Designing Artefacts Based on Triggers to Support Innovation and Creativity

Karlijn von Morgen

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Course: ITE500
Examiner: Yvonne Eriksson
Supervisor: Jennie Schaeffer
School of Innovation, Design, and Engineering
Mälardalens University
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Abstract

This master’s thesis aims to identify triggers for innovation and creativity both from theory and from practise in the context of an automotive manufacturing company. The identified triggers are then re-interpreted and used to design prototypes which aim to visualise, support, and stimulate incremental innovation. Through a design process, the prototypes are co-designed together with a group of participants from the automotive manufacturing company to explore and understand how to create prototypes that are relevant to the context. The result indicates that the prototypes do not only visualise, support, and stimulate incremental innovation but that they can also function as a foundation for radically design and develop new approaches to work; such as incorporating design thinking and a more diverse, inclusive, and creative approach to idea generation. Ultimately, the prototypes can be incentives for changing the organisation in the way the employees work and approach tasks, but the employees must learn how to use the prototypes to utilize them in the most efficient way.

Keywords: Triggers; innovation; creativity; co-designing; automotive manufacturing; artefacts.
Abstrakt

Den här mastersuppsatsen har som mål att identifiera triggers av innovation och kreativitet, både hämtade ur teorin men också praktiken inom fordonstillverkningskontexten. Dessa triggers används sedan i designprocessen för att designa prototyper för ändamålet att visualisera, stötta och stimulera inkrementell innovation. Designprocessen involverar co-design tillsammans med en grupp från företaget för att utforska och bättre förstå hur vi kunnat skapa prototyper som är relevanta för kontexten. Resultatet indikerar att prototyperna inte endast visualiserar, stödjer och stimulerar inkrementell innovation utan också kan fungera som en grund att designa och utveckla nya, radikala tillvägagångssätt att arbeta på inom organisationen; exempelvis genom att införliva design thinking och i högre grad mångfaldiga, inkluderade och kreativa sätt att ta sig an ide generering. Prototyperna kan vara drivsporrar till att förändra organisationen i det sätt de anställda arbetar på och tar sig an uppgifter men de anställda måste lära sig att använda prototyperna för att kunna dra nytta av dem på bästa sätt.

Nyckelord: Triggers; innovation; kreativitet; co-designing; fordonstillverkningskontext; artefakter.
Acknowledgements

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1. Introduction

This master's thesis treats the challenge of not having a shared way to visualise, support, and stimulate innovation and creativity at the workplace. This challenge is approached by identifying triggers for innovation and creativity both theoretically and practically. The master's thesis retrieves its knowledge base both from theory and from and the practical, intuitive context. The context in which this study takes of is within an automotive manufacturing company in midmost Sweden.

A wave of compulsory change is sweeping over the traditional automotive manufacturing segment as the European Union has recognised our need to secure our fuel resources and fight global warming (European Commission, 2013). While the aims are worthy of consideration, many of the automotive manufacturers are consequently faced with a critical challenge, namely leaving fuel-based products and services behind to focus on electricity or other non-emitting, environmental-friendly solutions. The automotive manufacturers either radically change their business, which might include renovating facilities, establish new business collaborations, and change hundreds of employment tasks, or agree to be put down either by those manufacturers who are able to change, or new ones who are emerging on the market. However, this daunting challenge also presents opportunities, which is acknowledged by the European Union. As a result, Innovation Union is an initiative driven by the European Union claiming that Europe's future is directly connected to its power to innovate (European Commission, 2013). Thus, on a European level, the argument stating that to be able to change, stay sustainable, and be competitive on the market, the automotive manufacturers need to invest in- and develop innovation. This leads to the opportunity to not only change the automotive manufacturing industry concerning their products and services, but also their overall organisational culture and approaches.

The opportunity to change the overall organisational culture and approaches of the automotive manufacturing industry is interesting and engaging. However, there might not be resources to do so within the automotive manufacturing company. For example, the automotive manufacturer collaborating in this study lacked a common strategy to visualise, support and stimulate innovation and creativity internally among its employees. An employee at the company pointed out that this lack of strategy was not due to a lack of knowledge regarding innovation and creativity, but rather a lack of knowing how to utilise it in the workspace (Personal communication 1.A). There are many different alternatives as to where to put the innovative power that the Innovation Union mention. However, the Swedish National Innovation Strategy agree that a creative, involved work environment is a prerequisite for promoting managers and employees’ capacity to contribute to innovation (Swedish Ministry of Enterprise, Energy and Communications, 2012). One clearly stated goal mentioned in the Swedish National Innovation Strategy is to continue to develop knowledge and good practice in management and methods of work to promote innovative workspaces and work environment in which employees’ expertise, creativity, and capacity for multidisciplinary work are utilised (Swedish Ministry of Enterprise, Energy and Communications, 2012). Alas, here the automotive industry need to ask themselves how they can develop a workspace and work environment that supports innovation and creativity in such ways. According to the Cambridge Business English Dictionary the word workspace refers to the direct space of someone’s work, such as a work desk, an office, or the computer screen (July 2018). Meanwhile, the word workplace is used more generally about a building or a room where
people perform their job's (Cambridge Advanced Learner’s Dictionary and Thesaurus, July 2018). Onward, these definitions of workspace and workplace are used accordingly.
2. Background

The wave of compulsory change has also started to ripple the water at the automotive manufacturer collaborating with me in this masters’ thesis. This radical change effort poses a massive demand on innovativeness and creativity. However, the automotive manufacturing company has recognised that their workplace does not meet the expectations and needs of the management and employees in terms of innovation and creativity (Personal communication 1.A). The organisation struggles to visualise, support, and further stimulate innovation and creativity as there is no sustenance in the culture or workplace to do so (Personal communication 1.A). My interest is based in alternative ways to approach work to minimise the overload that many struggles with in today’s context, relating to stress and burnouts (Försäkringskassan, 2016:2). Using innovativeness and creativity alongside design thinking might be a way to circumvent the overload as it could open up the workplace and make the approach to discussing with colleagues, solving problems or finding solutions more efficient and stimulating. My personal goal is to find more effective ways to approach work while using innovation and creativity at first-hand.

There is always something sparking or triggering innovation and creativity (von Stamm, 2008; Ekvall, 1997; Gnyawali and Srivastava, 2013; Montalvo, 2006; Eriksson, Niritamo & Kulkki, 2005; Leminen, Westerlund & Nyström, 2012; Magadley & Birdi, 2009; Oksanen & Ståhle, 2013; etc). Through my literature study I’ve gathered a variety of concepts and aspects that trigger innovation and creativity to help me and my co-designers to understand what is needed to design prototypes for visualising, supporting, and stimulating innovation and creativity. Thus, within this master’s thesis triggers are understood to be incentives that spark innovation and creativity based on a variety of concepts and aspects; triggers can affect us both on an individual and on a group level. In this master’s thesis these triggers are used to explore and re-interpret concepts and aspects that promote innovation and creativity to be able to design artefacts that visualise, support, and stimulate innovation and creativity.

Even though the changes facing the automotive manufacturer segment are mostly radical in nature, this master’s thesis is focusing on the incremental innovation taking place within the collaborating automotive manufacturer. The aim of the master’s thesis is not to prepare the automotive manufacturer on the big wave of change directly, but rather to support the already existing innovation and creativity processes which are, indeed, mainly incremental (Personal communication 1.A). The hypothesis is that if the automotive manufacturing company can utilise their incremental innovation and creativity in the workplace, they will raise their awareness of their innovation and creativity processes. With a heightened awareness of the innovation and creativity process, the employees can start expanding to tolerate and increase radical innovation and creativity within the organisation and its culture. An organisation’s culture is its foundation in the sense that it will frame the manner and method in which the employees behave, respond to problems, and deal with such things as crises, colleagues, customers and sudden change (Gupta and Trusko pp. 38-39, 2014). Thus, hypothetically speaking, if the automotive manufacturer manages to integrate incremental innovation and creativity into the organisation through the artefacts, this might indirectly aid them during the radical changes when faced with them.
2.2 Area of Research and Aim

Literature on innovation and creativity management usually discusses the possibility to influence innovation and creativity processes either through organisational culture or spatial environment, such as office-spaces or breakrooms (Oksanen and Ståhle, 2013; Haner, 2005; Moultrie et. al., 2007; Magadley and Birdie, 2009; Schaeffer, 2014; von Stamm, 2008; Gupta and Trusko, 2014). However, the literature study presented in this master’s thesis reveals that there is a lack of describing, understanding, and developing the artefacts that are going to be present and effect the culture or spatial environment regarding the innovation and creativity processes. Already in 2007, Moultrie et. al. mentioned this gap by arguing that there is a need for greater clarity on the characteristics and components of spatial environments for innovation and creativity and how they support innovation. This master’s thesis aims to fill that gap by exploring ways to visualise, support, and stimulate innovation and creativity at the workspace by re-interpreting triggers of innovation and creativity into artefacts. Within this aim is to also explore and discuss whether artefacts like these can be used to incorporate aspects such as design thinking and idea generation in more diverse, inclusive and creative ways in the organisation to promote a more effective approach to work. This aim is based on that there is an impending work-overload in today’s context which can have a negative effect on our health and well-being as well as our work-performance (Försäkringskassan, 2016:2). I am interested in exploring whether a more innovative and creative approach to work together with methods from design thinking can be taught by the artefacts and learnt to the employees at the automotive manufacturing company to help them circumvent declining work-performance due to overload.

2.3 Practical Problem and Objective

The practical problem addressed during this master’s thesis is the lack of components or artefacts for visualising, supporting, and stimulating innovation and creativity in the context of the automotive manufacturer. It is possible to narrow the practical problem down one step further, as the innovation that the manufacturer needs to visualise, support, and stimulate at first-hand is incremental. Therefore, the practical objective of the study is to provide artefacts for visualising, supporting, and stimulating incremental innovation custom to the context of the collaborating automotive manufacturer.

2.4 Theoretical Problem and Objective

The theoretical problem addressed aims to give a deepened and broader understanding of how artefacts, e.g. tools and activities, can support the innovative and creative processes. The objective is to contribute to the perceived lack of description-, understanding-, and development of artefacts for supporting innovation and creativity in contrast to our understanding of how organisational culture and spatial environment can do the same.
2.5 Research Question

The aim of the research as well as both the practical and theoretical objectives has been interpreted into a main research question and two sub-questions. These questions are presented below.

How can triggers of innovation and creativity be re-interpreted into artefacts that aim to visualise, support, and stimulate innovation?

- What are the triggers of innovation and creativity found in literature and the context of the automotive manufacturing company?
- How can the triggers of innovation and creativity be re-interpreted and transferred to artefacts?

2.6 Scope and Delimitations

It is within the scope of this master's thesis to identify and re-interpret triggers of innovation and creativity into artefacts. The artefacts will, at this stage, only function as channels through which the triggers are made available to the user. Therefore, the main objective is to identify, understand, and re-interpret triggers of innovation and creativity and not to take or discuss critical design choices regarding the artefacts, such as the manner and style. Moreover, this master's thesis is focused on an automotive manufacturer context and how to support innovation and creativity in their specific context. Furthermore, the master's thesis is limited to how the participants understand innovation and creativity in their daily work. The result of the master's thesis is focusing on triggers and artefacts for supporting innovation and creativity and not the physical or intangible space as these are not the main focus of this master's thesis. Moreover, the master's thesis also focuses on design thinking and design research and will not revolve around service innovation or service logic even though the fields might correlate and each result in valuable insights from different perspectives. In short, service innovation is about understanding how our resources in the form of products, activities and interactions lead to customer value during use in a certain context (Gustafsson, 2016 pp. 33). Service innovation acknowledges that value creating can be facilitated as early as in the development process by co-creating and collaborating with users as well as during use (Gustafsson, 2016 pp. 33). During use it is the user experience that determines the value creation (Gustafsson, 2016 pp. 33). In general, service innovation introduces something new into the way of life and organisation as well as timing and placement of what can be described as the individual and collective processes that relate to consumers (Carlborg, Kindström & Kowalkowski, 2014).

