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Influence of the Stage Gate on Innovation Performance in Creative Organisations - an exploratory study

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ABSTRACT

This study investigates the direct and indirect effects on innovation performance when implementing stage gate systems in creative organisations. A stage gate system is a model that is used to make new product development processes as effective as possible and it is the most used model in the world for that purpose.

Naturally this has meant a lot of researchers have looked into the effects of the stage gate on innovation performance, but past research has primarily dealt with the direct effects the model has on innovation and particularly on the creativity part of innovation. This study seeks to broaden to the scope of the current literature by investigating what indirect effects the stage gate has on innovation performance by influencing the strategy, structure and culture of an organisation. The study will also look upon what direct effects the stage gate has on the value creation abilities of an organisation, which neither have received much attention in previous research.

All organisations have a natural balance between how well they are at being creative and how well they are at generating value from that creativity. In some organisations, particular the creative ones, this balance is not in a healthy state, as they naturally focus on being as creative as possible which sometimes make them forget, that without the ability to generate value their creative efforts will be in vain.

The stage gate model is an ideal system for creative organisations to implement to improve the value creation side of the balance, but past research has in such a high degree criticised the stage gate model for being too structured, too rigid and causing creativity to wither. This has meant that many creative organisations have justified concern about implementing the stage gate in their organisations.

This study seeks through an exploratory design to illuminate the influence of the stage gate in creative organisations. The goal is to provide such organisations with a better foundation to decide whether or not they want to implement the stage gate. This is accomplished by interviewing a line of people, in eight creative organisations, who all possess insights into the effects the stage gate has had in their specific organisation.

The interviews and subsequently analysis result in six propositions of how the stage gate influences the innovation performance. This is further clarified by a numerical analysis of the before/after effects of the stage gate. The results are used to create a framework that explains how the stage gate influences creativity and value creation both directly and indirectly through the strategy, structure and culture of the organisation.

The thesis concludes that the stage gate does possess some of the negative influences as described by previous research. However its direct and indirect positive effects on the innovation performance of creative organisations highly surpass the negative effects. Thus creative organisations should not be in doubt whether to implement a structured approach to innovation in the form of a stage gate – they should simply be aware of the effects both directly and indirectly it will have on the organisation and subsequently on its innovation performance.

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1 INTRODUCTION

Innovation is becoming ever more important in the business environment of today as product lifecycles become shorter and the technology adaptation rate becomes faster (Afuah, 1998; Gallouj & Weinstein, 1997; Tidd, Bessant, & Pavitt, 2005), which means that a lot of organisations are using large amounts of resources to become successful innovators compared to ten or twenty years ago. Organisations that have a laidback waiting strategy will often find themselves struggling keeping up, as organisations that excel in innovation have the opportunity of growing faster, better, and smarter than their competitors and ultimately influence the direction of the entire industry (Davila, Epstein, & Shelton, 2006). Henry Chesbrough formulates this very precisely:

“Everyone knows that innovation is a core business necessity. Companies that do not innovate, die. This is not news” (Chesbrough, 2006) (page xiii)

However it is not easy to become a successful innovator as there are many factors that can hinder the innovative efforts of an organisation, no matter how good intentions it has (Kline & Rosenberg, 1986; Levitt & March, 1996). Being a successful innovative organisation requires both creative skills (Amabile, 1998; Brown & Duguid, 2000; Dodgson, Gann, & Salter, 2005; J. G. March, 1988) and being able to commercialize upon the ideas generated (Harryson, 2006). The problem is however that it is not just a question of mastering these two aspects separately that makes or breaks it for an organisation. The organisation has to strike a healthy balance between the two, where one does not get too much attention on the cost of the other (Davila et al., 2006).

Achieving the correct balance between creativity and value creation has turned out to be difficult for many organisations to maintain, as external circumstances like the recent financial crisis or internal changes, like the appointing of a new CEO, constantly influence the strategy of an organisation. Organisations that focus primarily on creativity often end up with a loose organisational structure which carries along a high chance of coming up with new product ideas. However the ideas risk getting lost or not being developed because of the lack of structure to harness them. On the other hand organisations that primarily focus on value

creation often get a more hierarchical organisational structure which means new product ideas rarely break the surface because of the rigid structure (Brown & Duguid, 2000).

Several models have been developed to help organisations organise their innovation efforts to accommodate both the creative and the value creation aspects like the stage gate model (Cooper, Edgett, & Kleinschmidt, 2002), the Chain-link model (Kline & Rosenberg, 1986) and the GTI-model (Harryson, 2006). The stage gate model was the first developed model of the three and seems also to be the one most widely known among organisations today. However the model falls short compared to the other two because it has a high focus on control, a hierarchical structure and promote incremental over radical innovations which makes it difficult for highly creative organisations to use it (Harryson, 2006).

Highly creative organisations are here characterized by using a considerable amount of their revenue on R&D, employing creative and highly educated workforces – often specialists from abroad and continuously developing new products and services or improving on existing solutions. The focus of the stage gate on control and hierarchical approach does not stop creative organisations from incorporating the stage gate model into their organisations as they are aware of the need of a structured innovation process to be able to create value. According to Product Development & Management Association, AMR Research and Booz-Allen Hamilton between 70-85% of leading U.S. organisations are using the stage gate model to drive new products to market (prod-dev.com, 2009).

However, due to the lack of appropriateness, meaning the stage gate might not be the best suitable innovation model to implement in a creative organisation, and sometimes the internally lack of knowledge of how to implement and use such a model (Geroski, 1996), there is a need for exploring the effects of an implementation of a stage gate system on the innovation performance in creative organisations. Therefore the following research question is conducted:

How does the implementation of a structured approach towards innovation in the form of a stage gate system influence the balance between creativity and value creation in creative organisations?

Drawing on different organisations that are highly creative and have implemented a stage gate fairly recently the research question above will be explored by using an exploratory qualitative design. The goal is to identify critical factors and patterns which get influenced when implementing a stage gate system to manage the innovative process in a creative organisation and integrate them into a refined theoretical model for future testing.

2 STATE-OF-THE-ART

The following chapter will review existing theory appropriate to answering the research question above. The goal is to bring the reader up to date with the current literature on the topic and will end up in a research gap that the thesis will seek to close. The chapter will not report any new knowledge, but solely list what is already known.

2.1 Innovation - a necessity and a challenge

Starting very broadly and slowly narrowing the focus this section will begin by exploring why innovation is so important today and why many organisations see it as a big challenge to become successful at innovation.

2.1.1 Innovation as a necessity

Before the industrial age competition was fairly limited as farmers, blacksmiths, carpenters etc. primarily competed against similar producers in their local environment and not on a global market which we have today. This did not mean that the producers of that time could sit back and make the same product in the same way year after year. Ever since the dawn of humans coming-up-with-new-ways-of-doing-things has been a source of success. Therefore innovation is not a particular new thing. Nevertheless it was not until the industrial age with the steam engine and new mass production systems that innovation as a term was given much thought. Innovation has not had a central place in the mindset of most organisations until twenty years ago as most organisation resources and efforts until then were used on incremental innovations in the form of providing better services by delivering products faster, cheaper or of higher quality instead of conducting scientific research to come up with entirely new products. (Bruland & Mowery, 2006). Today China and other Asian countries have taken

the role as the manufactures of the world with focus on producing products as cost-efficiently as possible.

This has in overall terms left the western world focusing on improving the products and coming up with entirely new products which has caused the technological development to move faster which in turn makes the traditional product lifecycle shorter and the general market moving faster. The consequence for most organisations is that they constantly have to be on the forefront, continually being one step ahead of their competitors. The problem is that the advantages that flow from being innovative and coming up with new products gradually get competed away as other organisations imitate (Tidd et al., 2005). In spite of this most organisations today have a high focus on innovation as it is one of the most effective ways of achieving a competitive advantage. An organisation gains a competitive advantage when it succeeds in implementing a value creating strategy not simultaneously being implemented by any current or potential competitor (Barney, 1991). This means that organisations consequently have to keep innovating and coming up with new ways of doing things, because if they don't other organisations will imitate, and the organisation will lose its competitive advantage. Hence, being innovative is a necessity for most organisations today.

2.1.2 Innovation as a challenge

Achieving a competitive advantage through innovation is not easy, just as it is not easy to define what competitive advantage is. Over the years there have been made quite a few definitions of competitive advantage, and how to obtain it. In the following section the resource based definition of competitive advantage will be used. The reason for this is that for example the Porterian definition has a fairly external view like other definitions has, where the resource based approach has a more internal view, which is more useful when dealing with the present topic. According to the resource based view (RBV) organisations achieve competitive advantage by acquiring strategic assets on imperfectly competitive factor markets and/or by developing and exploiting firm-specific assets (Barney, 1991). The assumption in this definition is that all organisations possess a unique set of resources and competencies, and based on these an organisation is able to create a position in the market that no other organisation is able to. This is possible because no other organisation possesses the exact same resources and competencies as that specific organisation. Thereby the organisation

achieves a competitive advantage. Innovation is hence different from organisation to organisation, and even though two organisations might seem alike on the outside, they are not able to come up with the same exact idea. This is however also what makes innovation very challenging. Organisations cannot simply duplicate what works for one organisation and expect the same thing to work for them as well.

There are many things that influence on the innovation of an organisation ranging from micro aspects of how individual employees behave, to macro aspects of how the organisation functions as a whole and to meta aspects in the form of all the external things that influence on an organisation. On all these levels the organisation is influenced consciously and subconsciously which makes innovation very difficult for the organisation to execute successfully. Organisations are hence often in a situation when innovating, that they have an intended and planned way to achieve success. But because of the constant influences and the uncertainty that innovation naturally hold, their plans fail and an emergent outcome/strategy occurs (Courtney, Kirkland, & Viguerie, 1997). The following chapter will more thoroughly discuss which things that influence the innovation of an organisation.

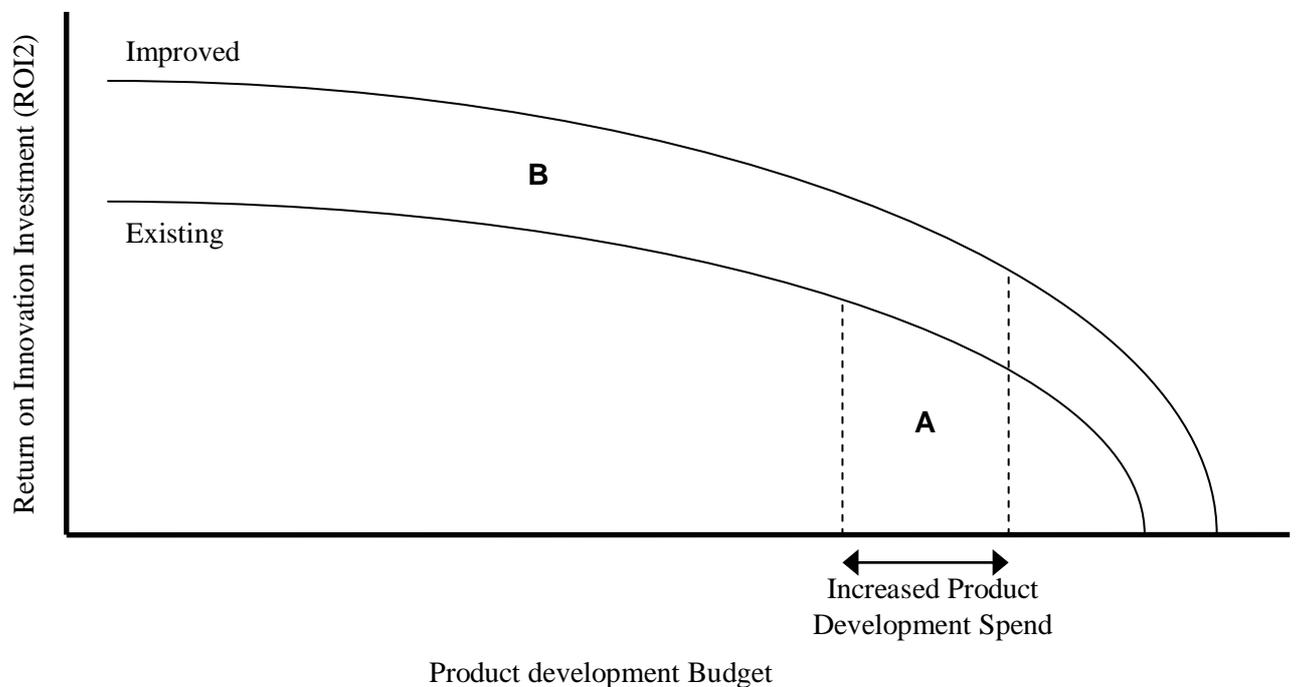
2.2 Central factors that influence the innovation performance of an organisation

As discussed above innovation is influenced on many levels and in many ways. It is however possible to divide these influences into four main factors, which make it possible to investigate the exact influence on innovation and more specifically on innovation performance. These factors are strategy, structure, culture and the external environment that will be discussed thoroughly below, but first it is important to establish what is meant by innovation performance.

2.2.1 Innovation performance

There exist many definitions of innovation performance, and it can be measured in equally many ways. The consultancy company Booz Allen Hamilton has come up with a very simple graph based on their research which shows the relationship between the resources used for innovation and the return of the innovation investment (ROI₂). The fundamental assumption in their model is that they have discovered, that innovation investments are subject to

diminishing returns. They argue that organisations will naturally invest in their best projects first, the next-best after that, and so on, until it is tossing good money away on more and more dubious projects (Kandybin & Kihn, 2004). This is illustrated in figure 2.1 as a curve going from left to right with an increasing sloping angle. Booz Allen Hamilton argues that all organisations have an intrinsic innovation performance curve which can be plotted easily by comparing the net present value of each project in their development pipelines and the required investments of those projects. Hence, this curve becomes very important as it predicts the future revenue, profit and growth of the innovation or in other words the innovation performance of the organisation. (Booz Allen Hamilton, 2004).



Source: Booz Allen Hamilton, 2004

Figure 2.1 The Innovation Effective Curve

Booz Allen Hamilton’s argument with this model is, besides showing the current innovation performance of an organisation, that an increase in resources allocated for product development is not always beneficial as this make the organisation “ride the curve”. An organisation ends up riding the curve if it increases its spending on idea generation and new product development without altering the processes, systems, structures or capabilities that determine their return of innovation investment (Booz Allen Hamilton, 2004). Organisations

can therefore not just pour money and resources into the development of new products - they also have to look at how they innovate and make their innovation processes more effective to be able to raise the curve and gain a higher return. Area A on the graph illustrates that if an organisation simply expands its R&D expenditures without thought, it ends up with a diminishing ROI. Area B in contrast shows the big potential organisations have in gaining additional return of investment (more high-quality new products, faster, and at lower cost) by simply optimising their innovation – which they actually can achieve even without additional expenditures. Organisations should hence understand that innovation is a complex thing which needs to be managed properly to yield a satisfactory return. A reason why innovation is so complex is that it is influenced by the strategy, structure, culture and external environment of the organisation which will be discussed next.

2.2.2 Influence of strategy on innovation

Strategy is one of the most visible factors that influence the innovation performance in an organisation, because it literally dictates what innovation an organisation should perform. Strategy should not be understood as a detailed plan or program of instructions. It is a unifying theme that gives coherence and direction to the actions and decisions of an organisation (Grant, 1997). Strategy guides management decisions toward superior performance through establishing a competitive advantage.

Strategy typically gets divided into three levels within an organisation corporate strategy, business strategy and functional strategy (Grant, 1997). Corporate strategy defines the scope of the organisation in terms of the industries and markets in which it competes. Business strategy defines how the organisation competes within a particular industry or market and functional strategies are the elaboration and implementation of business strategies in the individual functions in the organisation. Strategy can hence be seen as a waterfall flowing from the very broad and diffuses to the more concrete and practical.

2.2.2.1 Corporate strategy

The corporate strategy does not have a particular big influence on innovation performance as it is a very wide-ranging strategy. It does however tell in which kind of industry and market

the organisation believe it is in, which can influence the innovation. There is a clear difference in how an organisation would innovate if it said it was in the entertainment industry rather than the movie, music or computer gaming industries (Markides, 1997). Depending on how an organisation formulates its environment and thereby its competitors it inevitably also shapes how its innovation should be.

2.2.2.2 Business strategy

The business strategy of an organisation should act as cross-functional alignment making sure that production, marketing and R&D etc. all work in the same direction. This form of strategy influences the innovation performance in an organisation as the innovation has to fit with what the production can produce, and what the market department believes there is a market for.

Business strategy is sometimes also called competitive strategy because it refers to how an organisation should compete. The business strategy will therefore explicitly or tacitly dictate what kind of innovation the organisation is going to perform. An organisation can innovate within four main areas: product-, process-, position- or paradigm innovation (Tidd et al., 2005). None of them are better than the others or more profitable to perform. However each area is special in the meaning that it requires specific tools, knowledge and resources to innovate in that area. The business strategy hence clearly identifies which area the organisation wants to focus on and thereby influences the innovation performance of the organisation.

When the organisation has made a strategic decision to innovate in one of the four areas they either explicit or implicit also decide what kind of innovation the organisation should perform. Many researchers have dealt with the different types of innovation. One of these is Tidd (2005) who defines four innovation types based on whether the innovation overturns or reinforces existing core innovation concepts, and whether the link between existing knowledge elements changes or remains unchanged. These four types of innovation he named: incremental-, modular-, discontinuous- and architectural innovation (Tidd et al., 2005). Other writers are Henderson and Clark who look at whether an innovation enhances or destroys the component and architectural knowledge an organisation possess. Based on this

they also define four types of innovation which are very similar to Tidd's: incremental, modular, architectural and radical (Afuah, 1998) and Gallouj and Weinstein who specifically look on the service sector (Gallouj & Weinstein, 1997).

