
How do firms evaluate and select ideas?

Comparing firm internal innovation contests and firms' traditional innovation activities from a knowledge based perspective

Master Thesis

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Abstract

This paper aims to deliver insights in how companies evaluate and select innovative ideas. Interviews were conducted with employees who participated in an internal innovation contest of their company. The questionnaire included questions about the internal innovation contest and about the traditional innovation activities in this company. The analysis focuses on the evaluation and selection of ideas and compares idea screening in the innovation contest with the traditional innovation process of the company. The result consists of twenty-nine findings that help companies to better understand their innovation process. It becomes clear that ideas are evaluated by applying several criteria which are weighted differently. Feasibility, novelty and creativity are criteria predominantly considered at the early stage of the process, whereas at the later stage profitability gains importance. Also, the selection of ideas is influenced by the people involved in the process, for example, whether it is the employees from various departments or the management team only.

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1 Introduction

In the past twenty years, economists have recognised the importance of innovation and have dedicated an increasing amount of attention to the topic. Innovation plays a crucial role in driving economic growth but it was often taken as a given (Economist, 2002). As a result, researchers have started to explore the dynamics of innovation and aim to get a better understanding of how of innovation happens. But innovation is not only of great interest to researchers. Also practitioners across a range of business and management disciplines are eager to understand and better manage innovation. For companies, the management of innovation represents a key strategic issue (Baregheh, Rowley, & Sambrook, 2009). Ahlstrom (2010) even argues that the main purpose of a business is not profits but the development of new and innovative goods and services which leads to economic growth and delivers benefits to the society.

Innovation is risky and characterized by high uncertainty and it is therefore hard to find generalizations per se. Additionally, the heterogeneity of the companies' operations and contexts makes it even more challenging to give general advises on how to manage the innovation process. One way to reduce the risk and uncertainty is to carefully evaluate new product and service initiatives and to strive to make accurate decisions (Ozer, 2005). Once ideas are generated they need to be evaluated and selected for further development. How, and by whom the ideas are evaluated and selected can vary; the evaluation and selection can be continuous or at one point in time. The risk and the uncertainty that come along with innovation and the many ways to seek out ideas makes it challenging to derive generalizations for idea screening. Research about idea screening often only addresses a specific situation or context. Generally, recent literature dealt more with idea generation than with idea screening (Onarheim & Christensen, 2012). But to succeed with innovation and to successfully manage it, all parts need to be considered.

This paper aims to contribute insights to idea screening by investigating how ideas are evaluated and selected within a company. To do so, a company that conducted an internal innovation contest is observed. Interviews were held with participants of the contest. Broad questions about the innovation contest and about the traditional innovation activities in the company were asked. Therefore, a comparison of the evaluation and selection activities in the contest can be made with the traditional

innovation activities of the company. The analysis allows deriving general and specific implications for companies. General implications can be applied to various situations and to companies in different industries whereas some implications are only useful for companies with a similar context.

This paper will begin with a review of the existing literature. The focus of the literature review in section two is on idea screening. More precisely, the review on idea screening literature is divided into the three parts evaluation criteria, selection methods and further factors that have an impact on idea screening. Further topics within the innovation contests literature are reviewed and the section concludes with a comparison of the innovation contest to the traditional innovation process. Next, the empirical study is introduced in section three. Section three shows first which data was used and which questionnaire design was applied and as next the setting of the innovation contest and the process of the traditional innovation activities is explained. The fourth section discusses the findings from the interviews about the innovation contest and about the traditional innovation process and concludes again with a comparison of the two different processes. To conclude, the last section derives managerial implications and limitations of the study. Additionally, suggestions for further research are made.

2 Literature Review

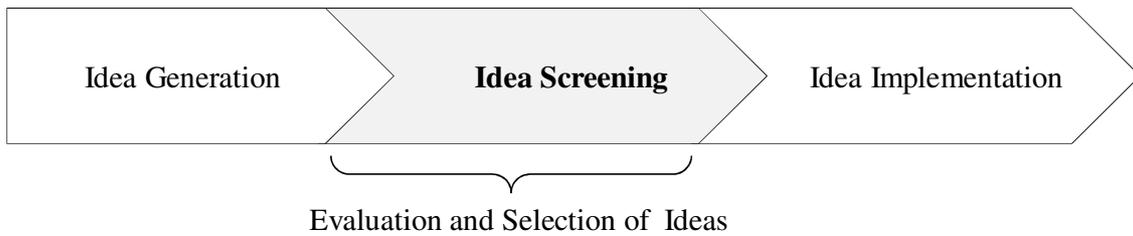
Innovation is an important key topic to almost every company. The environment in which companies operate is often extremely challenging as technologies change fast and competition is very high (Bothos, Apostolou, & Mentzas, 2008). Companies find themselves in a situation where they are expected to deliver more and more customized and new products and services with higher quality but with lower prices. To withstand the fast changing environment companies need to recognise the importance of innovation and they have to find ways to be successfully innovative. The base of innovation is to create a company culture and climate that fosters creativity and encourages employees to involve themselves to innovation (Ahmed, 1998). To help to create an innovative and creative environment companies should strive to improve the quality of the work environment as it has been found to be positively connected to the level of innovation and creativity of a company (Mathisen & Einarsen, 2004). Creativity is influenced by specifications and regulations established in a company, there is risk that too well-defined processes and procedures discourage employees thinking outside their present paradigm and therefore being less innovative (Kappel, 2001). According to Ahmed (1998) the innovation culture and work environment can be viewed as part of the competitive advantage companies can achieve and which can be hard for other companies to imitate.

Innovation requires a creative environment but it also needs to be managed well. Especially large and multi-brand companies that are R&D-intensive are dealing with the challenge of innovation management (Robbins & Gorman, 2015). Stevens and Burley (1997) found that in most industries only one out of 3,000 raw ideas lead to commercial success. This number points out how important the management of innovation and more precisely idea screening actually is. The management must be able to sort out the bad ideas from the good. Therefore, idea screening has become an important topic within the management literature of innovation.

Innovation is often connected to product development and accordingly named (e.g. Loch & Kavadias, 2007). Researcher and R&D managers agree that innovation should be managed as a process (Cooper, 1990; Loch & Kavadias, 2007; Salerno, De Vasconcelos Gomes, Da Silva, Bagnó, & Freitas, 2014; Trott, 2008). More precisely, the process of transforming ideas into commercial outputs can be understood as a linear sequential and integrated flow of phases and can be viewed as a value chain (Hansen &

Birkinshaw, 2007; Salerno et al., 2014) or as a stage-gate system which is further explained later in this work (Cooper, 1990). Moreover, the process of innovation is not a functional activity but rather an activity among the whole company (Kline & Rosenberg, 1986). It must be viewed as a management process and it requires know-how in all areas of a company (Trott, 2008). It is important to adjust the innovation process to the individual requirements and the context of a company as the innovation challenges differ for each company (Hansen & Birkinshaw, 2007). Salerno et al. (2014) propose in their study different innovation processes designs which are depending on the characteristics of the innovation project of a company. A very general form to illustrate the innovation process and to point out the focus of this paper is demonstrated below.

Figure 1: Innovation is a Process



Source: derived by the author

There is consensus among several researchers that the innovation process can be roughly split up into three phases; idea generation, idea screening, and implementation as shown in Figure 1 (Ebert, Chandra, & Liedtke, 2005; Hansen & Birkinshaw, 2007; Keum & See, 2014; Robbins & Gorman, 2015; Salerno et al., 2014). Once an idea is developed and implemented, a company needs to undertake marketing activities in order that the product or service is sold and revenue is generated.

This paper focuses particularly on idea screening and aims to give a deeper insight into this process, be it in the traditional innovation activities or specifically in the internal innovation contests. Idea screening contains two aspects; the evaluation of ideas and the selection of the ideas. The underlying theme of the remaining sections focuses on idea screening, but nevertheless, it is important to keep in mind that a company is only as successful as the weakest part of the whole innovation process (Hansen & Birkinshaw, 2007). Companies need to identify the strengths and weaknesses of every single phase of their innovation process and improve in the weaker parts in order to keep failure rates as low as possible and be successful (Hammedi, Van Riel, & Sasovova, 2011).

2.1 Idea Screening

A large amount of new opportunities and ideas arise during the idea generation phase of the innovation process. These ideas need to be evaluated and properly selected. Idea screening aims to identify exceptional opportunities and the most promising ideas out of the large pool of ideas that was generated in the prior phase of the process (Terwiesch & Ulrich, 2009).

The role of idea screening in future business creation is not well-explored yet (Martinsuo & Poskela, 2011). There is little research on how ideas are evaluated and selected. Until now, research has more focused on idea generation than on the screening of ideas (Onarheim & Christensen, 2012). The result of idea generation is the availability of a large pool of creative ideas which is a necessary but not a sufficient condition for innovation (Rietzschel, Nijstad, & Stroebe, 2010). In order that creative ideas can be implemented, the best ones must also be recognised and chosen (Onarheim & Christensen, 2012). Both, the generation of new ideas as well as the screening of the ideas are important to companies when the aim to implement a new product that promises high potential on the market (Soukhoroukova, Spann, & Skiera, 2012). Product planning is depending on the outcome of the screening process (Rochford, 1991). When screening new ideas, companies decide which resources will be allocated to the project in the future. Evaluating and selecting the best idea is a critical, complex and difficult task (Cooper & De Brentani, 1984; Cooper, 1990). Due to this, innovation is often described as fuzzy in literature (e.g. Onarheim & Christensen, 2012; Soukhoroukova et al., 2012; Terwiesch & Ulrich, 2009).

There is no clear link between investments made in innovation and its financial performance (Terwiesch & Ulrich, 2009). Spending more money on innovation does not necessarily imply financial returns. But when wrong ideas are chosen or mistakes are made when new ideas are screened, it can be very costly for companies (Baker & Albaum, 1986). Therefore, companies need to invest in idea screening to avoid failures by properly selecting the ideas which they want to implement. As a consequence, idea screening can be very costly and time consuming (Crawford & Di Benedetto, 2006). To optimize costs, idea screening must be effective and efficient.

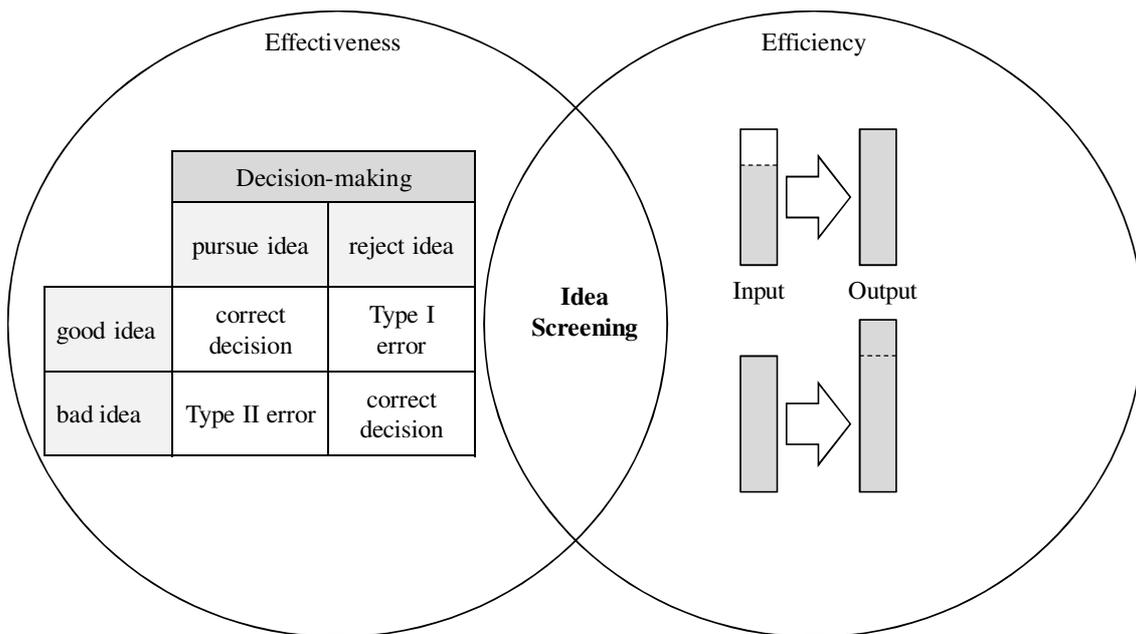
Effectiveness in screening and decision-making can be understood as the extent to which the outcome of the idea screening process meets the quality expectations of the management and fits into the strategy of the company (Hammedi et al., 2011). Effective

screening minimizes two types of errors (Kothari, 2004) that can occur when selecting ideas: Type I errors, where a company risks to neglect a good idea and therefore rejects an idea that would have been successful (Baker & Albaum, 1986). And Type II errors, where a company risks accepting a bad idea and therefore invests its scarce resources on inappropriate and unsuccessful projects (Rochford, 1991).

Efficiency is the relation between input and output and can be improved by either diminishing the resources but keeping the same output quality or by increasing the output quality by keeping the input equal (Hammedi et al., 2011). High efficiency can be achieved for example by optimising time and cost to reach screening decisions (Baker & Albaum, 1986).

The following figure illustrates effectiveness and efficiency in idea screening.

Figure 2: Effectiveness and Efficiency in Idea Screening



Source: derived from Kothari (2004) and by the author

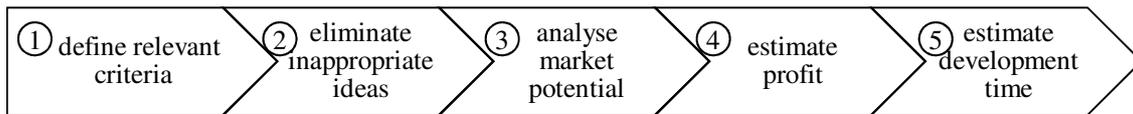
In order to identify the right idea, a proper evaluation and selection concept is required (Martinsuo & Poskela, 2011); a mechanism that filters and eliminates lower quality ideas and only allows promising ideas to survive (Terwiesch & Ulrich, 2009). In innovation literature several evaluation approaches can be found to identify the best ideas. Comparing the studies in the literature turns out to be difficult because of the heterogeneity of the rating metrics utilized (Kudrowitz & Wallace, 2012), or as a result of measuring different constructs (D. L. Dean, Hender, Rodgers, & Santanen, 2006).

Also, the studies differ to what the ideas are related to, for example, are they a new product or do they solve a situational problem (Kudrowitz & Wallace, 2012). Companies usually do not apply standardised and structured methods when they select ideas (Bothos et al., 2008). In some companies the evaluation of ideas is even inefficient or nonexistent (Cooper, 1990). Due to this, the decisions made by companies are not always accurate (Ozer, 2005). It can also happen that companies miss out on opportunities because there is no such coherent and formal selection process (Soukhoroukova et al., 2012). Therefore, companies need to find an effective and efficient way how ideas can be screened. The process should be optimized by lowering costs or increase the quality of the output in order that the possibility of bringing an unsuccessful product to market or that an idea is overlooked is minimized (Baker & Albaum, 1986).

As mentioned above, the goal of screening is to evaluate generated ideas in order that ideas that will likely be unsuccessful can be eliminated and ideas that will likely be successful can be selected and further developed (Hammedi et al., 2011). It involves deciding which idea is the best and adds the most value to the company (Bothos et al., 2008). Over time, it has been found that not only innovation as a whole should be viewed as a process, but also parts of it (e.g. Cooper, 1990; Karger, 1983; Schmidt, Sarangee, & Montoya, 2009). Idea screening can be understood as a process including several steps or stages to identify the best idea. The next paragraphs show and explain chronologically several approaches and concept of idea screening found in literature.