There are clear examples of design being integrated into service innovation and service logic. An example of when design has been used to establish meaningful service innovation are the so called “toolkit for user innovation” (von Hippel & Katz, 2002). These toolkits are design tools with the purpose to enable users to develop new product innovations for themselves as a value-creating service process (von Hippel & Katz, 2002). The toolkits provide the users freedom to innovate, allowing them to develop producible custom products via iterative trial and error (von Hippel & Katz, 2002). In short, the toolkits approach to product and service development involves transferring need-related product development tasks from
manufacturers to users and equipping the users with tools to carry out those tasks (von Hippel & Katz, 2002). Thus, there is a strong correlation between service innovation, service logic and design research. However, this master’s thesis will not revolve around service innovation or service logic as it solely focuses on design thinking and design research. This limitation provides me with a certain understanding of terms and approaches taken from design thinking and design research which could have been understood differently from a service innovation perspective. It also helps me to understand my role as a designer during the work with this master’s thesis.

2.7 Previous Research

There has been rather extensive research on space for innovation from a variety of perspectives and contexts (e.g. Magadley & Birdie, 2009; Haner, 2005; Moultrie et. al., 2007), as well as what incentives there are when creating space for innovation within organisations. One example is Oksanen and Ståhle (2013) who analyse the effect of physical space on innovation and find attributes of innovative space. Their research objectives are to see how a physical space intersects with innovation and innovativeness, and to find out what the most relevant elements of physical space for innovation are (Oksanen & Ståhle, 2013). Within the study is the general perception of that there is a relationship between space, innovation, and creativity (Oksanen & Ståhle, 2013). It is argued that, without the support of environment, innovation and innovativeness might never be displayed (Oksanen & Ståhle, 2013). However, when discussing and describing space for innovation and the attributes of innovative space, artefacts such as tools and activities that enable interaction in such an environment, are hardly mentioned. There seems to exist a gap where concrete discussions and descriptions of tangible, interactable artefacts for visualising, supporting and stimulating innovation and creativity are limited.

Another example is Schaeffer’s (2014) dissertation in which the objectives were to describe and analyse which workspaces users’ experience and perceive as important for innovation in the manufacturing context, to see the relation between workspace and innovation, and lastly to understand whether and how the workspace can be involved in the way the individual or group handle the coexistence of different innovation cultures. There are important similarities between Schaeffer’s (2014) study and this one, such as the context and the use of-, and realised opportunity with motifs for supporting innovation. However, the objectives within this study is instead to identify triggers of innovation and creativity and to re-interpret these triggers into artefacts to see how they are experienced and described as supportive of innovation and creativity. In summary, one can argue that Schaeffer (2014), and Oksanen and Ståhle (2013) contribute with knowledge about space for supporting innovation while this study aims to contribute with knowledge about co-designed artefacts for supporting innovation and creativity.

Apart from spatial environments, the understanding of the impact of culture on innovation and creativity is also providing triggers. Gupta and Trusko (2014 pp. 46-47) mention some required triggers of innovation and creativity within organisational culture. These are curiosity, courage, risk, positive contagion, creating and nurturing collaborative teams, rewards and recognition, and self-managing culture (Gupta and Trusko, 2014 pp. 46-47). Naturally, triggers of innovation and creativity when talking about spatial environments can be the same as when speaking about organisational cultures and vice versa. In the
same way, these triggers can also be relevant when speaking about artefacts, however there is still a lack of understanding how to re-interpret these shared triggers into the physical form of artefacts.

A more unusual perspective and direction of research is the one presented by Man (2001). In Man’s (2001) paper, innovation triggers in relation to mindsets is described and discussed. The paper revolves around innovative thinking and innovation triggers of the mind instead of triggers that can be more easily made tangible and utilised at the workspace by everyone. The paper is about positioning the brain and describes the innovation triggers of the mind in the context of technological growth (Man 2001). Even though one can argue that any trigger of innovation and creativity includes the mindset, Man’s (2001) study focuses more on the dissimilarities of the left- and right brain and rather logical and abstract thought process involving measurements, acceptance levels, “win-win” positions, etc. Thus, while innovation triggers are described and discussed in Man’s (2001) paper, it differs from the objectives within this study. For example, it is not mentioned in Man’s (2001) study how to, in a concrete manner, use the innovation triggers to establish a workspace more efficient in utilising them.
3. Theoretical Framework

There is a variety of aspects that are interpreted as necessary within an organisation to trigger or support innovation. One such aspect is the ability to be creative. The essence in creative action is the combining of principles and elements of knowledge and insights that have not been connected before (Ekvall, 1997). However, innovation and creativity are terms that do not let themselves be easily framed. There is a vast variety of understandings and traditions claiming their own interpretation of innovation and creativity. In the context of this master’s thesis creativity is perceived as an essential building block for innovation (Von Stamm, 2008 pp. 1). This perception is reflected in the generally accepted definition of innovation equalling creativity and successful implementation (Von Stamm 2008, pp. 1). Von Stamm so accurately wrote that creativity alone, to come up with ideas, is not enough; to reap the benefits one needs to do something with it (2008, pp. 1). To come up with an idea can be an individual act, thus creativity can be an individual ability. However, the development of that idea and its implementation is a team effort (Von Stamm, 2008 pp. 2). In conclusion then, creativity is an individual ability while innovation most likely is a team effort. Furthermore, creativity is understood as an ability supported by an existing body of knowledge. To be creative and relate a concept to a body of knowledge there must be a refined knowledge base already in place (Von Stamm, 2008 pp. 2). Anyone can achieve creativity by establishing a body of knowledge. Furthermore, creativity can be stimulated and supported through training, and by creating the right work environment and culture (Von Stamm, 2008 pp. 2). The triggers of innovation and creativity pose a natural impact on the organisational culture. Knowing that there are triggers of innovation and creativity that affect the organisational culture proposes that designing an artefact using the triggers might result in developing new approaches to work.

3.1 Literature Study

Triggers of innovation and creativity seems to be a well-known phenomenon. The literature study has revealed several triggers of innovation and creativity discussed from a variety of perspectives and from a diverse set of fields and journals. Even some paradoxes or contraries where found and will be noted in the following subsections. In table 1 found below the triggers are presented along with the source(s). The triggers are all further described in the subsections following table 1.

<table>
<thead>
<tr>
<th>Triggers of Innovation and Creativity</th>
<th>Source</th>
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<tbody>
<tr>
<td>Awareness</td>
<td>Gnyawali &amp; Srivastava (2013); Herrera (2015);</td>
</tr>
<tr>
<td>Motivation</td>
<td>Gnyawali &amp; Srivastava (2013); Scott &amp; Bruce (1994); Montalvo (2006); Bowonder et. al., (2010);</td>
</tr>
</tbody>
</table>
Diversity  | Gnyawali & Srivastava (2013); Bellefontaine & Policy Horizons Canada (2012); Leminen, Westerlund & Nyström (2012); Scott & Bruce (1994); Haner (2005); Penn & Vaughan (1999); Eriksson, Niitamo & Kulkki (2005);
Environment | Bellefontaine & Policy Horizons Canada (2012); Magadley & Birdi (2009); Scott & Bruce (1994); Moultrie et al. (2007); Oksanen & Ståhle (2013);
Empowerment | Bellefontaine & Policy Horizons Canada (2012); Martin (2011); Scott & Bruce (1994); Leewis & Aarts (2011); Penn & Vaughan (1999);
Users | Bellefontaine & Policy Horizons Canada (2012); Almirall, Lee & Wareham (2012); Leminen, Westerlund & Nyström (2012); Leeuwis & Aarts (2011); Eriksson, Niitamo & Kulkki (2005); Herrera (2015); Ogawa & Pongtanalert (2011);
Iteration | Bellefontaine & Policy Horizons Canada (2012); Haner (2005); Eriksson, Niitamo & Kulkki (2005);
Facilitators (people) | Martin (2011); Magadley & Birdi (2009); Haner (2005); Leeuwis & Aarts (2011); Herrera (2015);
Facilitators (technology and material) | Magadley & Birdi (2009); Scott & Bruce (1994); Haner (2005); Moultrie et al. (2007); Penn & Vaughan (1999);
Reward and Recognition | Scott & Bruce (1994);
Divergence and Convergence | Haner (2005);

3.1.1 Awareness

Gnyawali and Srivastava (2013) summarize their definition of awareness as a firm’s noticing of new technology developments and emerging market trends, often caused by the initiatives undertaken by competitors or other related firms. Awareness operates as a trigger of innovation and innovativeness through making the firm more aggressive in initiating and launching promising innovation project while at the same time speed up existing projects or shelve projects that may not be appropriate given the competitive and market conditions (Gnyawali and Srivastava, 2013). Lastly, Gnyawali and Srivastava (2013) also argue that awareness aids the firm in taking more informed resource commitments. Being aware of a new idea or opportunity should spur innovation efforts and help the firm in using its resources and capabilities for generating innovation more effectively and even develop or accessing new capabilities for that purpose (Gnyawali and Srivastava, 2013). Herrera (2015) seems to refer to awareness as “active sensing” and concludes that it can be an operational mechanism in both market and non-market aspects of business. According to Herrera (2015), the active sensemaking of the business context and wide-ranging stakeholder engagement mechanisms increases the likelihood that firms manage to anticipate and respond to market opportunities early and successfully.
3.1.2 Motivation

Motivation is referred to the firm’s willingness to engage in exploration and to both gather and commit resources for innovation (Gnyawali and Srivastava, 2013). Motivation is claimed to influence a firm’s search intensity, thus the amount of efforts a firm devotes to search for knowledge, new ideas, and new resources (Gnyawali and Srivastava, 2013). There are a few mentioned sources of motivation, namely pressure from competitors to be innovative, expected payoffs from innovation, and the availability of resources to be innovative (Gnyawali and Srivastava, 2013; Bowonder et al., 2010). According to Gnyawali and Srivastava (2013) strong motivation can lead to rigorous efforts to identify innovation opportunities, devote necessary resources for innovation projects, and a more deeply engaged and systematic approach to innovation tasks which consequently increases the likelihood of successful innovations (Gnyawali and Srivastava, 2013). Another perspective of motivation is “willingness”. Willingness refers to the organisational will to experiment with innovative ideas (Scott & Bruce, 1994). Montalvo (2006) writes about innovative behaviour and regards “willingness” as the first predictor of the firm’s innovative behaviour. The firm must be willing to innovate, and change and they need to plan or intend to engage in innovation (Montalvo, 2006).