It is not immediately possible to judge whether one innovation type is better than the other. Most researchers argue that an organisation should have one or two cash-cows they can incrementally innovate upon, and then have a pipeline of more radical products which can take over when it is no longer feasible to incrementally innovate on the existing products. Such considerations are part of the business strategy of an organisation. When an organisation formulates its business strategy it also decides how often it should launch new products. It decides how many resources it wants to use on R&D, it decides whether outsourcing is better than in-house. It decides whether the overall strategy should be to minimize costs or differentiate from competitors etc. All these decisions are implicit or explicit made by the business strategy of the organisation which therefore has a high influence on its innovation performance.

2.2.2.3 Innovation strategy

An organisation contains quite a few functional strategies, for example marketing strategy, production strategy, supplier strategy etc. However due to the focus of the thesis only innovation strategy will be elaborated upon.

One would expect an innovation strategy, because of its status as a functional strategy to be fairly tangible and measurable, but in many organisations the innovation strategy is as fluffy as the corporate strategy. The main reason for this is probably that it is very difficult to formulate an innovation strategy that makes sense in the daily work. This is why a lot of organisations end up with more of an innovation vision than a strategy. The innovation strategy has a very visible influence on innovation performance as it is this formulation employees and management turn to when deciding to keep developing a product or skipping it, and whether a new idea should be tried or not etc. The innovation strategy of an organisation has hence a high influence on its innovation performance.

2.2.3 Influence of structure on innovation

The structure of an organisation also has an influence on its innovation performance. Structure is here understood as the formal and informal framework of policies and rules within which an organisation arranges its lines of authority and communications and allocates rights and duties. The organisational structure determines the manner and extent roles, power and responsibilities are delegated, controlled, and coordinated, and how information flows between different levels of management (businessdictionary.com, 2009). By this definition it becomes clear that the structure of an organisation has a significant direct and indirect influence on its innovation performance and can both foster and inhibit innovation.

There exist two archetypes of organisational structures: centralized and decentralized. Few organisations are entirely one or the other, but most lean more to one over the other. Generally the centralized structure is said to be more bureaucratically with a more top-down approach which often inhibits the creative aspect of innovation (Amabile, 1998). The decentralized structure on the other hand seeks to eliminate the unnecessary levels of management and to place authority in the hands of first-line managers and staff which means there is a faster response to the situations demanding immediate attention, than in organisations relying on a more centralized structure. According to Tidd et al (2005) innovative organisations are those that are flexible, adoptive, learning, characterized by an organic culture and with capabilities of networking and team-working. This does not mean that decentralized structure always is preferred, Brown and Duguid (2000) argue that if an organisation becomes too decentralized with no organized processes the entire organisation will be in a mess. Many scholars also argue against a one-model-fits-all organisational structure. What is suitable for large global conglomerates will not necessarily work for small organisations. Structure is hence good in well thought quantities. Just not too much as it will strangle the innovation initiatives which bobble at the bottom of the organisation (Brown & Duguid, 2000).

Another aspect of structure is how the organisation controls and measures its employees. Even the most idealistic people must admit that control in some extent is necessary to be able to run a successful business. The problem described as the agent-principal theory arises, because the knowledge about the agent's work is divided asymmetrically to the agent's

advantage, and because the agent will often self-optimize (Eisenhard, 1989). This forces the principal or organisation to enforce certain structures whereby it is possible to control the agent's actions. Formulated thoughtfully with correct incentives structures, control can foster innovation like Mouritsen, Larsen and Bukh suggest with their updated balanced scorecard (Mouritsen, Larsen, & Bukh, 2004). However the reverse can also be the case, when the control structures become too strict and employees don't dare to ask questions or when the incentive system encourages the wrong behaviour. Having a well thought incentive system can have a vital influence on innovation. If the employees feel the management is appreciating their ideas by either giving them bonuses, letting them take part in development of an idea or recognises them professionally, they will be highly motivated to come up and suggest new ways to improve products or processes etc. (Scotchmer, 2004).

If an organisation has a very rigid structure where all communication goes up and down and not across departments it can also have negative influence on innovation performance. Organisations can then unintentionally develop a silo vision where one department does not know what another does and can end up making double work for each other or in worst case scenarios also fight each other as enemies (Jeston & Nelis, 2008). This can be very inhibiting for innovation in the organisation.

A typical manifestation of the structure of an organisation is the organisational chart which lists all the different departments, business units etc. in the organisation. The innovation of an organisation is influenced depending on where the organisation chooses to place its innovation efforts like in a department of its own – integrated or divided from the rest of the organisation, integrated into each business unit or flowing all-round in the organisation. It is therefore important that the organisation decides how it wants to use innovation to gain a competitive advantage, and then places its innovation efforts in the organisation accordingly.

Davila (2006) explains this quite well by saying: How you innovate determines what you innovate (Davila et al., 2006). Or in other words innovation success depends on what you do and how you do it. It is therefore not unimportant how an organisation is structured when looking on its innovation performance.

2.2.4 Influence of culture on innovation

Organisational culture is the third factor that has a significant influence on the innovation performance of an organisation. It will in the following section be understood as a historically situated and emergent system of negotiated meanings and practices common to the people in an organisation (Brannen, 1991). At first a more broad definition of culture will be discussed.

Culture can broadly be understood as the differences between nations in the form of power distance, individualism, masculinity and uncertainty avoidance (Hofstede, 1989). These differences also shine through in relation to innovation in organisations. For example in organisations with larger power distances, champions of innovation need more support from hierarchical superiors. Eventually this can lead to more revolutionary innovation, as the need to check with colleagues suppresses drastic changes. The opposite is true in more collectivist organisations, where champions of innovation often will involve more people from their organisation in their thoughts than in more individualist organisations which then lead to more innovation, but perhaps not as revolutionary. And champions of innovation in organisations with stronger uncertainty avoidance often feel more constrained by existing rules and structures. As a result innovation is particularly pronounced in such organisations (Hofstede, 1989). Organisations can influence these cultural characteristics, but they are based in national cultures which mean they are quite difficult to change.

Narrowing the focus to organisational culture it is, like national culture, fairly difficult to change as it grows out of the historical path the organisation has taken. According to Nelson and Winter (1982) an organisation intentionally and unintentionally builds up certain organisational routines which makes it able to compete better. Over time these routines become skills or an organisational culture which is not easily changed (Nelson & Winter, 1982). MIT Professor Edgar Schein puts it this way: organisational culture changes slowly and with great difficulty (Schein, 1985). This is of course fine as long as the environment is changing slowly too. Unfortunately the surrounding environment can change rapidly and with little warning. A radical change in the environment, such as the current financial crises or the development of a new technology, will require the organisation to change rapidly if it wants to remain competitive. However the culture of the organisation, which evolved under

one set of environmental conditions, can hinder the organisation in adapting to the changed environment.

The culture of an organisation thus has a considerable influence on its innovation performance as it is the basis of the organisation, and if the culture is poor compared to the current environment then it also promotes poor innovations. Essentially, radical changes lead to anxiety and fear of the unknown, exactly the things that the culture is acting to protect against. Some researchers argue that rational professionals would never behave with anxiety and fear. Unfortunately, under stress, we're just not that good at being rational. At exactly the point where the organisation needs to experiment and allow itself to make mistakes, it becomes less able to do so. The innovation performance of an organisation is therefore both directly and indirectly influenced by the culture as everything else in the organisation is or as Tidd, Bessant, and Pavitt (2005) put it: the organisational culture is a significant influence on the propensity of an organisation towards innovation (Tidd et al., 2005). However any culture will not do. To be a successful innovator it requires a culture that constantly guides organisational members to strive for innovation and a climate that is conducive to creativity. Organisation cultures that facilitate radical innovation tend to be more tolerant of risk taking and the uncertainty that facilitates this type of innovation (Claver, Llopis, & Molina, 1998).

Culture can be divided into two components explicit and implicit. The explicit culture represents the typical patterns of behaviour by the people and the distinctive artefacts that they produce and live within. The implicit culture refers to values, beliefs, norms and premises which underline and determine the observed patterns of behaviour (Ahmed, 1998). This distinction fits well with the traditional iceberg metaphor where most of the culture of an organisation is hidden under water. This means that even though management is trying to change the culture to become more innovation orientated there can be something under the surface that blocks the management's attempt of change. Culture has thus the ability both to hinder and enhance innovation in the organisation through the norms that are held unconsciously by the organisation. If the right types of norms are held and are widely shared then culture can foster innovation. But if the culture for some reason is resisting innovative behaviour, then no matter the effort and good intention of individuals, primarily the management trying to promote innovation, few innovative ideas are likely to be forthcoming.

Organisations do not consist of one overarching culture, but instead of a myriad of sub-cultures. According to Trice & Beyer (1993) most organisations have multiple cultures embedded within an encompassing or overall culture and these are labelled as subcultures. Such subcultures are characterised by distinct clusters of ideologies, cultural forms and behaviours and may differ from other subcultures and from the overall culture in which they are embedded. This view is supported by Martin & Siehl's (1983) observation that organisational culture is not a monolithic phenomenon, as it is composed of various interlocking, embedded and sometimes conflicting subcultures which cut across vertical and horizontal boundaries and function. According to Krefting & Frost (1985) if the subcultures in an organisation are very diverse, then they have a wide range of self-interests. This means that there is a greater risk that the interests of one subculture adversely can stop the introduction of change. The presence of such subcultures can indirectly influence the innovation performance in the organisation either by promoting it or by trying to counter and destroy innovative initiatives from the management, because it will perhaps negatively influence the subculture's specific work situation.

Culture has hence, like strategy and structure, a significant influence both directly and indirectly on the innovation performance of an organisation.

A fourth aspect which possibly has the same influence on the innovation performance of an organisation, as culture, strategy and structure combined, is its surrounding environment. The environment is however not within the primary scope of this paper, but never the less it is important to be aware of the substantial influence customers, competitors and suppliers and to a lesser extent legislators and NGOs etc. have on innovation performance. Consequently this will be elaborated upon below.

Today a growing number of organisations are making use of what Henry Chesbrough (2003) calls open innovation. Chesbrough argues that the boundaries between an organisation and its environment have become more permeable which means that innovations can easily transfer inward and outward. The central idea behind open innovation is, that in a world of widely distributed knowledge organisations cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions e.g. patents from other organisations. In

addition, internal inventions not being used in the business of an organisation should be taken outside through licensing, joint ventures, spin-offs (Chesbrough, 2003). Organisations applying an open innovation approach can experience a higher innovation performance than organisations that do not. However there is also a risk involved because external partners can exert opportunistic behaviour, and there is also a considerable cost involved to control and guide the external in and outputs.

Customers have, by definition, a quite considerable influence on the innovation performance of an organisation as they are the ones who decide whether they want to buy a certain new product or service or not. Instead of collecting information about needs from a random/typical set of customers organisations can make use of a more strategically approach, where they identify certain customers, called lead users. The term lead user is developed by Eric von Hippel in 1986 and is defined as a user of a product that currently experience needs still unknown to the other users and who will benefit greatly if he/she obtains a solution to these needs (Von Hippel, 1986). An organisation can use such a user to identify new methods or approaches towards creating innovative products that are true breakthroughs via ideas that may not have surfaced by simply examining existing users with traditional market research techniques and thereby improving the innovation performance. According to Lilien et al (2002) the lead user does not even have to use the products of the organisation. They argue that organisations can collect information both from the users in their own target market, as well as users in other markets that face similar problems, but in a more extreme form, for example auto manufacturers are finding inspiration in the aerospace industry that faces similar problems in a more extreme form (Lilien, Morrison, Searls, Sonnack, & von Hippel, 2002). Customers in general and lead users in particular therefore have a quite substantial influence on the innovation performance of an organisation.

Involvement of suppliers in the innovative process can also influence the innovation performance. Walter Powell (1998) argues that learning is no longer only limited to one person or organisation, but entails the collaboration between people and/or organisations (networks). Organisations should collaborate because they thereby fill in missing pieces of their value chain, they gain access to new knowledge, and they get embedded in a community

of practice (Powell, 1998). The suppliers of an organisation can possess key information the organisation can use to improve its innovation performance.

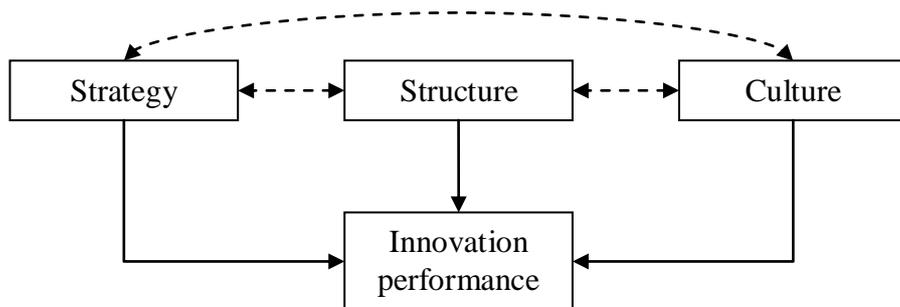
Competitors also have an influence on the innovation performance of an organisation, even though it is more indirect than the influence of customers and suppliers. Niels Stieglitz (2003) talks about how two or more industries can converge into one causing the players on the different markets to adjust to the new market conditions. It is usually not one organisation or product causing the convergence, but an effect of different innovative products coming together from completely different points (Stieglitz, 2003). If an organisation fails to see such a convergence and keeps making its “traditional” product it could influence its innovation performance negatively.

Also legislators, NGOs and the local community which surround an organisation can influence its innovation performance, even though more subtly than the examples above. This means that all organisations can be seen as being embedded in a specific external environment which directly and indirectly influences its innovation performance. The innovation performance of an organisation is therefore in reality not a simple equation as pictured in this thesis, but a highly complex aspect with has many known and unknown variables. However for the sake of the research question, the thesis will limit itself from all external aspects that influence the innovation performance and narrowly focus on the internal aspects. It is acknowledged that this is a considerable simplification of the real world, but a necessary simplification to be able to answer the posed research question fully and thoroughly.

2.2.6 Innovation process and outcome are unique for all organisations

As the discussion above indicates the innovation process and performance will never be the exactly the same in two otherwise similar organisations. There are so many different aspects that influence the innovation performance of an organisation. For example what organisation specific assets it has, what corporate-, business- and innovation- strategy it formulates, how it structures its organisation, how it controls its employees, what culture it has and how its geared for change, whether the organisation is based in a masculine or feminine culture, what subcultures it has etc. These influences make it impossible to see identical innovation processes in two organisations and as a result the two will not be able to innovate the same

things. Their innovations might look the same, but because of the influences listed above each organisation will have focused more on some areas over others in the innovation. In figure 2.2 below these influences have been split up into three central factors that influence the innovation performance of an organisation: strategy, structure and culture.



Source: Own creation

Figure 2.2 Influences on innovation performance

The figure shows all three factors influencing innovation performance, which make them all essential when an organisation wants to implement a structured approach to innovation. It is important to notice that the strategy, structure and culture of cause also influence each other independently in the organisation, which is represented by the dotted lines in the figure. There are hence many different aspects to consider and influences to take into account when implementing a structured approach to innovation in an organisation that prior has not had any particular innovation structure.

2.3 Innovation process consist of two parts

At this point it is beneficial to define what is really understood by the word ‘innovation’.

According to Edward B. Roberts, an American technology writer and academic figure, innovation is the sum of invention and exploitation. Another definition is given by the co-founder and president of the Bainbridge Graduate Institute Gifford Pinchot III who believes innovation happens when an invention is done, and the second half of innovation begins: turning the idea into a business success. A more theoretical definition is written by the Austrian writer and management consultant, Peter F. Drucker who defines innovation as

“the specific instrument of entrepreneurship. It is the act that endows resources with a new capacity to create wealth. Innovation, indeed, creates a resource. There is no such

thing as a 'resource' until man finds a use for something in nature and then endows it with economic value. Until then, every plant is a weed and every mineral just another rock" (Drucker, 1985) (page 27).

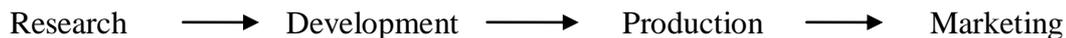
All these definitions capture the central aspect of innovation: firstly it is about coming up with a new idea and secondly about commercializing it (Dahlin & Behrens, 2005). These two things combined is innovation! Or as Davila (2006) puts it: innovation consists of two processes: the creative and the value creation (Davila et al., 2006). And the better an organisation is at these two processes the higher innovation performance it will be able to expect. The following sections will elaborate upon these two aspects.

2.3.1 Without creativity no new ideas will be invented

Creativity is vital for an organisation wanting to achieve a competitive advantage by being innovative. According to various dictionaries creativity is the ability to see something in a new way, to see and solve problems no one else may know exists, and to engage in mental and physical experiences that are new, unique, or different (answers.com, 2009). In business terms for an idea to be creative it must also be appropriate, useful and actionable. It must somehow influence the way business gets done by improving a product or by opening up a new way to approach a process and as such creativity has always been seen as a very difficult thing to manage (Amabile, 1998). However there is nothing magical about creativity. The creative aspects of innovation can be managed, measured, and directed, as shown by the creativity and innovation practices of many successful organisations (Davila et al., 2006). The problem according to Amabile is that creativity is killed much more often than it is supported in most organisations. Creativity is undermined unintentionally every day in work environments that are established, for entirely good reasons, to maximize business imperatives such as coordination, productivity and control (Amabile, 1998). However structure and process are not natural foes of creativity. Many managers feel that imposing any structure on creative people will ruin the results, but structure can, in fact, enhance creativity if built and used in the right way (Davila et al., 2006).