Karger (1983) defines five steps that are required to review ideas and identify the best in his paper. First, a company has to define relevant evaluation criteria. In a second step, inappropriate ideas should be eliminated by only choosing feasible ideas that fit into the corporate strategy. Furthermore, the company has to be able to provide the technical requirements as well as the capacity for the implementation. Also legal constraints and marketing possibilities as well as distribution options should be considered. The ideas that fulfil the criteria of the second step are then analysed on their market place potential as third. Besides applying rational criteria such as opportunity of competitive advantage or meeting market needs, Karger (1983) also includes gut-feeling to the evaluation. If then the ideas are predicted to generate more revenue than they cost, in the last step, the ones that allow intermediate action and are less time consuming are chosen. Following figure shows the five steps of idea screening by Karger (1983).

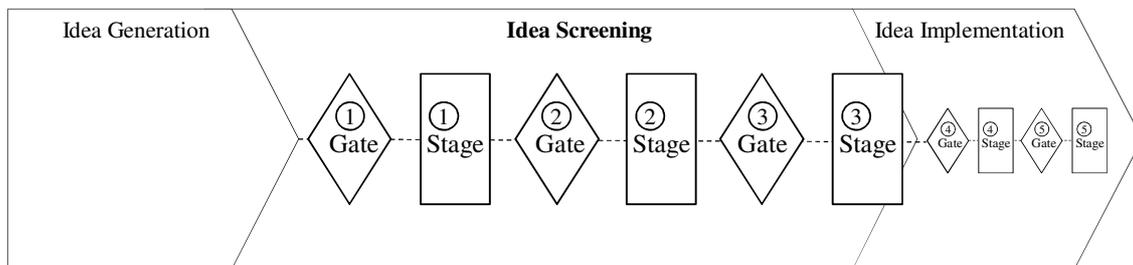
Figure 3: Five Screening Steps by Karger



Source: derived from Karger (1983)

A more general process is presented by Cooper (1990). He presents a multi-stage-gate approach that also includes several steps until the best idea is identified but he allows more flexibility to the process. In concrete, Cooper's stage-gate concept (1990) is a multi-stage process where stages are defined as steps in the innovation process from generation to full commercialization and gates are screening activities where specific criteria has to be fulfilled in order that the idea is pursued further. Each gate gives the opportunity to control the risk, to prioritize the persuaded ideas and to allocate resources (Schmidt et al., 2009). When applying Cooper's concept (1990) companies need to determine the barriers that are present at the different stages. In comparison to Karger (1983) who already predefines the evaluation criteria at each step, Cooper's approach (1990) leaves some freedom to adapt the evaluation criteria of each stage and the selection method at each gate to the company's objective and context.

Figure 4: Stage-Gate System by Cooper



Source: derived from Cooper (1990)

A similar approach to Cooper (1990) is suggested by Rochford (1991). The author proposes that the initial criterion is on the one hand the question if an idea fits the company's objective and on the other hand if it is do-able. If so, also Rochford (1991) suggests to use a multi-stage process to apply secondary criteria such as feasibility, organisational structure, time, financial options, market potential and gut-feeling to decide whether an idea is pursued further.

Schmidt et al. (2009) investigate, amongst others, the influence of the numbers of review points (gates) that are used in the evaluation process. They found that the

numbers of review points is higher for radical ideas than for incremental ideas and therefore, the survival rate is lower for radical ideas (Schmidt et al., 2009). The authors also found evidence that over the multi-stage screening process the numbers of ideas that survive decrease. This result is no surprise since the aim of the multi-stage screening process is to reject ideas that do not meet the evaluation criteria at the single gates (Cooper, 1990). More surprisingly again is the result, that there is no positive link between performance and the number of review points (Schmidt et al., 2009). This result implies that any statement can be made yet about which is the best number of gates or review points that a company should apply in their evaluation process to successfully screen the best and most promising ideas.

After having introduced a process view to screening, the following section focuses on which and how many different criteria are used at each gate or review point of the screening process. Afterwards, methods on how to select the evaluated ideas are explained. Then, factors are revealed that additionally influence effectiveness and efficiency in idea screening and as last, opening the idea screening process is discussed.

2.1.1 Criteria to Evaluate Ideas

One of the first steps in the process of screening ideas is to determine the criteria that will be applied to evaluate the ideas (Karger, 1983; Rochford, 1991). There is typically little relevant and reliable information available at the idea stage and defining formal criteria is therefore challenging (Cooper, 1990). Ideas are difficult to monitor because they can hardly be measured in absolute terms (Connelly, Tihanyi, Crook, & Gangloff, 2013). The lack of information makes it hard to decide which criteria to focus on (Cooper & De Brentani, 1984). Organisations are less challenged by obtaining ideas but more by the assessment of those ideas (Magnusson, Netz, & Wästlund, 2014). Baker and Albaum (1986) in contrast conclude that not much information is required in the idea screening stage when the relevant criteria can be identified. What is important is that a company has to adjust the screening process and the criteria to their own situation and chose the model for screening ideas accordingly (Baker & Albaum, 1986).

The most common approach to evaluate ideas according to Magnusson et al. (2014) is a rational assessment process where specific formal criteria are applied. The approach can be viewed as a process where ideas are put through a funnel or a filter and thereby are assessed by several predefined criteria (e.g. Magnusson et al., 2014; Terwiesch &

Ulrich, 2009). Suggestions on how this process should be designed are made by Karger (1983), Cooper (1990) and Rochford (1991) and were explained in detail in the previous section. This section tries to find an answer to the question of what is a good idea by summarising criteria found in literature. The definition of what a good idea is and what characteristics a good idea has, differs from study to study. Researchers use different criteria and various amounts of evaluation criteria in their studies. They categorize or group them in alternative ways. Even different descriptions and definitions for the same evaluation criterion are used. Nevertheless, following paragraphs aim to give an overview over several evaluation criteria that companies could apply in their screening process.

As one of the first apart from Karger (1983) who claims that successful ideas are especially feasible and promising in their early stage, Cooper and de Brentani (1984) explored which criteria is used from managers to select ideas. The authors defined 89 criteria and divided them into eleven categories. They aimed to find how the criteria is weighted and combined when evaluating ideas. The defined categories by Cooper and de Brentani (1984) are *product differential advantage, corporate synergy, technological and production synergy, project financing, financial potential, size of market, diversification strategy, market maintenance strategy, product life, rational market and domestic market*. A similar allocation is made by Baker and Albaum (1986) but they only use 33 criteria divided in five categories, namely *societal factors, business risk factors, demand analysis, market acceptance factor and competitive factors*. Rochford (1991) suggests the screening criteria categories *market, product, feasibility, compatibility of fit, time, financial* and a category *others*.

More recent literature shows simplified categories for evaluation criteria. For example, Dean, Henders, Rogers and Santanen (2006) divide the criteria into the four categories *novelty, workability* respectively *feasibility, relevance* and *specificity*. Kudrowitz and Wallace (2012) also suggest to use four criteria but slightly different ones. They use *novel* respectively *creative, useful, clear* and *product-worthy* which means feasible and marketable. The study of Magnusson, Netz and Wästlund (2014) base on the criteria *originality, user value, producibility, strategic fit* and *profitability* in relation with *intuitive decision making*. In order to provide a better overview, following table summarises the evaluation criteria according to each author.

Figure 5: Evaluation Criteria assigned to the Authors

Authors	Cooper / De Brentani (1984)	Baker / Albaum (1986)	Rochford (1991)	Dean et al. (2006)	Kudrowitz / Wallace (2012)	Magnusson et al. (2014)
Criteria / Categories	<ul style="list-style-type: none"> • product differential advantage • corporate synergy • technological/production synergy • project financing • financial potential • size of market • diversification strategy • market maintenance strategy • product life • rational market • domestic market 	<ul style="list-style-type: none"> • societal factors • business risk factors • demand analysis • market acceptance factor • competitive factors 	<ul style="list-style-type: none"> • market • product • feasibility • compatibility of fit • time • financial • others. 	<ul style="list-style-type: none"> • novelty • workability/feasibility • relevance • specificity 	<ul style="list-style-type: none"> • novel/creative • useful • clear • product-worthy (feasible/marketable) 	<ul style="list-style-type: none"> • originality • user value • producibility • strategic fit • profitability • intuition

Source: summarised by author (see author in first line of the table)

Studies such as from Cooper and de Brentani (1984), Baker and Albaum (1986) and Rochford (1991) try to capture all dimensions and relevant factors which influence the evaluation and the outcome of an idea, whereas the other authors try to focus and simplify the evaluation dimensions. Interestingly, there is a trend in literature that the amount of evaluation criteria used and the complexity of the categories decreases over time. Additionally, evaluation criteria such as novelty, originality and creativity were only considered in recent literature. Researcher also recognised the impact of intuition and that gut-feeling plays an important role when companies evaluate and select ideas. This trend yields that the evaluation of ideas must be kept as simple as possible and that using too many criteria does not lead to an increase of evaluation performance. To conclude, when companies need to screen ideas, in general, less is more.

Cooper and de Brentani (1984) studied which criteria are weighted more than others. They find that the most important criteria are the *financial potential* of an idea including the profit and sales expectations, the expected market share and the likelihood of success. The *corporate synergy* as well as the *technological and production synergy* belongs to the dominant criteria too. Companies prefer to use their existing resources to implement an idea at marginal cost. The fourth dominant criterion was found to be the *product differential advantage*. An idea that promises differential advantage is more likely selected. On the other hand, Cooper and de Brentani (1984) found that *project financing* and the *rational market dimension* which means if customers buy the product rationally or not are not relevant in the idea selection. In the study of Baker and Albaum (1986) it turned out that *functional feasibility*, *profitability*, *potential sales*, *need* and *price* were the most important evaluation criteria. Since not all criteria are relevant to identify the best idea, companies should define relevant criteria and reduce them to maximum in order to keep the screening process simple.

Ronkainen (1985) studied the changes of the criteria *market*, *product* and *financial* during the product development process and found that there is a shift of how the criteria is weighted in the different phases of the process. Further, not all the companies weight the criteria equal, for a technology-driven company the criterion product including the feasibility is more important, for other companies the criterion market is the most dominant. This result is supported by Schmidt et al. (2009), they found the number of marketing, technical and financial criteria differ among companies and industries for evaluating ideas.

Also Carbonell-Foulquié, Munuera-Alema and Rodríguez-Escudero (2004) studied the relative importance of five groups of criteria, namely, *strategic fit*, *technical feasibility*, *customer acceptance*, *market opportunity* and *financial performance*. Their study focuses on highly innovative products and they also find that there is a weight shift among the different phases. For example, *strategic fit*, *technical feasibility* and *market opportunity* are more important criteria at the beginning of the process, whereas *financial performance* gets more important at the end stages of the process. Customer acceptance appeared to be highly weighted throughout the whole process.

Schmidt et al. (2009) revealed in their study that the number of criteria used increases over the time and that the number is higher for incremental ideas than for radical ideas. They explain that evaluation criteria are used in a more professional manner for incremental ideas than for radical ones. Schmidt et al. (2009) found that technical criteria are the most frequently used when evaluating incremental ideas, whereas for radical ideas it is financial criteria. The authors also linked the number of criteria used with performance and interestingly there is no positive association between the two. Only the initial screen is related to performance in the market (Schmidt et al., 2009). This result puts emphasis on the early stages of the evaluation process and the importance of decision making from the beginning.

According to Martinsuo and Poskela (2011) companies do not make much use of formal criteria and selection processes when they evaluate and select ideas. Nevertheless, they found that *strategic*, *market* and *technical* criteria are mainly considered when evaluating the ideas. Interestingly, this result is in line with the findings of Carbonell-Foulquié et al. (2004). Martinsuo and Poskela (2011) provide four implications to the management of innovation. First, when screening ideas they should be evaluated on long-term criteria not only on their short-term potential. Second, the outcome of the

study implied that in order to overcome multiple simultaneous competing interests a holistic evaluation process is required. Third, the use of a formal evaluation process is less advised by the authors because a more informal process leaves space for more flexibility. And last, managers of innovation should screen for complex idea which are challenging in consideration of technology and of yet non-existing knowledge.

The following table summarises the reviewed literature on the importance of evaluation criteria and illustrates the change over time if any and the focus of the research by each author.

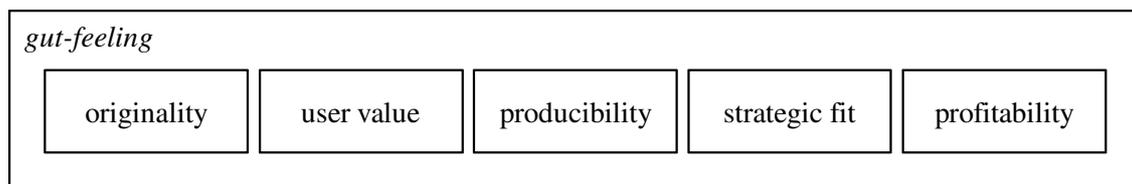
Figure 6: Overview of the Importance of Evaluation Criteria

Author	Focus	Importance of Evaluation Criteria	
Cooper / De Brentani (1984)	relevance of criteria	<i>most important criteria</i> 1) financial potential 2) corporate synergy 3) technological and production synergy 4) product differential advantage <i>irrelevant criteria</i> • project financing • rational market dimension	
Baker / Albaum (1986)	relevance of criteria	1) functional feasibility 2) profitability 3) potential sales 4) need 5) price	
Ronkainen (1985)	relevance according to industry	<i>technology-driven:</i> 1) product 2) feasibility <i>others:</i> 1) market	
Martinsuo / Poskela (2011)	relevance of criteria	1) strategic criteria 2) market criteria 3) technical criteria	
Carbonell-Foulquié et al. (2004)	highly innovative products	<i>early stage</i> 1) strategic fit 2) technical feasibility 3) market opportunity 4) customer acceptance	<i>later stage</i> 1) financial performance 2) customer acceptance
Schmidt et al. (2009)	incremental and radical ideas	<i>incremental ideas:</i> technical criteria <i>radical ideas:</i> financial criteria	

Source: summarised by author (see author in first row of the table)

A new and different perspective on evaluation includes *intuition*. In a early study, Rochford (1991) mentioned gut-feeling when defining a category others. Magnusson et al. (2014) investigate in intuitive criteria and link gut-feeling to formal criteria. They claim that gut-feeling can be explained trough formal criteria. Magnusson et al. (2014) explore how intuitive screening respectively the gut-feeling is linked to formal criteria and recognize that intuitive screening is based on the criteria *originality*, *user value*, *producibility*, *strategic fit* and *profitability*. Intuitive decisions can only be made by experienced experts who relate their decision to the context. Magnusson et al. (2014) find that the five criteria is weighted differently depending on the context and the nature of the idea, whether it is radical or incremental. The following figure illustrates the explanation of intuitive decision making from above.

Figure 7: Intuitive Decision-Making



Source: derived from Magnusson et al. (2014)

To conclude, it is important that a company predefines the objective and the relevant criteria according to its context and environment. The criteria might be different across markets and is therefore weighted differently depending on the objective (Carbonell-Foulquié et al., 2004). When screening ideas, quantitative and qualitative criteria should be included according to the company's context and an appropriate method to measure the multiple criteria should be found (Martinsuo & Poskela, 2011). In general, the model should kept simple using a minimum number of context-dependant criteria (Baker & Albaum, 1986). Many researchers studied the use of evaluation criteria but there is hardly any relation to performance studied yet. In order that ideas can be successfully evaluated, not only knowledge about the alternative ideas is required but also about customer needs and the strategic objectives of the company (Martinsuo & Poskela, 2011).

2.1.2 Methods to Select Ideas

When a company has figured out which evaluation criteria are important according to its context, it needs to pursue a method to select the best idea. Companies often use

intuitive and informal methods to screen and select the ideas. Baker and Albaum (1986) investigate this in several simple models which are presented in following. Based on those models, Kudrowitz and Wallace (2012) suggest to apply a test to rapidly screen a high amount of ideas and Magnusson et al. (2014) propose to intuitively assess ideas to select the best ones.

Examples for intuitive and informal models commonly used in companies are raking and scoring models, economic models or optimization models (Baker & Albaum, 1986). *Raking models* select the highest ranked idea by comparing them according to specified evaluation criteria. *Scoring models* work similar but the ideas are not compared to each other but each idea receives a score by using the evaluation criteria. *Economic models* forecast payoffs and profits and *optimization models* select an idea solving a mathematical function.