3.1.3 Diversity

For innovation to take place, the creative process of humans involved is crucial (Eriksson, Niitamo & Kulkki, 2005). It is believed that the ability to collaborate between people of different backgrounds, with different perspectives, and possessing different knowledge has a considerable influence on the creativity process within a group (Eriksson, Niitamo & Kulkki, 2005). Moreover, diversity in both external and internal resources could be a trigger of innovation and creativity. Gnyawali and Srivastava (2013) state that diversity in a firm’s alliance network resources can enhance their ability to generate innovations. Furthermore, diverse perspectives and skill-sets is claimed to enable a holistic understanding of a system to address its complexity which according to Bellefontaine & Policy Horizons Canada (2012) is beneficial when working toward innovation in the context of innovation labs. Diversity among actors, resources, and activities is said to support innovation at all phases of the lifecycle (Leminen, Westerlund & Nyström, 2012). Scott and Bruce (1994) have also found that innovative organisations are characterised by a tolerance for diversity among its members. Haner (2005) as well as Penn & Vaughan (1999) claim that today, learning in organisations entails the acquisition of diverse information. From this claim, Haner (2005) continues to argue that despite the documentations of individuals contributing to innovation success, innovation will not likely achieve its greater destination if undertaken by a single individual.
3.1.4 Environment

Creative and stimulating environments that encourage out of the box thinking and innovative solutions is also claimed to be a trigger of innovation in the context of innovation labs (Bellefontaine & Policy Horizons Canada, 2012; Magadle & Birdi, 2009; Oksanen & Ståhle, 2013). Another perspective on the physical environment is to give people time to get away from their usual workspace in the early stages of the innovation process (Magadle & Birdi, 2009). This can result in generating creative ideas for new products and services in a pleasant and pressure-free spatial environment (Magadle & Birdi 2009). According to Scott and Bruce (1994) psychological climate theory suggests that individuals respond primarily to cognitive representations of environments rather than to the environment itself. This is caused by that environments represents signals individuals receive concerning organisational expectations for behaviour and the potential outcomes of that behaviour (Scott and Bruce, 1994). These signals cause the individuals to formulate expectancies and instrumentalities and respond to these expectations by altering their own behaviour to realise positive self-evaluative consequences (Scott and Bruce, 1994). Moultrie et. al. (2007) also question the general understanding of how the spatial environment supports innovation and creativity. In their report, they argue that if the spatial design of innovation environments can provide a strategic resource, the strategic intent must be made explicit (Moultrie et. al. 2007).

3.1.5 Empowerment

According to Penn & Vaughan (1999) innovations tend to come from grassroots and therefore staff are being trained in "self-organisation". Providing work-situations where there is a reduced hierarchy and heightened empowerment on an individual level is argued to stimulate and support disruptive thinking which in turn stimulates and supports innovation (Bellefontaine & Policy Horizons Canada, 2012). In a paper by Martin (2011) there is an example of a cofounder realising that innovation could be generated if the employees were empowered to develop their own ideas. Based on this, a team of “innovation catalysts” were created to aid managers on work with design initiatives (Martin, 2011). Scott & Bruce (1994) add to this perception by claiming that innovative organisations are characterised by an orientation toward support for their members in functioning independently in the pursuit of new ideas. When looking at supervisor-subordinate relationships, Scott and Bruce (1994) could also draw the conclusion that high-quality dyadic relationships may give subordinates the level of autonomy and discretion necessary for innovation to emerge. Leewis and Aarts (2011) further argue that interdependencies and regularised interaction patterns tends to constrain meaningful innovation, agreeing with the previous statements from the previously referenced authors.

3.1.6 Users

In the context of innovation labs, the initiative to involve users is observed to capture either market knowledge about preferences, sustainability of the implementation, or more specialized domain-based
knowledge (Almirall, Lee & Wareham, 2012; Eriksson, Niitamo & Kulkki 2005). Thus, involving users to create user-centred solutions through co-creation is a tool and benefit used in innovation labs to trigger innovation (Bellefontaine & Policy Horizons Canada, 2012; Leminen, Westerlund & Nyström, 2012). According to Leewis and Aarts (2011) numerous studies show that successful innovations are usually based on an integration of ideas and insights from not only scientists, but also of users. To achieve mass-deployment and remain competitive one of the main keys is the ability to innovate and create the applications of value for the users (Eriksson, Niitamo & Kulkki, 2005). One example of how to approach the user is to involve them through open source innovation (Eriksson, Niitamo & Kulkki, 2005). Open source innovation lets the user contribute to the evolving sum of products in a growing network (Eriksson, Niitamo & Kulkki, 2005). Herrera (2015) writes about corporate social innovation (CSI) and argues that co-creation with costumers supports value laden innovation. Theoretical research on user innovation has in fact demonstrated that there is a tendency for social welfare to increase where innovation is triggered by both users and manufacturers (Ogawa & Pongtanaler, 2011). However, user innovation is not just a supplement to the traditional manufacturer innovation but a source of new ideas that increase the probability of success (Ogawa & Pongtanalert, 2011).

3.1.7 Iteration

According to Bellefontaine & Policy Horizons Canada (2012) putting thinking into action through an iterative process of testing solutions is a common benefit of innovation labs. Furthermore, Haner (2005) summarizes the iterative aspect of creativity and innovation by describing the iterative and consequential characteristics of creativity processes. According to Haner (2005) both creativity and innovation processes need to be understood as complex, partly iterative and partly simultaneous efforts. It's simply so that the process of conveying needs to the developers is a complex, often trial and error like, process where the developers respond with prototypes to solve the needs until the user or customer is satisfied (Eriksson, Niitamo & Kulkki 2005).

3.1.8 Facilitators (people)

In a study conducted by Magadley and Birdi (2009) they found that despite the significance of the technology, most informants in their study agreed on that innovative and creative success would not have been possible without the facilitators. The facilitators, in this case, being people responsible for facilitating group discussions, manage the mood and motivation of all group members, as well as to steer the discussions in the right direction (Magadley & Birdi, 2009). In a paper by Martin (2011) it has been described how a firm gave birth to so called “innovation catalysts” from within its own pool of employees. The innovation catalysts were available to help work-groups to create prototypes, run experiments, and learn from customers (Martin, 2011). Furthermore, Haner (2005) describes social facilitators as related to effects regarding mutual competitiveness, mutual reinforcement, mutual support, and knowledge sharing. Leewis and Aarts (2011) state that apart from scientists, the ideas and insights of intermediaries and other
social agents are key for successful innovations. Penn & Vaughan (1999) mention that managers are being replaced by “facilitators” to support grassroot innovation instead of enforcing organisational aims through a management hierarchy and formal mechanisms. Another perspective on facilitators as people comes from Herrera (2015) writing about stakeholder-engagement in corporate social innovation. Herrera (2015) claims that active-stakeholder engagement leads to co-creation opportunities and social-capital building. Thus, the role of the facilitator can take a variety of forms and have different objectives.

3.1.9 Facilitators (technology and material)

According to Magadley and Birdi (2009) and Haner (2005) a range of low-and high-tech supporting tools and material aim to aid articulation of creative ideas and facilitate group work in environments such as innovation labs. Examples of tools and materials that were noticed in Magadley and Birdis (2009) and Haner (2005) studies were whiteboards, electronic brainstorming systems, small cinematic theatres, pictures, laptops with internet connection, multimedia projection tools, information sources, and various visualisation technologies (including 3D). Many of these supporting tools are for visualisation, which is a core component of innovation, design and creative processes (Moultrie et. al. 2007). Other tools are for supporting collaboration and group work, which is believed to support innovation and creativity (Oksanen & Ståhle, 2013). Penn & Vaughan (1999) argue that the use of new communication technologies allows rapid response to a changing business environment. According to Scott and Bruce (1994) the supply of resources that are critical to innovation is a manifestation of the organisational support for innovation. However, in the findings of their study, Scott and Bruce (1994) found the coefficient between resource supply and innovative behaviour negative. They identified that the zero-order correlation between the two was nonsignificant, it appeared that a suppression effect was operating and that there was no relationship between resource supply and innovative behaviour (Scott & Bruce, 1994).

3.1.10 Reward and Recognition

In a paper by Scott and Bruce (1994) it’s been claimed that the climate of innovative R&D units is characterised by rewards given in recognition of excellent performance and by organisational willingness to experiment with innovative ideas.

3.1.11 Divergence and Convergence

Haner (2005) stresses the importance of understanding how divergence and convergence are part of phases in both creativity and innovation processes. While convergence refers to phases such as preparation, elaboration, and evaluation due to its connection to integrative and exploitative behaviour, divergence refers more to incubation and insight phases due to its connection to explorative and expansive behaviour (Haner, 2005). Because of the roles divergence and convergence have in creativity and innovation processes
Haner (2005) argues that successful realisation of said processes depends on some “not-well-formalised” mixture of mastering divergence and convergence. Haner (2005) further mentions that divergence and convergence are instigators of activities triggering and supporting innovation and creativity, such as brainstorming (divergence) and analysing (convergence).
4. Methods

To support the master’s thesis, methods with a focus toward design research and ethnography have been selected and used. The methods involving the employees from the automotive manufacturing company aim to be interactive and capture the intuitive strategies hidden by the day-to-day work routines.

4.1 Qualitative Design Research and Design Thinking

Qualitative design research, research through design and “designerly ways of knowing”. These are examples of ways to describe research that departs from the typical scientific way of doing research to instead focus on design as a way of doing research. Previous studies suggest that one of the main differences between scientific research and design research is that scientists problem-solve by analysis, whereas designers problem-solve by synthesis (Cross, 2007 pp. 22-23). What this means in practise is that designing is a process of pattern synthesis, rather than pattern recognition (Cross, 2007 pp. 24). Design problems are widely recognised as ill-defined or “wicked”, they are not problems for which all the necessary information is, or ever can be, available to the problem-solver (Cross, 2007 pp. 23). Therefore, they are not susceptible to exhaustive analysis and there can never be a guarantee that the “correct” solution can be found (Cross, 2007 pp. 24). The solution is not simply swimming around in the data, it must be actively constructed by the designer’s own efforts (Cross, 2007 pp. 24).

Learning about users by listening to them, watching them, or taking part of their lives by experiencing a day in it is, in all its complexity and breadth, summarised in the term “qualitative design research” (Laurel 2003). This can also be referred to as Human Centred Design (HCD). The main idea is to put the human needs, capabilities, and behaviours first, then design to accommodate those needs, capabilities, and ways of behaving (Norman, 2013 pp. 8-9). In brief, HCD is a design philosophy starting with a good understanding of people and the needs that the design is intended to meet (Norman, 2013 pp. 9). This understanding is achieved primarily through observation as people are seldom aware of their own needs and even the difficulties they are encountering (Norman, 2013 pp. 9). HCD is an iterative process which starts off by the design researcher making observations on the intended target group, generates ideas, produces prototypes and test them, repeating the process until satisfied with the outcome (Norman, 2013 pp. 222). Conclusively, the core of HCD is to observe the target group in their natural environment, in their normal lives, where the design solution will be used (Norman, 2013 pp. 222). It is essential to understand the real situations that the target group encounter, not some isolated incident or laboratory-specific environment affecting the context (Norman, 2013 pp. 222).

Ethnography, which is a method adapted from the field of anthropology, plays a heavy role in design research and this master’s thesis. The term “ethnography” started to get familiar in the design discussions in the late 1980’s (Laurel, 2003 pp. 26). In the context of design research, ethnography has been defined as a research approach that produces a detailed, in-depth observation of people’s behaviour, believes and preferences, by observing and interacting with them in their natural environment (Laurel, 2003 pp. 26). Thus, ethnography has been the means to achieve a human centred design perspective in this master’s
thesis, a method within the qualitative design research. An important aspect to note regarding ethnographical research is that it breaks many of the traditions used as guidelines in classical market research (Gustafsson et. al., 2016 pp. 118). One example of this is that ethnography does not rely on a random selection of different subjects, but instead aims to identify users capable of making extraordinary contributions (Gustafsson et. al., 2016 pp. 118). This is easily joint with the philosophy of HCD as it is important that the people being observed match those of the intended audience when applying HCD (Norman, 2013 pp. 223). Ethnography heavily relies on close collaboration between the target group and their personal experiences that leads to insight and understanding of the situations that either facilitate or obstruct value-creating processes (Gustafsson et. al., 2016 pp. 118). Understanding how people live makes it possible to discover otherwise elusive needs that can provide organisations with strategies (Gustafsson et. al., 2016 pp. 118).