One of the first theoretical frameworks developed for understanding how innovation comes about in an organisation is the linear model of innovation. Even though it is a very simple model and it does not fully describe how innovation is a result of non-linear actions in the

form of numerous iterations and abstractions. It does however help to understand where creativity is set apart from value creation.



Source: Dodgson et al., 2005

Figure 2.3 Linear model of innovation

The creative process of innovation concerns the two first aspects of the figure: research and development. Research and development can be done in countless ways. Some organisations have R&D departments with hundreds of scientists while others rely on idea generation from customers or employees and based on this input comes up with new solutions. No matter how an organisation conducts its research and development it is important that it allows its employees the space and freedom to be creative. One way of doing this is given by Mark Dodgson et al (2005) who suggest that organisations should apply a Think, Play, Do approach. According to the writers ‘Thinking’ should be facilitated by technologies that build virtual research communities and permit new ways of finding and combining information through data search. ‘Playing’ is then facilitated by simulation, modeling, and visualization technologies, which build upon existing technology platforms and developing capacities of virtual reality. And finally ‘Doing’ is facilitated by rapid prototyping technologies, which build upon existing design and manufacturing systems (Dodgson et al., 2005). By applying such an approach the authors argue that the employees will be more inclined coming up with new inventions. The management should also be aware that innovation is by definition uncertain and that it is therefore impossible to predict in the beginning of the creative process what ideas will be successful and which won’t. It is therefore important for the management to realize that failure is part of the creative process.

However what organisations must not forget is that, even though it would like to act and be understood as an innovative organisation, creativity is not dispersed evenly across the organisation. Instead it exists in hugely disproportionate quantities across the organisation at any given time (Davila et al., 2006). Some individuals are very inventive, and some are not. Innovation is not a quality initiative where it is necessary to make it every ones job all the time in order to be successful. Those who are creative and good at innovation will become

frustrated at a process that dilutes their efforts with largely untalented people (Davila et al., 2006). According to Amabile (1998) the best way to foster creativity in people is by thinking about the three components which she argues creativity is made up of in every individual: expertise, creative thinking skills and motivation where expertise and creative thinking skills are individuals' natural resources which the management not immediately can influence. Motivation however consists of two things: extrinsic which comes from outside a person in the form of guidelines and instructions which is where the management has a possibility to influence and intrinsic which originates from the interests of a specific individual, which the management cannot influence (Amabile, 1998). Amabile argues that intrinsic motivation, a person's internal desire to do something is more essential for creativity than the extrinsic, and people will be most creative when their motivation comes out of their own interest, not by the external pressure. The management therefore has to a large degree to recognize that they for a great part of the individual creativity have a limited influence. This might also be the reason why some organisations get individual creativity mixed up with corporate creativity. Individual creativity may spring from mysterious sources which are beyond the management control, which is why it is sometimes seem easier for the management to hire a new "innovation-star" rather than analyse and update the creative process in the organisation (Editors, 2002). Concluding it can be said that without creativity no new inventions will come about and there would be no need for the value creation part of innovation, which would leave an organisation with a poor innovation performance.

2.3.2 Without value creation new ideas will never be profitable

Value creation or commercialization is the second part of innovation and is equally important as the creative part as it is this part alone that determines whether a new idea becomes profitable or not for the organisation. Value creation makes up the last two parts of the linear innovation model: production and marketing (figure 2.3).

Value creation as a concept does not seem to be a much researched topic or perhaps it is just taken for granted by most researchers. A search in Business Source Complete on 'Innovation' and 'Commercialization' gives 244 results and a search on 'Innovation' and 'Value creation' gives 89 results. This should be seen in relation to a search on 'Innovation' and 'Creativity' which gives 1265 results. There therefore seem to be a poor focus in the innovation literature

on how organisations should achieve a proper return on their innovations efforts. However it is not just researchers that sometimes have too much focus on the creativity part of innovation. Many large organisations use vast amounts of resources on R&D, but when comparing the R&D to sales ratio many organisations have a surprising low return on their investments (Booz Allen Hamilton, 2005).

Ford, DaimlerChrysler and Toyota who in 2004 were the third, fourth and fifth biggest global R&D spenders all only had a four percent R&D-to-Sales ratio, and the average ration over the twenty biggest global R&D spenders was seven percent (Booz Allen Hamilton, 2005). This number does not say much in itself, but it indicates that many organisations do not get the real potential out of their innovation efforts because they lack or oversee the importance of value creation. Profitable innovation, in other words, cannot be bought. Simply spending more usually leads to a waste of resources on increasingly marginal projects. The solution to improving innovation performance is not to boost R&D spending, but to raise the effectiveness of the R&D spending by focusing on the value creation part (Kandybin & Kihn, 2004).

Some researchers who have dealt with the value creation aspect are Davila et al (2006) who argue that value creation contains such tasks as profitability analysis, asset utilization, capital management, efficiency optimizing and benchmarking, which they argue traditionally mature organisations normally excel in compared to emerging ones (Davila et al., 2006), but as the statistics from Booz Allen Hamilton show this is not always the case. Other researches who have dealt with value creation is Desouza et al (2009) who discusses more in detail what value creation/commercialization is about. According to them value creation involves clarifying how and when ideas can be used by people other than the group that developed them, and using data or prototypes from the experimentation process to demonstrate tangible or visible benefits. Value creation in their optic takes possible ideas and creates internal or external market value, creating parameters within which value can be expressed or shared in a coherent fashion. Value creation allows organisations to identify stakeholders and their needs (or desires) and sometimes to redefine those stakeholders, including or excluding groups with conflicting or complementary needs. The output of a commercialized idea is a defined product

or service (or a combination of the two) and how to market it. A business plan is the visible manifestation of this.

Value creation is not just about getting the best ideas developed and configured to best suite the customers. An equally great part of value creation is what an organisation does with the ideas that get rejected during the creative process. Basically there are three things an organisation can do when an idea is rejected. First, the idea can simply be thrown out and never be thought about again. Second, the idea or concept can be sold or licensed to another organisation or third the idea can be put into an idea bank for later use. The first approach seems not to be very smart, but according to Carl Kester this is what many organisations end up doing because of the big uncertainty that by definition is involved when doing innovation (Kester, 1984). The second approach requires that the idea has been developed so much that it is possible to patent it, but it can be a very profitable strategy to develop ideas to the patent stage and then sell them off or license them to other organisations. IBM has for example done this with great success (Davis, 2008). The third approach is to set up an idea bank where it is possible to store ideas that are not profitable to develop at the moment or do not fit with the current strategy of the organisation. Timothy Luehrman gives in his 1998 article an example on how an organisation can build such an idea bank by using the analogy of a tomato garden. Luehrmann argues that the ideas an organisation comes up with can be seen as different options the organisation can decide to invest in or not and based on different financial variables it is possible to calculate the net present value of these different options. Based on these values it is possible to plot each idea or option into a 'tomato garden' that consist of six areas: now, maybe now, probably later, maybe later, probably never and never (Luehrman, 1998).

Organisations that have a clear focus on value creation by thinking about 1) the timelines of the product introduction, 2) the locations of where the product should be introduced, 3) which market to be targeted, 4) the budget and promotional strategies for the product introduction or 5) who strategically saves and organises discarded ideas, will be able to achieve a competitive advantage through innovation easier and better than those organisations which forget or neglect this part of the innovation process. Excelling in these tasks will, everything else being equal, lead to a higher innovation performance.

2.3.3 Importance of balance between creativity and value creation

As the discussion above shows both creativity and value creation are very important for an organisation to consider and manage to become a successful innovator. Creativity without the ability to translate it into profits can be fun, but it is unsustainable. Profits without creativity is rewarding but only works in the short term (Davila et al., 2006). Some researchers also describe this challenge as exploration versus exploitation, where the former entails the quest for new knowledge which can be combined in new constellations, to subsequently develop new organisational capabilities and future innovation, and the later pertains to the efficient utilisation and development of the existing repository of corporate knowledge (Levinthal & March, 1993; J. G. March, 1991; Murray, 2001). This duality is difficult for many organisations to manage because they usually only look at one or the other, not realizing that they are connected and any change made in one will unavoidable influence the other (Davila et al., 2006). Creativity and value creation can hence be seen as two processes that need to be in balance for innovation to be successful in an organisation. If either the commercialization or the creative mindsets dominate completely, then the organisation is stuck with very poor innovation performance (Davila et al., 2006).

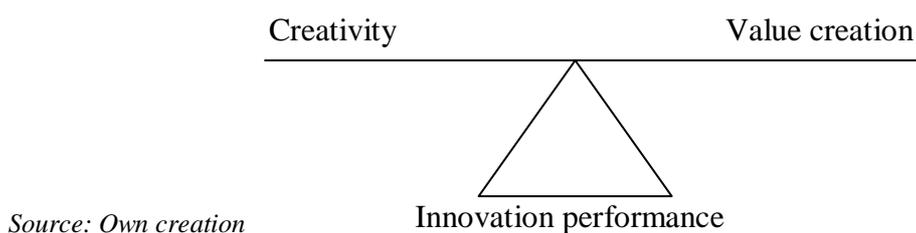


Figure 2.4 Balance between creativity and value creation

As figure 2.4 shows achieving the ideal balance between creativity and value creation is vital, so that the organisation generates successful new ideas and gets the maximum return on its investments (Davila et al., 2006). Unstructured creative processes can displace effective value management, yielding a factory of great ideas, but insufficient commercial success. Innovation does not mean ignoring business imperatives, but it does mean you have to be aware of the processes within your organisation that kill creativity. Commercialization processes also need to be managed to produce high-quality results fast by turning the best creative concepts into marketable products and services (Davila et al., 2006). Many

organisations get one component working only to realize that their success in that area is frustrating their attempts in the other. Without management intervention providing a clear innovation strategy well-designed processes and strong leadership will cause creativity to crowd out commercialization and vice versa. These two elements are the necessary ingredients for innovation, but they do not coexist easily. Too much emphasis on delivering value through execution can stifle the creative processes and the same is true the other way around (Davila et al., 2006).

Even though a balance is preferred, it must be expected that in most organisations one side will be more pronounced than the other. Especially creative organisations will often have a tendency to have a higher focus on the creative side and less on the value creation side. As described above organisations can achieve competitive advantage through innovation, and one way to do that is to obtain a mix of creativity and value creation which no other organisation possesses. Creativity and value creation can therefore exist as a fraction where one has more focus than the other. However, this only works when the organisation is aware of the importance of both, and strategically finds the right balance for them between the two. Organisations that are able to strategically work with this balance are sometimes referred to as ambidexterity organisations (M. Tushman & O'Reilly, 1997). In this context, (He & Wong, 2004) suggest that the interaction between explorative (creativity) and exploitative (value creation) innovation is positively related to sales growth rate, but also conclude that the organisational tension inherent between exploration and exploitation may become unmanageable when both are pursued to extreme limits. The thesis will not advocate for organisations to become ambidextrous, but instead shed light upon the importance of the balance, and how it can get influenced positively and negatively, directly and indirectly by implementing a more structured approach to innovation.

2.4 Different organisations – different challenges

In this way innovation performance varies from organisation to organisation as it is influenced by at least three internal central factors (strategy, structure and culture) and also a number of external factors. But organisations also differ in their approach to innovation, and whether they see innovation as a mean to gain a competitive advantage or not. To describe this, it is helpful to draw upon Porters four generic strategies which he developed in the early 1980s.

Even though the strategies can seem fairly simple today and other theorists have questioned whether it is in fact not possible for an organisation to pursue two conflicting strategies at the same time (Sarkees & Hulland, 2009; M. L. Tushman & O'Reilly III, 1996), the model gives a good overview of which basic strategies an organisation can follow. These strategies are: overall cost leadership, cost focus, differentiation and differentiation focus (Porter, 1980). These strategies are all fairly well known, so a description of each strategy will not be given here. However what is interesting is how organisations obtain a competitive advantage by means of the different strategies. Organisations that use the overall cost leadership or cost focus gains competitive advantage from being able to produce at the lowest cost. All their strategy efforts is as a natural consequence streamlined towards cost minimizing which means that factories are built and maintained, and labour is recruited and trained to deliver the lowest possible costs of production. The opposite is true for organisations pursuing either the differentiation or the focused differentiation strategy. They gain competitive advantage by supplying a product which is better than the competitors whereby they are able to charge a premium price. Organisations making use of one of these two later strategies will often incur higher costs than those organisations using one of the cost strategies. However these costs are offset by the increase in revenue generated by higher prices.

2.4.1 Characteristics of creative organisations

According to Porter the different ways to achieve competitive advantage are equally good, meaning that two organisations can be equally successful even though they pursue entirely different strategies to accomplish their success. However very simplified can an organisation, that uses either the differentiation or the focused differentiation strategy, be said to be more creative in nature than an organisation using the overall cost leadership or cost focused strategy. The reason for this is that organisations using a differentiation strategy rely on unique products which requires some form of product development, whereas cost focus organisations often offer 'no frills' products which don't differ much from organisation to organisation. By having a differentiation strategy there is also the chance that any differentiation could be copied by competitors. Therefore there is always an incentive to innovate and continuously improve for organisations using such a strategy.

To narrow the focus of the thesis it will only deal with organisations that can be said to be creative in nature, however it is still a bit unclear what exactly constitutes a creative organisation. Therefore it is necessary to define what characterises such an organisation.

First, a creative organisation uses a considerable amount of its revenue on R&D. Second, it employs a creative and highly educated workforce – often specialists from abroad. Third, it often uses and develops advanced technology. Fourth, it encourages its employees to use some time each day not related to a specific job assignment to think or play. Fifth, it often applies a project orientated method of working and has a fairly flat hierarchical structure. Sixth, it can depend on immaterial rights. Seventh, it continuously develops new products and services or improves on existing solutions. And eighth, it can develop knowledge and/or technology rather than a regular physical product. Organisations that fit into at least five of these eight criteria will in the rest of the thesis be characterised as creative organisations and will constitute the analytical framework of the thesis.

2.4.2 Creative organisations and their challenges in managing the balance between creativity and value creation

The reason why the thesis will specifically deal with creative companies is that they have bigger challenge in managing the balance between creativity and value creation than organisations that are primarily focused on cost. Creative organisations are by definition creative and therefore many of such organisations can have a tendency to put creativity higher than value creation. An example of this is given by Volberda (1998) who describes how 3M encouraged a too creative behaviour among its employees which resulted in

“idle financial and intellectual resources, an environment that encourages people to work around and even defy their superiors, and a determination to the company follow where its scientists and customers lead [...] The company does not have a clear strategy; the development and introduction of a product merely evolves” (Volberda, 1998) (page 59).

Another example is a telecommunication organisation’s attempt to reinvent itself by using information technology to slice and dice its service set into ever more finely differentiated options. The organisation hoped it would boost revenues by more precisely fulfilling the needs of every imaginable buyer. But offering so many options has had the opposite effect.

The customer service reps were forced to sort through more than a thousand promotion codes while they were talking to a potential customer. The result was that the sales agents gave slow and often inaccurate answers to inquiries, and customers grew frustrated and headed to its competitors (Gottfredson & Aspinall, 2005). This fits well with the argumentation by Groenel that organisations can fall into a renewal trap by investing too much in research and development without a clear direction of where the organisation wants to go with the increased funds (Groen, de Weerd-Nederhof, Kerssens-van Drongelen, Badoux, & Olthuis, 2002). Mark Gottfredson and Keith Aspinall (2005) also argue for such a problem even though they have labelled it as ‘complexity’:

“as a company increases the pace of innovation, its profitability often begins to stagnate or even erode. The reason can be summed up in one word: complexity. The continual launch of new products and line extensions adds complexity throughout a company's operations, and, as the costs of managing that complexity multiply, margins shrink.”
(Gottfredson & Aspinall, 2005) (page 64).

Especially creative organisations can have a challenge in managing their balance between creativity and value creation, which can influence their innovation performance negatively. However one way they can achieve and maintain such balance is by systemising innovation in the organisation.

2.5 The stage gate model – a way to guide and control innovation?

Such a systemising could be achieved by implementing a stage gate system. The stage gate is a template or road map for driving new product projects from idea through to launch and beyond. It breaks the product innovation process into stages with each stage comprising a set of parallel, cross-functional activities. Between stages are gates. These gates open or close the door for projects to move to the next stage. Gates are so to speak the quality control check points in the process, where senior management reviews the quality of the project, and decides whether to continue spending on it or not (Cooper, 1995). According to Cooper the stage gate system is ideal for new product development because it increases the efficiency of the innovation process, gives faster times to market and increases the effectiveness in terms of new product success rate. Cooper’s research into dozens of U.S. and Canadian organisations and divisions that have adopted stage-gate processes shows major improvements in performance: improved teamwork, less recycling and rework, improved success rates, earlier

detection of failures, a better launch and even shorter cycle times (Cooper, 1995). The stage gate system hence seems as an ideal tool for creative organisations wanting to improve their innovation performance.

2.5.1 Stage gate model explained

The stage gate is typically made up of five or six stages with the same number of gates. Figure 2.5 shows a model of the stage gate. Gate 1 is the first screen an idea meets and decides whether resources should be committed to it. The criteria here tend to be qualitative and few in number: strategic alignment, technical feasibility, competitive advantage and opportunity attractiveness. Each gate has a predefined set of “must meet” requirements and “should meet” desirable characteristics which ideas going through should satisfy. The idea then goes to Stage 1 which is a quick review of the idea, often completed in 10 to 20 person-days’ work effort. Its activities include a preliminary market assessment and a preliminary technical assessment.