Baker and Albaum (1986) additionally test four alternative decision models on their efficiency. More precisely, they analysed the percentage of which a model correctly selects an idea or correctly rejects an idea. The most conservative model is a *five criteria conjunctive model* that accepts the idea only if a minimum value of the criteria is fulfilled and rejects the idea else. The authors also tested a *disjunctive model* where a defined level on criteria must be reached independent from the others, a *lexicographic model* where the ideas are ranked and the best one selected for further analysis, and a *linear compensatory model* where the scores of a criterion are weighted, then multiplied and the one with the highest or higher than the defined score is then selected.

The most important finding of Baker and Albaum (1986) is that companies do not need a high amount of information to select good ideas. They rather choose a few criteria which fit the situation and risk tolerance of the company the best in order to avoid that an idea is either pursued that will be unsuccessful or an idea that would be successful is overlooked. This is an important finding because earlier in this paper it was described that there is very little information available at the early stage of ideas which makes screening difficult. The most efficient way to screen a high amount of ideas at that stage is therefore to use a simple model with only few criteria (Baker & Albaum, 1986). In order to reach superior results, also Baker and Albaum (1986) claim to use a multi-stage model.

With respect to the finding of Baker and Albaum (1986) of choosing a preferably simple model, Kudrowitz and Wallace (2012) propose to apply the *NUF test* (by Gray,

Brown, & Macanufo, 2010) as a quick model to rate ideas on a scale of 1 to 10 based on three criteria *Novel*, *Useful* and *Feasible* (NUF). Novel also includes creativity since the authors found that the two criteria are redundant and useful can also be interpreted as value depending on the industry a company operates. The result of the scores can then be mapped in a spider plot. The advantage of this test is that it can be applied to a high amount of ideas and the test is well-structured. The test should be applied as a first pass evaluation tool when a high amount of ideas was generated. Afterwards, more criteria such as marketability for example should be considered when deciding which ideas to pursue.

Kudrowitz and Wallace (2012) additionally reveal in their study that visualizing and drawing the ideas could help to avoid that creative ideas are overlooked in the selection process. Furthermore, they found that the quantity of ideas was correlated with creativity in their study. This indicates that the chance of selecting a more creative idea is higher when a higher amount of ideas was generated. Kudrowitz and Wallace (2012) also explored crowd-sourcing methods of evaluation. They found that crowd-sourcing methods are in principle appropriate with the only exception of the criteria *feasible* as more knowledge is required to properly select ideas according to this criterion.

Another method to simply screen ideas that is even less time consuming is the *intuitive assessment* studied by Magnusson et al. (2014). The only disadvantage of this model is that why an idea is selected cannot be explained because it is a holistic assessment. There is no reasoning for why the idea received a high score but knowing could be important to a company. A solution would be to explain the selected idea by formal criteria afterwards. Another restriction of the intuitive assessment is that experience is required. Depending on the background of the expert the criteria are intuitively weighted differently. Therefore, to reach an efficient screening outcome, experts from various departments of the company should be included. Nevertheless, the intuitive assessment provides a fast method to screen ideas.

To give a better overview on the selection methods, the following figure summarises the above discussed models.

Figure 8: Overview of the Selection Methods

Authors	Models	Description
Baker/Albaum (1986)	Ranking model	Evaluation criteria is specified, ideas are then compared to each other and ranked accordingly.
	Scoring model	Each idea receives a score by using specified evaluation criteria, no comparison is made.
	Economic model	Forecasts payoffs.
	Optimization model	Solves a customized mathematical optimization function.
	Conjunctive model	Accepts the idea if a predefined minimum amount of criteria are fulfilled, rejects idea else.
	Disjunctive model	Defined level of criteria must be reached in order that the idea passes, else the idea is rejected.
	Lexicographic model	Ideas are ranked and best one selected.
	Linear compensatory model	Scores of a criterion are weighted and multiplied, the idea with the highest score or all the ideas that are above a defined score are selected.
Kudrowitz/Wallace (2012)	NUF-Test	Gives a score from 1 to 10 for the criteria novel, useful and feasible to each idea and the result is mapped in a spiderplot.
Magnusson et al. (2014)	Intuitive assessment	Idea is intuitively selected, no reasoning available why the idea was selected.

Source: Baker and Albaum (1986), Kudrowitz and Wallace (2012), Magnusson et al. (2014)

To sum up, several models have similar methodologies. But there are models where the ideas are evaluated independently or where the ideas are evaluated in relation with each other. Also the evaluation criteria are weighted differently across the models. In some models, all ideas are selected that are above a certain level, other models only chose the best idea.

At the beginning of the screening process when a high amount of ideas need to be evaluated and selected, it is recommended to use a simple model with only very little evaluation criteria (Baker & Albaum, 1986). There are standardised easy tools such as the NUF test proposed by Kudrowitz and Wallace (2012) to rapidly screen high amounts of ideas. If enough experience is available, often an intuitive assessment is also sufficient to screen ideas at the very beginning (Magnusson et al., 2014). At the later stage of the screening process when only a few ideas are remaining, companies should make use of more sophisticated and multiple models to evaluate which idea is best. For instance, to estimate profitability an economic model could be used (Baker & Albaum, 1986). The next section aims to reveal additional factors to evaluation criteria and selection methods that influence the effectiveness and efficiency of screening ideas.

2.1.3 Factors to increase Effectiveness and Efficiency

Using the right criteria, method and tool to screen the best ideas are important aspects of idea screening. But there are more factors influencing the efficiency in idea screening. For example, leadership roles, the composition of the team and informal networks (McDermott & O'Connor, 2002). Additionally, several other factors such as reflexivity in teams, hierarchy and alternative screening resources are identified. The latter includes idea markets and opening the innovation process.

Hammedi, van Riel and Sasovova (2011) explore the impact of reflexivity on the innovation process. They find that the screening process can be improved when the responsible teams reflect on the tools and criteria used for screening and adapt them to the requirements and environment of the company. The decision-making process can be positively influenced when reflexivity and as a consequence a better understanding of the action is fostered in teams. As a result, the efficiency as well as the effectiveness of the decision-making is increased. Hammedi et al. (2011) also find that the leadership style plays an important role. The authors suggest that transformational leadership stimulates reflection on the evaluation process and the selection criteria the most. A study of García-Morales, Jiménez-Barrionuevo and Gutiérrez-Gutiérrez (2012) supports the result. They found that transformational leadership positively influences organizational innovation and therefore, the performance of a company.

In order to foster reflexivity, stopping and thinking should be allowed during the screening process (Hammedi et al., 2011). The team involved in the screening process should not accept routines and should be open for alternative options. Hammedi et al. (2011) also claim that rational thinking fosters reflexivity. This stands somehow in contrast to Magnusson et al. (2014) who claim that intuitive assessment is very efficient. A study of Dean and Sharfman (1993) found that less procedural rationality is required in uncertain decision-making environment which principally applies to innovation.

Another factor is the influence of hierarchy to idea screening. Keum and See (2014) claim that in the screening process hierarchical structures are more successful than flat structures. They found that hierarchical groups evaluated and selected their ideas more carefully. Groups with a flatter hierarchy are prone to behavioural biases, for example self-promotion. Also Onarheim and Christensen (2012) found that owner or contributors of an idea tempt to promote their ideas and that endowment or ownership effects are a problem in idea screening. Therefore, decision-makers should be objective (Ozer,

2005). An option to reduce the behavioural bias is to setup the evaluation criteria in advance and apply them invariably during the screening process (Cooper, Edgett, & Kleinschmidt, 2002). This suggestions stands a bit in contrast with the results from Hammedi et al. (2011) who explains that teams should rethink their routines. Moreover, finding these criteria and weight them objectively is extremely difficult (Soukhoroukova et al., 2012) and therefore, predefining the evaluation criteria without the possibility to adjust it is less recommended. Another way to possibly solve the problem is to exclude the creators and contributors of the idea to the screening process (Onarheim & Christensen, 2012). Thereby, self-promotion for instance is not possible anymore and the bias vanishes.

Jespersen (2007) tested if cross-functional teams influence idea screening and found that there is no difference between screening in cross-functional or single-unit teams. This result can be reasoned by the nature of teamwork itself. In order that teams function well, special effort and support from the company is required (Jespersen, 2007). The ability to work in teams is not present in many organisations and has to be fostered and respectively trained (Lewis, 2001). Concerning the team size, Schmidt et al. (2009) found that the number of evaluation teams increases over the innovation process and is higher for radical ideas than for incremental ideas. Nevertheless, they found that team size is not positively linked to performance (Schmidt et al., 2009).

In the study of Onarheim and Christensen (2012) they show that there is no significant difference in preference between experienced employees and executives voting in the idea screening process. Galbraith, DeNoble, Ehrlich and Kline (2007) revealed in their study that experts provided little predictive power. Therefore, experienced employees should be integrated in the evaluation process because they offer a valuable contribution and an alternative view to the executive decision-makers (Onarheim & Christensen, 2012). Ozer (2005) finds that one of the factors of efficient decision-making is the selection of knowledgeable people. But he also realises that for companies the training and qualifying of those people is not always feasible. The most knowledgeable and suitable people are those employees who work for the company since a long time because they already rotated on different positions and built up their own informal network (McDermott & O'Connor, 2002).

Another factor to increase efficiency and effectiveness in idea screening is diversity. When the evaluation teams are mixed from different backgrounds and functional areas,

the selection of ideas is positively influenced because diverse expertise is shared and different objectives from different units are met (Ozer, 2005). McDemott and O'Connor (2002) found that cross-functional teams including members from different backgrounds and broad expertise are suitable to build evaluation teams. Also Crawford and Di Benedetto (2006) support diversity and find that employees from different departments such as for example with marketing, technical or finance function can positively affect the evaluation process. The use of multiple, various experts that represent different functions is beneficial for the selection process of ideas. The only limitation of this benefit is the threat of groupthink (Soukhoroukova et al., 2012).

A new way of screening ideas are idea markets where participants can collectively evaluate the ideas (Soukhoroukova et al., 2012). Stocks on idea markets represent the suggested ideas which are then filtered and evaluated through buying and selling the idea stock. According to the study of Soukhoroukova et al. (2012) idea markets are a useful tool to evaluate ideas mainly because the screening effort of the management is reduced because the ideas are evaluated on the idea market. Additionally, idea markets also act as a communication channel within a company and facilitate the exchange of opinions and trends (Soukhoroukova et al., 2012). Employees are connected and empowered which creates an innovative environment and culture and this is, as introduced at the beginning, what makes a company successful in innovation (Ahmed, 1998).

Recent literature also dealt with the question if a company should open innovation across the different innovation process phases. It has shown that many ideas, technologies and applications may originate and exist outside an organisation and companies therefore have to find out how to get access to those external resources (Piller & Walcher, 2006). Opening the screening process can on the one hand be understood as screening ideas that are generated externally (Terwiesch & Ulrich, 2009) and on the other hand, include externals to the evaluation team (King & Lakhani, 2013). King and Lakhani (2013) discuss in their paper whether to open or not innovation during the various phases of the innovation process. They claim that, in general, to open innovation leads to a higher amount of ideas generated. But the value of the ideas tends to have a lower average. Nonetheless, the value of the best idea is higher when open innovation is used (King & Lakhani, 2013). This finding only concerns the case when a company announced its needs to the public and then gets idea submissions. A common

and famous tool to reach the public is the innovation contest. They are often set up when companies implement open innovation. Innovation contests are explained in more detail in the next section. An additional and alternative form of open innovation according to Terwiesch and Ulrich (2009) is idea screening by screening communication channels such as print or web-based media and events for ideas. Thereby, ideas can be identified that are already revealed by journalists, bloggers or through social networks (Terwiesch & Ulrich, 2009).

King and Lakhani (2013) also reveal that opening the evaluation and selection process can be beneficial because the outsiders have knowledge about the aspect and can make the process easier to the company. In addition, opening the evaluation and selection process shifts risks and cost to the outsiders. But even though there are high benefits for a company through opening the process, they must be aware that outsiders may have different and opposing incentives which are not consistent with the company's strategy. Determining the right innovation strategy may vary from industry to industry. (King & Lakhani, 2013)

Opening the innovation process is also related to the question whether innovation is still protected or if the ideas can be easily imitated by other companies. Terwiesch and Ulrich (2009) explain that in resource-intensive industries where a high level of expertise is required, the threat of imitation is smaller because imitating is too expensive. This also yields, that less screening activities outside of the company are required since the probability that innovators outside the company discover and exploit new opportunities is low (Terwiesch & Ulrich, 2009).

As mentioned above, innovation contests are a tool to screen for ideas outside the company. But they can also be used to boost internal innovation. The following section discusses the characteristics of innovation contest and their impact on idea screening.

2.2 Innovation Contests

Innovation contests are a great tool to integrate multiple employees, stakeholders or externals into the innovation process of a company (Phaal & Muller, 2009; Piller & Walcher, 2006). Creative and outside the box thinking is stimulated by innovation contests, mainly because employees who otherwise would not have participated in innovation activities (Greve & Taylor, 2000). Therefore, innovation contests are a popular tool to encourage innovation within a company (Boudreau, Lacetera, &

Lakhani, 2011). Also because through a innovation contest new product and service development can be accelerated (Hjalmarsson, Johannesson, Juell-Skielse, & Rudmark, 2014). Moreover, a broad pool of participants who submit ideas can be reached which increases the capacity of idea generation but at the same time high costs are avoided (Yücesan, 2013). According to Yücesan (2013), innovation contests improve the performance of a company by increasing its profitability or market share. Furthermore, the author claims that by setting up a contest companies save costs of time and evaluation expenses which appear when companies eager to improve their profitability and market share by traditional innovation activities. In general, companies set up innovation contests for innovation purposes only. But they can also be set up by the companies with the aim to promote sustainability or education for example (Adamczyk, Bullinger, & Möslein, 2012).

An innovation contest or innovation tournament can be defined as the process of creating, screening and developing ideas with the aim that exceptional and promising opportunities can be identified (Terwiesch & Ulrich, 2009). This definition yields that also innovation contests can be understood as a process of which idea generation and idea screening are also parts of. Usually the implementation of the idea happens after the contest and is integrated to the traditional innovation process of the company. Therefore, innovation contests should be viewed as a complement to the traditional innovation activities (Phaal & Muller, 2009). Also Piller and Walcher (2006) share this view and explain that innovation contest have to be seen as a supplementary tool to the traditional innovation process instead of seeing them as substitutes. As an example, innovation contests could be integrated by organising an internal workshop in the company which adds an exceptional and complementing activity to the traditional innovation activities.

Over time, innovation contests became more and more important to corporate practice of companies (Bullinger & Moeslein, 2010). They especially regained attention when companies started to recognize the potential of open innovation (Lampel, Jha, & Bhalla, 2012). Participants of a contest can either be internals respectively employees of the company or externals. Therefore, innovation contest can also be a great opportunity for companies to include users and customers to the internal innovation process (Phaal & Muller, 2009). According to Piller and Walcher (2006) including externals respectively users and customers can be beneficial to companies because they own a higher degree

of product-related information and are able to come up with solutions or new ideas. The authors also state that companies from several different industries can take advantage of implementing such an innovation contest where also externals are included. Innovation contests are also often associated with open innovation because they are a popular instrument for companies to get access to public information (Hjalmarsson et al., 2014).

In order to manage innovation contests successfully, a deeper understanding of how such contests affect the company and how it should be designed is required (Adamczyk et al., 2012). Innovation contests are a popular tool but companies are often lacking the knowledge about how to apply and implement them ideally. Innovation contests must be designed carefully to support on the one hand the generation of ideas and on the other hand the effective screening of those ideas (Yücesan, 2013). The performance of the innovation contest is influenced by various design elements (Piller & Walcher, 2006). To give an overview, the following table by Bullinger and Moeslein (2010) shows design elements of an innovation contest and their attributes. The table is extended in a later work by Adamczyk et al. (2012) that reviewed and classified innovation contests as well.