My role during the organising, performing and writing of this master’s thesis is both as a researching student, designer, and facilitator. As a facilitator, my role is to bring in the participating employees into the design process in the ways most conductive to their own ability to participate (Sander and Stappers, 2008). This I mostly achieved by listening to-, and actively directing the participants through open-ended, exploratory questions to let them explore the design process. As a designer, I dealt with the wicked problems by applying visual thinking, conducting creative processes, finding missing information, and making necessary decisions in the absence of complete information (Sander and Stappers, 2008). As a researching student my responsibility was to meet the criteria set by academia and be transparent during the process of the master’s thesis.

During this master’s thesis, I’ve attempted to establish co-design. Co-design indicates collective creativity as it is applied across the whole span of a design process (Sander and Stappers, 2008). In this context, co-design refers to the collective creativity of designers and people not trained in design working together in the design development process (Sander and Stappers, 2008). During this process, most emphasis has been put toward the so called “fuzzy front end” or formally called “pre-design” (Sander and Stappers, 2008). The fuzzy front end is illustrated in figure 1 and describes the many activities that take place to inform and inspire the exploration of open-ended questions regarding the design process and its potential solution (Sander and Stappers, 2008). In the fuzzy front end, the solution is not yet clear. It is often not known that the deliverable of the design process will be (Sander and Stappers, 2008). Considerations of various natures come together in this critical phase, e.g. understanding of users and context of use, exploration and selection of technological opportunities, etc. (Sander and Stappers, 2008). The goal of the exploration in the fuzzy front end is to determine what is to be designed (Sander and Stappers, 2008).
Figure 1 illustrates the fuzzy front end and the design process as perceived and used during this master’s thesis. The visualisation of the fuzzy front end is inspired by Sander and Stappers (2008) and further processed by me to fit my purposes. The design process shown via the illustration is inspired by Ambrose and Harris (2010) but again, processed by me to better suit my own design process used during this master’s thesis.

When talking about design thinking it often involves the design process and methods for designing. The design process can be compromised to seven stages: define, research, ideate, prototype, select, implement and learn (Ambrose and Harris, 2010 pp. 10-11). Each of these stages require design thinking (Ambrose and Harris, 2010 pp. 10-11). The first stage, define, is about establishing what the real problem is; the second stage, research, is collecting background information; the third stage, ideate, is creating potential solutions; the fourth stage, prototype, is resolving solutions; the fifth stage, select, is about making choices – it’s the point at which one of the proposed prototypes is chosen for development; the sixth stage, implement, is normally delivering the solution and the seventh stage, learn, is obtaining feedback from what has happened throughout the design process and when the solution is put into context (Ambrose and Harris, 2010). The most important of it all is that the process is iterative and expansive, resisting the temptation to immediately rush to a solution for the stated problem (Norman, 2013 pp. 218-2019). Determining the real problem instead of searching for a solution and considering a wide arrange of potential solutions instead of stopping at one is the process known as design thinking (Norman, 2013 pp. 218-219).

4.2 The Design Process

Having a few years of experience of design processes, I know that they can vary depending on the design problem and the solutions at play; the important part of the process is that it involves uses through methods and perspectives from e.g. human centred design and co-design as well as methods from design thinking such as sketching and brainstorming. During this master’s thesis the design process started off with defining the problem. This may have started with interviewing the managers to get an idea of their perceived problem but defining the real problem was a process that took as long as to the brainstorming session (in stage three of the design process) to define. The initial problem was defined as “we do not have a collective
way of visualising, supporting and stimulating innovation”, however this was merely a symptom of the real problem.

During research I made the literature study to understand the body of knowledge around triggers of innovation and creativity as described in theory. The photo ethnographical study and the 1-on-1 interviews taught me about the context of the problem and what the participants experienced as triggers of innovation and creativity. This lead to my body of knowledge around triggers of innovation and creativity as found in the practical context. All this knowledge gained during research was fed into the creative process at the ideate stage (Ambrose and Harris, 2010 pp. 18-19). During the 1-on-1 interview there was a shift in the problem definition as the participants expressed that their options were limited when it comes to innovativeness and creativity. However, they agreed to the initial problem definition.

During ideate I drew on the research gathered in the previous step and sketched down ideas that the participants had already started to formulate but not made into something concrete. These ideas had been expressed in various degrees of clarity during the photo ethnographic study and the 1-on-1 interviews. This resulted in the four sketches of potential prototypes, Kokongen, Stormen, Flex-mattan and Inspohyllan. I brought these sketches with me to the brainstorming session to try to make it clear whether there were any misunderstandings or shortcomings in the definition stage as I had picked up a perception of the problem from the participants that varied from the initial one (Ambrose and Harris, 2010 pp. 20-21). During the brainstorming session it was made clear from the discussions stemming from the sketches and that the participants were really hoping for or looking for something to change their approach to work. The problem was starting to look more like needing to change the work approach in a way that supports the employees in their innovativeness and creativity.

Based on the new problem definition, which was ”finding a new way to approach work that supports the employees in their innovativeness and creativity", I started to sketch on prototypes to resolve the solution. The prototypes were Kreativen, Refläkten and Loggen placed in the context of the automotive manufacturing company to allow the employees to visualise and handle the design concept, to get an idea of its physical presence and tactile qualities (Ambrose and Harris, 2010 pp. 22-23). This carried over to the next step in the design process as having the prototypes installed in the context was the essence of the field experiment. I also collected feedback in the meantime. The prototypes were functioning from a technical viewpoint; they did not pose any problem in the area they were placed, and they were positively visited by employees. However, one could draw the conclusion that the employees did not know how to utilise the prototypes in the most effective way. This conclusion could be based on the feedback which stated that they needed to learn how to use the prototypes first, and on the fact that Loggen was hardly used. The conclusion also confirmed the defined problem, namely that the employees do not have an approach to work that supports their innovativeness and creativity. Working with innovation and creativity demands that you know how to use tools and methods such as brainstorming, the Venn diagram, the descriptive value web, insight sorting, POEMS, etc (Kumar, 2013). The prototypes demanded that the employees knew how to take a break to reflect on their work tasks, that they knew how to communicate ideas on a whiteboard and knew how to gather diverse people into a group for idea generation.

Here, the design process involved in this master’s thesis ended. The last two steps to be made to complete the process are for the automotive manufacturing company to take. In short, they need to select whether
the prototypes will be realised and if so, in what way. During implementation, I would highly recommend arranging so that the employees get tools for using the realised prototypes, such as courses in how to work with design thinking and creativity.

For anyone familiar with Ambrose and Harris (2010), who inspired this design process, the design process illustrated in figure 2 will look amiss. For the purposes of this master's thesis I've chosen to put “learn” before “select” and “implement” when according to Ambrose and Harris (2010) “learn” should be last in order. I've done this change since, according to my experience, you must collect and process feedback and learn about how the users experienced your design(s) before you either select any or implement them. This provides a segment in your design process that has you criticise your own design(s) and, most likely, iterate to make changes that improves the outcome. Even though the design process might look linear in this kind of illustration, the real design process has been iterative during the whole development. However, putting “learn” as a steady segment in front of “select” and “implement” encourages you to once more look at user feedback and learn from it instead of rushing to the finish line.

4.3 Literature Study

The literature study is part of knowing the context when talking about qualitative design research. Overall, the goal is to gain as many insights as possible about the context, get prepared to confidently explore opportunities, and begin to see directions for the future (Kumar, 2013 pp. 51). The literature study is likely to result in information found that can be used as evidence of aspects relevant to the research, which are the known triggers of innovation and creativity and their influence on people (Denscombe 2014 pp. 319).
However, it is not solemnly about gathering evidence. The literature study should also include interpretation of the evidence and a search for hidden meanings and structures (Denscombe 2014 pp. 319). Performing a literature study should thus result in knowledge and understanding of what kind of triggers of innovation and creativity there are and how they affect people. It is also a means of gaining new perspectives and a broader foundation for discussions, conclusions, and comparison to the context of the on-going research. Supporting the on-going research with a literature study could also be considered an act of building a credible foundation for the following phases of the study (Kumar 2013 pp. 65).

Based on that the topics relevant for this master’s thesis are varied, ranging from fields such as humanities, organisational management, and innovation and creativity within a manufacturer context, the search engine used was Google Scholar. Google Scholar has a wide range of fields within its limit and was thus deemed as relevant to use for this master’s thesis. Google Scholars inclusive search engine had a chance to show search results combining different fields in a relevant way. The strategy behind the literature study was to search for relevant keywords and filter the results by relevancy. Per search, the top twenty hits showing were considered based on the relevancy of the abstract and whether it was accessible. This was done to limit the literature study and enable a higher number of searches with unique keywords instead of narrowing the number of searches to instead read more papers from each hit. Figure 2 presented below illustrates how the search process functioned.

![Figure 2: A visualisation of the search process. This figure illustrates the search process involved in the literature study.](image)

As is illustrated in figure 2 a new keyword(s) was identified, sometimes based on key-findings from the previous search or by realising any missing knowledge. A search using the keyword(s) to create a search string was then initiated and the abstracts of the top-twenty hits were read to sort out any papers that were not relevant enough. The papers that did seem relevant were read in full. In table 2, the used keywords are
presented. After having found and read articles, reviews, and papers a short summary was written and sorted into a repository to enable easy access during the remaining of the study. The repository also had a rating-system for each paper found, making it easier to get an overview of which papers and topics have been most relevant to this study.

Table 2: Used Keywords

<table>
<thead>
<tr>
<th>Keywords</th>
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<tbody>
<tr>
<td>Catalysts of Innovation</td>
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<tr>
<td>Innovation Labs</td>
</tr>
<tr>
<td>Intuitive Innovation</td>
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<tr>
<td>Physical Space for Innovation</td>
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<tr>
<td>Space for Innovation</td>
</tr>
<tr>
<td>State of The Art Innovation Labs</td>
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<tr>
<td>Triggers of Innovation</td>
</tr>
<tr>
<td>Visualizing Innovation</td>
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</tbody>
</table>

4.4 Ethnographic Interview

The term ethnography means a description of people or cultures, according to Denscombe (2014 pp. 125). Conducting an ethnographic interview will thus imply assimilate a holistic perspective, which can be comprehensive and time-consuming. According to Denscombe (2014 pp. 125-126), attention should be put toward certain aspects when performing an ethnographic study, a list of examples of such aspects modified to fit the context of this study is presented below:

- routine and normal conditions regarding the everyday work related to innovation and creativity,
- how people experience their capacity to innovate and be creative at the workplace,
- how they understand innovation and creativity at their workplace,
- and how the culture at the workplace is comprehended and affects the context.