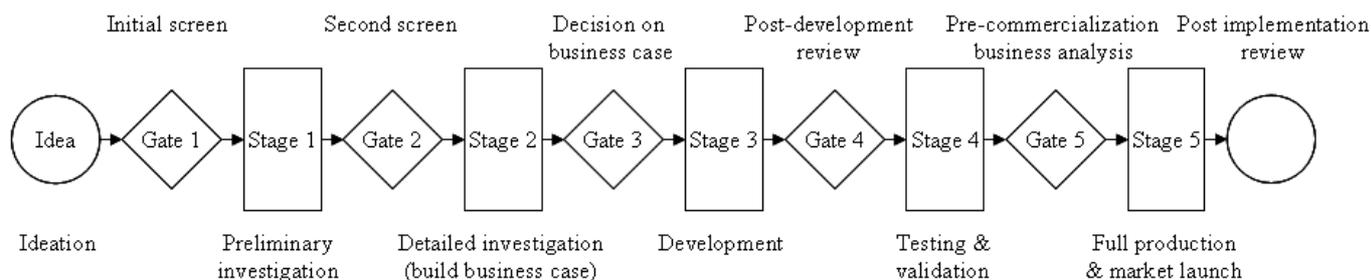
The idea then moves to Gate 2. The criteria here tend to be more rigorous than in Gate 1, because a go decision at this point means more resources will be allocated to the development of the idea. Often a scoring model is developed to measure for synergies, market attractiveness and competitive situation, elements of product advantage and profit potential. Next the idea goes to Stage 2 which is where management develops the business case that defines the product and verifies the attractiveness of the project before heavy spending in the next stage, development. Typical Stage 2 includes activities such as: a user needs-and-wants study to determine the customer's desires and the ideal product, competitive analysis, technical and manufacturing appraisal, legal, patent, and regulatory assessment and a detailed financial analysis.

Gate 3, the decision following the work in Stage 2 is the final gate before the development stage. This is the last point at which the project can be killed before incurring heavy spending. Gate 3 also yields a “sign off” on the product definition. The criteria for a pass are often tough and include a rigorous repeat of the Gate 2 “must“ and "should" criteria as well as a critical financial and risk return review. Stage 3 emphasises technical work, while marketing and manufacturing activities also proceed in parallel. For example, market analysis and customer feedback continue with constant customer opinion sought as the product takes shape during

development. Meanwhile, detailed market test plans, market launch programs and production and operations plans take shape.

Next is Gate 4 which is the post-development review where planners recheck the continued attractiveness of the project. Has work proceeded in a quality fashion? Does the developed product conform to the original definition specified at Gate 3? Etc. In Stage 4 the entire project is tested and validated - the product itself, the production process, customer acceptance, and the economics. This stage often has activities such as in-house product tests, user or field trials, pre-test market and revised financial analysis.

The final gate, Gate 5, is the pre-commercialisation business analysis which opens the door to full commercialisation: a market launch and full production or operations start-up. It is the final point at which the project can still be killed. Criteria to pass Gate 5 focus largely on the quality of efforts to date, on the appropriateness of the production and launch plans, and on the financial viability of the product. The fifth and final stage involves putting the marketing launch plan and the production or operations plan in motion. (Cooper & Kleinschmidt, 1993)



Source: Cooper & Kleinschmidt, 1993

Figure 2.5 Model of the stage gate

2.5.2 Stage gate as a management control system

Looking objectively the stage gate is a management control system (MCS) designed for new product development which empowers the organisation members to be creative, flexible and innovative while at the same time prevents the organisation from risks evolving through the empowerment (damaged reputation, financial losses, missed opportunities...) (R. Simons, 1995b). According to Davila many people wrongly assume that control and structure by

definition are the natural foes of creativity. They feel that imposing any structure on creative people will ruin the results, but if built and used in the right way structure can in fact enhance creativity (Davila et al., 2006). However in the theoretical literature there is no consensus that Davilas argumentation is right. One line of research argues that a widespread use of MCS is incompatible with innovation. Here MCS is seen as deterrents for creativity and for coping adequately with the uncertainly associated with product innovation (Abernethy & Stoelwinder, 1991; Amabile, 1998; R. E. Miles & Snow, 1978; Ouchi, 1977). Another line of research, the innovation management literature, tends to minimize or ignore that MCS effects product innovation negatively (Dougherty & Hardy, 1996; Gerwin & Kolodny, 1992; Leonard-Barton, 1995; Tidd, Bessant, & Pavitt, 1997; Verona, 1999), thus suggesting that the use of formal MCS by top managers is not relevant for successful product innovation. This thesis will though lean towards a third line of research which, in similarity with Davila, argues that MCS may provide a proprietary agenda and a stimulating forum for the generation and implementation of creative ideas including product development ideas. According to this research line many innovative organisations are intensive users of MCS which often leads to increased innovation performance (R. Simons, 1990; R. Simons, 1991; R. Simons, 1995a). This is backed up by Clark and Fujimoto (1991) who in their study of the product development process in the auto industry argues that:

“Today's effective product development organisation is characterized not only by creativity and freedom, but also by discipline and control in scheduling, resource use, and product quality. [...] The challenge in product development is not so much unilateral pursuit of organic structure and permissive management style as a subtle balance of control and freedom, precision and flexibility, individualism and teamwork”
(Clark & Fujimoto, 1991) (p. 169).

The thesis therefore sees the stage gate model as a MCS which can help to improve the innovation performance of an organisation.

2.5.3 Critique of the stage gate model

This does, on the other hand, not mean that the stage gate is perfect. It has over the years received some critique. Buggie (2002) for example presents strong criticism against the model stating that it is not a model for new product development at all. It is more like a general project management model, that can be used to control milestone achievement. According to

Buggie the most crucial fault of this model is its decision gates focusing on searching “fatal flaws” of new initiatives thus excluding especially many radical ideas. (Buggie, 2002).

Other critique has dealt with the stage gate’s linear approach to innovation. Tomke (2003) argue that all experimentation consists of iterating attempts to find the most probable direction in which the solution lies. According to Thomke, good and timely feedback from experiments is crucial for the development of new products. Therefore, long feedback delays can hinder improvement and ultimately make experiment results useless. Moreover, rapid feedback is crucial for industries with a short time-to-market cycle, where delayed feedback is usually only used for verification purposes, long after the decision has been made (Thomke, 2003). The stage gate does not have a feedback mechanism build into it which according to Tomke (2003) is a problem. This argumentation is backed up by Kline and Rosenberg (1986) who in their model specifically take into account the need for short and long feedback links all the way through the innovation process (Kline & Rosenberg, 1986).

A third critique point is that the stage gate does not take into account the actual ideation and creation of new ideas. Cooper et al have however acknowledged this critique and in 2002 published two articles discussing how the stage gate could be optimized to accommodate also the very beginning of the innovation process: the ideation phase also called the fuzzy frontend (Cooper et al., 2002). Other critique points are that the managers don’t have the flexibility to evaluate projects whenever and however they see fit – the stage gate sets required checkpoints and evaluation criteria. Furthermore, by organizing product development into stages makes the magnitude of an investment inversely proportional to the uncertainty associated with the investment. For example, at the early stages of a product development effort, uncertainty is typically high and the funding level is low. As work and time reduce uncertainty, projects are either cancelled or they advance to subsequent stages, where investment increases. This feature gives stage gate pipelines their characteristic funnel shape which can result in some good ideas never getting the chance they deserve (Summers & Scherpereel, 2008).

2.5.4 The use of stage gate in creative organisations

The stage gate is not without fault, but it is still one of the most widely used models to systematise innovation in an organisation (prod-dev.com, 2009). There are naturally some

challenges when implementing such a system in an organisation and especially in a creative organisation. As with any other system a correct implementation of the stage gate is decisive for its success. Poor implementation of the stage gate is often very damaging for the organisation: little or no improvement with new product performance, wasted time, money and resources, costly disruptions to critical new product timelines and the employees' loss of confidence in the stage gate as a helpful tool (stage-gate.com, 2009). According to Jens Arleth, stage gate consultant, a main reason why the stage gate does not get implemented successfully is because of the lack of knowledge internally in the organisation implementing the stage gate. He argues that most organisations lack experience in designing stage gate processes and this is why they fail, and why they need his service (stage-gate.eu, 2009). Even though he is clearly selling himself as a consultant he does have a valid point that is backed up by Cook & Brown (1999) who argue that there is a difference between knowing and knowledge. According to them knowledge is static and necessary to action: something that is part of action. Knowing is dynamic, concrete and rational: the epistemic work that is done as a part of action. Knowing something refers to aspect of action whereas knowledge is the tool at the service of knowing (Cook & Brown, 1999). Most organisations can be said to have the knowledge of how a stage gate is supposed to work, but they lack the knowledge of how it actually works, and how it is going to work specifically in their organisation which can cause a poor implementation of the stage gate.

In specific relation to creative organisations Christensen et al (2008) raise concern that the usage of a stage gate can tip the balance between creativity and value creation too much toward the later. They argue that the key decision criterion at each gate is the size of projected revenue and profit from the product and the associated risks. The problem is that revenues from products that incrementally improve upon those the organisation is currently selling can be credibly quantified. But this is not the case for proposals that seek to create growth by exploiting potentially disruptive technologies, products, or business models, because they can't be bolstered by hard numbers. When such projects are pitted against incremental sustaining innovations in the battle for funding, the incremental ones sail through while the seemingly riskier ones get delayed or die. (Christensen, Kaufman, & Shih, 2008).

They also attack the process itself. The first critique point is that the teams in charge of getting ideas through the stage gate process know how good the projections (such as NPV) need to look in order to win funding, and it takes only nanoseconds to tweak an assumption and run another full scenario to get a faltering project over the hurdle rate. If, as is often the case, there are eight to ten assumptions underpinning the financial model, changing only a few of them by a mere 2% or 3% each may do the trick. Focus is therefore no longer on developing the best product through creativity, but instead on tweaking the numbers to make one idea win over another because of a too high focus on value creation. (Christensen et al., 2008).

The second critique point regarding the process is that the stage gate system assumes that the proposed strategy is the right strategy. Once an innovation has been approved, developed, and launched, all that remains is skilful execution. If, after launch, a product falls seriously short of the projections (and 75% of them do), it is cancelled. The problem is that, except in the case of incremental innovations, the right strategy cannot be completely known in advance. It must emerge and then be refined. The stage gate system is not suited to the task of assessing innovations whose purpose is to build new growth businesses which is often the case in creative organisations. (Christensen et al., 2008).

A creative organisation therefore faces some clear challenges when it decides to use and implement a stage gate system. These challenges relate to how the stage gate works together with the existing strategy, structure and culture of the organisation, and how the stage gate influences its existing balance between creativity and value creation.

2.6 Research gap

Whether the stage gate influences strategy, structure, culture and the balance between creativity and value creation has not been discussed much in the innovation literature. It is known that strategy, structure and culture influence the innovation performance and thereby also the balance between creativity and value creation. However it is not known what an introduction of a stage gate does to the balance directly and indirectly by influencing the strategy, structure and culture of an organisation which then in turn influences the balance.

This thesis will through an exploratory study, seek to uncover what happens to the innovation performance of an organisation when a stage gate is introduced. The thesis will solely look upon creative organisations as they are more sensitive to changes in their innovation balance. The research question of this thesis is as following: how does the implementation of stage gate systems influence the balance between creativity and value creation in creative organisations. This question constitutes a gap in our current knowledge of innovation and is therefore important to shed light upon.

Even though this topic has not been studied before there has been other studies investigating some of the same aspects. The following will shortly outline the nature of some of the related studies that have been carried out in the past.

In 1994 Poul O'Connor studied the implementation of stage gate in a multi organisation perspective and found out that many organisations recognize the benefits of developing new products through a stage gate work-flow process. Yet implementing such a process is a significant challenge, made complex by the dynamics of time, changing organisational structures, and the transition of key personnel. He concludes that the critical concerns when implementing a stage gate are the organisational change issues as they create a divide between knowing what each organisation ought to be doing and realizing the benefits from actually doing it. Therefore, how well an organisation implements the stage gate is clearly linked to the effectiveness of the process and to resultant future positive cash that flows from new products. The challenges discussed and the timeframes observed were quite notable, but equally notable was the positive tone of the interviewed. All of the participants believed strongly that their organisations were far better off with their stage gate process than without one. A definitive, well-implemented process, the group agreed, can energize the new product development effort of an organisation and help it realize greater impact from new products sooner. It will be the quality and the timeliness of specific actions that these organisations take over the course of implementation that will determine the true success of their stage gate processes. (O'Connor, 1994). The current thesis will relate to O'Connor's study as it will support his finding that the organisation structure needs to be updated to accommodate the stage gate. It will also support the statements made by his participants that the organisation is better off with the stage than without it.

In 2007 John E. Ettlief and Jorg M. Elsenbach studied the nature of the stage gate process in the context of innovative projects. They found that organisations modify their formal development regimes by using the stage gate to improve the efficiency of this process without significantly sacrificing product novelty. They found that 48.6% of respondents said their organisations used a traditional stage gate process, and 60% of their new products were considered to be a commercial success. They also found that about a third of respondents said their organisations are now using a modified stage gate process for new product development. They concluded that the long-standing goal of 50% reduction in product development time without sacrificing other development goals (e.g., quality, novelty) is finally within practical reach of many firms. Innovative organisations are not just those with new products but also those that can modify their formal development process to accelerate change. (Ettlief & Elsenbach, 2007). As with the study by O'Connor the current thesis will also support Ettlief and Elsenbach's claim that the stage gate helps organisations becoming more effective without sacrificing their ability to be creative.

In their 2008 paper Rajesh Sethi and Zafar Iqbal studied how the stage gate has the potential of restricting learning in a new product development project and thus hurting the performance of novel new products. Their results that are based on a survey of 120 projects using the stage gate process for new product development show that repeated application of strictly enforced and objective evaluation criteria for improved control makes projects more inflexible. Gate conditionality does not mitigate the adverse effect of gate review criteria. Project inflexibility leads to learning failure, and this effect is worsened when the technological environment of the firm is turbulent. In turn learning failure adversely influences the market performance of novel new products. (Sethi & Iqbal, 2008). The current thesis will partly support Sethi and Iqbal's argument that a too rigid stage gate will destroy new product development attempts of an organisation, but only partly as it is equally bad having a stage gate that does not get enforced and deadlines not kept.

A search has been made for other related studies, but most other studies concerning the stage gate are dealing with how the actual innovation process is carried out and discusses pros and cons, looking solely at new product development and not on the implications the stage gate has on the organisation as a whole. This thesis will, as the three studies above, contribute to

the stage gate literature by applying a broader perspective and see what implications the stage gate has outside the actual new product development process.

This also represents a practical problem. Many, especially creative organisations are in doubt whether they should implement a structured approach to innovation in a form of a stage gate model. They are afraid that the stage gate will destroy their creative abilities, conflict with their culture and perhaps even change the strategy of the organisation. Answering the research question will help organisations thinking about implementing the stage gate to get a better foundation to base their decision on as many of the direct and indirect effects of the stage gate will be analysed and discussed.

The question will be answered by interviewing a number of creative organisations that already have implemented the stage gate. The thesis will result in an identification of critical factors and patterns which get influenced when implementing the stage gate in a creative organisation and integrate these into a refined theoretical model for future testing.

3 METHOD

The methods used in writing the thesis will be described and discussed in the following section.

3.1 Research content

To answer the research gap a qualitative data analysis method is chosen. The reason for this is that qualitative data are a source of well-grounded, rich descriptions and explanations of factors and patterns that are influenced when implementing a stage gate system in a creative organisation. This could not be done by using a quantitative design as there is no prior knowledge to base the quantitative questions upon. However based on the results presented in this thesis it will be possible to construct and carry out a quantitative research that can confirm the results of this study. With qualitative data it becomes possible to preserve a chronological flow, see precisely which events led to which consequences, and derive fruitful explanations. By applying this approach it also becomes possible to go beyond initial conceptions and to generate or revise conceptual frameworks. (M. B. Miles & Huberman, 1994).

When applying such a research method the challenge is to make sense of massive amounts of data, reduce the volume of information, identify significant patterns and construct a framework for communicating the essence of what the data reveal. This demands a certain amount of skill of the researcher as Patten (1988) explains:

“..the human element of qualitative inquiry is both its strength and weakness - its strength is fully using human insight and experience, its weakness is being so heavily dependent on the researcher’s skill, training, intellect, discipline, and creativity. The researcher is the instrument of qualitative inquiry, so the quality of the research depends heavily on the qualities of that human being” (Patton, 1988).

And as Miles and Matthew (1994) points out it is also vital to formulate and follow a well-argued research method:

“The most serious and central difficulty in the use of qualitative data is that methods of analysis are not well formulated. For quantitative data, there are clear conventions the researcher can use. But the analyst faced with a bank of qualitative data has very few guidelines for protection against self-delusion, let alone the presentation of unreliable or invalid conclusions to scientific or policy-making audiences. How can we be sure that an “earthy”, “undeniable”, “serendipitous” finding is not, in fact, wrong?” (M. B. Miles & Huberman, 1994).

In a later section of the methods part will it be explained how this difficulty has been embraced and solved to produce a truthful representation of the research area chosen for this thesis. However there are more to it, to make a credible qualitative study. Therefore the following sections will address what techniques and methods that were used to ensure the integrity, validity, and accuracy of the findings.

