplace in large, mature companies. We therefore believe this study presents a useful set of issues and lessons learned to consider before and after implementing processes to support innovation, both Lean Startup methodologies and others. Looking beyond this study, it would be interesting to further explore creative ways of incentivizing not only individual inventors to pursue New Ideas, but also how such activities can be made more accepted and encouraged by the teams those inventors leave behind.

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