Figure 9: Design Elements of Innovation Contests

Design Elements	Attributes					
Media	online		offline		mixed	
Organizer	Company	Public Organisation		Non-Profit Organisation	Individual Person	
Task Specificity	low			high		
Task Complexity	low			high		
Degree of Elaboration	Idea	Sketch	Concept	Prototype	Solution	Elaboration
Contest Phases	one		two		multiple	
Contest Period	very short-term	short-term		long-term	very long-term	
Participation	Individual	Team (self-selected)		Team (given)	both	
	mandatory			voluntary		
Reward and Motivation	monetary		non-monetary		both	
Evaluation	Jury of Experts	Peer-Group		Self-Assessment	mixed	
	Cross-functional		Experts		outside the Company	

Source: Adamczyk et al. (2012), Bullinger and Moeslein (2010)

The most relevant element for this paper is *evaluation* and the question by whom and how ideas are evaluated and then selected. Adamczyk et al. (2012) mention the forms *jury evaluation* where a group of expert evaluate the ideas, *peer evaluation* where the

ideas are evaluated by the other participants of the contest and *self-assessment* where the idea is evaluated by the participant. The forms can also be mixed and combined. Anyhow, Bullinger and Moeslein (2010) discover that there is a trend towards evaluation through a jury of experts. More generally, researcher found that allowing higher competition in a contest by permitting a higher number of participants, increases the overall contest result, especially for highly uncertain problems (Boudreau et al., 2011). This result also applies to evaluation of ideas as Piller and Walcher (2006) found that integrating a bigger group into the evaluation of ideas generates better results.

Even though the literature provides insights on how to design innovation contests and how ideas should be evaluated and selected, there is still need of a better understanding of the different forms of evaluation and selection in the different stages of a contest (Bullinger & Moeslein, 2010). The output of the innovation contest is influenced by the performance of the idea generation phase and the performance of the idea screening. A company has to keep in mind that it only performs as good as it does in its weakest part (Hansen & Birkinshaw, 2007). Since this paper focus on idea screening, in following idea generation is not addressed anymore and only factors and aspects that impact idea screening are considered. In contrast to idea generation, the evaluation and selection of the ideas generated in contests happens typically inside the company (Yücesan, 2013). According to Piller and Walcher (2006) the submitted ideas should be assessed by a predefined set of evaluation criteria and by an evaluation team nominated by the management. This implies that usually the single participants or the crowd is not involved to the evaluation and selection of the ideas that arise in the contest. Still, there are exceptions such as Threadless.com, to name a famous example, where the crowd is involved in the assessment of the best T-Shirt design through ranking and voting systems (Brabham, 2010). But in general and similar to the above explanations of screening in the traditional innovation activities, also idea screening in innovation contests requires knowledge that is often only available internally (Ozer, 2005).

Terwiesch and Ulrich (2009) advise in their book that good screening in innovation contests is on the one hand efficient and on the other hand accurate. By efficient they mean that decisions need to be made without high costs and fast despite the problem of imperfect information. The two requirements stand in contrast to each other since an accurate decision is exactly what takes time and is costly since all ideas must be examined in detail. In order to address both requirements, the screening process should

be split up in similar rounds (Terwiesch & Ulrich, 2009). Viewing the evaluation process as a multi-stage process supports the concepts of Karger (1983), Cooper (1990) and Rochford (1991) described in section 2. Also Yücesan (2013) describes that innovation contests have to be evaluated efficiently meaning that they must favour a fast evaluation and selection of a broad pool of ideas and under uncertainty. To analyse efficiency and performance of innovation contests, tournament theory builds a solid foundation (Connelly et al., 2013). Yücesan (2013) studied tournament theory in the context of innovation and stated that idea screening performs unwell in innovation contests. The author conducted a simulation study and found that innovation tournaments are not efficient and effective for screening ideas and opportunities because she found that evaluation and ranking systems are either accurate or efficient, but not both. They cause high costs if they are accurate or they are efficient but the ideas are not screened properly. As a solution, Yücesan (2013) proposes a selection approach based on ordinal optimization called Optimal Computing Budget Allocation (see Yücesan, 2013 for detailed explanation) which promises efficiency and accuracy.

Hjalmarsson et al. (2014) propose a framework of barriers that companies may face when they aim to set up an innovation contest. They found for instance that lack of time and money are the most common barriers to companies. But there exist also other barriers such as high costs of innovation and of finance, high risk-level of innovation, lack of technical competence and information, uncertain demand, lack of strategic fit or hindering policies and regulations (Hjalmarsson et al., 2014). This framework is in line with the findings of the literature above regarding traditional innovation activities (see section 2.1). In order to make a connection, a barrier can therefore be viewed as a stage-gate or evaluation point where the idea does not pass and is rejected. To conclude, in the literature there are several points to advice given on how to design an efficient innovation contest. Nonetheless, the design of the contest needs to be modified according to the strategy and objective a company pursues (Terwiesch & Ulrich, 2009).

2.3 Comparison and Conclusion

The previous section already showed that there are similarities of idea screening between innovation contests and in traditional innovation activities. This section compares idea screening in contest and in traditional activities and in order to build a bridge to the empirical part the previous sections are summed up.

There are not many differences between the traditional innovation process in companies and innovations contests. Idea screening must be effective, efficient and as accurate as possible. The evaluation criteria and the selection method must be chosen appropriate to the company's context and be kept simple. The complexity of the proposed screening models and approaches by researchers decreased over time. There is no generalized framework developed yet that can be applied to many different companies and industries. On the contrary, since innovation is characterized by high uncertainty, companies need to adapt their evaluation and selection process to their situation. Predefined narrow processes should be avoided when dealing with innovation in order to give new ideas the chance to arise. Researchers also recognized the importance of intuition when it comes to evaluation and selection of ideas. The level of formality when screening can vary but the process needs to be properly understood to make it effective, efficient and accurate. Martinsuo and Poskela (2011) conclude very applicably that „it is not the evaluation system as such that would promote innovation performance, but rather how the evaluation helps in understanding the product complexity and transforms it to commitments, choices, competence search, and innovation activity“ (2011, p. 910).

Idea evaluation and selection usually takes place in several rounds, be it in innovation contests or in the traditional innovation activities. The innovation culture, the context of a company and the composition of the team, they are all factors that play an important role in the screening process. Innovation contests open up the possibility within a company to quickly change a culture, the context or the team involved in innovation. They can be viewed as exceptions to the traditional innovation activities which lead to higher performance when implemented in the right way. For instance, employees can be included who usually have nothing to do with idea generation or idea screening in a company. New points of view are integrated to the traditional innovation activities which opens new opportunities to companies.

In the following sections, idea screening of a company is studied in order to get a deeper understanding of the process and to gain more insights of evaluation and selection of ideas.

3 Empirical Study

Last chapter gave an overview on the existing research. The idea screening literature in general was reviewed and the chapter also dealt with idea screening in innovation contests. Idea screening has not been researched so extensively yet, researchers developed models and frameworks addressing specific situations and companies in various contexts. There is only little research comparing idea screening in innovation contests to the traditional innovation process. This study aims to explore how ideas are evaluated and selected, by whom and when, and to find differences between the innovation contest and the traditional innovation process.

To do so, this study utilizes a qualitative research method. Qualitative research offers answers on *how*, *who* and *when* questions and aims to understand the perspective of those who are studied (Silverman, 2013). As Terwiesch and Ulrich (2009) say very aptly, “there is no way to learn how to swim, you have to plunge in“ (p. 206). Therefore, after having reviewed the literature, as next, the plunge into the field is made in order to learn more about idea screening. To address the research question, a single case study was chosen. Case studies allow investigating and reflecting real-world problems in depth, especially when there is little theory and research available (Robert K. Yin, 2013). In order to address the research question of this paper, interviews were conducted at a company. Questions about the traditional innovation activities were asked and about the innovation contest that was organized internal in the company. The following sections will give more details on the before mentioned company, the interviewees as well as the questionnaire that was used during the interviews. Furthermore, the set up of the innovation contest will be described, followed by an explanation of the traditional innovation activities.

3.1 Data and Questionnaire

The company examined in the context of this paper is a multi-national company that has revenue of around CHF 5.7 Mio and is characterized by having a high growth rate. The company organized an internal innovation contest integrated into a two-day workshop. Eighteen employees from different departments in Switzerland and Germany were invited. They work either in the R&D, sales or process development department. Out of these eighteen invited employees, seven were interviewed for this study. Five of them were members of the winning group. The other two interviewees were part of two other

groups. Furthermore, they were the team leaders of the R&D department and the organizers of the innovation contest. Some of the participants were also included in the traditional innovation process, especially the ones from the R&D department.

In order to find answers to the research question, a set of broad questions was developed by the author in collaboration with the Department of Technology and Innovation Management at the University of Zurich. The full questionnaire can be found in the appendix. Then, in depth interviews were conducted with the participants of the contest. The questionnaire contained questions about idea generation, evaluation and selection. The duration of the interviews was approximately two hours each. The questions were designed in an open manner in order to encourage the interviewee to communicate his opinion free of any restrictions or pre-formulated answers. Moreover, also discussions were allowed. The interviews were audio recorded and notes were taken by the researchers. The answers were written down in brief for every questionnaire. Finally, the answers were summarized in a table in order to get a better overview and be able to make comparisons of the answers. Additionally to the interviews, the company provided reports and photographs documenting the innovation contest. For example, pictures of the groups' clustered idea cards were made available.

3.2 Setting and Proceeding of the Innovation Contest

As mentioned above, eighteen employees from different departments were invited to participate in a two day meeting. On the first day, they visited an exhibition and listened to several presentations related to the topic they were asked to generate ideas on and about innovation. The speakers came from different backgrounds such as from the exhibition, from university as well as internal from the company. On the second day, the contestants were introduced to three workshops. The task of the first workshop was to figure out trends and present them. The second and especially relevant workshop for this paper was the innovation contest. In the third workshop the employees were asked about possible improvements fostering the company culture and innovation. Since the focus of this work is the comparison of the innovation contest to the traditional innovation process, the author was only interested in investigating the second workshop, the innovation contest. The innovation contest was set up like a workshop described by Terwiesch and Ulrich (2009).

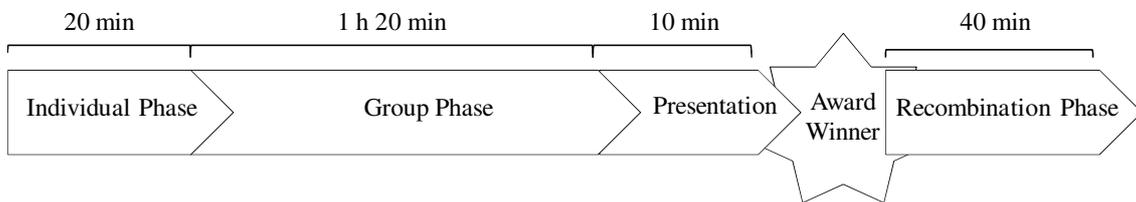
Participants

Eighteen employees from various departments were assembled to participate in the workshop as described in the previous section. The participants came from the R&D department, the sales department or from the process development department and from two different countries. During the workshop, they were divided into four randomly drawn groups where at least one employee from each department was part of the group.

Contest Design

Before starting, the participants were introduced to the task. They were asked to generate ideas out of trends and combinations of trends with the aim to present project sketches. More precisely, they were asked to present novel and innovative products and applications that the company would be able to present to its customers within two years. The following figure gives an overview of the design of the innovation contest showing the three phases and the time that was given for each phase. Then, the subsequent paragraphs explain the phases in detail.

Figure 10: Three Phases of the Innovation Contest



Source: derived by the author

After the introduction of the task, the first phase of the workshop was initiated. The participants were given twenty minutes to brainstorm individually. During this time, no discussions were allowed. Each idea was written down on a white or yellow card. Whether the color was white or yellow did not matter. The color of the cards only served to indicate the phases. When the twenty minutes were over, the participants joined their groups which were randomly drawn before. First of all, they had to find a creative group name and then each group member presented the individually generated ideas to the group. The ideas were collected and the group was asked to cluster and link these ideas on a pin board. The ideas that each member wrote down on the white or yellow card were marked with a cross if the idea was not further used or with a plus if the idea was combined with another idea. The ideas that were further developed and combined with each other were rewritten on orange or red cards. Then, the group chose

one to three ideas they wanted to work out more detailed with the goal of presenting them at the end of this phase. To do so, the group was given one hour and twenty minutes and afterwards a lunch break was scheduled. After said lunch break, the groups were asked to present their ideas in ten minutes each and afterwards the best idea was awarded by a prize. To be considered for an award, the presentation should contain a description of the project and show the link to the trends that were discovered before. Moreover, the presentation also had to include the benefits for the customers. The content of the presentation was part of the criteria to win the contest.

In order to determine the best project, every participant was involved in the evaluation process by rating the projects of the other groups. However, the group members were not allowed to rate their own project. Alongside their general impression, the participants were also asked to rate the ideas according to innovation grade, benefit to customer, link to the trends and also intuition. The idea with the highest rating won the contest and the members of the winning team were awarded with a towel, energy bars and a battery charger.

In the third phase, the same groups got together again with the aim to combine their ideas and projects with those of the other groups. The main goal of this phase was to get inspired by the other group's ideas and extend and improve their own idea. The participants were asked to write down the combined and re-worked ideas on blue and green cards this time and put them on the pin board again. After forty minutes the groups were then invited to present their new projects again. Each presentation was given five minutes.

3.3 Traditional Innovation Activities

In order to be able to compare the idea screening in the innovation contest to the traditional innovation process, the contestants were additionally asked about the traditional innovation process in the company. Not all the participants were equally involved in the innovation process but especially the employees from the R&D department and the process development were part of the process. Innovation in the investigated company is mainly driven from top-down, but they also introduced expert trainings and creativity afternoons to boost innovation.

Innovation from Top-Down

When customers express their needs or new potential benefits to customers are revealed, then the management is forced to act in order to defend the competitive advantage of the company. The management defines goals which have to be achieved by the employees. It often concerns incremental innovation which means products that are already being produced and on the market, need to be improved. The employees face a problem given by the management or the team leaders and are mandated to investigate and seek for solutions. Since the task is given from the top, it is henceforth called innovation from top-down. Innovation from top-down is the most common part of the traditional innovation process.

Expert Trainings

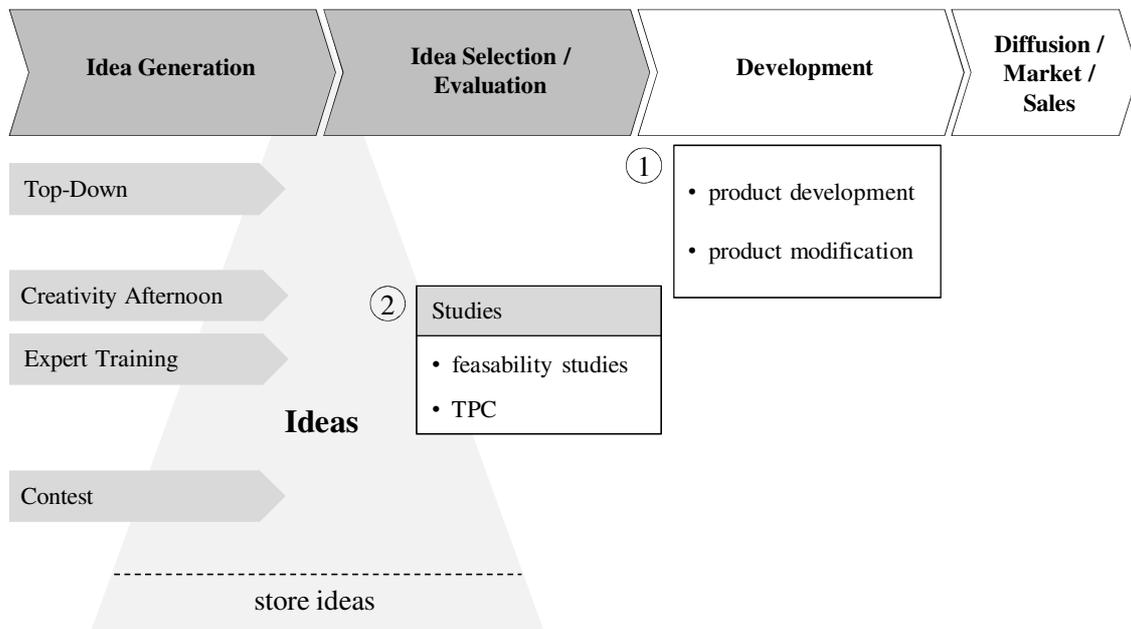
The idea of expert trainings is to broaden the horizons of a few selected employees. They are given the chance to look into other departments of their company and they are usually also sent abroad. Those training have an educational objective and aim to promote the exchange among the employees. The main tasks are investigation, research and getting to know the department from other branches of the company.