3.2 Procedure of data collection

The following section will describe how the data for the thesis was collected. The first part will explain how the interview partners were selected, the second will explain how the interview guide was constructed, and third part will explain how the guide was tested.

3.2.1 Theoretical sampling of interview partners

The qualitative research theory typically recognises two main types of sampling: probability sampling and convenience sampling. However the sampling made in this thesis falls into a third category, which Joseph A. Maxwell calls purposeful selection (Maxwell, 2005). The reason for this is that the term ‘sampling’ is problematic for a qualitative research design as used in this thesis, because it implies the purpose of ‘representing’ the population sampled. Due to the limited sample in this thesis and the nature of the research topic it is not possible to generalize the findings to other organisations that do not look like the sampled.

The research question will be answered by interviewing creative organisations that have implemented the stage gate. It was important to get a wide variety of creative organisations to be able to get as broad a context as possible. It was set as a goal to get organisations from different industries and get both small and large organisations measured on number of employees. The selection of the interviewed organisations was done by searching for organisations that made use of the stage gate. The search was done primarily online via websites dedicated to the stage gate and via Google, but also offline by asking various people if they knew organisations that used the stage gate. The initial search constituted around twenty organisations all using the stage gate, but five of these organisations did not live up to the creativity requirement and were discarded. This resulted in a short list of fifteen organisations that were contacted and asked if they wanted to participate in the study. Ten of these organisations accepted to participate, but two of these were discarded, because it was too long time ago they had implemented the stage gate and would not be able to provide the before/after information which is central for this study. The study consequently comprises the eight organisations listed in table 3.1 below. Incidentally these organisations all operate in different industries making it possible to make fairly broad conclusions as the research sample is very heterogeneous. If any tendencies are found that transcend the different organisations this shows that the tendency is fairly widespread across different industries and does not concern with specific conditions within one industry. This does not mean that all organisations in the industries analysed act in this way. By having this condition it becomes impossible to say anything with certainty regarding a specific type of organisation within a specific industry, but instead it becomes possible to locate a tendency that can be verified in later research. The organisations also vary in number of employees which again makes it

possible to locate a trend, but not say anything for certain. All the organisations meet the requirement of being creative, and they all have implemented the stage gate within 20 years which make them ideal for this study.

Organisation	Years since implementation	Number of employees	Industry	Number of interviews conducted
A	> 10	> 10.000	Beer & soft drinks	1
B	< 5	< 1.000	Medico	1
C	5 – 10	1.000 - 10.000	Electronics	2
D	> 10	> 10.000	Pumps	2
E	< 5	< 1.000	Gum	2
F	> 10	1.000 - 10.000	Toys	1
G	< 5	< 1.000	Software	1
H	5 – 10	> 10.000	Windows	2

Table 3.1 Organisations analysed in the study

The sampling of interviewees in the chosen organisations was also based on Maxwell’s purposeful selection approach. According to Maxwell this is a strategy in which particular settings, persons or activities are selected deliberately in order to provide information that can’t be obtained as well from other choices. The interviewees have hence been specifically selected based on their ability to provide information about how their respective organisations innovated before the stage gate and how they now innovate with the stage gate. All interviewees are either innovation or project managers as regular employees were not able to give the holistic picture which was needed. It was sought to get two interviewees per organisation to minimise bias. However in half of the organisations interviewed this was not possible. This might influence negative on the results as people remember different things and interpret same things differently and also see different things depending on where they are in the organisation.

This can be seen in one case where two people from the same organisation were interviewed. In that case there were some discrepancies between their different statements. To minimise such bias it would have been beneficial to interview up to five people in each organisation and then cross check the different statements, however the research question demanded a specific type of interviewee who possessed the before/after knowledge. Combined with the normal

difficulty of getting through to the organisations and subsequently getting them to agree on being interviewed this made it impossible to get more than two interviews per organisation.

The interviewees were initially contacted via phone where the research topic was shortly explained to them. Afterwards an email was sent to them explaining the topic further along with a description of what knowledge the interviewee should possess. In most cases a dialog then commenced via email, where the interviewee either agreed to participate or forwarded the email to a person they thought better suited for the interview. After an interviewee had agreed to take part a meeting was setup. Four out of the eight organisations interviewed are located in Jutland. In these cases the interviews were done over the phone while the rest of the interviews were done face to face at the different organisations.

All interviews were started by a short presentation of the interviewer and the research topic. The topic was only explained in overall terms to make sure the interviewee did not feel obliged to answer the questions in a certain way. Before the actual interviews started all interviewees were asked if they would agree to the recording of the interview. All interviewees accepted this. The interviewees were also informed if they wanted anything not recorded they could just say so, and the recording would be stopped. None of the interviewees made use of this option.

3.2.2 Structure of the interview guide

The interview and subsequently the interview guide were structured as a narrative interview. This was done due to the exploratory nature of the study where little was known about the subject beforehand, so it was important to let the interviewees tell as much freely without getting biased by the interviewer. By encouraging the interviewees to tell stories (narratives) they unconsciously told a more accurate description of how they viewed the world than by asking them very narrow questions where they would not have been able to talk freely. As Barbara Czarniawska (2004) argues an interview is not a window on social reality, but it is a part, a sample of that reality. According to Czarniawska we all live in a world of many and fast connections, where we constantly have to explain ourselves to strangers. While each one of these accounts will be unique in the way every interaction is, it would be both presumptuous and unrealistic to assume that an interviewee will invent a whole new story just

for the sake of a particular researcher who happened to interview him or her (Czarniawska, 2004). By using a narrative approach it became possible to obtain the interviewees' perceptions, his or hers interpretation of the world.

The interview guide contained seven broad questions which encouraged the interviewee to talk freely and go in whatever direction he/she felt right. The questions are listed in the table 3.2 below. If the interviewee did not understand the question or at some point stopped and had nothing more to say, two to three questions were prepared for each of the main seven questions. These questions were a bit more closed and guided the interviewee to talk about specific aspect within each of the overarching questions. When the interviewee had answered the seven main questions, the second part of the interview guide was put into action. This contained a list of everything which was already known about the subject beforehand and a specific question for each known aspect. The interviewer then checked each point whether the interviewee had already answered that aspect otherwise it was asked. Through this method it was possible to influence the interviewee as little as possible to minimise bias and get new not already known knowledge while at the same time obtain knowledge about the already known aspects.

What was underlying reason to use and implement a stage gate system?
How did the company innovate before it had a stage gate?
Tell me about how the implementation went?
What do you think are the main differences between now and before the stage gate?
How does the company innovate today with the stage gate?
How did the stage gate affect the creativity aspect in your innovation efforts?
How did the stage gate affect the profitability aspect in your innovation efforts?

Table 3.2 The main questions of the interview guide

The last part of the interview guide consisted of six questions which the interviewees were asked to answer from a scale from one to five. The questions were closed in nature and concerned how well the interviewee thought the organisation was at being creative, at generating value and at being innovative before the stage gate was introduced, and how well the organisation did these things after the introduction. The questions could only be answered in five ways which meant the answers were directly comparable and were contributing to the

research as a form of pseudo quantitative data. The questions were specifically set at the end of the interview guide as these questions can be seen as the core of the research question and therefore very closed. The questions helped triangulate and validate the results given by the interviewees in the preceding interview.

3.2.3 Pre-test

After the interview guide had been created a pre-test was conducted on the CEO of a small internet organisation Wise Entertainment. The interviewee was not an expert in the stage gate, but knew the basic terms and was able to give good feedback on how the interview guide could be optimised. This resulted in the alterations of several of the questions to make it clearer for the interviewee what was meant by them.

3.3 Procedure for data analysis

The following part will explain how the data gained from the interviews were analysed and discuss pros and cons about this analysis method.

3.3.1 Transcription

Because of the explorative nature of the study and the loose and open interview guide a lot of the information given by the interviewees could not be used to answer the research question of the thesis. The main focus of the interview was to gain knowledge about the effects of the stage gate, but to gain that knowledge it was necessary to let the interviewees talk as freely as possible without guiding them to any specific conclusions. The result was that all the interviews have only been partially transcribed, meaning that only the parts of interest for the research question have been written down. All the interviews were listened through before the actual transcription process began, and notes were made describing what information was of interest before the actual transcriptions were carried out.

The transcripts should be seen more as a quote collection rather than a detailed account of each interview. The questions asked by the interviewer have as a consequence also been left out of the transcripts. The disadvantage of this method is that it is not possible to read the transcriptions and get a linear story of how the different interviews proceeded. However all interviews are available from the author in digital audio format if a reader wishes to check the

accuracy of the written transcripts which are enclosed in appendix A. This method might have left out some indirect or subtle statements regarding the research question, but after all the interviews were transcribed, they were listened through again to make sure no important statements were left out. This quality loop caught around two to three statements per interview which were not initially written down during the actual transcription phase.

All interviews except one were carried out in Danish. The transcripts are as a result hereof all but one written in Danish. However all the codes are in English, and all quotes used in the thesis have been translated into English. The reference number used correlates with the complete Danish transcription.

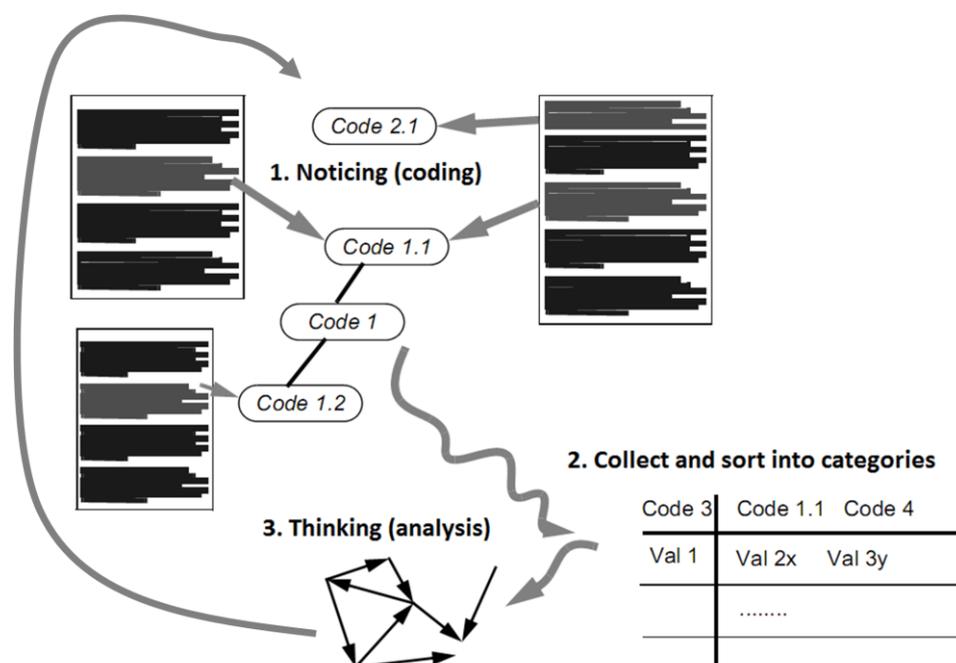
3.3.2 Data coding and categorizing based on qualitative content analysis

The goal of the thesis is to identify how the implementation of a structured approach towards innovation in the form of a stage gate system influences the balance between creativity and value creation in a creative organisation. Therefore an appropriate analysis method was picked to be able to analyse the information gathered.

The method chosen is called grounded theory (GT), which is a systematic qualitative research analysis (QDA) methodology in the social sciences emphasizing generation of theory from data in the process of conducting research. Within GT two different paradigms have arisen, Glaserian and Straussian. In this thesis the Straussian paradigm will be used as it is more applicable for validation criteria and has a more systematic approach to research. According to the Straussian paradigm QDA is a range of processes and procedures, where the data collected is moved into categories whereby it is possible to obtain a holistic understanding of a certain situation (M. B. Miles & Huberman, 1994).

QDA is an iterative analysis method containing three parts: noticing, collecting and thinking (J. V. Seidel, 2009). Noticing means becoming aware of interesting aspects in the data collected and then naming these things or 'coding'. Once all interesting aspects have been coded the next part is to collect and sort them into categories. The third part is thinking where the things that have been collected are examined. The goal here is to make sense out of the collection by looking for patterns and relationships and to make general discoveries about

the phenomena being researched. However as noted above this is not a linear process, because when starting to think about the patterns and relationships in the data, new things are noticed in the data. These new things are then collected and considered. That then generates a new viewpoint from where it is possible to see new connections in the data and so forth (J. V. Seidel, 2009). This is illustrated by figure 3.1 below. The process is also holographic in the sense that each step in the process contains the entire process. For example, when a certain aspect is noticed the researcher is already mentally collecting and thinking about that aspect before actually coming to those stages.



Source: J. V. Seidel, 2009

Figure 3.1 Procedure of qualitative data analysis

The analysis process in this thesis has therefore been very fluent and emergent and started simultaneously with the transcription of the interviews. Below is listed how the process went in summarised terms, however in praxis there were many iterations where keywords had to be rethought, categories had to be deleted and meaning had to be confirmed after searching through the data two or three times.

Each interview was listened through and quotes of interest were written down in an Excel spreadsheet, and a few initial keywords describing the specific quotes were written down in the boxes next to the quotes. The keywords were formed on a preliminary idea on what the

quote was about. As more and more interviews were transcribed the keywords became more and more precise and defined, as quotes from the different interviews were listed next to the keywords. The keywords were listed within eight main themes to get an overview of them. After all interviews had been transcribed, a list of approximately 80 keywords were listed with a of row quotes beside each keyword from each interviewee who had said something that could be linked to that specific set of keywords.

Later all keywords were read through, and those keywords that overlapped were combined or if there was only one quote for a keyword that quote was either discarded as of no meaning for the research question or placed under another keyword which then was edited to be able to contain the new quote as well as the existing quotes within that keyword. This resulted in a list of around 50 keywords.

After all keywords had been worked through, the process of adding categories and dimensions for each keyword started. This was done by comparing and contrasting the keywords with each other and with the eight overall themes. Based on this it was possible to formulate seven categories that could contain all the keywords. After the categories were formed, it was possible to formulate multiple dimensions for each of the category. Table 3.3 below lists a few examples of how the final analysed data looked. The interviewee number refers to the organisation and person interviewed. The ref. nr. is a unique number each quote was assigned. The quote lists the statements the interviewee made (translated into English). The last three columns show the keywords, category and dimension that are thought to be most accurate in describing the quote.

Interviewee	Ref. Nr.	Quote	Keywords	Category	Dimension
C1	6	It was all a chaos. It was the management's opinion that the things did not work and the fact probably was that the products were much delayed and cost a lot to make	Reason for implementing stage gate (difficult to coordinate innovation effort)	Implementation, reason for	Better coordination
E1	62	It [stage gate] has slowly but steady spread so it is no longer just concerned with innovation understood as product development, but has spread to the entire company mindset	Stage gate has affected the overall strategy	Influence on strategy	Influence on the overall strategy
G1	193	You cannot make radical innovation with this model [stage gate]. To that you need a much more agile development model where you say to some people; now you are going to sit in this room for a month and then we will come back the 31st and see what has come up – then it can either be a catastrophe or unbelievable good.	Stage gate has meant slightly fewer radical ideas	Influence on creativity	Caused fewer radical ideas

Table 3.3 Example of the data analysis carried out

The thesis will treat the codes created with an objectivistic approach as a ‘condensed representation of the facts described in the data’ (J. Seidel & Kelle, 1995). By applying this approach the code words can be treated as surrogates for the text, and the analysis can focus on the codes instead of the text itself. However to use this method it is vital that the coding is trustworthy. To achieve this trust three actions took place after the quotes had been segmented into categories and dimensions. At first it was checked that every time a category and a dimension were used to identify a quote that quote is an unambiguous instance of what that category and dimension represents. Secondly it was checked that the categories and dimensions were applied to the quotes consistently in the traditional sense of the concept of reliability. Thirdly the interviews were listened through a final time, to make sure that every quote that could be placed under the formulated categories and dimensions were identified and written down. (J. V. Seidel, 2009). Based on these actions the codes formed for this thesis are adequate surrogates for the quotes they identify. The quotes are reducible to the codes, and it is therefore appropriate to analyze the relationships among the categories and dimensions.

3.3.3 Data analysis of questionnaire

At the end of each interview six questions were asked as a follow up on the previous conversation with the interviewee. The six questions dealt with how the interviewee thought the organisation was at being creative, creating value and being innovative before and after the stage gate was implemented. The interviewees could answer the six questions on a scale from one to five, where the former was very poor and the later was very good. The output of these questions resulted in a numerical representation of the preceding interview. This data was not intended nor is it used as a quantitative investigation, but instead as a validation of the findings found in analysis of the interviews. However to do so it was necessary to perform some basic statistical analysis. All answers given were put into an Excel spreadsheet, and the answers for each question were added up and divided by the number of answers to get an average. Graphically columns were created to present the before/after effect of the stage gate, and thereafter bars with standard deviations were added to graphically show that the results have no statistical basis and therefore can only be used in combination with the primary research foundation of this thesis the interviews conducted. The questions however gave a knowledge that could not be reached through the interviews which was why they were asked.

4 PRESENTATION OF RESULTS

The following section will present the results and will answer the research question of the thesis that has been reached by the method described above. The results will be parted up into seven sections. First, the reasons why the interviewed organisations implemented the stage gate will be presented and how the different implementations went. The second section will elaborate on how the strategy, structure and culture of the different organisations were influenced. The third section will look at how the stage gate influenced the creativity of the organisations and the fourth section will look at how the stage gate influenced the value creation of the organisations. The fifth section will look into how the stage gate influenced the balance between the two in numerical terms. The sixth section will combine all the previous findings and present a framework to explain the influence of the stage gate on the innovation performance both indirectly and directly. The final section will compare the results with the state-of-the-art.