Ethnographic interviews allow the researcher to learn about people in an open-ended and exploratory fashion (Kumar 2013 pp. 111). The above aspects where used as a foundation for the ethnographic interview and interpreted into open-ended, exploratory questions. Typical for ethnographic interviews is that they are conducted in the location or context where the activities being discussed occur (Kumar 2013 pp. 111). This might result in that the conversation is more concentrated and direct and less abstract (Kumar 2013 pp. 111). Another advantage of conducting the interview in the location or context of the activities being discussed is that it allows the people being interviewed to demonstrate activities and share their experiences visually and interactively (Kumar 2013 pp. 111). Finally, discussing experiences in their actual context can aid people’s memory while also contributing to that they are more comfortable and talkative as they are situated in their known environment instead of an unfamiliar setting (Kumar 2013 pp. 111).
One can claim that there is less risk for bias when conducting an ethnographic interview due to that the questions are open-ended and exploratory instead of scripted (Kumar 2013 pp. 111). It could also be that empathy is established between the involved parts, both the researcher and the people being studied. This is an important factor during ethnographic studies since the whole aim is to come close to- and describe people and their cultures. Even though the ethnographic interview failed in terms of being more dynamic, the open-ended and exploratory questions did indeed establish empathy between the participants and the interviewer. Visiting the different places after the interview was also not optimal in terms of the purpose of an ethnographic interview but the result was still a heightened understanding and empathy for the culture and surroundings of the informants. However, there are also some traps associated to ethnographic studies. There is the risk of an ethnographic study to result in a detailed and descriptive report instead of an analytical understanding or support for a theoretical position (Denscombe 2014 pp. 140-141). There is also the challenge with defending the ethnographical studies reliability as the result tends to rely on the researcher’s interpretation of phenomena and events (Denscombe 2014 pp. 140-141). When it comes to ethics there are multiple risks associated with conducting an ethnographic study. It can range from infringement in the private to asking questions that are offensive to people. Having a written consent is therefore of uttermost importance during ethnographic studies (Denscombe 2014 pp. 140-141). Therefore, the informants were told on which terms they participated in the interview and were handed information regarding their participation. The consent was already established via the company itself, on their terms.

To be able to generalise from ethnographic studies a good praxis is to a) compare the result with the result of other, similar studies, b) consider how well the result matches or contradicts existing, relevant theories, and c) describes the topics meaning in relation to the beliefs and priorities that exist in the researchers own culture (Denscombe 2014 pp. 134-135). However, within this study it is not interesting to generalise from the ethnographic studies since the specific context is of key interest.

### 4.4.1 Application of Ethnographic Interview in This Master’s Thesis

During the ethnographic interview three managers from the automotive manufacturing company were taking part for about 40 minutes. A forth manager had to be excused since his/her presence was needed elsewhere. In co-design the person(s) who will eventually be served through the design process is given the position of “expert of his/her experience”, and thus plays an important role in knowledge development, idea generation, and concept development (Sander and Stappers, 2008). Therefore, the managers participating in the interview were co-designing during the whole interview. They were all experts of their own experiences and their input was crucial.

The ethnographic interview was voice-recorded on a mobile device with the consent of the participating managers. Notes were also taken using pen and paper to support the voice-recordings. The participating managers were the managers of the employees taking part of the ethnographic photo study and who collaborated on identifying an artefact for visualising, supporting and stimulating creativity and innovation in their workspace. These managers were especially interesting since their attitudes towards creativity and innovation could colour the other participating employees. The main reason for the ethnographic interview was to learn and understand how these managers dealt with and understood creativity and
innovation in the organisation and how they felt supported and stimulated to be creative and innovative. Well in beforehand, the managers had all received homework relating to this via e-mail. The task was to make it so that we could visit places where they felt they could be innovative and creative in their workplace. They also received instructions to bring with them, in any way they saw fit, an artefact or representative object of what they themselves would like to have in a space for innovation and creativity but that they perceived as missing as of then. Moreover, they were also expected to bring with them an artefact or representative object of what they perceived hindered innovation and creativity at the workplace already. As it turned out, there were issues with this kind of homework. Due to that two of the three managers had limited time to spend on the interview, they had no time to walk to the places they wanted to describe. Therefore, the interview had to take place in a small conference room instead while the managers tried to verbally describe the workplaces they had intended to show me. After the three interviews, the third manager, 1.1, walked with me to the described workplaces to give me a clearer perception of what we had previously discussed. Furthermore, only 1.3 had brought an artefact to the interview. Once again, we had to make do with verbal descriptions of what the managers would have liked to bring with them to pass the homework.

It is difficult to know exactly why the managers failed their homework in the extent they did. It could have been anything from having read the e-mail a while back and forgotten about the instructions to not understanding how to bring with them what they had intended. An important lesson learned is to not limit the interview to uncertain requirements such as having the participants bring artefacts or visiting places together during the interview. From this experience, I’ve learned that an alternative method could be to bring artefacts or materials yourself. An idea is to let the participants create the artefacts they describe by sketching or making simple paper-prototypes. Letting pictures or small objects lay on the table during the interview could also help the participants to visualise what they are saying and might bring forth latent insights and intuitive strategies. However, this approach could result in an entirely different kind of interview, more in the line with a workshop or a user picture interview which brings other criteria to the designers table. Nevertheless, the intention was to approach the managers in an environment they felt comfortable and supported by during the interview while they could also show artefacts and get further stimulated. The artefacts were intended to have been a bridge between latent insights and intuitive strategies, and together explore these insights and strategies explicitly.

During the interview, the focus was to listen after connections between the creativity and innovation triggers identified through literature and the experiences and perceptions shared by the managers. Apart from listening to specific keywords such as motivation, diversity, and empowerment (which were all theoretically identified triggers) I also listened after the managers own triggers. This I did since I wanted to identify triggers not only from theory but also from practise. More than often, the managers described triggers without naming them in a specific way or identifying them as triggers. During the analysis of the ethnographic interview, I compared the results with the triggers found in literature. I compared the concepts of the triggers and the strategies described by the managers to identify similarities and differences. When something described by the managers did not match any already identified trigger, I attempted to re-interpret it into a new kind of trigger instead, a practically identified trigger.

Even though many aspects of the ethnographic interview that I had perceived as important for its success were not met, the results remain valuable to the study. Perhaps being able to visit the places directly during
the interview as intended would have helped to create a deepened understanding shared between me and the managers. Had the managers also brought artefacts as intended the discussions might have been more concrete and exploratory; perhaps the managers had gotten the chance to debate and discuss more among each other with the aid of the artefacts. However, empathy was still built between me as a researching student and the managers. Insights and strategies were also shared and unexpected realisations with relevance to the study were also revealed.

### 4.5 Photo Ethnography

Photo ethnography is yet another method within ethnography. Therefore, many aspects regarding ethnography mentioned in the section above is also true for this section, such as its meaning, what to put attention toward, how it should be conducted, advantaged and disadvantages, the importance of consent, and what to think about regarding generalizability. However, during this photo ethnography the participants were asked to use photography to document their engagement in innovation processes and creativity and what artefacts or spaces at the workspace or workplace that have a certain meaning to them concerning innovation and creativity (Kumar 2013 pp. 112-113). The participants involved in taking the photographs were also asked to describe the photos with accompanying notes and keywords (Laurel 2003 pp. 26-27). Once the session for taking photos was completed, the photos and notes were returned to the researcher who then reviewed them and learned from both the visuals and the notes (Laurel 2003 pp. 26-27).

One key advantage with the photo ethnographical study applied here, was that it allowed for showing the ways in which the participants already feel empowered to innovate and be creative at their workspace. One strategy to develop a space for utilising innovation and creativity, or any other aim, is to understand and amplify the ways the people already intuitively approach it (Doorley and Witthoft, 2012 pp. 36). An example of this can be found in Schaeffer (2014), were photo ethnography is used to understand the users’ experience on workspaces for innovation in a manufacturing industrial context. In this master’s thesis, the photo ethnographical study is part of the design process as an attempt to let the participants show where their intuitive strategies take place so that it is possible to identify aspects that are empowering them, providing them with control, or in any other way supports their innovative and creative processes.

This approach could be considered engaging for both the researcher and the participants (Laurel 2003 pp. 26-27). It also captures the participants points of view, has a chance of revealing the unexpected, and builds empathy (Kumar 2013 pp. 112-113) However, when applying photo ethnography on a large group of participants it risks becoming difficult to conduct (Laurel 2003 pp. 26-27). According to Laurel (2003, pp. 26-27) organising and managing many photographs and notes requires careful planning and setting strict guidelines for oneself as a researcher.
4.5.1 Application of Photo Ethnography in This Master’s Thesis

The photo ethnographical study was initiated by a kick-starter meeting. The participating employees were all invited to meet in a small conference room. There, they received two tasks. The first task was called “The Story Opener” and involved telling everyone a short, personal story of when the person had been successfully creative (IDEO, 2017). The aim of the “The Story Opener” was to establish empathy among the participants and myself and to get away from “the work-self” to instead become “the human-self” (IDEO, 2017). For my personal story, I had brought with me a self-crafted picture-book about myself and my personal attributes. The picture-book was considered fun and the intension was to invite the participants to put any seriousness or shyness away to instead be relaxed and have fun while sharing a personal anecdote. All the participants contributed with a short, personal story even though the thought-process of coming up with an example of when they had been successfully creative seemed to be difficult for some. I had pushed for that the participants should sketch while thinking about what to tell us, and some could show their thought-process or other drawings related to their story while telling us, which created an atmosphere of creativity.

The second task taking place during the kick-starter meeting of the photo ethnographic study was called “Sketch Your Neighbour”. For this, I had brought a variety of coloured pencils and blank papers. The task was to sit opposite to someone and sketch their face during only 60 seconds (IDEO, 2017). Since drawing more than often makes people feel uncomfortable this task was planned to raise some vulnerability (IDEO, 2017). If we, as a team, could fail in front of each other, the group dynamic could become more open, generous, and positive (IDEO, 2017). During and after this task there was a lot of laughter and the participants seemed more relaxed. In retrospect, I would have liked to start the kick-starter meeting with the “Sketch Your Neighbour” task first and put “The Story Opener” as second since “The Story Opener” was more demanding in terms of cognitive load and it seemed like the participants found that they had to deliver on a higher level of performance. The two tasks were part of the design process and design thinking. As the participants were taking their first steps as co-designers there was a need for letting them experience creativity collectively. By taking part of the two tasks the participants, and I, could show a piece of our creativity for each other and start to form an understanding of each other’s maturity and understanding of creativity.

After the two tasks, the participants had a break to get coffee and I served cookies. Thereafter, I presented the photo ethnographical study and handed out information regarding the procedure as well as some inspirational pictures, an example of which can be seen below in figure 4. The kick-starter meeting took place on Monday the 5:th of Mars and the results of the photo ethnographic study (including a minimum of 2 photos and a short motivation to each) was set to take place until Friday the 9:th of Mars. All the participants contributed and handed in their results via e-mail.
Once the result from the photo ethnographic study was gathered I analysed the notes and the photos by comparing it to what I had previously found in the literature study. The analysis will be further described in a section below. The aim was to investigate whether the practical data would reflect the theoretical data, thus whether the practical data reviled evidence of the theoretically identified triggers. The participants were all strategically chosen for their positions and their daily work tasks and involvement in the same project. They were a group of people working with incremental innovation both individually and in teams, therefore they were chosen for their pre-understanding of incremental innovation at the automotive manufacturing company.