Creativity Afternoons

Recently, the R&D department of the investigated company decided to give their employees more time to explore and realize their ideas. They are given time every Friday afternoon to freely be creative. Be it thinking about ideas, sketching them, testing or conceptualizing new ones. If an idea is mature enough, it is handed in to the team leaders of the department and they decide if more time for that idea can be invested. Furthermore, creativity afternoons are organized like a contest. The employees can hand in their ideas and the best ideas are awarded monetarily. There are categories such as the most creative or the craziest idea.

Figure 11 shows an overview of the traditional innovation process that is discussed and explained in this section.

Figure 11: Overview of the Traditional Innovation Process



Source: derived by the author

In order to store the ideas and additional to the three described ways of how innovation originates, the company implemented an IT tool for innovation. A few years ago, the tool was introduced with the idea to create something like a Facebook for internal innovation worldwide. All employees of the company from all departments and from all over the world have access to this tool. With the implementation of this tool, the company aimed to give every employee the possibility to report ideas by providing a platform where they can enter their ideas and make it available to other employees. In fact, it is very similar to an online community. The report has a predefined format and requirements that need to be fulfilled in order for the idea to be submitted. Once an idea is entered, other employees have the possibility to develop the idea further. Using an online platform like this allows national boundaries to be overcome. Unfortunately, according to the employees the tool is poorly used and not frequently consulted.

When ideas are selected for further development, the traditional innovation process of the R&D department in general consists of two parts: (1) product development and modification and (2) studies. Product development and modification is the main part of the process and includes the majority of working hours. On average, the employees work seventy per cent of their time for the development and the modification of the products. The main task is to fulfil the customer's orders and to work on the official projects. Whereas in product development and modification a product results as output,

studies do not necessarily produce a product. Studies take around 30% of the employee's working time and the goal of such studies is to give the employees the freedom to explore. There are two types of studies that are applied in this company. On the one hand, there are technology creation projects which are characterized by being very time consuming. The employees are given a large amount of time to properly test and develop the ideas. Most likely, the study results in a new official project and a product that is implemented. On the other hand, there are feasibility studies. The employees decide by themselves if they want to further examine their ideas. Feasibility studies typically include analysis of the potential of the idea. Compared to creation projects, feasibility studies take less time and no formal request is required. Feasibility studies take on average 50 working hours and technology creation projects take more than 200 working hours. Feasibility studies are therefore conducted more often than technology creation projects.

In order to turn the ideas into definitive projects, the budget to implement the idea has to be approved first. The budget also includes the working time on a specific idea that is allocated to the employees. The ideas are typically preselected by a local R&D management team. The team usually consists of team leaders of the R&D department. To preselect the ideas, the local team leaders interact with team leaders from other countries in order to share their experience and knowledge. There is always a chance that the idea already existed in a branch from another country and therefore the exchange of information is essential especially to avoid simultaneous development of the same products and projects. When an idea is approved by the local management team it is presented to a global R&D management team consisting of six country managers of different R&D departments.

In general, the R&D team decides which studies to will be conducted. The decision which products are then implemented is made by a team consisting of R&D members and employees from the marketing and production. Usually, ideas arise from the R&D departments but they will also have to be approved by other departments such as marketing and production.

4 Findings

In the following sections, there will be an analysis of the answers to the questionnaire as well as the findings of the interviews: Firstly, the findings of the innovation contest will be revealed. Secondly, the findings of the traditional innovation contest will be described and thirdly, a comparison of the findings of the innovation contest and the findings of the traditional innovation process will be made. To give a better overview on the results of the analysis, each finding is briefly summarized after the related paragraph explaining the finding. All information is based on the answers to the questionnaire.

4.1 Innovation Contest

The management of the company was very satisfied about the outcome of the innovation contest. Furthermore, they were generally satisfied with the quality of the submitted ideas. In fact, the winning idea is currently being implemented. Additionally, two ideas that arose in the contest are presently analysed in feasibility studies and are integrated into the traditional innovation process. The success of the contest can be partly explained by the well elaborated preparation. The contest was very well-organised and the structure was adapted to the context of the company. As stated above, understanding the design of a contest is required as it influences the performance of the contest (Adamczyk et al., 2012).

Finding 1. *The innovation contest was well-organised and structured which builds an important base for a successful outcome.*

To show in detail how the contest was designed according to Adamczyk et al. (2012) and Bullinger & Moeslein (2010), the following table highlights the classification of each design element.

Figure 12: Design Elements of the Contest

Design Elements	Attributes					
Media	online		offline		mixed	
Organizer	Company		Public Organisation	Non-Profit Organisation	Individual Person	
Task Specificity	low			high		
Task Complexity	low			high		
Degree of Elaboration	Idea	Sketch	Concept	Prototype	Solution	Elaboration
Contest Phases	one		two		multiple	
Contest Period	very short-term		short-term	long-term	very long-term	
Participation	Individual	Team (self-selected)		Team (given)		both
	mandatory			voluntary		
Reward and Motivation	monetary		non-monetary		both	
Evaluation	Jury of Experts		Peer-Group		Self-Assessment	mixed
	Cross-functional			Experts		outside the Company

Source: Adamczyk et al. (2012), Bullinger and Moeslein (2010)

The innovation contest was set up offline and internal by the company. No highly specified task was given to the participants as they were asked to generate ideas according to expected trends. But since the task specification was very broad and the company is technology-driven, the task complexity was very high. The objective of the contest was to elaborate an idea, sketches or a concept. In order to prepare the ideas, sketches and concepts for the presentation, only several hours were given. Therefore, the contest is classified as very short-term. During the elaboration, the participants were working in randomly selected given cross-functional teams. The participants were non-monetary motivated since the monetary value of the reward was very low. When it came to the evaluation of the winning idea, each participant was included in selecting the idea.

In the interviews, the participants of the contest emphasized that they liked and appreciated to be included in the innovation process. Especially the employees from other departments than R&D appreciated that they had the possibility to contribute their ideas. These statements underline that innovation contests are a great tool to boost innovation and to include employees who usually do not take part in such innovation activities (see Greve & Taylor, 2000; Phaal & Muller, 2009; Piller & Walcher, 2006 in section 2.2). Additionally, the employees that were invited to the innovation contest had been working for the company for at least seven years. Most of them had been working for the company between ten and twenty years. McDermott and O'Connor (2002) stated

that employees who have been working for a company for a long time are the most suitable to include in innovation activities because they are very knowledgeable. Including knowledgeable people positively impacts decision making according to Ozer (2005). The interviews support the explanations in section 2.1.3 about effectiveness and efficiency in innovation.

Finding 2. *Including experienced and knowledgeable employees to innovation contests positively impacts the success of the contest.*

Through the innovation contest, the employees gained deeper insights into the company's innovation process and its vision. The only point that was criticized was that the time for group work was a little bit too short. Day one of the two-day workshop served as warm-up and introduction day and was perceived as relatively long whereas the part where the group worked together was perceived as very short. For the future, the employees suggested to be given more time. But all in all, the general feedback on the overall innovation contest was very positive.

Finding 3. *The overall feedback of the contest was very positive, only time pressure was criticized.*

4.1.1 Individual Phase

All team members presented their ideas at the beginning of the group phase. Interestingly, no one pre-selected and evaluated the own idea after the individual brainstorming. All ideas that the participants wrote down during brainstorming were also presented. Several employees reported that they already had some ideas in advance. This could be one explanation why there was no evaluation or selection of the own ideas in this phase. It was also reported that the participants only wrote down the ideas of which they were convinced. Therefore another explanation could be that selection may already have happened before when thinking of what idea to write down. Probably only the ideas that the participants wanted to further pursue and actually share were written down.

Finding 4. *Employees do not preselect their own ideas anymore as soon as they are written down during brainstorming in the individual phase of the contest.*

The groups presented their ideas one after another. When someone had the same idea as another group member, it was immediately communicated. In general, the generated ideas were very broad. Nevertheless, some ideas were complementing each other and were therefore linked and combined. Interestingly, some interviewees mentioned that everyone pursued and promoted their own ideas.

Finding 5. *Employees promote their own ideas.*

The ideas from the individual employees differed concerning the development and application of the idea but the technology and production approaches were similar. The ideas also differed depending on the department the participant is working for. Employees from different department have other frameworks in their minds according to which they seek for ideas. They weight characteristics of an idea differently and their focus on the ideas varies.

4.1.2 Group Phase

The individually generated ideas presented to the group were clustered and linked. The group discussed which ideas to further develop or eliminate. Some ideas were omitted early because they were not relevant to the task or not innovative enough. The groups discussed the ideas in order to find which one they wanted to present. It was mentioned that they had to deal with time pressure. To reach an agreement and to select the idea that was going to be presented was time consuming. To accelerate the process, most groups therefore decided to exclude the less attractive ideas and only further discuss the most interesting ideas.

In order to evaluate the ideas and to decide which ideas to present, several criteria were used. The most often mentioned and therefore assumed to be the most important criteria was creativity and novelty or feasibility. As mentioned earlier, the criteria novelty and creativity are redundant (Kudrowitz & Wallace, 2012). The criterion includes originality and grade of innovativeness as it was also described by the interviewees. The other most important criterion is feasibility. It includes the question if the idea is producible and feasible especially concerning the technological aspects. To turn ideas into products can be a challenging process and the resources and capacity to produce have to be available, be it physical resources or knowledge.

Finding 6. *The most important and highest weighted evaluation criteria in the early stage of the idea is novelty respectively creativity and feasibility.*

The third and equally important criterion as feasibility was *intuition*. Many decisions were made according to the gut-feeling the employees had and if they liked the idea. In this paper, intuition is assumed to be a separate criterion. According to Magnusson et al. (2014) gut-feeling and intuition could be explained partly by formal criteria. But whether intuition included formal criteria cannot be derived from the answers given to the questionnaire.

Finding 7. *Intuition plays an important role when evaluating and selecting ideas.*

A less weighted criterion was profitability. Profitability includes market and sales potential. An idea has to meet customer needs to be sold and therefore to generate revenue. A product that is demanded on the market also leads to higher market share. Revenue and market share both influence the profitability of an idea. Moreover, an idea is only sold successful if it satisfies customer needs and if it is actually useful. Due to this, all those aspects are summarized and included in the broad term profitability. Also strategic fit was mentioned to be an evaluation criterion but it was very little weighted. For the innovation contest, it did not seem to be relevant whether the generated ideas fit into the strategy of the company or if they offered a solution to actual problems. A possible explanation could be that the participants were very well introduced to their task and therefore the ideas generally fit the strategy of the company.

Finding 8. *Profitability and strategic fit are less important criteria in the early stage of the idea.*

In order to choose the winning idea, the most important and highly weighted evaluation criterion was novelty and creativity. Another but less important criterion was feasibility. Profitability additionally influenced the decision making and intuition still played an important role. When the interviewees were asked how they assess the winning idea, it was the three relevant evaluation criteria that were mentioned, namely novelty respectively creativity, feasibility and profitability. Novelty and creativity was still the most important criterion and highest weighted.

Finding 9. *The most important characteristic of the winning idea is in particular that it is novel and creative.*

Compared to the importance of the evaluation criteria that was applied to find the idea that was presented, intuition was less important for the voting of the winning idea. At least it was not reported as being essential to the interviewees. A possible explanation could be that the participants were more rational when voting for other ideas than when developing an own idea in the group. However, this is only an assumption which needs to be further investigated first.

Finding 10. *When evaluating ideas of others, the participants are more rational and rely less on intuition than when evaluating the own ideas of the group.*

The selection of the idea that was presented at the end was based on two different methods. When each group member presented their idea to the others, the group already started first discussions about the ideas just presented. With the aid of clustering and grouping and by further discussing the ideas, favoured ideas were identified. Every participant contributed their own opinion and individual experience according to the department they were coming from. As an example, when thinking of the feasibility of the idea, the R&D was more involved and when thinking of profitability the experience from the sales department was focused on. In order to make fast decisions on which ideas to eliminate or further pursue, one of the groups used a voting method. The ideas were given votes by raising hands; hence each group member had two votes. Thus, the ideas with the most votes were discussed, combined and developed further. Moreover, the winning group decided to present only one idea. Their objective was to focus on only one idea but develop it more profoundly. In comparison, other groups presented up to three ideas. From the interviews, it is also known that apart from the winning group, the two other groups also made their decisions based on discussions about which ideas they wanted to further pursue and which ideas to eliminate. The only difference to the winning group was that the other groups did not use a voting system as their selection method.

Finding 11. *Decisions were made based on discussions on which ideas to further develop and which ones to ignore.*

Interestingly, no one of the interviewees reported that a group member was too dominant or that their own ideas could not be presented or enforced for that reason. For example, in the winning group no member felt neglected or ignored by the others. In general, the answers of the interviewees imply that the group dynamics were harmonic and that the members worked together very well.

Finding 12. *Team work was characterised by being very dynamic and harmonic and there were no dominant team members.*

One member of the team explained that he had held back his opinion at the beginning and let the other members develop their ideas because he had had the same idea earlier. But at that time the idea was rejected. Therefore, he did not want to influence the group negatively and held back his experience with the idea. Since he was part of the winning group, holding back the negative opinion was the right decision. The fact that the idea was eliminated earlier but was selected now implies that ideas should be saved somewhere. There is the chance that a rejected idea might become important later in time.

Finding 13. *Eliminated ideas should be stored since they could be reselected at a later point in time.*

In order to elect the winning idea, every participant distributed three, two or one point to their favourite idea that was presented before. Only the idea presented by their own group was not allowed to be rated. One of the problems of idea screening is self-promotion as also stated by Onarheim and Christensen (2012) and explained in section 2.1.3 of this paper. The problem occurred during the group decisions on which ideas to pursue after the individual phase, as reported by some participants. By excluding the idea of the own group from the evaluation process, self-promotion was eliminated.

Finding 14. *The winning idea was selected by applying a rating method where the own idea was not allowed to be rated in order to eliminate the bias of self-promotion.*

To rate the ideas, no specific criteria was given. Nevertheless, most of the participants rated the ideas according to the criteria that they also applied when evaluating which idea to present eventually. The most common criteria were novelty and creativity, followed by feasibility and profitability.

Finding 15. *The ideas were rated according to the criteria novelty or creativity, feasibility and profitability.*

The winners of the contest received a prize in form of physical goods. As a reminder, it was a towel, power bars and a battery charger. Since the prize had no high monetary value it was not perceived as incentive to win and as prize as such. The interviewees reported that the incentive to win was recognition and the aim to be the best.

Finding 16. *The participants were motivated to win by non-monetary incentives such as recognition for example.*

After the nomination of the winning idea, a break was announced before the participants were gathered for the next task.

4.1.3 Recombination Phase

After the break, the same groups came together again with the task to further develop the presented idea by adding ideas of the other groups. The winning group did not combine their idea with others. Instead, they rethought their idea and discussed possible problems that could arise. Whereas in the group phase emphasis was on highlighting the advantages, it was on discovering potential disadvantages in the recombination phase. While the winning group did not use any other ideas, the other groups were inspired by the presentation and included parts of the ideas that were presented. The main changes that were made to the ideas were changes in the application of the idea. In other words, it was basically not about changing the idea itself but its applicability and implementation.