4.1 Analysis of reasons for the implementation of the stage gate

It would be expected with the implementation of any new system the different interviewees had fairly different reasons for implementing stage gate. And they also had multiple reasons for the implementation as such. An action is not based on one single reason or need which can be seen from the table 4.1 below.

<i>Reasons</i>	<i>Occurrences</i>	<i>Percentage</i>
Become more effective	11	92%
Better coordination	7	58%
Too many poor ideas	7	58%
Not enough structure	6	50%
Company had grown	4	33%
Lack of structure meant lost ideas	4	33%
Market orientation	4	33%
Unifying language	3	25%
Be able to learn from previous experience	2	17%

Table 4.1 Reasons for implementing the stage gate

A minority of interviewees said that they wanted to be able to learn from previous new production development processes which they were not able to before the stage gate as they did not have any system in place to gather such knowledge. Others saw the stage gate as a unifying language which could help the different departments to talk to each other in a language they all understood instead of talking in marketing vs. production language. And yet some said their organisations had grown to a size where a more formalized product development process was simply needed.

33% of the interviewees said they did not have a particular structured innovation process which meant ideas were lost or not developed upon.

“I could imagine that there are many ideas which have not been passed to the right people, because nobody knew how to do it” (H2, 45).

Another 33% said they historically had been too product driven, and they needed a system which could make them more focused on the end user and have a more holistic view.

“We were perhaps also too focused on the product alone. It is not enough just to make a product. You also have to make a production setup, marketing, sales and all the other

things. We might have forgotten that in the excitement for the product. We are a very engineering heavy company” (D2, 9).

50% gave a general lack of structure as reason for the implementation.

“I actually think it was pretty unstructured. There was not the feeling that you knew where the things were in the process. It was difficult for management to get an overview of the projects when we did not have such a model” (C2, 39).

58% said they needed better coordination.

“It was all a chaos. It was the management’s opinion that the things did not work and the fact probably was that the products were much delayed and cost a lot to make” (C1, 6).

And another 58% said they had too many poor ideas. The reason all interviewees gave for the implementation except one, a total of 92%, was they wanted to become more effective:

“Earlier we used a lot of money on product development and it was an old form of product development. We had multiple development departments which were completely independent satellites where a lot of creative people sat and got wild ideas [...] The more ideas they could generate the better. However there were only a small fraction of these ideas that could be turned into a product. This meant a vast amount of costs compared to what the output was” (H1, 28)

As the results show the majority of interviewees argued in one way or another that they implemented the stage gate to heighten their value creation abilities. This is not surprising as the purpose of the stage gate is to streamline and make the product development process more efficient. However they did mention two reasons concerning creativity. That they had too many poor ideas, and they wanted to be more focused on the end users needs than the product itself. Even though it was a minority of interviewees who mentioned these two reasons it shows that choosing to implement a new system, like the stage gate, is not some rash decision. Organisations have to make a thorough investigation to have a proper basis for a decision. They carefully have to weigh up all the advantages against the disadvantages. This leads to the following proposition.

Proposition 1: The bulk of reasons for implementing the stage gate fall on the value creation side of the balance

One of the central disadvantages when implementing a stage gate is that the employees need to be schooled in how to use the new system correctly. As with any organisational change the employees can be reluctant to it. Only 25% the interviewees said the employees were positive about the prospect of getting a new system, that potentially could turn their tasks upside down and redistribute the power from some employees to others. Some organisations tried to counter this by involving the employees in the implementation process, but only three interviewees, 17%, said the employees were positive and were actively involved in the implementation process. 5 interviewees, 42%, said the employees were involved in the process, but were negative and 25% said the employees were not involved and also negative. Consequently a total of 67% of the interviewees said the employees were negative no matter if they were involved in the implementation process or not. Organisations therefore have to be aware of the consequences when implementing a stage gate system, not just in regards to its employees, but also in regards to its strategy, structure and culture which will be analysed next.

4.2 Analysis of implications on strategy, structure and culture

As the state-of-the-art showed the innovation performance of an organisation and consequently the balance between creativity and value creation are all influenced by strategy, structure and culture. It is not known whether the stage gate indirectly influences the balance by influencing the strategy, structure and culture of an organisation. The following section will look at this aspect.

Strategy

The interviewees' answers regarding the influence of the stage gate on strategy is listed in table 4.2 below. As can be seen 17% of the interviewees said the stage gate meant the organisation got a higher focus on having an optimal product portfolio. And another 17% said the stage gate influenced the innovation strategy of the organisation.

<i>Influences</i>	<i>Occurrence</i>	<i>Percentage</i>
No impact on the innovation strategy	10	83%
Influence on the overall strategy	7	58%
No influence on the overall strategy	5	42%
Impact on the innovation strategy	2	17%
Meant higher focus on product portfolio	2	17%

Table 4.2 Influence of the stage gate on strategy

However 83% said the stage gate did not have an influence on the innovation strategy.

“It is not because of the stage gate [that we have an innovation strategy]. It is because we professionalised so many other systems” (H1, 73).

“[How about the innovation strategy – has the stage gate affected that?] No. It’s the other way around. The stage gate should be flexible and should be adapted to the strategy” (A1, 70).

This could indicate the stage gate does not influence the strategy of an organisation, but on the other hand 58% of the interviewees phrased that the overall organisation strategy was actually influenced by the stage gate.

“It [stage gate] has slowly but steady spread so it is no long just concerned with innovation understood as product development, but has spread to the entire company mindset (E1, 62). We have seven core processes [...] and one of these is our development process which actually is a stage gate model [...] so it has a big influence on the company as it has been chosen as one of our seven core processes” (F1, 61).

But 42% say it has not influenced the overall strategy.

“Our strategy has not been influence by the stage gate. The stage gate is a tool to achieve the strategies and not the other way around” (H1, 52).

The findings don’t show anything conclusive. There seem to be varied opinions whether the stage gate influences the strategy or not. Some interviewees solely look at the stage gate as a tool to carry out the strategies planed, where others see the stage gate as an inspiration to reshape the strategy. The reason for this becomes evident when parting the organisations up into sizes based on how many employees they have. As table 4.3 below shows 75% of the small organisations say the stage gate influenced their overall strategy while 80% of the big

organisations say it did not have any influence. The size of the organisation implementing the stage gate seems therefore to be influential for whether the strategy gets influence or not.

Organisation size (number of employees)	No influence on the overall strategy		Influence on the overall strategy	
	Number of interviewees	Percentage	Number of interviewees	Percentage
< 1.000	1	25%	3	75%
10.000 > 1.000	0	0%	3	100%
> 10.000	4	80%	1	20%

Table 4.3 Organisation size decisive for the influence on strategy

The interviewees from the smaller organisations state that the influence is expressed by a more systematized and cost efficient strategy approach. The stage gate can thus be said to influence the value creation of smaller organisations indirectly through influencing the organisations strategy, but this influence is not noticeable in larger organisations, and that leads to the proposition below.

Proposition 2: The stage gate influences the value creation side of the balance positively indirectly by influencing the strategy of an organisation. This is however only true for small and medium sized organisations

Structure

Turning to how the stage gate influences the structure of the different organisations the results are more conclusive as can be seen of table 4.4 below.

<i>Influences</i>	<i>Occurrence</i>	<i>Percentage</i>
Organisation changed with the implementation	6	50%
Organisation changed later on	4	33%
Organisation has not changed	2	17%
Meant a rise in measurement of employees	7	58%
The measurement of employees is the same	3	25%
Caused a measurement of employees	2	17%

Table 4.4 Influence of the stage gate on structure

A minority of 17% say their organisation structures have not changed with the implementation of stage gate. However 50% of the interviewees say the structure changed with the implementation or immediately thereafter.

“It [stage gate] has been a contributory reason for us to get a stronger structure and more disciplined and perhaps also a better decision process [...] If we want to have this process [stage gate] and believe that is the best one, then we also need to change the organisation a bit” (F1, 79).

“We have had to rewrite the actual decision processes. The stage gate has made a change on the organisation otherwise we would not be able to use it” (G1, 75).

Finally 33% say the organisation changed at a later stage.

“We launched it [stage gate] without changing radically on the organisation, but gradually we have formed our R&D so it does not only concern product development, but actually have the entire process from idea creation to the product is produced for the first time” (E1, 83).

Hence 83% of the interviewees say their organisation structure at some point was updated to accommodate the stage gate. As argued in state-of-the-art the structure of an organisation is influencing the innovation performance of that organisation or in other words the balance between creativity and value creation. Consequently as the stage gate influences the structure and the structure in turn influences the balance it can be argued that the stage gate has an indirect influence on the balance between creativity and value creation. It is not possible to determine whether the influence is positive or negative and how it is expressed in detail.

One aspect that seems to change in the majority of organisations is the measurement of the employees. 58% of the interviewees say the stage gate has caused a higher degree of measurement and 17% say they did not measure their employees before, but do now. This leaves a minority of 25% saying the change in the organisational structure has not been expressed in measurement of employees. Most other changes vary greatly from organisation to organisation due to the many aspects that influence innovation in an organisation as described in state-of-the-art. This therefore leads to the following proposition.

Proposition 3: The stage gate influences both the creativity and value creation side of the balance indirectly by influencing the structure of an organisation, but it is not possible to determine how this influence is expressed

Culture

Turning to culture the stage seems also to influence that. This can be seen in the table below.

<i>Influences</i>	<i>Occurrence</i>	<i>Percentage</i>
Culture has changed	8	67%
Culture has not changed	4	33%
Caused new values	7	58%
Caused no new values	5	42%

Table 4.5 Influence of the stage gate on culture

67% of the interviewees say their culture has changed after the stage gate was implemented.

“It [stage gate] creates a culture where it is easier for people to prioritise their time” (E2, 92). *“If I look at the various employee surveys then it is also possible to see that the employees feel we have become more profit oriented or cost focused”* (F1, 96).

The stage gate seem to have a fairly significant influence on the culture of an organisation and the main way of influence seems to be by making the organisation more focused on profit, streamlining and systematising. Some of the interviewees expressed concern that this alteration in culture can have unfortunately side effect, as employees apparently stop thinking for them self and put too much trust into the system.

There were some interviewees who said they were not able to see a change in the culture due to the stage gate. 33% of the interviewees had this opinion.

“There has not been a change in culture [...] everyone is happy that we now have a common language - a uniform way of seeing and estimating projects. No doubt about that. And it fits very well with the culture we have [...] and those values we have” (H2, 87).

However others had the exact opposite view:

“It [stage gate] has definitely carried with along a new culture. It has become routine work. Everything has been put into system” (H1, 90).

Interestingly the two interviewees are coming from the same organisation, but have completely contradictory views making the data inconclusive. This can be because they are in different departments and view the stage gate and its implications from different viewpoints. It is also worth noticing that the statements given by the different interviewees are simply their personal views of the reality as discussed in the method section. Even so it is fascinating that two people in the same organisation can have such contradictory views on the same matter. This quite clearly shows that the effects of the stage gate on culture is not particularly evident. That is also the aspect of culture. Culture is something underlying that is difficult to grasp and analyse. It is very difficult for the management to influence the implicit culture of an organisation. It is therefore not possible to determine in organisation H whether or not the stage gate has influenced the culture.

However as the majority of the interviewees lean to one viewpoint, that the culture has changed, then all other things being equal that can be said to be a more accurate interpretation of the reality. This is further backed up by 67% saying that the stage gate also influenced the organisation values.

“It [stage gate] certainly puts focus on quality, and it is contributing to focusing on things that need to be finished. That’s the positive part. The negative is that it perhaps also can cause us to say: if we just had two days more, then we could do it a bit better, then we would be sure to get through [a gate review]” (D2, 105).

33% however said the stage gate had no effect on their organisation values.

“The stage gate has not meant that we have said we need any new values in the company” (H2, 98).

It seems that the stage gate has an influence on the culture of an organisation. The influence is primarily expressed by creating a higher focus on profit, costs, efficiency and systematising among the employees. As discussed in state-of-the-art the culture of an organisation has an influence on its innovation performance. This means it also has an influence on the balance between creativity and value creation. In contrast to structure that was discussed in the

previous section it is fairly clear that the influence via culture on the balance is on the value creation side. This leads to the proposition below.

Proposition 4: The value creation side of the balance is positively influenced by the stage gate via its influence on the culture

4.3 Analysis of the effect on creativity

As described in the state-of-the-art many researchers argue that the stage gate limits the employee’s freedom and hinders them in having a playful behaviour which has a negative effect on the creativity of an organisation. Whether the stage gate has such an effect on the creativity will be addressed in the following section. Before listing the results, in table 4.6 below, it is necessary to be aware that the influence of the stage gate is very complex. The stage gate can foster creativity by systematising the process while at the same time destroying it by formalizing the process too much. Some of the results below can therefore seem contradictory, but this is most likely due to time span since implementation of the stage gate. This will be explained in more detail below.

<i>Influences</i>	<i>Occurrence</i>	<i>Percentage</i>
No influence	7	58%
Reduced focus on creativity	7	58%
Caused fewer radical ideas	7	58%
Improved creativity	7	58%
Sharpened the focus on the best ideas	5	42%
Stage gate has been revised and updated	5	42%
Caused a more market driven approach	4	33%
Obstacle for creative people	3	25%
Innovation has become too rigid	3	25%
Caused an ideation system to arise	3	25%

Table 4.6 Influence of the stage gate on creativity

As can be seen 58% of the interviewees say that the stage gate has no influence on the creativity.

“The stage gate has overall not had an effect on our ability to think creatively” (H2, 174).

Interestingly enough another 58% say that the stage gate improved the organisations creativity.

“You have a minimum number of activities in each phase that are the most required and then when you have done that shit, say it takes you 10 hours, then you have 10 hours free to think about creativity: to think about how you can create value instead of having 30 insecure hours where you think “how should I do it” and you end up having to do it all over from the beginning” (A1, 204).

This view is backed up by 42% of the interviewees who say that the stage gate has sharpened their focus on the best ideas.

“We have become better and faster to get something tangible out of an idea and being creative” (C2, 208).

In addition 33% say the stage gate caused them to have a more market driven approach.

“We have become much more customer focused, and we now have a department that does nothing else but dealing with our customers and their needs” (B1, 212).

However there is not entire consensus among the interviewees about this supposedly positive influence. 58% of the interviewees also say that the stage gate has reduced their focus on creativity.

“It [stage gate] restricts creativity. That is the whole idea of the stage gate: that you think inside some boundaries instead of thinking very broad” (G1, 183).

Another 58% say the stage gate has made them get fewer radical ideas.

“The risk of eliminating a product that could have been surprising on the market is big, because you try to be as systematically as possible, and of course you can make mistakes in your calculations, and we might be very conservative [...] It is particular the genius stuff that is difficult to judge, so I think the risk is substantial” (H1, 192).

Not particular negative, but still a problematic influence on creativity is raised by 25% of the interviewees who say that the stage gate causes the innovation process to become too rigid, which is the same concern as expressed by Sethi Iqbal (2008).

“We have a tendency to make all projects run in the same template [...] It might be the dissimilarity in the different project types that can cause them to be locked in the same model, so it is the model that determines how it runs” (F1, 214).

As a consequence of the rigidity 42% of the interviewees say that they have revised and updated the stage gate after they first implemented it.

“We have developed a new version that we have not implemented yet. We have taken out some gates, so instead of having 5 or 6 gates, we have fewer gates, so we have 3 or 4 gates for that very big breakthrough and for the smaller easier projects we have 1 or 2 gates” (A1, 221).

As the contradictory findings above show it does not seem possible to conclude whether the stage gate has a positive or negative influence on creativity. The interviewees themselves are very vague about the influence. That is visible as 3 interviewees (25%) say the stage gate both reduced their focus on creativity and improved their creativity. 4 other interviewees (33%) said the stage gate caused fewer radical ideas and improved their creativity and finally 4 other interviewees (33%) said the stage gate sharpened their focus on the best ideas while causing fewer radical ideas. These statements seem to be a bit clashing. The reason for the inconclusive data could be that the different interviewees simply have not thought about what consequences the stage gate has had. Many organisations probably implement the stage gate, observe it has a positive effect on value creation as they would expect, but then forget or miss all the other effects it has in the organisation. Knowledge about the effects of the stage gate, beside specifically on new product development, therefore seems to be fairly limited in the different organisations.

However if taken into account the time since the stage gate was implemented in the different organisations a more clear picture arises as shown in the figures below. As can be seen of table 3.1 on a previous page four interviewees said their organisations had implemented the stage gate less than five years ago, four said between five and ten years and a final four said they had implemented it ten or more years ago.