4.6 Focus Groups, 1-on-1 Interviews

The focus groups with 1-on-1 interviews is an extension of the photo ethnography. The aim is to review the photographs and notes taken together with the participant who handed them in (Kumar 2013 pp. 112-113). It allows the researcher to gather further information through open-ended and exploratory questions. The result from the interviews following the photo ethnographic study could be sources of rich information and potential insights about the participants experiences and possible unmet needs (Kumar 2013 pp. 112-113). The interviews are ideally held in the same location the photos were taken while the researcher allows the participants to walk her through their thoughts (Kumar 2013 pp. 112-113). The interview also gives the researcher a natural opportunity to ask additional questions to gain clarification (Kumar 2013 pp. 112-113). The interview in combination with the photo ethnography gives the researcher the chance to ground conversation with artefacts for better understanding and promotes learning in context (Kumar 2013 pp. 112-113). When discussing 1-on-1 interviews specifically, one can argue that they are ideal for learning exactly how each participant feels and thinks about the topic or design discussed, without concern for the influence of others except the researcher (whose influence can’t be avoided) (Laurel 2003 pp. 24-25).
4.6.1 Application of 1-on-1 Interviews in This Master’s Thesis

During the master’s thesis, the 1-on-1 interviews took place either in the location of where the photos were taken or in a private setting elsewhere, depending on the possibility to visit the locations and the amount of privacy asked for by the participants. Out of six participants, two were interviewed at a minimum of one place represented in their photos. Three participants were interviewed in more private settings elsewhere and the last participant was interviewed via e-mail due to illness. During all interviews taking place face-to-face, printed versions of the participants photos and notes were spread out on a table or held up and used during the discussions. Meanwhile, the interview was recorded on a mobile device. The questions were open-ended and exploratory, based on the photos and written contributions from the participants.

The aim of the interviews was to get clarification on what the participants had wanted to mediate with their contributions. This was also partly done from an ethical point of view to take an extra step of precaution regarding the interpretation of the results.

4.7 Analysis and Synthesis of Practical Findings

The previous sections have explained methods for data gathering for a qualitative study. In this section the form of analysis used to understand the theoretical and practical findings is described. According to Merriam and Tisdell (2016 pp. 195-196) the collection of data should occur simultaneously to the analysis in a qualitative study, since the qualitative study is emergent. As described in the previous sections, the use of open-ended and exploratory questions results in that the exact questions asked and where to look next is not known in beforehand, unless the data is analysed as it is being collected (Merriam and Tisdell 2016 pp. 195-196). However, this does not imply that the analysis is finished once the data is collected (Merriam and Tisdell 2016 pp. 195-196). Instead, the analysis naturally becomes more intensive as the study progresses and once the data are in (Merriam and Tisdell 2016 pp. 195-196). Ultimately, the collection and analysis of data is iterative and dynamic process (Merriam and Tisdell 2016 pp. 195-196).

Since the methods are ethnographical an ethnographical analysis approach was taken during analysis. Analysis of ethnographical data often implies analysing rich, thick descriptions (Merriam and Tisdell, 2016 pp. 229). Analysing these rich, thick descriptions means identifying essential features and systematically describing the interrelationships among them as well as interpreting it (Merriam and Tisdell, 2016 pp. 229-230). Thus, the analysis was done by comparing the practical data to the triggers found in the literature study (see table 1), as categories in a form of cognitive map. The categories helped organise the analysis and break the practical results into smaller parts for easier description, interpretation, and understanding of interrelationships. After the analysis, a second step was taken. During the second step, the practical data was compared with the triggers found in the literature study to sort out the triggers found in literature that were not shown in the practical results and thus perhaps not relevant in the context of the automotive manufacturing company. Lastly, the third step was to synthesise, thus combining the parts left to construct a problem-solution.
In summary, the analysis was conducted simultaneously to the collection of data. All data was continuously reviewed during the process of collecting it, to adjust the open-ended and exploratory questions to the hypotheses and aim of the research question. The analysis of qualitative data was primarily inductive and comparative, which is also the aim during this study (Merriam and Tisdell 2016 pp. 195-196). Moreover, the analysis aimed to be an explanation and a description of causation. The reason for this is that the study aims to predict how something will occur in the future. Therefore, the result of the analysis needs to show how things are associated – relations and connections etc, why things occur – underlaying causes etc, and when things are likely to occur – probability of recurrence, forecasting etc (Denscombe 2014 pp. 342-343). Since the aim was to not only get a result from the analysis but to also take the result and construct a problem-solution, there were additional steps to the analysis. The two additional steps helped to sort the result of the analysis and to combine the parts of the result to construct a problem-solution.

4.7.1 Application of Analysis and Synthesis of Practical and Theoretical Findings in This Master’s Thesis

The analysis of the practical findings was done first by an inductive analysis. The purpose of the inductive analysis was to identify frequent or dominant themes within the result. This was done by summarising the results from each method and combing it through to find essential features. Secondly, a comparative analysis was also conducted. In the comparative analysis the results were compared to the categories of theoretically identified triggers of innovation and creativity. The aim of the comparative analysis was to be able to systematically describe the results and the interrelationships among them as well as being able to interpret the result in a meaningful way.

When the inductive and comparative analysis were conducted a third step called "assortment" was next. This step was indirectly part of the analysis since it was required for the synthesis to be meaningful. The purpose of assortment and synthesis is to be able to take the result from the analysis and construct a problem-solution. The aim of assortment was to, in collaboration with the participants from the automotive manufacturing company, chose which critical functions as identified during analysis to consider during synthesis. The validity, relevancy, and satisfactory of each critical function or theme identified during analysis was tested. Thereafter I synthesised the results from the analyses to combine the parts identified to construct a problem-solution. The aim of synthesis was to put together the analyses to form ideas and make sense of the practical findings gathered. During synthesis, a problem stated was generated. Both assortment and synthesis are further explained in the following subsection.
4.7.2 Choosing Design Proposals Through Assortment and Synthesis

The next step after concluding the inductive and comparative analyses was to assort the results and test them. This was part of choosing a design proposal to develop to construct a problem-solution. This was done through a brainstorming session with the participants who partook in the photo ethnographical study and the 1-on-1 interviews. The brainstorming session lasted for about one hour and was held in a medium-sized conference room. During the brainstorming session a PowerPoint was used as support for sharing the brainstorming tasks. The session was voice recorded on a mobile device and notes were taken to support the recordings. Two warm-up exercises were used to get the participants to feel comfortable and raise the openness during the actual brainstorming. The warm-up exercises were a kind of memory-game where the participants had to memorise details from a picture, having only a few seconds to do so. Thereafter, they had to write down everything they remembered on post-it notes together as two teams. In the second stage of the memory-game the participants also had to remember the placement of the details in the picture and place their post-it notes with the detail in the right spot on the table in front of them. The warm-up exercises brought a lot of laughter.
The actual brainstorming session was held around four design proposals all based off the most dominant themes and critical functions found during analysis of the practical findings. These design proposals were presented to the participants as sketches with a short description. The participants were asked to discuss each proposal for several minutes. There was a selection of topics to help the participants, should they get stuck during discussion. These topics were “possibilities for development”, “possibilities of application”, “weaknesses”, “strengths”, “implementation”, and “maintenance”. However, the participants never needed to use any of the suggested topics as the discussion was rich from start to finish. After the brainstorming session held to finish assorting the results of the previous analyses, I started synthesising the results. As described in the subsection above, synthesising was done to form ideas and make sense of the practical findings even further. Through synthesising I generated a problem statement and made an iteration. From having a design proposal, I re-defined it based on the results from the brainstorming session. The result from the iteration became the design proposal tested during the field experiments described in the following section.

4.8 Field Experiments

Experimental activities aim to, under controlled circumstances, investigate specific factors’ characteristics and relations (Denscombe 2014 pp. 107). Another advantage to experimental activities is that they can be used to isolate certain factors and in detail study their effect, as well as to discover new relations or characteristics within the research topic, or even investigate already existing theories (Denscombe 2014 pp. 107). The type of experimental activities conducted within this study fall under the category of field experiments. The experiments will thus take place at the facilities of the automobile manufacturing company that is collaborating during the study, involving employees from the company.

The field experiments allow the researcher to observe the impact of new artefacts that have been introduced through the experimental activities (Denscombe 2014 pp. 110). Field experiments means systematically evaluating new factors to decide if the implementation of them in the specific context will result in the expected outcome (Denscombe pp. 110). However, even though the experiments will be conducted in the real context that they will hopefully be implemented in later, the participants are likely to change their own
behaviour as they are aware of being observed (Denscombe 2014 pp. 111-114). This change of behaviour can be caused by an array of reasons, the participants might want to meet the observer’s expectations and thus behave as they believe is desirable even though it differs from how they really would act. The participants might also get overly motivated and engaged, or even insecure and uncomfortable, and thus change their behaviour accordingly. This is something to be aware of when conducting the experiments and drawing conclusions from it.
5. Results

In the subsections below the results from the methods used in this master’s thesis is presented. The participants connected to the results have been given coded numbers to allow their contribution to be undistinguished.

5.1 Ethnographic Interview

At multiple times throughout the ethnographic interview participant 1.4 referred to a need here called “visualisation” (Personal communication 1.4). Visualisation is thus a practically identified trigger of innovation and creativity first found during the ethnographic interview with the managers. Participant 1.4 approached visualisation from a variety of perspectives (Personal communication 1.4). These are further accounted for in table 3 along with other, practically identified triggers found during the ethnographic interview.

<table>
<thead>
<tr>
<th>Practically Identified Triggers of Innovation and Creativity</th>
<th>Interpreted Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visualisation: rapid, visual feedback.</td>
<td>Visually approaching and using the actual products and the testing-results. Referred to as rapid, visual feedback.</td>
</tr>
<tr>
<td>Visualisation: reminder of tools.</td>
<td>Visualisation of the tools available to the employees, such as visualising, feeling and touching the actual products.</td>
</tr>
<tr>
<td>Visualisation: reminder of efforts.</td>
<td>Visualisation of the work and achievements made by the employees as a reminder of their innovative and creative efforts.</td>
</tr>
<tr>
<td>Visualisation: sharing information.</td>
<td>Visualisation of individual experience and knowledge as well as problems and solutions to give access to information.</td>
</tr>
<tr>
<td>Openness</td>
<td>A resistance to rejection in correlation to idea generation.</td>
</tr>
</tbody>
</table>

The first perspective, here called rapid, visual feedback, was emphasised as important since it enabled the employees to visually take part of the testing taking place in real time and thus get visual feedback on the spot while simultaneously having the calculations from theory on paper to compare with (Personal communication 1.4). This rapid, visual feedback enables the employees to make alterations during tests and ask each other questions such as “what happens if we do this?” (Personal communication 1.4). Immediately, the employees get visual results and realise that “then we have to solve the problem by doing X and Y”
As an example of how effective rapid, visual feedback can be, participant 1.4 describes how a team of employees have taken own initiatives during work to improve the parts being tested in the testing area to get clearer results (Personal communication 1.4). These initiatives of work-improvement have been taken during action in the testing area as the employees are able to question themselves due to the rapid, visual feedback (Personal communication 1.4). In conclusion, the rapid, visual feedback allows the employees to repeat the tests to see what their solutions results in. The rapid, visual feedback can thus result in impactful “aha-experiences”.