Finding 17. *The ideas were not combined but adjusted by expanding and changing the application and way of implementation.*

To further develop and recombine the ideas, no new evaluation criteria were applied but fewer criterions were used. Additionally, there was a change in the weighting of the criteria. The most important criterion during this phase was profitability. In the earlier stages of the idea generation profitability was considered less important. It seems that questions such as if the market needs are met or if there is future sales potential, gained importance with the increasing maturity of the idea. Novelty and creativity was still an

important criterion but not the most important one anymore. As soon as the idea was developed, it was only adjusted and combined with other novel and creative ideas. If other ideas were not valued as such, then they were not considered for combining them with the own idea. The last criterion that influenced the evaluation and decision making was feasibility. Compared to before, feasibility was much less weighted in the later stage of the idea. This could be explained by the maturity of the idea. Since only feasible ideas were selected in earlier phases, the criterion was not as relevant anymore because the idea was already evaluated in terms of feasibility before.

Finding 18. *The evaluation criterion profitability gained importance whereas feasibility became less important.*

In summary, the following table summarizes the findings of all three phases of the innovation contest including the selection of the winning idea. It focuses on the evaluation criteria, the selection methods and how and by whom decisions were made.

Figure 13: Summary of Idea Screening in the Innovation Contest

<i>Summary</i>	Individual Phase	Group Phase	Selection of Winning Idea	Recombination Phase
Evaluation Criteria	none applied	(1) novelty/creativity (2) feasibility (3) intuition (4) profitability (5) strategic fit	(1) novelty/creativity (2) feasibility (3) profitability (4) intuition	(1) profitability (2) novelty/creativity (3) feasibility
Selection Method	no selection took place	- discussion - consensus - voting	- rating	- discussion - consensus
Decision Making	continuously when writing down ideas by individuals	continuously in the discussion by all group members	after presentation, point of time by all participants	continuously in the discussion by all group members

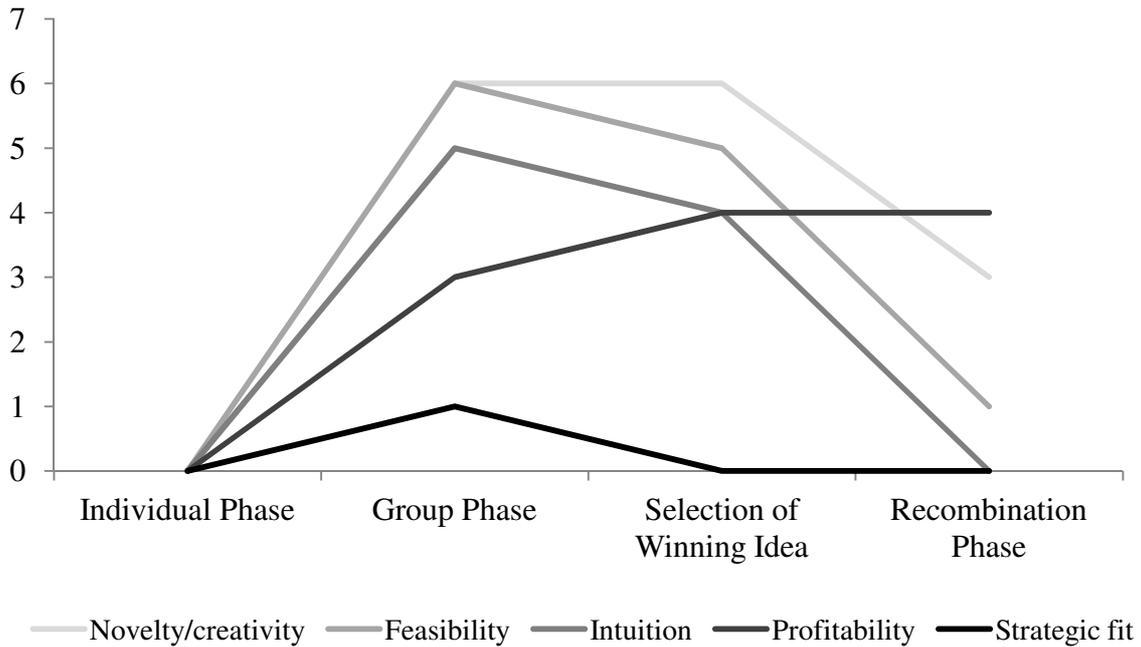
Source: derived by the author

Decision making in groups took place by discussing. The decision, which idea to present at the end of the group phase, was made democratically. To speed up the process voting by raising hands was used as help. Only by the selection of the winning idea, a formal rating system with rules was applied. This can be reasoned by the

different characteristics of decision making. During the group phase decision making is about choosing which idea to develop and to present in the end. It is a continuous decision making process. The selection of the winning idea was only at a single point of time and decision making was focused on the selection of one idea. Consensus, on which idea is best, was not necessary to be reached when the winning idea was selected. Through the rating method, the winning idea was identified. But when the group developed the ideas and had to decide which one to present, consensus was required and the opinion of each group member was important. Furthermore, during the group phase, no formal selection method was used. But when selecting the winning idea, a formal method was used. This method can be best compared to the lexicographic model that was tested by Baker and Albaum (1986). They found that the model classifies around 65% to 80% of the successful ideas as successes and around 65% of the unsuccessful ideas as failures (Baker & Albaum, 1986, p. 37). Therefore, choosing a selection method where the participants give votes to their preferred ideas seems to be an accurate method to identify the best ideas.

Looking at the amount of evaluation criteria used, there is a decrease over time. At the beginning, five categories of evaluation criteria were considered, namely novelty and creativity, feasibility, intuition, profitability and strategic fit. Towards the end only novelty and creativity, feasibility and profitability were used. The following graph illustrates the change in weight of the evaluation criteria. The figure shows how the criteria were weighted over time and how the importance of the criteria varied during the different phases. The graph was derived by counting the criteria mentioned by the interviewees. It aims to show the change over time and is based on estimates since no exact numbers exist.

Figure 14: Change of Evaluation Criteria over Time



Source: derived by the author

The graph shows that the importance of the criteria changed over time. At the beginning the ideas were mainly evaluated by novelty and creativity, at the end profitability became more important. Intuition played an important role in decision making, especially at the early stage of the idea. Later on only formal criteria were applied to evaluate the ideas. Overall, not a high amount of evaluation criteria were used. This is in line with the findings of Baker and Albaum (1986) that only a few criteria are necessary to choose a good idea.

Finding 19. *Only few evaluation criteria were used and over time, the amount of evaluation criteria used decreases and weights of the criteria change.*

Comparing the results above to the literature, some similarities can be found. Ronkainen (1985) found that for technology-driven companies feasibility is one of the most important evaluation criteria. This also applies to the company investigated in this paper since feasibility is an applied criterion. The result is also in line with Carbonell-Foulquié et al. (2004) who found that in the early stage, strategic fit, technical feasibility, market opportunity as well as customer acceptance are important criteria. The weight of the importance of the criteria changes in the analysis of this paper. Feasibility and market opportunity are more important than strategic fit. Financial

performance gains importance at the later stage of the idea according to Carbonell-Foulquié et al. (2004) which was also observed in this study as the importance of profitability increased. When the change of importance over time is investigated in literature, novelty and creativity is not considered. The criteria are only named in studies where applied evaluation criteria are investigated (e.g. D. L. Dean et al., 2006; Kudrowitz & Wallace, 2012; Magnusson et al., 2014).

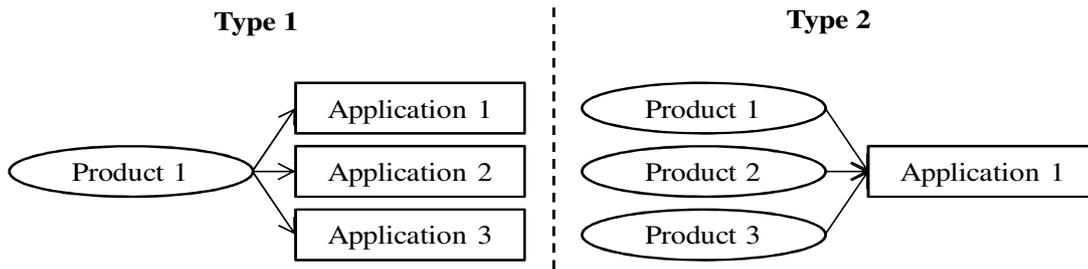
Concerning the composition of the group, it was reported that employees from the different departments also weight the evaluation criteria differently. In the discussion, employees from the sales department considered profitability already in the early stage of the idea whereas for the process development department and the R&D feasibility was more important. Novelty and creativity was equally distributed and mentioned among the different departments. Jespersen (2007) compared the performance of cross-functional und single-unit teams in idea screening and found that there is no difference between the teams. This somehow contradicts the finding of this paper that participants from other department evaluate the ideas differently. However, a comparison of the screening performance between cross-functional and single-unit team was not made in this paper.

The next section reveals the findings of the traditional innovation process and afterwards, the findings are compared to each other.

4.2 Traditional Innovation Process

The process of innovation differs from department to department. Typically, the R&D and process development are faced with innovation in their daily work. The sales department is less involved in the development of new ideas but they provide some valuable input to the R&D and the process development since the sales people are in close contact to their customers. There are two different types of innovation in the company. On the one hand, existing products remain unchanged but the application of the product is changed. A product that is already established in an area may be also useful for other areas. On the other hand, for the same area a new product is invented or modified in order to improve the application.

Figure 15: Types of Innovation



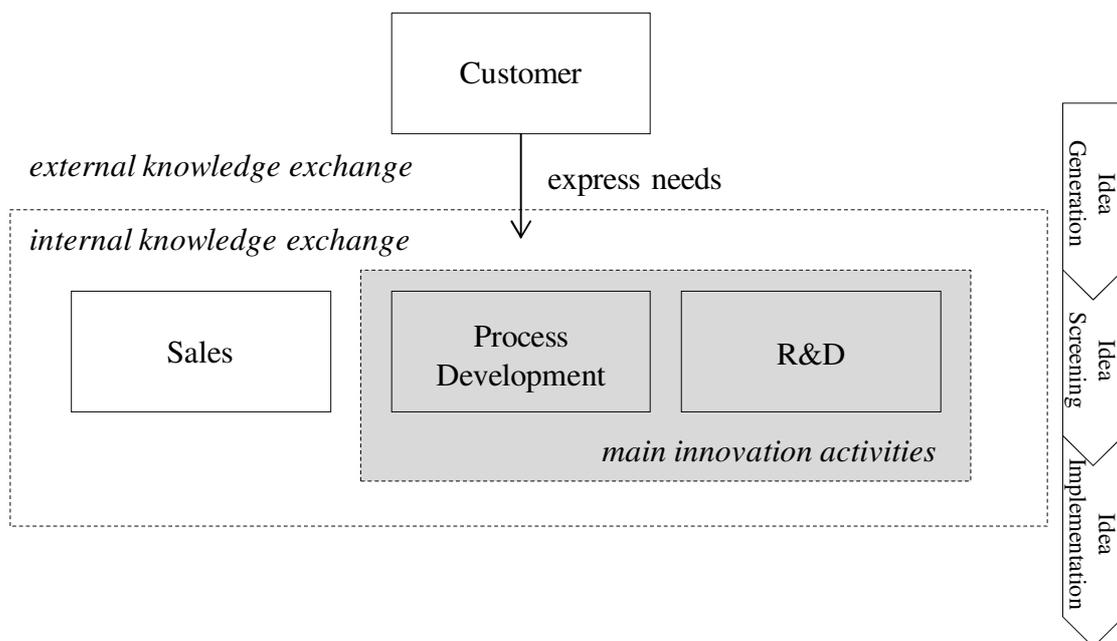
Source: derived by the author

The majority of the ideas emerges from the customers as innovation in the investigated company is highly customer-driven. The employees from the sales department are in close contact with the customer since they are responsible to market the products. The managers from the other departments maintain contact with the customer by regularly organising meetings to recognise and capture their clients' needs.

Finding 20. *Innovation is mainly customer-driven.*

To give an overview, the following figure illustrates how the departments are involved in the innovation process. It is predominantly the process development and the R&D that are involved in innovation activities.

Figure 16: Customer-driven Innovation



Source: derived by the author

The interviews revealed that the sales department is poorly integrated in the traditional innovation process of the company and sales employees have little possibilities to contribute their ideas. Through daily contact with customers, the employees from the sales department are well informed about customer satisfaction, benefits and needs. However, to contribute to innovation with a new or modified product, they have to apply for a new project with the aim to better meet customer needs and to increase their benefits. Generally, there is little interaction between sales and process development or R&D. Employees from the sales department usually do not submit ideas. They analyse the revenue of the projects, reveal where there is need for action and report it.

Finding 21. *The sales department is poorly involved into the innovation activities.*

The R&D and process development departments are very innovative and aim to adjust their innovation process continuously to improve. The managers of the departments are eager to better understand the innovation process and are open to try new methods and tools to improve the process. An example is the introduction of the creativity afternoons. In the meanwhile, they are highly appreciated among the employees from those departments because it gives them the possibility to contribute their ideas and freedom to independently work on them. In general, the employees voluntarily contribute their ideas and are also willing to share and submit them. Hence, ideas are submitted continuously and openly shared among the employees. Interestingly, most of the interaction between the employees happens during the breaks and when they meet in the cafeteria.

Finding 22. *Employees from the R&D and process development are generally highly motivated to contribute their ideas.*

Interaction is mainly characterized by sharing of the idea and giving feedback. Ideas are rarely combined due to this interaction. When ideas are combined, it only happens randomly and usually the ideas are very similar. The combination of ideas is not specifically pushed by the management and employees are not sensitive on combining their ideas. The fact that innovation in this company is mainly customer-driven, adds to the result that little combination takes place. Only when new ideas arise in the company, the idea is modified and combined with the aim to serve several fields of applications.

The ideas that arise from the sales department are rarely contributed because there is a fee to apply for projects and they do not have other possibilities to submit ideas. This is different for the R&D and process development department; the employees can document their ideas and submit them to their team leaders. The innovation culture differs among the departments since submitting ideas is highly pushed by the team leaders, for example through the creativity afternoons. Submitting ideas from sales side, however, is only pushed by the customer.

Team leaders are more likely to submit all their ideas whereas their employees preselect their own ideas more stringent. This finding is in line with the hierarchy recommendations from Keum and See (2014). During idea generation, hierarchy leads to fewer ideas submitted because the employees are somehow insecure to present ideas to their team leaders because they fear to be judged as not good enough. Therefore, employees only submit their ideas if they are fully convinced and they perhaps already obtained feedback from colleagues.

Finding 23. *The hierarchical position in the company influences the level of pre-selection concerning the submission of individually generated ideas.*

As revealed above, the sales department is little to not involved in the traditional innovation activities and innovation mainly takes place in the process development and R&D department. In the following paragraphs, the analysis therefore focuses on those two departments.

The innovation activities in the investigated company can basically be split up in three steps as it was also recommended in the reviewed literature (see beginning of section 2). First, employees individually generate ideas and decide by themselves which ones to further pursue. In a second step, the ideas are presented to the team leader who then decides if the idea is further pursued. In case of a positive decision, the whole team develops and works on the idea. The promising ideas are then launched as projects. This includes the further development and the implementation.

Even though, the innovation activities can be split into three process phases as it was introduced in the literature review, the three phases are not clearly separated from each other in practice. Ideas are screened already when they are generated for example. Idea screening takes place during the whole innovation process and shows multiple stages. The innovation process can be compared to the stage-gate system by Cooper (1990)

which includes continuous evaluation and selection of ideas. When investigating the evaluation criteria over time, similarities to Karger (1983) can be found. At the beginning of the process, inappropriate ideas are eliminated either by the individual employee or later by the management team. When an idea passes those stages, it may for instance become a technology creation project, where a proper market potential analysis is made and the profit is estimated.