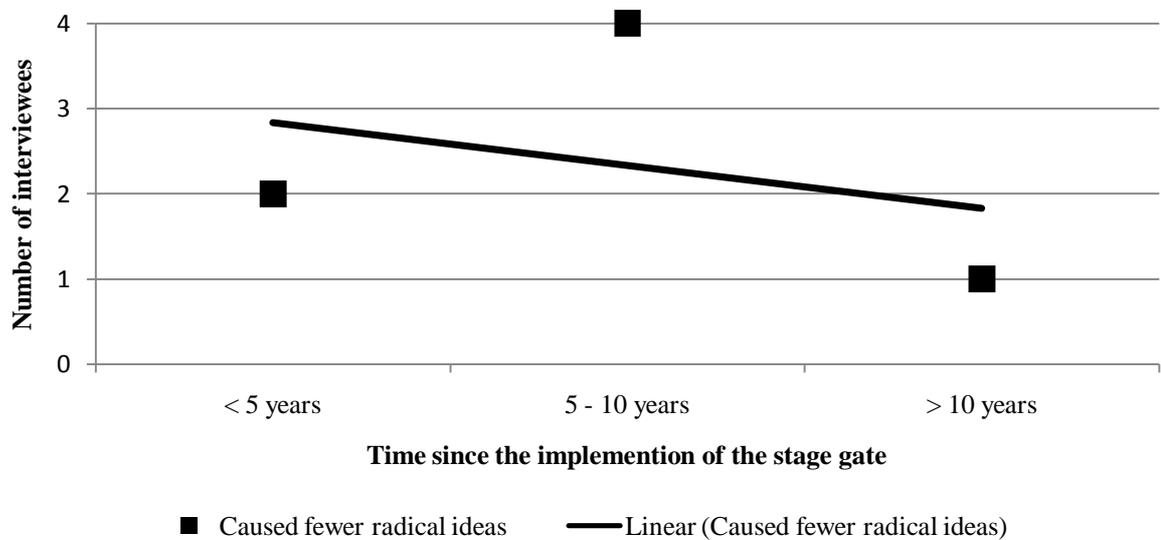


Figure 4.1 The stage gate has caused the organisation to get fewer radical ideas

Figure 4.1 shows that for the interviewees who say the stage gate has been implemented up until five years ago two have experienced getting fewer radical ideas. For the interviewees where it is between five and ten years since the implementation all (four interviewees) say they have gotten fewer radical ideas. And for the interviewees where the stage gate has been implemented ten or more years ago one interviewee says it has caused his/her organisation to get fewer radical ideas.

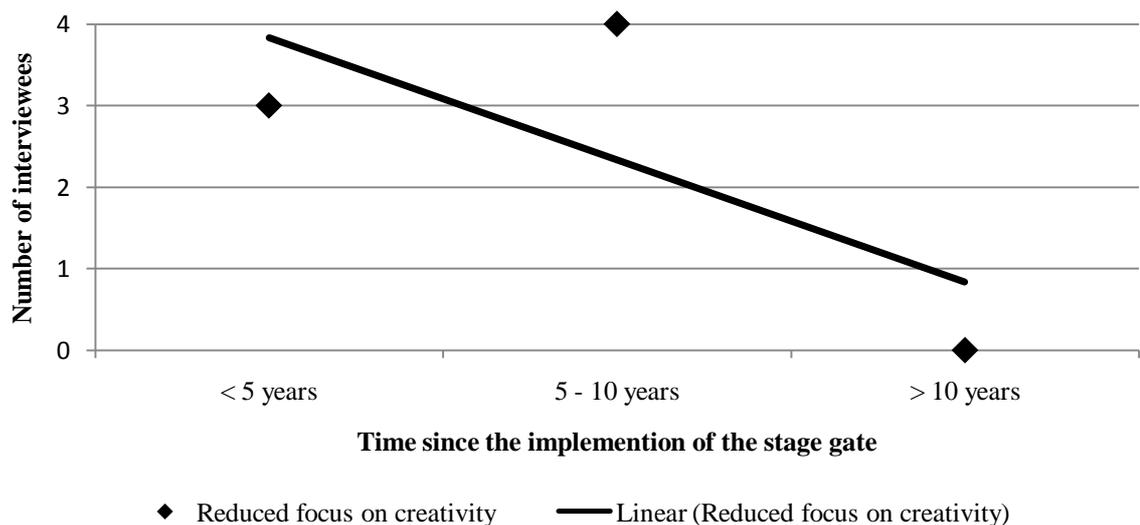


Figure 4.2 The stage gate has caused a reduced focus on creativity

Figure 4.2 show the same tendency as figure 4.1. Of the interviewees who say it is less or five years since they implemented the stage gate three say it has caused a reduced focus on creativity. All the interviewees who have implemented the stage gate between five and ten years ago, but none of the interviewees where the stage gate has been implemented ten or more years ago say they have gotten a reduced focus on creativity. Based on these two figures it thus seems that the negative effects on creativity diminish over time.

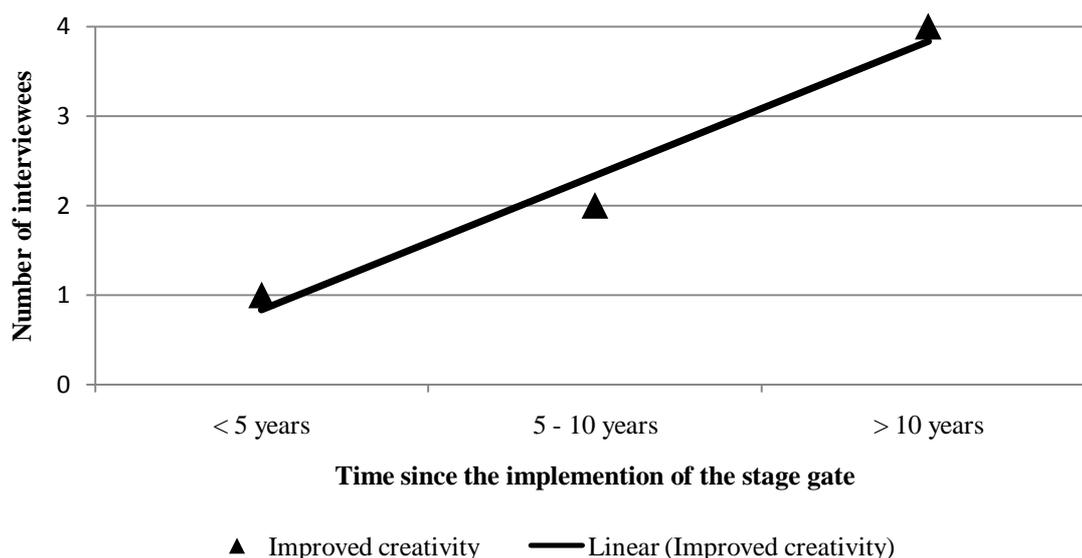


Figure 4.3 The stage gate has improved the creativity

This trend can also be read from figure 4.3. However this figure goes a step further and indicates that not only does the negative effects on creativity diminish over time it actually changes, so the stage gate ends up having a positive effect on creativity if one look on the long run. As can be seen only one of the interviewees for whom it is five or fewer years ago since the implementation say it has improved the creativity of the organisation. This number rises to two interviewees for those where it is between five and ten years ago since the implementation. And all of the interviewees where they have implemented the stage gate ten or more years ago say it has improved their creativity.

It is clear that it is not immediately possible to compare the results above as they deal with different aspects of creativity. Nevertheless the figures together show a noteworthy tendency.

That is that creativity is fairly negatively influenced in the earlier years after the implementation, causing fewer radical ideas (figure 4.1) and reducing focus on creativity (figure 4.2). But as time goes the stage gate becomes a natural part of the tool kit of the organisation. The stage gate transforms to actually influencing positively on creativity as indicated on figure 4.3. This conclusion is of course affixed with a certain amount of uncertainty as many aspects beside the stage gate influences the creativity of an organisation over a ten year or longer period as discussed in state-of-the-art.

Based on the interviews made it is possible with some certainty to say that the stage gate does have an influence on the creativity of an organisation. In the beginning the influence will be predominantly negative. This will over time shift to a more positive influence. Some previous literature, as described in the stage-of-the-art, argues that the stage gate hinders creativity and that can also be partly read of out the results from this study. What also can be read, is that the people in the organisations are aware of this issue with the stage gate and after some time actively update and adjust the stage gate, so it's does not have this negative influence. As previously mentioned the stage gate is one of the most widely used innovation models today. If it really was an obstacle for creativity on the long run as argued in other literature, organisations would probably not implement it. Even though organisations sometimes do irrational things due to bad management, a dysfunctional culture or poor view and understanding of the surround environment, the results presented here seem to point to a positive influence on the long run. This all leads to the following proposition.

Proposition 5: The stage gate has a direct influence on the creativity. At first this influence is predominantly negative, but as the stage gate becomes integrated in the organisation it changes to become a positive influence

4.4 Analysis of the effect on value creation

The main reason for implementing the stage gate is however not to improve the creativity of an organisation, but instead to improve its efficiency or value creation ability. In the table 4.7 below is listed the results of the study in regards to how the value creation of an organisation is directly influenced by the stage gate.

<i>Influences</i>	<i>Occurrence</i>	<i>Percentage</i>
More cost effective development process	12	100%
Higher focus on profit	10	83%
Better thought out ideas	9	75%
More streamlined development process	5	42%
No influence on innovation budget	5	42%
Higher focus on costs	4	33%
Fewer resources allocated to each idea	3	25%
Possible to compare ideas	2	17%
Possible to measure the quality on an idea	1	8%
Not a higher focus on profit	1	8%

Table 4.7 Influence of the stage gate on value creation

In contrast to the areas analysed above the stage gate seems to have a very significant positive influence on value creation. An impressive 100% of the interviewees said they got a more cost effective development process due to the implementation of the stage gate.

“We have become more effective, we have become sharper. We don’t have so many scattered shots: we have become more focused on an overarching strategy and follow that. It has made us more effective, but not that alone” (F1, 128).

83% said they got a higher focus on profit.

“We have become more focused on profit. Yes, there is a better profit margin on the products. Those products which the stage gate creates uncertainty about get closed down before they become finished products” (E2, 135).

In relation to that 33% also said they got a higher focus on their costs.

“I think we have become even more focused on it being economical to develop: it [new product] needs to be cheaper and faster to develop“ (D2, 112).

25% said the stage gate meant fewer resources were allocated to each idea than before.

“In a way you spend less money because you become more structured, so you know where you spend your money and you place your money where it’s most important” (A1, 156).

However 42% said the stage gate had no influence on the innovation budget. Looking at how good products the organisations launch after the implementation of the stage gate. 75% of the interviewees say they have gotten better thought out products.

“We are more goal-oriented with our ideas and those ideas we get are probably also more thought through. Earlier we would send a product on the market and then go a long time before we realised that we actually did not sell any of those products. There is a much higher focus on that today” (H2, 145).

42% of the interviewees also said they had obtained a more streamlined development process.

The influence of the stage gate on value creation is as the results above indicate quite significant and predominantly positive of nature. The stage gate helped the organisations to become more efficient and cost effective. It helped to get a higher focus on what is very important for all organisations: profit and it helped them to get a higher focus on cost minimising. It also helped to get better designed products, so each individual product could generate more revenue, and it helped getting a more streamlined development process. The only negative influence seems to be that 25% of the interviewees say that it meant fewer resources were allocated to each idea. This seems to be a necessary effect of becoming more cost efficient and getting a higher focus on costs. Overall the stage gate hence has a noteworthy positive effect on value creation in creative organisations, leading to the following proposition.

Proposition 6: The stage gate influences positively directly on the value creation side of the balance

4.5 Analysis of the effect on the balance

Finally turning to the overarching question of the thesis the following section will analyse how the stage gate influences the balance between creativity and value creation in creative organisations in numerical terms.

As mentioned in the method part all interviewees were at the end of their interviews asked six questions. They had to score on a scale from one to five, one being the lowest and five being the highest. The questions dealt with how creative the interviewee thought the organisation was before and after the stage gate, how well the organisation was to create value before and after the stage gate, and finally how innovative the interviewee thought the organisation was before and after. The answers show the same tendency as the results presented above. The

stage gate helped the different organisations to obtain a more healthy balance between creativity and value creation by influencing significantly positive on the value creation side without any major negative effects on creativity.

Interviewee	Before stage gate			After stage gate		
	Creativity	Value creation	Innovative	Creativity	Value creation	Innovative
A1	3	3	3	3	4	4
B1	3	2	1	4	4	4
C1	4	4	2	3	4	4
C2	3	2	3	3	4	3
D1	2	3	2	4	4	3
D2	4	-	-	5	-	-
E1	4	2	3	4	4	4
E2	3	2	2	3	4	4
F1	4	3	3	4	5	4
G1	5	4	5	4	3	4
H1	4	3	3	4	4	4
H2	4	3	3	3	4	4
Average	3,6	2,6	2,5	3,7	3,7	3,5

Table 4.8 Before and after effect of the stage gate

Before analysing the results above it is important to be aware of the many aspects beside the stage gate, both internally and externally, that have influence on creativity, value creation and innovation in an organisation as discussed in the state-of-the-art. The results listed in the table 4.8 cannot be taken as a direct consequence of the implementation of the stage gate. In addition interviewee D2 only possessed knowledge about the beginning of the product development process which is why the person did not feel confident in answering the questions regarding value creation and innovation.

Looking at the value creation level it has jumped notably after the implementation of the stage gate which is not surprisingly since that is exactly what the stage gate is meant for. Looking at the creativity results something interesting is shining through. The existing literature is critical towards the stage gate and claims that it is the creativity that suffers when an organisation implements a stage gate system. The numbers above show only three interviewees who say their creativity level have decreased after the introduction of the stage

gate. Six interviewees say the stage gate have actually caused them to be even more creative while three say the creativity level has neither increased nor decreased. This difference can be attributed to the time span after the different organisations implemented the stage gate.

The creativity level has remained fairly the same, while the value creation level has risen dramatically. This can clearly be seen in the two figures below. Figure 4.4 shows how the creativity level has risen a bit from 3,58 to 3,66 where the second figure 4.5 shows that the value creation has risen from 2,58 to 3,66. Due to the small sample number there is no statistical evidence for this tendency as shown by the bars with standard deviations.

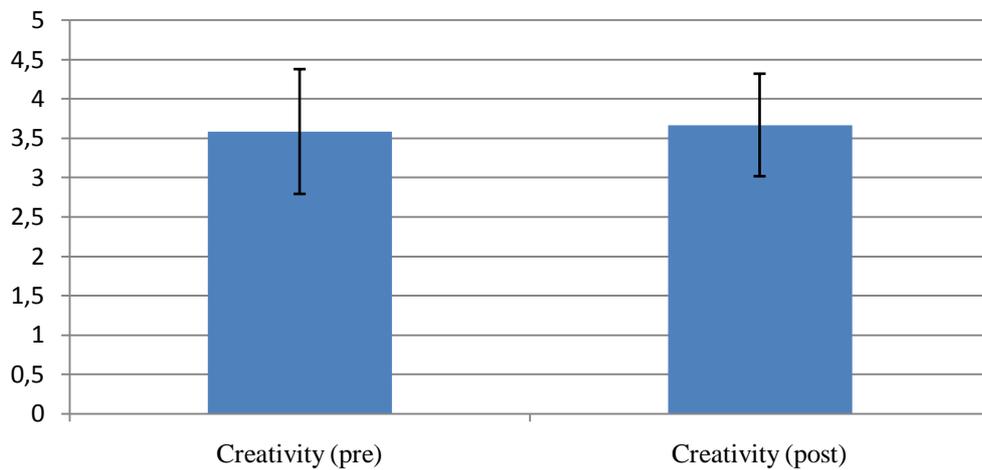


Figure 4.4 Influence of the stage gate on creativity

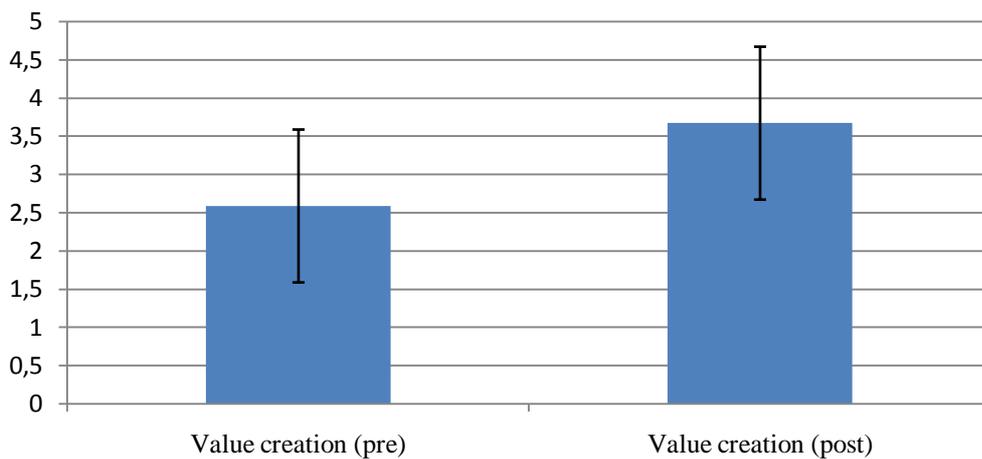


Figure 4.5 Influence of the stage gate on value creation

Nevertheless it is clear that the stage gate has had an influence on the balance between creativity and value creation. Prior to implementation all of the organisations analysed seem to have had predominance towards creativity which was expected would be the case in the state-of-art, but by implementing the stage gate they have raised their level of value creation without lowering their level of creativity as shown in figure 4.6 below.