The second perspective, referred to as visual reminder of tools, was raised as a concern regarding that the employees tend to forget simple work tools such as visualisation, feeling and touching the products during the “rush of the day” (Personal communication 1.4). Participant 1.4 claims that there is no process in place of reminding the employees of the tools they have (Personal communication 1.4). In correlation to the lack of visual reminders of tools there is also a shortage of visually reminding the employees of their work efforts (Personal communication 1.4). As an example of this, 1.4 describes the monthly meetings during which the employees get an overview of what they have achieved during the previous month (Personal communication 1.4). These meetings are described as often being “aha-experiences” (Personal communication 1.4). Due to the “rushing forward” in a fast pace the employees seem to forget what they did just days or hours ago (Personal communication 1.4). The employees need to be visually reminded of what they do in their daily work, which they do not refer to as being innovative and creative; instead, they refer to their work as just solving problems and keep running further (Personal communication 1.4). The employees do a lot to solve their tasks but forget to let themselves know what they have achieved (Personal communication 1.4). Apart from establishing a new, practically identified trigger of innovation and creativity participant 1.4 also mentioned the already theoretically identified trigger called “diversity”. This was found as 1.4 mentioned the benefits of cross-functional groups of employees during testing and their ability to contribute with versatile experience (Personal communication 1.4).

During the ethnographic interview with participant 1.3, visualisation was once again mentioned. While describing a fictional, functional space for innovation and creativity, 1.3 argued for the need of being able to bring up CAD-models visually in relation to the physical tests being conducted (Personal communication 1.3). This relates to the rapid, visual feedback. Furthermore, 1.3 theorised about introducing the possibility of taking apart and putting together actual products with regular hand-operated tools to raise awareness of the products, which also relates to visual feedback (Personal communication 1.3). Beyond confirming the impact of visualisation 1.3 also mentioned openness as a trigger of innovation and creativity. Openness was regarded as important since ten stupid ideas can generate one great idea, thus there must be openness without the fear of having ideas rejected (Personal communication 1.3).

During the third and last ethnographic interview, participant 1.1 also mentioned visualisation at multiple occasions. The need of visualisation was described as having the need of showing problems physically to be able to talk about them as well as showing solutions visually to spread inspiration and initiate further idea generation (Personal communication 1.1). Visualisation was theorised as a way of giving quick access to information both digitally and physically (Personal communication 1.1). An example of when visualisation would be beneficial to the employees was described as employees compiling their individual experience and knowledge into a holistic total visually shared among a team (Personal communication 1.1). As of now, the
individual experience and knowledge is segregated among the employees without a fruitful way of making it accessible (Personal communication 1.1).

Furthermore, participant 1.1 mentioned two theoretically identified triggers of innovation and creativity, the first one being “empowerment”. One example of this was when 1.1 mentioned crosstalk taking place during lunch as people with opinions regarding aspects that they normally are not involved in give their input to colleagues (Personal communication 1.1). In accordance to theory, this is an example of when regularised interaction patterns which hinder innovation are broken, empowering the employees. Participant 1.1 continues to describe empowerment by pointing at the reduced hierarchy and heightened empowerment on an individual level during the lunchbreak as the lunchroom is more open and accessible and not governed (Personal communication 1.1.). Lastly, in addition to empowerment, 1.1 also mentions the theoretically identified trigger called “facilitators (people)”. When there is a complex problem to be solved interaction between people is needed (Personal communication 1.1). Participant 1.1 theorises about educating a handful of individuals within the organisation to have them commit to creative leadership and act as moderating roles or as “igniting sparks” to shake up the organisation (Personal communication 1.1).

Thus, in addition to the practically identified triggers of innovation and creativity described in table 3 a handful of already theoretically identified triggers of innovation and creativity were mentioned. These are presented in table 4 below.

**Table 4: Theoretically Identified Triggers of Innovation and Creativity – Ethnographic Interview**

<table>
<thead>
<tr>
<th>Theoretically Identified Triggers of Innovation and Creativity</th>
<th>Number of Participants Mentioning it (total of 6)</th>
<th>Interpreted Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empowerment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitators (people)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5.2 Photo Ethnography**

Due to the sheer amount of data that could be interpret and presented as result from the photo ethnography I have chosen to narrow it down by summarising it and present only the dominant themes and the critical functions found.

**Table 5: Triggers of Innovation and Creativity – Photo Ethnographic Study**

<table>
<thead>
<tr>
<th>Trigger of Innovation and Creativity</th>
<th>Number of Participants Mentioning it (total of 6)</th>
<th>Interpreted Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visualisation</td>
<td>5</td>
<td>Closeness to the actual products and the testing of them. Using products,</td>
</tr>
</tbody>
</table>
prototypes and sketches to visualise thoughts.

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change of Scenery</td>
<td>3</td>
<td>Getting away from the current work-related situation to get a fresh perspective or clear thoughts.</td>
</tr>
<tr>
<td>Reflection (alone-time)</td>
<td>5</td>
<td>Get time to reflect in group to develop ideas. Getting alone-time to reflect on work to get ideas.</td>
</tr>
<tr>
<td>Solidarity</td>
<td>3</td>
<td>Meet with others on a personal level.</td>
</tr>
<tr>
<td>Diversity</td>
<td>2</td>
<td>Meet with others to share experiences and knowledge between different departments.</td>
</tr>
<tr>
<td>Awareness</td>
<td>3</td>
<td>Have product-knowledge and being able to look for knowledge from outside sources.</td>
</tr>
<tr>
<td>Flexibility</td>
<td>2</td>
<td>Tools that are ready-to-use and able to move around depending on your needs.</td>
</tr>
</tbody>
</table>

Only two of the triggers of innovation and creativity found during the photo ethnographic study were also identified in theory, namely “diversity” and “awareness”. The rest of the triggers identified during the photo ethnographic study were thus identified in practice.

*Figure 7: Pictures showing triggers as perceived by the participants. Left - solidarity, Middle - reflection, Right - flexibility.*
5.3 Focus Groups, 1-on-1

Due to the sheer amount of data that could be interpret and presented as result from the 1-on-1 interviews I have chosen to narrow it down by summarising it and present only the dominant themes and the critical functions found. These are in large the same as presented in the subsection above, however in this section the meaning of them is further elaborated on by the participants to give clarity.

5.3.1 Visualisation

Product closeness and real time, visual testing of the products seems to be a central trigger of innovation and creativity among most of the participants. The main critical function of product closeness is expressed to be that it enables the participants to talk about the products while holding it or having it in front of them. Other critical functions found when discussing visualisation are the possibility to use pen and paper to sketch and sharing those sketches, using prototypes to visually see and understand the products while being at the desk, visually show ideas and successful solutions, and seeing the products in their entirety as the end customer would see them.

5.3.2 Change of Scenery

A change of scenery is mainly about trading the current work-related situation for some time to get a fresh perspective or clear your thoughts. The change of scenery is argued to be stimulating and helpful to the thought process. One participant explained that “during a change of scenery you can get feedback from your colleagues in ways that you normally would not at the regular workspace. Perhaps we are not able to talk openly at the workspace due to the subject being sensitive, but somewhere else we are enabled to” (Personal communication 2.5). Thus, a change of scenery might also change on which terms and conditions colleagues meet and talk. Another participant explained the benefits of a change of scenery as “a way to get outside the box; if you are not locked to what you normally do then you are enabled to find new solutions. However, if you have been long on the same spot you start to hesitate to new ideas” (Personal communication 2.3).

5.3.3 Reflection (alone-time)

Reflection seems to be a way of breaking a pattern and clearing thoughts, much like the change of scenery. One participant described this by saying that “breaks allow you to talk about something else [other than
work-related tasks] for a while. You get rested and that stimulates creative thoughts” (Personal communication 2.4). Reflection is often associated to having time for oneself during work to reflect on problems, ideas or results from brainstorming with others. This was described by one participant as “I need time to work in my head and not on my computer. Acceptance to reflect and just “passively” sit down, thinking, is important” (Personal communication 2.2). Reflection is also described as being a way of getting “unstuck” on something.

5.3.4 Solidarity

Solidarity is mainly about coming together and sharing. One participant described it as “people are important to solve problems, we need each other’s jigsaw pieces to create a solution” (Personal communication 2.2). Meeting with people is perceived as sparking creativity due to the exchange of ideas and experiences. Moreover, having a closer, personal relationship with colleagues that allows for conversations that are not necessarily about work-tasks is thought to make it easier to communicate overall and in more formal, work-related contexts as well. One participant further elaborates on this note by saying “if we are personal we open up more and learn about each other, we get close to each other” (Personal communication 2.5).

5.3.5 Diversity

It was recognised that diversity among employees is important. Lifting each and all’s individual experience and knowledge is perceived as stimulating “out-of-the-box” thinking. Other’s cultures, input, and perspectives are acknowledged as inspiring and up-lifting, preventing patterns from suffocating innovation and creativity. One concern regarding lifting diversity was expressed as “it is important to let everyone speak since the silent people can sit on ideas too and therefore we need to lift them as well” (Personal communication 2.1).

5.3.6 Awareness

Awareness has been theorised upon from a variety of perspectives. One participant approaches awareness by stating that “I tend to forget that I have sketches, then, when I see them again I think to myself ah, right” (Personal communication 2.3). Thus, this concerns awareness about your own intuitive strategies and efforts. Another perspective on awareness is the understanding of products, knowing how to develop them, gaining insight from them, understanding how the products will be used, what the future challenges are, and so forth. One participant approached this perspective by saying that “if you understand the details and the entirety [of the products] then you can convert that to knowledge” (Personal communication 2.1). Another participant thought it important to be aware of and understand how colleagues work (Personal
communication 2.4). Yet another perspective concerns awareness about ideas and insights. One participant described this by arguing that "our innovative ideas sometimes become balls that stop bouncing, we need a forum to discuss and try out our ideas and innovations" (Personal communication 2.2). Lastly, it was also brought forward that searching for knowledge from outside sources was done to raise awareness, whether it was during personal conversations about topics not related to work or conversations highly related to work. Even sharing information was brought up as important to gain input from others to raise awareness and solve issues and develop ideas.

5.3.7 Flexibility

Ready-to-use tools and flexible workspaces such as a chair that does not represent a definite workspace were examples of when the participants thought of flexibility as a trigger for innovation and creativity. Regarding ready-to-use tools, it was argued that movability of screens to show results or share other information could be fruitful for creative discussions. Flexible, non-assigned workspaces were also claimed to support creativity. An example of this was a table and a few chairs set up in the middle of the workplace where it did not belong. It was used both as a flexible workspace and place to sit down and have lunch together or simply spend time together. The flexibility of these aspects was described as fun, making it easier to work, and supporting of reflection.

5.4 Analysis and Synthesis of Practical and Theoretical Findings

Through the inductive analysis I identified an assortment of frequent and dominant themes in the result from the literature study. These themes were categorised to organise the results and give it meaning. These categories provided me with a pattern to use and look for when analysing and synthesising the practical results. The result from the analysis and synthesis of the practical and theoretical findings is further presented below in table 6.

<table>
<thead>
<tr>
<th>Theoretical trigger</th>
<th>Practical trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Awareness</td>
</tr>
<tr>
<td>Motivation</td>
<td>-</td>
</tr>
<tr>
<td>Diversity</td>
<td>Diversity</td>
</tr>
<tr>
<td>Environment</td>
<td>Change of scenery</td>
</tr>
<tr>
<td>Empowerment</td>
<td>-</td>
</tr>
<tr>
<td>Users</td>
<td>-</td>
</tr>
<tr>
<td>Iteration</td>
<td>-</td>
</tr>
<tr>
<td>Facilitators (people)</td>
<td>-</td>
</tr>
</tbody>
</table>
Due to being aware of the frequent and dominant themes in the results from the literature study I could more easily identify the essential features and the interrelationships among them in the practical results from the ethnographic interviews and the photo ethnographic study. Thus, the analysis of the literature study made it possible for me to synthesise the result from the practical methods. The synthesised results provided me with a set of “main” triggers and four design proposals. These design proposals are further described below.