Employees already preselect their ideas before they are presented to their team leaders. As a consequence, not all ideas are submitted. They report that they only submit the ideas that they perceive as important, feasible and necessary. Other ideas are discarded because they seem to be too costly and would probably not be accepted and further developed. To make it comparable to the evaluation criteria used in the innovation contest, the statements of the interviewees are assigned to the evaluation categories that were applied above. When employees individually evaluate their own ideas to decide if the idea is good enough to present it to the team leaders, they mainly evaluate the idea by *feasibility*. When they experiment by themselves they first figure out if the idea is feasible and if it is also producible. If so, then also *profitability* and *strategic fit* are considered. Also *intuition* plays a role when deciding if the idea should be pursued. The employees only present an idea that is perceived and viewed as good enough.

Finding 24. *Feasibility is the most important evaluation criterion when employees decide which ideas to further pursue and to present to their team leaders.*

The management team, consisting of several experts, decides on which ideas to further develop and invest more time to analyse their probability of success. The decisions are made during meetings and no specific evaluation criteria are applied. The team leaders mentioned that no specific checklist is used to evaluate the ideas. The team discusses the ideas and decides subjectively and intuitively whether to invest in the idea or to eliminate it. Magnusson et al. (2014) claim that intuitive decision making is only recommended when the experts are experienced and relate their decision to the context. Since the management is experienced and is well-informed about the company's context, intuitive decision making is an appropriate method.

Finding 25. *The decision whether an idea is further pursued is subjectively and intuitively made by the management team.*

When the management team decides to pursue and develop an idea, they allocate work time to the employees who further investigate in the idea. A project proposal is made and a feasibility study or a technology creation project is started. If the project indicates a high success rate, the management team decides again if the project is pulled further. If the decision is positive, then the project is presented to the marketing department. If the management team of the marketing and sales department is convinced, a business plan is set up including a financial statement and risk analysis. The marketing department then decides if the product is launched. If the idea predicts a success rate of more than 80 per cent, then the project is usually launched and implemented.

Finding 26. *Financial evaluation criteria only become relevant at the very mature stage of the idea.*

To sum up, specific evaluation criteria seems to be more considered at the early stage of the idea. Feasibility is the most important criterion right after the idea is generated. The more advanced the idea becomes, the more do profitability criteria and financial criteria gain importance. Since innovation is highly uncertain and risky and even though there are analyses to estimate the success rate of ideas, management decisions are highly influenced by intuition and subjectivity. The following table gives an overview of the evaluation criteria, the selection method and the decision making process of each stage of the innovation activities.

Figure 17: Summary of Idea Screening in the Traditional Innovation Process

<i>Summary</i>	Individual Innovation Activities	Team Innovation Activities	Project Launch
Evaluation Criteria	(1) feasibility (2) profitability (3) strategic fit (4) intuition	(1) intuition	(1) profitability (2) financial fit
Selection Method	no methods applied, ideas that are selected that are perceived as "good enough"	discussion in team, no checklist exists as help	discussion in teams
Decision Making	individual employee decides which ideas to present to team leaders	team leader respectively management	management team and marketing

Source: derived by the author

The table shows that over time, different and less evaluation criteria are being used. It makes also clear, that there is no formal selection method present. Not even simple evaluation methods such as using a checklist are used. In literature, it is often mentioned, that companies do not make use of standardised and structured methods (Bothos et al., 2008). Not using any formal method can lead to ineffective and inefficient idea screening (Soukhoroukova et al., 2012). But this has not necessarily to be the case. Not having a specific structured and standardised method also minimizes the probability that a successful idea is overlooked (Baker & Albaum, 1986) because idea screening is not restricted. Therefore, discussing the ideas in teams and then select the most promising ones can be an effective and efficient way to screen ideas. Especially because there are no high costs besides meeting time. The only part that underlies a formal process is when an idea was given a go-decision and it then is evaluated by conducting a feasibility study or technology creation project. If the project is launched depends on the outcome of those studies but the projects are then discussed again in teams that have to agree on the further development.

The next section aims to build a bridge between the innovation contest and the traditional innovation activities. A comparison of the findings from the innovation contest and the traditional innovation activities is made.

4.3 Comparison of the Findings

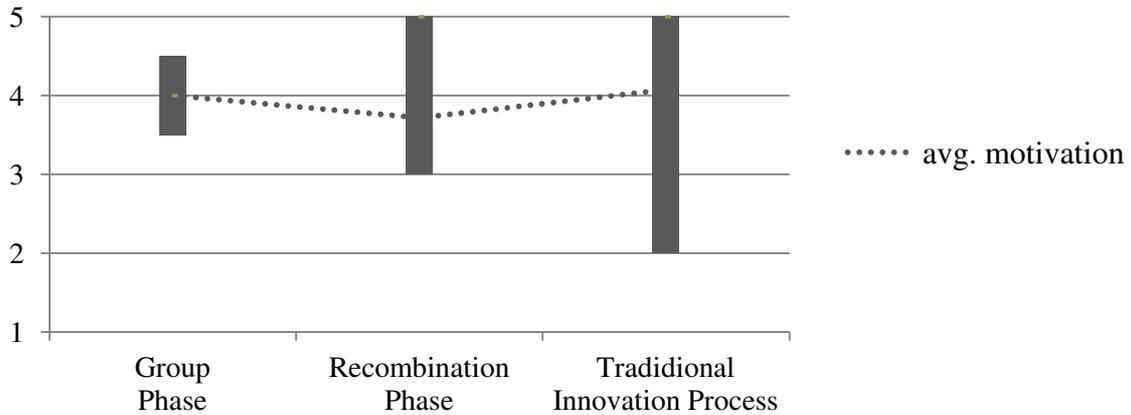
To begin with, the analysis shows that, in general, the employees of the company are very motivated on what they work for. They aim to be creative and like sharing their ideas. Be it in traditional innovation activities as well as in the contest. This all speaks in favour of the company that managed to build a good innovation atmosphere and climate. As stated by Ahmed (1998) the innovation culture within a company is the base of successful innovation. Since the company demonstrate growth in revenue which stands for success, it can be concluded that the innovative company culture is positively connected to high performance of the company.

Finding 27. *The innovative company culture builds the base for successful innovation.*

Innovation contests are usually set up when a company is lacking new ideas and to foster idea generation (Boudreau et al., 2011). The objective of the contest is to motivate the employees to participate in innovation (Greve & Taylor, 2000). As

following figure will show, the employees are already noticeably motivated apart from the innovation contest.

Figure 18: Overview of the Motivation of the Participants



Source: derived from the questionnaire

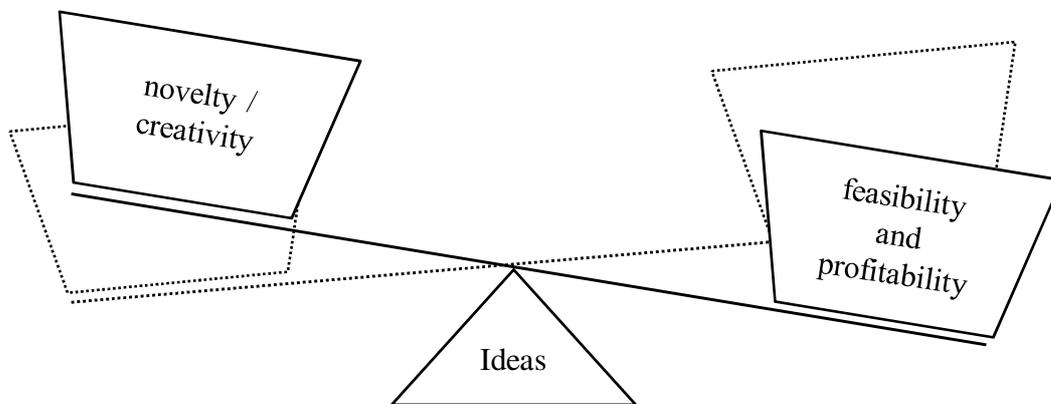
The figure indicates the high level of motivation during the group phase, the recombination phase and the traditional innovation process. The vertical bars show the range of the motivation and the dotted line demonstrates the average level of motivation. On a scale from one to five, an average of four is generally high. The motivation of the participants was slightly lower during the recombination phase and shows a wider range in the traditional innovation process. Latter can be explained by the fact that not all employees are included in the traditional innovation process. As mentioned above, the employees from the sales department are excluded and therefore less motivated to be innovative.

The generated ideas from the traditional innovation activities and the contest differ heavily. But still, the range of ideas is a bit wider in the innovation contest. Comparing the criteria of the ideas, it was reported that the ideas from the contest were more complex and as a consequence implementation of those ideas is harder. Therefore, the feasibility of the ideas from the contest is lower than of the ideas that arise during the traditional innovation activities. However, the ideas out of the traditional innovation activities are reported to be less novel and creative than the ideas from the innovation contest.

Finding 28. *Ideas from the innovation contest are more novel and creative but less feasible than the ideas arising from the traditional innovation activities.*

This indicates that there could be a trade-off between ideas that are more feasible and ideas that are more novel and creative. As the following figure shows, ideas that are evaluated as highly creative are most likely also hard to implement and therefore feasibility is rated lower. Vice versa for less creative ideas, they are most likely easily to implement. Furthermore, implementation is also connected to profitability. If an idea can easily be implemented, it implies also low costs. An idea that is novel and creative is typically characterized by being complex. This entails that the production of the idea is challenging and resource-intensive. Therefore, also profitability stands in contrast to creativity and novelty.

Figure 19: Trade-off between Creativity/Novelty and Feasibility



Source: derived by the author

Interestingly, novelty and creativity was not considered as important evaluation criteria when selecting ideas in the traditional innovation process. Mostly, ideas are subjectively selected and intuition plays an important role. Furthermore, the ideas have to be feasible and profitable in order that they are pursued. In general, more different evaluation criteria were used at the early stage of the idea. The amount of considered criteria decreased with the maturity of the idea. Overall, in the innovation contest, more criteria were applied over time. Considering that in the traditional innovation process the ideas are developed further than in the innovation contest and that the time range is greater, this statement is very weak. But with more certainty, in both, the contest and the traditional activities, feasibility is an important criterion at the early stage of the ideas, profitability gains importance with the maturity of the idea.

Decision making processes are similar but the decision makers differ. The ideas are selected by discussing in teams which is the same proceeding in the innovation contest and in the traditional innovation process. The difference in the innovation contest is that

all invited employees, who came from different departments and various hierarchy levels, were involved in decision making. Ideas were selected by the employees from the R&D, the process development and from the sales department at the same time. Whereas, in the traditional innovation process of the company the management respectively a group of local or global team leaders decide. First the R&D and the process development department select ideas separately. Then those ideas are discussed by the team leader of both departments. When an idea is selected, then only the sales department is included too.

Finding 29. *The procedure of decision making is similar but the decision makers are different.*

The interviewees reported that the ideas that were generated during traditional innovation activities reappeared in the innovation contest. Additionally, the selected ideas in the contest are further developed in the traditional innovation process. These two statements imply that an internal innovation contest cannot be seen as a separate and isolated instrument. In contrary, the internal innovation contest must be viewed as part of the traditional innovation activities. The contest is an instrument that can be occasionally set up when required.

5 Conclusion

Innovation contests should be viewed as part of a company's traditional innovation activities, especially when they are set up internally. Innovation contests are a tool to take action. For instance, if a company is lacking of new ideas, an innovation contest can be an instrument to generate new ideas. However, if a company already is flooded by new ideas, caution is advised when considering setting up a contest. If the participants anticipate that the capacity to implement new ideas is not available they are less motivated to submit ideas. Innovation contests are a tool that can be additionally implemented to the traditional innovation activities in order to quickly adapt to organisational requirements, needs and changes. In general, the innovation process should be designed in order that it admits high flexibility and can be regularly adapted to the company's context.

Even though this paper focuses on idea screening, it is important to understand innovation as a dynamic process. Whether the success can be explained by the ideas generated or the subsequent idea screening is unclear. No matter how efficient, effective and accurate the screening process is, if the performance of the idea generation process is poor, there are no good ideas to select from. When more ideas are submitted, the probability of finding an exceptional opportunity increases (Connelly et al., 2013). But then, the best ideas need to be discovered through screening first. Both phases as well as the subsequent implementation of the idea eventually influence success. Therefore, all aspect should be considered when managing innovation. Being effective, efficient and accurate in idea screening is only a part of the whole. Furthermore, it is impossible to fully control innovation. Bothos et al. (2008) state rightly in their paper that innovation is uncertain in its nature, there are several unpredictable factors such as competition, technology, society and economy that change very fast and that are related to the success of an innovative idea but a company cannot influence.

5.1 Managerial Implications

Even though, there are factors which a company cannot influence, there are ways to improve the management of innovation. Concerning idea screening, no general manual exists which can be used by the management. Nevertheless, an in-depth understanding of the process and the factors influencing idea screening supports the decision making. Since in this paper a multinational, technologically innovative company in growth stage

was investigated, the implications fit best for companies operating in a similar environment.

To begin with, awareness of the dynamics of an innovation process builds the base for managing innovation and being successful in it. The traditional innovation process is mainly customer-driven. New products are developed or existing products modified when customers are asking for it and projects are planned according to customer needs. When a company strives to develop new products independently from what customers directly demanded exceptional instruments to boost innovation can be introduced.

Apart from giving the employees free time at work to explore new ideas or sending them to trainings where their horizon is broadened, an internal innovation contest is a proven alternative instrument. The innovation contest can be set up according to the objective of a company. As an example, several design elements such as the participating employees influence the outcome of the contest. Including employees from departments that are usually not involved in the innovation process is leading to a different evaluation and selection of ideas. As shown above, an employee from the sales department considers profitability of an idea earlier than an employee from the R&D department who mainly thinks of feasibility at the beginning. Employees do not only evaluate ideas differently between various departments, they also evaluate ideas in a different manner than the team leaders and the management who usually select the ideas. Additionally, employees at lower hierarchy levels are more prone to preselect their ideas more critically. They share fewer ideas than employees at higher hierarchy levels. Sharing and submitting ideas must therefore be fostered by the unit managers who need to create a positive innovation culture where ideas are not judged negatively.

An innovation contest gives a company the opportunity to include the employees in the selection of ideas which would not be possible in the traditional innovation process due to hierarchical structures and processes. The only bias that needs to be considered when including the employees who submitted the ideas to the idea selection is that they tend to promote their own ideas. A selection method should therefore be applied whereby the own idea is not allowed to be evaluated.

That an innovation contest is a great instrument to boost innovation of new products and services can be additionally shown when taking a look at the evaluation criteria. The ideas from the innovation contest were examined as being more novel and creative than those from the traditional innovation activities. Additionally, the winning idea was

mainly assessed to be novel and creative. Therefore, if a company strives to generate something totally new and inexistent yet, an internal innovation contest could optimally support the project. Nonetheless, the company needs to be aware of the trade-off between novelty or creativity and feasibility. Novel and highly creative ideas are maybe less feasible and challenging to implement because the resources are lacking. The two evaluation dimensions novelty or creativity and feasibility, are the most import ones at the early stage of the idea. Only later on, financial dimensions are included to the evaluation.

Since innovation is uncertain and risky it is unclear if a formal idea screening process leads to a better outcome than an informal process. Since intuitive idea screening has no negative impact on performance, intuition is an accepted and reliable when ideas are evaluated. Selecting ideas by intuition is time-saving and only needs little resources. To finalize, ideas that were eliminated and not selected to be further pursued should nevertheless be stored. There is a probability that an idea which was rejected is re-selected at a later point in time.

5.2 Limitations

Since innovation is highly uncertain and risky it makes it difficult to study and derive generalizations, especially since evaluation and selection of ideas both differ within a certain company as well as among industries. Depending on the situation and the context of a company idea screening varies. Therefore, to derive a framework that is applicable to various companies and industries is hard. To measure the effect of idea screening on the performance of the idea is highly challenging because for example, no information about the outcome of the ideas that were eliminated is available. As a consequence, comparing performance of various idea screening methods is almost impossible.