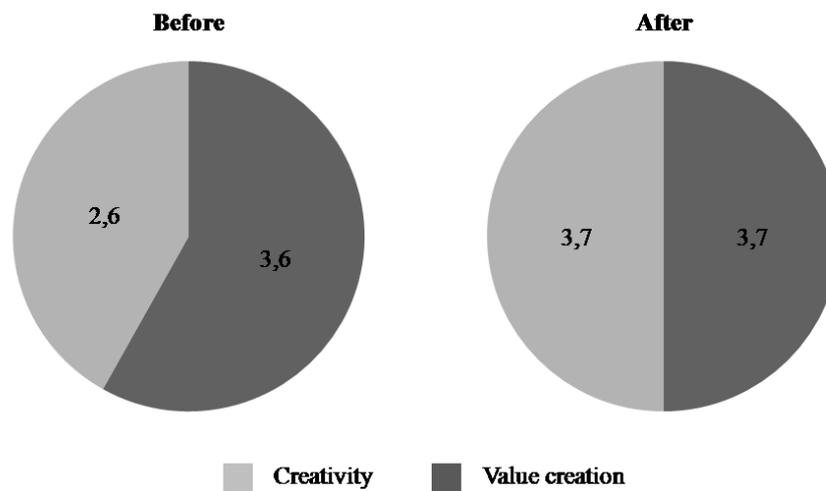


Figure 4.6 Value creation and creativity level before and after the stage gate

The study shows that it is possible to implement the stage gate and get its positive influence on value creation without getting its negative influence on creativity. This contradicts some of the existing litterateur, which is why it is important to stress that this is an explorative study. The results presented here are consequently not transferable to other organisations than those analysed.

4.6 Framework to explain stage gates effect on the balance

The following section will put all the results found above into a framework, and it will answer the research question of the thesis: how the implementation of a stage gate system influences the balance between creativity and value creation in creative organisations. Figure 4.7 below shows the influence. The solid lines represent the direct effects of the stage gate and the dotted line represents the indirect effects.

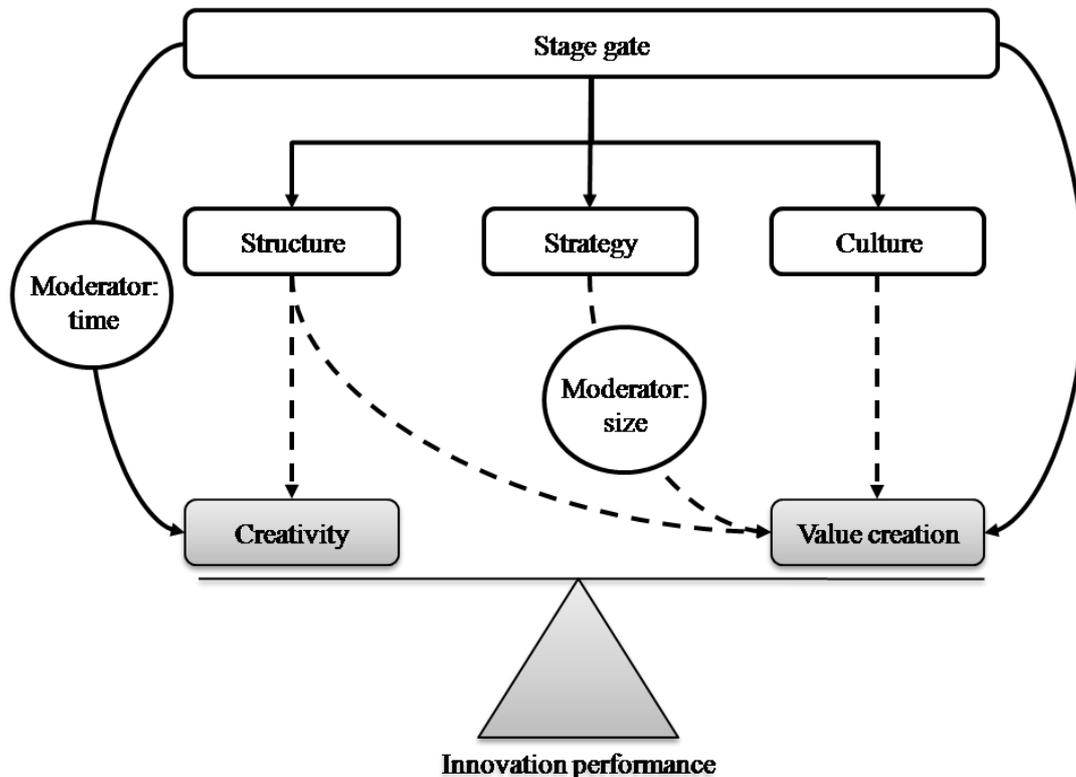


Figure 4.7 Influence of the stage gate on innovation performance

What generally characterises the creative organisations which implement the stage gate is that they have an unbalance between creativity and value creation, meaning they have too much focus on the creative side and too little focus on the value creation side. The stage gate corrects this unbalance by influencing significantly positive on the value creation side.

The stage gate does this by having an indirect positive influence on value creation through culture. There is also an influence via structure, but it has not been possible to determine whether that influence is positive or negative. There is also a positive influence via strategy. However this influence is moderated by the size of the organisation. If a large organisation implements the stage gate it will most likely not have an influence on its strategy whereas if a small organisations implemented it, it will. The value creation is also directly positively influenced by the stage gate. All in all that are four positive influences the stage gate creates on the value creation side. Turning the focus to the creativity side there is an indirect influence via structure, but as on the value creation side it is not possible to determine whether this influence is positive or negative. The only other influence on creativity is directly from

the stage gate. The direct influence is negative in the first years after the implementation, but as the stage gate becomes a natural part of the organisation it begins to influence positively on creativity.

Concluding it can be said that the stage gate does influence the balance between creativity and value creation for the better and consequently improves the innovation performance of the organisation. Creative organisations are by definition highly focused on creativity and therefore have an unbalanced creativity and value creation ratio. By implementing the stage gate they will be able to heighten their value creation level without lowering their creativity level, and thereby create a better business as they will be able to generate extra value from their creativity efforts. The created framework visualises these effects.

The discovered effects of the stage gate do not seem to have been found and acknowledged in previous literature. This is most likely due to the limited research that has been conducted into how organisations can achieve a proper return on their innovation efforts by becoming better at creating value from their creativity. With the current study and the framework presented above it becomes evident that it is not just a case of excelling at creativity. Organisations have also got to implement structured systems that emphasises the importance of excelling at value creation. This fits well with The Innovation Effective Curve developed by Booz Allen Hamilton (figure 2.1). Here the advantage of focusing on creativity and value creation at the same time becomes visible. Creative organisations that don't implement a structured approach to innovation in the form of for example a stage gate model will inevitable "ride the curve". In contrast, creative organisations that acknowledge the necessity of excelling in both creativity and value creation, and therefore implement the stage gate, will be able to push their innovation curve outwards, because of the overall positive influence the stage gate has on the balance and subsequently on the innovation performance of an organisation.

4.7 Comparison of results with state-of-the-art

The thesis has provided yet another facet to the discussion regarding the stage gate. When starting the research it was not with an intend to either diminish or praise the stage gate, but through the research it has become clear that the findings in this thesis is more in line with Robert Cooper and his positive view on the stage gate rather than the negative view by several

other researchers (Buggie, 2002; Christensen et al., 2008; Summers & Scherpereel, 2008; Thomke, 2003).

The thesis is in line with Poul O'Connor's study from 1994 that the structure of an organisation will have to change for the stage gate to be able to exist in the organisation. The thesis also confirms O'Connor's conclusion that it takes time to reap the creative benefits from the stage gate as there is a difference between knowing what each organisation ought to be doing and realizing the benefits from actually doing it, as O'Connor expresses it.

The thesis also supports John E. Ettl and Jorg M. Elsenbach 2007 study that the stage gate helps an organisation to become more effective without losing creativity on the long run, though it might experience loss of it on the short run. The thesis also found, like Ettl and Elsenbach that a large part of the organisations have modified and updated their stage gate since they first implemented it.

In Rajesh Sethi and Zafar Iqbal study from 2008 they argue that the stage gate can hinder creative thinking if enforced too strictly. The thesis supports this argument. A large part of the interviewees said that they, after the implementation of the stage gate, have set up an ideation phase in front of the stage gate, so the creativity still gets the leeway to flourish uncompromised by the structure, the stage gate brings to the development process. This ideation phase would probably never have been thought of, had it not been for the stage gate. The thesis can for that reason only partly support Sethi and Iqbal's conclusions, as the restricting negative force of the stage gate simply makes practitioners come up with add-ons to the stage gate that helps prevent issues like those Sethi and Iqbal describe.

As the results show the present study has contributed to the existing pool of knowledge regarding the stage gate. It has been shown that the stage gate influences an organisation much more than what was known up until now. As discussed in the state-of-the-art the stage gate is not merely a tool innovation departments can use from time to time. It is instead a management control system that provides an agenda and a stimulating forum for the generation and implementation of creative ideas. The stage gate can of course be implemented as a stand-alone tool, but the benefits from it cannot be reaped until it is thoroughly grounded in the organisation. It has also been discovered that the stage gate thrives perfectly well in

highly creative organisations. And it does not hamper creativity on the long run as critics of the stage gate claim. The stage gate is consequently a highly effect system that can enhance the innovation performance of creative organisations.

5 DISCUSSION

The following chapter will discuss the findings of the thesis. First the main results will be summarised. Second the implications for practice will be discussed. Third the limitations of the study will be discussed and fourth further research will be suggested.

5.1 Summary of the main results

The findings of the thesis resulted in six propositions on how the stage gate influences different aspects of an organisation when it is implemented in the organisation. The point of departure in the summary below will be these six propositions.

Proposition 1 dealt with the reasons for implementing the stage gate. It was found that the argumentation for implementing the stage gate revolve primarily around value creation aspects, which already at that point indicated that the influence of the stage gate on the value creation side of the balance.

It was not immediately possible to determine whether the stage gate influenced creativity and value creation indirectly by influencing the strategy of the organisation. The interviewees were parted in regards to this aspect. By using the size of the different organisations as a moderator it lead to proposition 2 that the stage gate does influence the strategy towards a more value creation focus in small and medium sized organisations and this is not the case in big organisations.

The majority of the interviewees said that their organisational structures were changed at some point to accommodate the stage gate. It was not possible to determine how that change is reflected on value creation and creativity, but as previous literature expresses there is a connection between a change in the structure of an organisation and its value creation and creativity efforts. This lead to proposition 3 that the stage gate influences both the creativity

and value creation side of the balance indirectly by influencing an organisations strategy, but it is not possible to determine how this influence is expressed.

It is fairly evident that the culture of an organisation will change to become more focused on profit, costs and general heightening of efficiency after the implementation of the stage gate. A minority of the interviewees expressed concern that the stage gate generated such a value focused culture that suppressed the creative behaviour among the employees. The majority of the interviewees only mentioned the value creation influences and not the possible side effect on creativity. Proposition 4 therefore became that the value creation side of the balance is positively influenced by the stage gate via its influence on the culture.

The influence of the stage gate on creativity is fairly difficult to determine. Many of the interviewees had conflicting opinions of how the stage gate was influencing and if it was in fact influencing at all. By adding the time since implementation as a moderator it lead to proposition 5 that the influence is negative in the beginning and then gradually becomes positive as the stage gate is becoming a natural part of the organisation. These results are of course not conclusive as many other factors influence creativity which can cause the positive spin, but they do show a tendency that is worth noting.

Value creation is predominantly only influenced positively by the stage gate. It seems that most of the organisations lacked a unified language and control system to judge the potential of the different ideas they get before the stage gate. They were not able to create an overview of all their ideas and make and follow a combined product strategy for the whole organisation. The development process seemed to be more controlled by the creative incentive rather than what the organisation could profit from. The implementation of the stage gate meant a higher focus on profit, costs and efficiency which the majority of the organisations seemed to lack. This resulted in proposition 6 that the stage gate influences positively directly on the value creation side of the balance.

Finally turning to the measured influence of the stage gate where all the results above become visible. The value creation side of the balance clearly jumped with the implementation of the stage gate while the creativity level remained the same or increased a bit too. Before the stage gate was implemented all the organisations seemed to have an unbalanced relationship

between their creativity and value creation abilities. This was corrected by the indirect and direct influences of the stage gate. The findings resulted in a framework. In easily understandable terms it explains how the stage gate expresses its effect on the innovation performance by influencing the balance between creativity and value creation.

5.2 Implications for practice

The output for practitioners from this thesis is that they should not be afraid to implement a stage gate in their organisation because they fear it will hamper their creative abilities. Any organisation has a ratio between their creativity and value creation abilities, but as the study shows this seems to be out of balance in creative organisations that do not have a structured approach to innovation, in the form of for example a stage gate.

However before implementing a stage gate model an organisation needs to be aware that the stage gate does have influences that reach beyond the actual product development process. In small and medium sized organisations the introduction of a stage gate can mean a change in the strategy of the organisation. According to the study such a change will be towards a higher focus on the market and customer needs and a step away from the very product focused strategies. In larger organisations this influence will not be particularly noticeable.

To accommodate the stage gate organisations will have to change their organisation structures. There is no way around this. Implementing a stage gate and keeping the existing decision-making processes will not work. It seems that creative organisations often have fairly decentralized decision authorities which the stage gate will influence. The decisions will be much more centralized as the stage gate creates a much more systematized and structured approach to innovation. The organisation can either realise the need for a change in their structure and do so when the stage gate is implemented or be forced to do so at a later stage.

The stage gate will also change the culture of a creative organisation from a very free, open-minded and product focused culture to a more profit, reporting and customer focused culture. Some creative organisations might say they generate such innovative products that the customers will inevitably follow, and that justifies their heavy focus on the creativity side of the balance. This is of course true. Some organisations do produce highly innovative and

sought after products. However the result of this study simply shows that a creative organisation that implements a stage gate model is not going to become less creative just because they become better at creating value. They will simply get more out of their creativity efforts, so instead of making 100 kroner per hour spend on developing a product they will make 200 kroner, and this is not a bad thing.

This does not mean that the implementation of a stage gate doesn't have any negative effects on the creativity of an organisation. As with the implementation of any system it takes time for the organisation to adjust and benefit from the new system. The same is true for the stage gate. The first years after the implementation the creative abilities of the organisation will be influenced negatively, but this shouldn't be a reason for not implementing the stage gate, as the benefits on the long run will most likely compensate for the cons on the short run.

The absolute benefit from implementing comes when looking at how the stage gate influences the value creation of an organisation directly. The stage will help organisations that previously had very little focus or knowledge about the importance of creating value from its creativity efforts by structuring and also by limiting the manoeuvrability. Looking on an environment with pure creativity like a university this would be problematic, but as organisations at large are put in the world to make money, this is a necessary sacrifice to become more profitable than just focusing primarily on creativity.

Organisations and particular creative organisations should therefore not be afraid of implementing some kind of structured approach towards innovation in the form of a stage gate. They do however need to take into account all the effects the stage gate will carry with it – not only the effects on the actual product development process, but also all the direct and indirect effects across the organisation, which all influences the innovation performance of the organisation.

5.3 Limitations of the study

It has been sought after to make the study as thorough and accurate as possible, but this is of course not possible all the way through. There will always be areas where things could have been done differently with a better result and sections in which it would have been beneficial

to provide more or less detail than is the case. The following section will reflect and discuss the limitations of the research.

Starting the thesis the research question seemed to be very unique and not explored by other researchers. However as the research proceeded it slowly became visible that many of the conclusions that would be reached in the thesis had been made by previous research. This is of course positive as the results of the thesis confirm previous results. The research question could perhaps have been tweaked to deal with an even less researched area.

The goal was to interview two persons in ten different organisations. But it proved to be fairly difficult to get the interviews and in four out of eight organisations interviewed it was only possible to find one person who possessed the knowledge required for the interviews. The results presented in the thesis are consequently not as supported as hoped, but they do show some clear tendencies that further interviews will most likely confirm.

The organisations interviewed are operating in different industries which have made it possible to find tendencies that transcend industry specific aspects. This has also meant that it has not been possible to find dissimilarities between one industry and another. This could have been countered by choosing to interview at least two organisations in the same industry and then compare these organisations with others in other industries.

The data coding process could have been run more strategically from the start. But as it is an exploratory study it was not possible to know which patterns should be looked for beforehand. The coding process resembled a trial-and-error process with much iteration, but this only proved to be beneficial as the many iterations meant that unfound connections suddenly appeared in the data the third or fourth time around.

5.4 Further research

As with any exploratory study the results achieved in this thesis are only indicative. There is thus a need for further research to confirm the results presented. A quantitative survey would be ideal for this purpose. Such a study should investigate whether the propositions stated here and the framework proposed are statistically valid.

It would also be interesting to conduct another exploratory study and investigate whether there are any industry specific conditions. It might be that the influence of the stage gate is different on an organisation producing technology than on one producing medicine or any other product.

All the interviewees for this thesis were either project leaders or innovation managers or in other words mid or senior level in the organisations. It would also be very interesting to interview people on the floor and get their view on how the stage gate has influenced the organisation. However there is a build in problem in this approach as people on the floor will most likely have difficulty seeing the overall influence of the stage gate. Nevertheless it would be interesting getting their view on how the stage gate has influenced the organisation culture and structure. This would probably be different from what is achieved by asking the managers.

Another research area could be to look more into how the change in the organisation structure that the stage gate causes is expressed. In the thesis it was merely found that the stage gate influences the balance indirectly through a change in the organisational structure. But is that influence positive or negative when looking at respectively at creativity and value creation?

Finally it would be interesting to combine the results from various studies. For example a study looking solely at the stage gate and its negative and positive influence on product development, with a study like the present that looks at the influences across the organisation and with a study that investigate how much more profitable an organisation becomes by implementing the stage gate. Thereby it would be possible to get a holistic picture of the stage gate and all its influences. Such a study should include results from both those researchers who are pro stage gate like Robert Cooper and those who are con like Clayton Christensen, Stephen Kaufman, Willy Shih, Gary Summers and Christopher Scherpereel.

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