In addition, the analysis of this paper is only based on a single case. Without having a comparison of multiple cases it is almost impossible to derive generalizations. Also the number of the conducted interviews is very little and therefore it has to be questioned if it is representative. Most of the interviewed participants were part of the winning group which maybe leads to very positive and therefore biased results. It could be that other groups worked together less harmonically so that members of the other groups perceived the innovation contest differently. Furthermore, there has been time passed

between the innovation workshops and the interview date. It occurred that the interviewees mixed up the different workshops and also the phases of the innovation contest. Therefore the author sometimes had to deal with contradictory information. Additionally, the analysis was derived from the statements of the respondents and did not base on specific numbers. The weights related to the evaluation criteria over time based on estimations only.

The questions were asked very broad and open because the study aimed to gain insights out of the box. A framework was only derived afterwards which leads to new unanswered questions and which require further research. This study builds the basis for further investigations on how ideas are evaluated and selected especially when comparing innovation contests to traditional innovation activities.

5.3 Future Research

For future research a more extensive study is recommended. The study should be conducted with more participants, if possible with participants from different departments, countries and also several companies from various industries. Also, the influence of the decision makers on the outcome of an idea should be further investigated, as example, the effect of hierarchy and by whom the idea is selected should be further explored. Moreover, a framework should be developed that is very adoptive to the various companies, their cultures and the industries. In order to so, much more knowledge about the innovation process and especially about the idea screening process is required. In fact, it should also be questioned if a formal idea screening process is needed since many companies are successful with evaluating and selection ideas informally.

To support the results, a quantitative study could be included to measure the importance of the evaluation criteria and the change over time. Additionally, which evaluation criteria is chosen in which stage could be observed by including participants from different departments but also from different countries, especially when a company operates globally and in culturally different settings. Also, the evaluation and selection of ideas by intuition should be further investigated since it seems to be an important part in idea screening.

Since usually only the performance of the selected idea is observed, it could be interesting to compare the outcome of all ideas that were generated in order to examine

if the best idea was selected. To do so, a study could be set up in $t=n$ where several ideas are already developed. The participants evaluate and select ideas as they were in $t=0$. It then would be of a great interest if the participants would choose those ideas who turned out to be successful. By doing so, statements on the performance of idea evaluation and selection could be derived.

To conclude, it will be interesting to read what further idea screening research reveals and if there will be a way to reduce risk and better predict the uncertain outcome of innovation.

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Appendix

Fragebogen [Questionnaire]

A Warm-Up (5 Min) [Warm-up (5 min)]

Erklärung: Befragung für Masterarbeit – Verstehen von Prozessen während des Innovationsworkshops – Daten werden vertraulich behandelt

[Clarification: Questionnaire for master thesis – Understanding the processes during the innovation workshop – Data is kept confidentially]

Dürfen wir das Interview aufzeichnen?

[Are we allowed to record the interview?]

Haben Sie Fragen bevor wir beginnen?

[Do you have any question before we begin?]

Wie hat Ihnen der Innovationsworkshop gefallen?

[How did you like the innovation workshop?]

Fragen zur Person:

[Personal questions:]

Position und Abteilung?

[Position and department?]

Dauer (Unternehmen/Position/Abteilung)

[Duration (company/position/division)]

Zusatzfragen Management vorab:

Ist der Workshop so abgelaufen, wie auf den Folien erläutert?

[Additional question to the management in advance:

- Did the workshop proceed how it was explained on the slides?]

B Innovationsworkshop: Individuelle Ideengenerierung & Gruppenarbeit (25 Min)

[Innovation Workshop: Individual Idea Generation & Group Work (25 min)]

1. Welche Schritte haben Sie unternommen, um individuell (also vor der Gruppenphase) Ideen zu generieren?

[What steps did you take to generate individually your ideas (before the group phase)?]

2. Haben Sie im Anschluss bei der Gruppenarbeit alle Ideen vorgestellt, die Sie vorab generiert haben?

[Did you present all your ideas that you generated previously?]

• Falls nein, warum haben Sie nicht alle Ihre Ideen vorgestellt?

[If no, why did not you present all your ideas?]

- Falls nein, nach welchen Kriterien haben Sie die Ideen selektioniert, die Sie den anderen Gruppenmitgliedern vorgestellt haben?
[If no, according to which criteria did you select your ideas that you presented to the other group members?]
- 3. Wie beurteilen Sie die Ideen der anderen Teammitglieder?
[How do you evaluate the ideas of the other group members?]
- 4. Wie stark haben sich die generierten Ideen der Teammitglieder unterschieden?
[To what extent did the generated ideas of the different team member differ from each other?]

(überhaupt nicht – etwas – sehr)
[(Not at all – a bit – a lot)]

In welcher Hinsicht haben sich die Ideen unterschieden?
[In what respect did the ideas differ from each other?]
- 5. Haben Sie Ideen geclustert und verlinkt?
[Did you cluster and link the ideas?]
- Falls ja, erklären Sie bitte anhand einer weiterentwickelten Idee, wie Sie hierbei vorgegangen sind.
[If yes, please explain according to an example of a developed idea how you proceeded?]
- 6. Wie sind Sie in der Gruppe vorgegangen bei der Selektion der Ideen? (bspw. Rating)
[How did you proceed in your group to select an idea? (e.g. rating)]
 - a. Wer hat entschieden? (alle, Leader etc.)
[Who did decide? (all/leaders etc.)]
 - b. Anhand welcher Kriterien wurde entschieden? (Neuheit, Funktionalität etc.)
[According to what criteria did you decide? (Novelty/functionality etc)]
 - c. Wann wurde entschieden? (kontinuierlich, nur am Schluss)
[When did you decide? (continuously/at the end)]
- 7. Wie beurteilen Sie Ihre Motivation während der Gruppenphase?
[How do you rate your motivation during the group phase?]

-1-	-2-	-3-	-4-	-5-
(sehr niedrig)				(sehr hoch)
<i>[(very low)]</i>				<i>[(very high)]</i>

Was motivierte Sie während der Gruppenphase Ihre Ideen einzubringen?
[What motivated you during this phase?]
- 8. Wie beurteilen Sie die Idee, welche Ihre Gruppe präsentiert hat?
[How do you evaluate the idea which was presented by your group?]
- 9. Wie beurteilen Sie die Idee, welche gewonnen hat?
[How do you evaluate the idea that won?]

Wäre die Gewinneridee auch ohne den Innovationsworkshop entstanden?
[Do you think that the winning idea would also have been brought without the innovation workshop?]

C Innovationsworkshop: Rekombination (10 Min) [Innovation Workshop: Recombination (10 min)]

10. Worüber haben Sie sich mit Teammitgliedern anderer Teams in der Kaffeepause ausgetauscht?

[About what did you talked with your colleagues during the coffee break?]

11. Wie beurteilen Sie die Ideen der anderen Gruppen?

[How do you evaluate the ideas of the other groups?]

12. Wie stark haben sich die Ideen der einzelnen Gruppen unterschieden?

[To what extent did the ideas of the different groups differ from each other?]

(überhaupt nicht – etwas – sehr)

[(Not at all – a bit – a lot)]

In welcher Hinsicht haben sich die Ideen unterschieden?

[In what respect did the ideas differ from each other?]

13. Konnten Sie Ideen anderer Teams nutzen, um Ihre eigenen Ideen weiterzuentwickeln?

[Could you use the ideas of the other groups to develop your idea?]

Falls ja, erklären Sie bitte anhand einer weiterentwickelten Idee, wie Sie hierbei vorgegangen sind.

[If yes, please explain according to an example of a developed idea how you proceeded?]

14. Wie wurde entschieden, welche Ideen der anderen Gruppen genutzt werden?

[How did you decide which ideas of the other groups you wanted to use?]

a. Wer hat entschieden? (alle, Leader etc.)

[Who did decide? (all/leaders etc.)]

b. Anhand welcher Kriterien wurde entschieden? (Neuheit, Funktionalität etc.)

[According to what criteria did you decide? (Novelty/functionality etc.)]

c. Wann wurde entschieden? (kontinuierlich, nur am Schluss)

[When did you decide? (continuously/at the end)]

15. Wie beurteilen Sie Ihre Motivation während der Rekombinationsphase?

[How do you rate your motivation during the recombination phase?]

-1-	-2-	-3-	-4-	-5-
(sehr niedrig)				(sehr hoch)
<i>[(very low)]</i>				<i>[(very high)]</i>

Was motivierte Sie während dieser Phase?

[What motivated you during this phase?]

16. Hatten Sie nach Abschluss der Rekombinationsphase alle Ihre Ideen eingebracht?

[Did you come up with all your ideas after the recombination phase?]

Falls nein, warum haben Sie nicht alle Ihre Ideen vorgestellt?

[If no, why did not you present all your ideas?]

Falls nein, was machen Sie jetzt mit den Ideen, die Sie nicht vorgestellt haben?

[If no, what are you going to do with your ideas that you did not present?]

D Regulärer Innovationsprozess (20 Min) [*Regular Innovation Process (20 mins)*]

17. Wie entstehen im regulären Innovationsprozess Ideen (ausserhalb des Innovationsworkshops)? (definierter Prozess/ Unterstützung durch Tools/ Meetings/ zusätzliche Zeit für Mitarbeiter/ Eigeninitiativen)
[How do ideas emerge in the regular innovation process (outside the innovation workshop)? (defined process/support through tools/meetings/additional time for employees/self-initiative)]
- a. Wer ist beteiligt? (R&D, Marketing)
[Who is involved? (R&D/Marketing etc.)]
- b. Wann werden Ideen eingebracht? (kontinuierlich, bestimmter Zeitpunkt)
[When are ideas brought in? (continuously/certain point of time)]
- (Falls noch nicht beantwortet) Sind Sie an diesem Prozess beteiligt? Falls ja, was sind Ihre Aufgaben?
[(if not answered already) Are you involved in those processes? If yes, what are your tasks or responsibilities?]
18. Haben die beteiligten Mitarbeiter Zugriff auf die Ideen der anderen Mitarbeiter?
[Do the involved employees have access to the ideas of the other employees?]
- Falls ja, wie interagieren diese? (Meetings/ Telefon/ Email/ IT-Tools)
[If yes, how do they interact?]
19. Werden im regulären Innovationsprozess Ideen miteinander kombiniert?
[Are the ideas combined with each other in the regular innovation process?]
- Falls ja, erklären Sie bitte anhand einer kürzlich weiterentwickelten Idee, wie hierbei vorgegangen wurde.
[If yes, please explain according to a recently developed idea how the proceedings are?]
20. Bringen Sie alle Ihre Ideen in den regulären Innovationsprozess ein?
[Do you integrate all your ideas to the regular innovation process?]
- Falls nein, warum stellen Sie nicht alle Ihre Ideen vor?
[If no, why do you not present all your ideas?]
21. Bitte denken Sie für einen Moment an Ideen, die vor kurzem im regulären Innovationsprozess entstanden sind.
[Please take a moment and think about the ideas that emerged recently in the regular innovation process.]
- Wie stark haben sich die Ideen unterschieden?
[To what extent did the ideas differ from each other?]
- (überhaupt nicht – etwas – sehr)
[(Not at all – a bit – a lot)]
- (Falls gleiche Antwort wie bei Innovationsworkshop) Wie ist die Bandbreite an Ideen im regulären Innovationsprozess im Vergleich zum Innovationsworkshop?
[If the answer is the same as above: How is the variety of the ideas in the regular innovation process compared to the ideas in the innovation workshop?]

(kleiner – gleich – größer)
[(smaller – the same – greater)]

In welcher Hinsicht haben sich diese unterschieden?
[In what respect did the ideas differ from each other?]

22. Wie werden die Ideen selektioniert und beurteilt? (Vorschriften, Neuheit, Funktionalität, Ranking, in Meetings etc.)

[How are the ideas evaluated and selected?
(Regulations/novelty/functionality/raking/in meetings etc)]

a. Wer beurteilt die Ideen? (Experte, Management)
[Who evaluates the ideas? (Expert/management)]

b. Anhand welcher Kriterien wurde entschieden? (Neuheit, Funktionalität etc.)
[According to which criteria do they decide? (novelty/functionality etc.)]

c. Wann werden die Ideen beurteilt? (mehrmals, am Schluss)
[When are the ideas evaluated? (several times/at the end)]

(nur falls „mehrmals“ und nicht schon oben beantwortet) Wer wählt die Ideen aus, welche dann umgesetzt werden?

[(only if “several times” and not answered yet) Who chooses the ideas that are implemented?]

(nur falls „mehrmals“ und nicht schon oben beantwortet) Anhand welcher Kriterien erfolgt die Entscheidung?

[(only if “several times and not answered yet) According to which criteria is the decision made?]

23. Wie viele Ideen werden in der Abteilung jährlich generiert? (Schätzung genügt)
[How many ideas are generated yearly? (estimation is enough)]

24. Wie viele neue Produkte entstehen schlussendlich daraus? (Schätzung genügt)
[How many new products emerge in the end out of the ideas? (estimation is enough)]

25. Wie beurteilen Sie Ihre Motivation während des regulären Innovationsprozesses?
[How do you rate your motivation in the regular innovation process?]

-1-
(sehr niedrig)
[(very low)]

-2-

-3-

-4-

-5-
(sehr hoch)
[(very high)]

- (Falls gleiche Antwort wie bei Innovationsworkshop) Wie ist Ihre Motivation im regulären Innovationsprozess im Vergleich zum Innovationsworkshop?
[(If the answer ist he same as in the innovation workshop) How is your motivation in the regular innovation contest compared to the innovation contest?]

(niedriger – gleich – höher)
[(smaller – the same – greater)]

Was motiviert Sie während des regulären Innovationsprozesses Ihre Ideen einzubringen?

[What motivates you to contribute your ideas to the regular innovation process?]

26. Wie beurteilen Sie folgenden Satz: „Die Mitarbeiter können im regulären Innovationsprozess selbstständig entscheiden, welche Ideen Sie weiterverfolgen.“
[How do you rate the following sentence: “The employees are able to decide autonomous which ideas they pursue?”]

-1- -2- -3- -4- -5-
(trifft nicht zu) (trifft zu)
[(very true)] [(not true at all)]

(Falls 3, 4 oder 5): Wann können bzw. konnten die Mitarbeiter selbstständiger entscheiden?

[(If 3, 4 or 5): When are or where the employees able to decide more independent?]

(im Innovationsworkshop – im regulären Innovationsprozess – weiß nicht)

(in the innovation workshop – in the regular process – I do not know)]

E Zusatzfragen Management (10 Min)
[Additional Questions to Management (10 min)]

27. Wie schätzen Sie das Verhältnis „radikale/inkrementelle Ideen“ als Output der drei besprochenen Phasen ein?

[How do you estimate the ration between “radical” and “incremental” ideas as an output of the three discussed phases?]

- a. Innovationsworkshop: Individuelle Ideengenerierung und Gruppenarbeit

(radikal: ____ % / inkrementell: ____%)

[Innovation workshop: individual idea generation and group work

(radical: ____ % / incremental: ____%)]

- b. Innovationsworkshop: Rekombination

(radikal: ____ % / inkrementell: ____%)

[Innovation workshop: recombination

(radical: ____ % / incremental: ____%)]

- c. Regulärer Innovationsprozess

(radikal: ____ % / inkrementell: ____%)

[regular innovation process

(radical: ____ % / incremental: ____%)]

28. Wem gehören die Ideen, die während den verschiedenen Phasen entstehen?

[Who owns the ideas that emerge during the three phases?]

(dem Unternehmen – dem Team – dem jeweiligen Mitarbeiter)

[(to the company – to the team – to the employee)]

29. Wie wurden Ideen nach der Rekombinations-Phase selektiert?

[How where the ideas after the recombination phase selected?]

Und anhand von welchen Kriterien?

[And according to which criteria?]

30. Werden Ideen aus dem Workshop weiterverfolgt? Falls ja, welche?

[Will the ideas from the workshop be pursued? If yes, which ones are they?]

Declaration of Authorship

I hereby declare

- that I have written this paper without any help from others and without the use of documents and aids other than those stated above,
- that I have mentioned all used sources and that I have cited them correctly according to established academic citation rules.

Widen, June 29, 2015

A handwritten signature in black ink, appearing to read 'A. Pommer', with a large, sweeping flourish above the name.

Alessandra Pommer