5.4.1 Reflection and Change of Scenery

“Kokongen” is a design proposal based on the triggers identified in the practical context namely “reflection (alone-time)” and “change of scenery”. The idea behind Kokongen is that it provides the employees with relaxing and closed-off seating for reflection and a break from phones, computers, and other distractions. The participants had expressed the need for reflection between meetings, project, intense work, etc. to “connect the dots”, gain a better understanding of all the details involved, and do work in their head before putting it in action. The participants also expressed needing a change of scenery to gain a fresh perspective or simply get cut off from regular distractions. The trigger here called “change of scenery” is identical with the trigger identified in theory called “environment” with the only exception that the trigger identified in practice is more concentrated on getting away from a usual workspace and not about aspects such as aesthetics relating to innovation and creativity in the environment. Kokongen is simply about giving people the choice of getting away from their usual workplace to better be able to generate creative ideas (Magadley and Birdie, 2009).

Regarding the trigger called “reflection” which also was identified in the practical context, it could have some correlations to the trigger “empowerment” which was identified through the literature study. When described by the participants, reflection often gave them the opportunity to circumvent hierarchy to engage in more disruptive thinking and developing their own ideas, which is also described as empowerment (Bellefontaine and Policy Horizons Canada, 2012). Kokongen could act as an support for the employees who would like to functioning independently in the pursuit of new ideas (Scott and Bruce, 1994).
5.4.2 Flexibility and Solidarity

“Stormen” is a design proposal based around the triggers “flexibility” and “solidarity” which were identified in the practical context. Its aim is to provide the employees with a portable device for brainstorming and sharing knowledge and ideas. The participants had talked about ready-to-use tools for innovation and creativity in the workspace and having the possibility to exchange thoughts; Stormen was an example of how to support this. Looking at it from a slightly different perspective, Stormen could also provide a tool for co-creation between employees but also customers or users. Stormen is a combination of tools and materials and could be an example of what Magadlely and Birdie (2009) and Haner (2005) claimed to aid articulation of creative ideas and facilitating group work.
5.4.3 Flexibility and Change of Scenery

“Flex-mattan” was also based on the trigger “flexibility” as well as “change of scenery” both identified in the practical context. The idea was to give the employees more freedom in what triggers of innovation and creativity to focus on by providing them with the possibility of setting-up their own tools and workspaces in a temporary setting. Thus, flex-mattan could be used as an area for reflection and alone-time if built for that purpose but it could also be built to support visualisation of products and ideas or working in diverse teams to gain new insights or help each other. Flex-mattan is a way of creating creative and stimulating environments that encourage out of the box thinking and can support innovative thinking, much as a dedicated innovation lab but then in a more flexible format (Bellefontaine and Policy Horizons Canada, 2012). Another aspect of flex-mattan would be to document each unique one by taking a picture of it and share it. This way, the manufacturing company could keep track of what kind of workspace-settings the employees seemed to use the most. With this information, the company could invest in more permanent workspace solutions.

![Figure 10: A visualisation of the design proposal Flex-mattan. The figure illustrates a sketch of a design proposal.](image)

5.4.4 Awareness

“Inspo-hyllan” is a design proposal based on the trigger “awareness” as defined by the participants in the practical context. This includes awareness of one’s own intuitive strategies and innovative efforts, ideas and insights that are at play among the colleagues, and how other colleagues approach work. Thus, its aim is to gather used and un-used ideas, sketches, thoughts, results, prototypes etc. to make the company and the employees aware of innovative and creative ideas and efforts even if they are not utilised in a project or product at the time of realisation. The kind of awareness described by the participants can be somewhat
related to the trigger “motivation” rather than “awareness” if we compare it to the triggers identified in theory. Within motivation is an aspect called “willingness” which refers to the organisational will to experiment with innovative ideas (Scott and Bruce, 1994). Inspo-hyllan could be regarded as a tool enabling the company to experiment with innovative ideas as they come to the surface of the organisation. The ideas around Inspo-hyllan were also loosely related to the theoretically identified trigger “reward and recognition” as the participants had expressed the want to further develop the design proposal into a system of recognising and rewarding innovative and creative ideas and the willingness to experiment with them (Scott and Bruce, 1994).

![Figure 11: A visualisation of the design proposal Inspo-hyllan. The figure illustrates a sketch of a design proposal.](image)

5.4.5 Choosing the Design Proposal

During the brainstorming session, the participants agreed upon that a combination of all design proposals in a system for a new approach to work would be the most optimal solution. Taking this realisation in account, that is the realised need for a new approach, I decided to develop prototypes based on the design proposal called flex-mattan. This offered the employees ways of experiencing a variety of triggers of innovation and creativity in a simple way.

5.5 Field Experiments

After having chosen a design proposal based on the brainstorming session together with the participants I started sketching up ways to realise the concept of Flex-mattan in the context of the automotive manufacturing company. This included asking for permission on what space to dedicate for the field experiments, making crude sketches about how to place the “squares”, the furniture, and the tools within as well as gathering furniture and tools with the aid of the automotive manufacturing company and friends.
Finally getting aid to install the actual prototypes and carry the furniture and tools to the dedicated space and arranging them in the best possible way. The result was three prototypes which were called “Kreativen”, “Refläkten” and “Loggen”, all three developed with varied purposes in mind. However, all three prototypes were examples of how the concept of Flex-mattan could be varied according to the needs of the employees.

At the day of finalising the instalment of the prototypes at the automotive manufacturing company, I invited all participants to come experience the prototypes and share their opinions and ideas. We walked past the prototypes while I introduced them to the participants who recognised them from our work together and their own ideas and suggestions. We sat down for a coffee-break together and celebrated the result. One of the main points we discussed was how to get employees to use the prototypes now that they were installed. The participants agreed to being front-runners which included using the prototypes together with other employees as well as spreading the word. We also sent out information about the prototypes per e-mail around the company and hung up information about both the master’s thesis and the prototypes. In general, the prototypes were placed in a well-trafficked area.

In total there were three prototypes installed at the automotive manufacturing company. The first one, Kreativen was meant to symbolise a flexible, ready-to-use tool for diverse creative work such as brainstorming, idea generation, and workshops for thinking outside the box. It provides seating, the possibility to quickly share information on a whiteboard, arrange post-it notes, and a place to approach work in a different way.

![Kreativen Prototype](image)

*Figure 12: Kreativen in the context of the automotive manufacturing company. The figure illustrates elements from the prototype Kreativen.*

Kreativen was the prototype used most frequently, according to the feedback that I gathered through leaving a variant of a logbook at each location. The logbook was a one-sided paper with three questions regarding usage, experience, and further development. All visitors were called to fill in the logbook and leave it behind for me to pick up upon visit. Two examples of how it was used according to the filled in logbook was a) during breakfast while the employees discussed an ongoing project and b) having a nice
chat about the schedule of the day. Overall, the concept of Kreativen can be perceived as valuable to the employees but they also express that they need time to learn how to use it properly. Additionally, the environment in which Kreativen is situated has been described as too noisy and distracting.

Refläkten was a prototyped focused on offering reflection and alone-time to take a step back from details to see the bigger picture and what to do next. It was based on the most frequently mentioned trigger for innovation and creativity by the participants and therefore represented a version of Flex-mattan that was likely to be built by the employees themselves if they had the opportunity to do so. Refläkten consisted of a bean bag, a noise reducing screen, and a laptop support for supporting either a laptop or pen and paper while sitting in the bean bag to sketch ideas or mindlessly write notes while reflecting.
Feedback regarding Refläkten suggests that the person sitting down in the bean bag gets too close to the floor which is said to be distracting when people pass by. There has also been a suggestion to move Refläkten to a more secluded area to truly offer a non-distracting area for the tool since its purpose is to offer the possibility to reflect and get way from the usual work-tasks.

The last prototype was Loggen. The idea behind Loggen was to offer a tool for sharing ideas and knowledge cross boarders, thus offer diversity and visualisation. Loggen simply consisted of a whiteboard and there were pens, an eraser and magnets to use. Placed in a breakroom it could be used in a more informal way thus offering employees to connect ideas from outside work in the context of work.
Unfortunately, I received next to no feedback about Loggen which suggests that few knew how to use it. The only comment I received about Loggen was from participant 2.1 who argued that Loggen was put in a too informal location and that the artefact would not be used to discuss work-matters and write down ideas and thoughts regarding work since it was placed in the breakroom.
6. Discussion

In the subsections below, various aspects about the master’s thesis are being discussed more openly while I theorize on things that could have been done differently and attempt to interpret the results in different ways.

6.1 Results

The results, the prototypes based on the identified triggers, might seem simple looking at the aesthetics and the technicality. The prototypes themselves are in an early stage. However, it could be argued that they do already support innovation and creativity as they can stimulate consciousness of necessary change processes within the organisation, related to innovation and creativity. Through the realisation of the prototypes, and the identification of the triggers stimulating innovation and creativity, the automotive manufacturing company have raised awareness about innovation and creativity and thus realised new opportunities for developing their work approach and organisation to visualise, support, and stimulate innovation and creativity. In short, the prototypes can be used as they are, supporting the employees as tools to use when working with innovation and creativity; however, the prototypes also raise consciousness of innovation and creativity and what changes can be made within the organisation to further visualise, support, and stimulate innovation and creativity.

Due to the raised consciousness of necessary change processes relating to innovation and creativity, the automotive manufacturing company could make more mature investments in innovation and creativity at the workplace. Due to the identified triggers and the ability to use the prototypes, the automotive manufacturing company should be more aware of new possibilities relating to innovation and creativity and how to implement these into the organisation and work approaches. This way, one could argue that Kreativen, Refläkten, and Loggen each offer more radical solutions due to the consciousness they raise that could affect the whole organisation and work approach. A valid future direction for the automotive manufacturing company could be to use this consciousness and the prototypes to support learning and developing more agile approaches to work; leaning towards design thinking and using idea generation in more diverse, inclusive, and creative ways. This relates to that the prototypes arguably raise consciousness regarding innovation and creativity within the organisation and the possibility of more varied approaches to work.

It is possible that the prototypes as installed at the company did not generate enough feedback, or the “right” kind of feedback simply due to that the employees did not know how to utilise them. Note that the prototypes do not instruct nor teach the employees these methods and approaches which are rather radical in the context of the automotive manufacturing company, as I’ve perceived it, but they do support and suggest new ways of approaching work as they make the employees cautious of innovation and creativity. It lies in the hands of the company to learn from the prototypes and develop the new approaches according to what the users, the employees, need to be able to collectively visualise, support and stimulate their own, and others, innovativeness and creativity.
As can be interpreted from the literature study, we often develop spatial environments for innovation and creativity to support users (e.g. Magadley & Birdie, 2009; Haner, 2005; Moultrie et. al., 2007; Schaeffer, 2014). More rarely it seems so that one starts with looking at the activities to understand how the spatial environment could support them instead. During this master’s thesis, I have started with co-designing tools and support for activities without talking about the environment specifically, other than acknowledging it as a theoretically identified trigger and as important when talking about changing scenery which was an important, practically identified trigger. However, when the feedback from the prototypes arrived, it often was regarding the spatial environment in which the prototypes were situated and not about the functions of the prototypes and how they were utilized. This suggests, in a very loosely defined way, that the spatial environment is important to the activities and tools for stimulating, supporting and visualising innovation and creativity. The environment affects the efficiency of the activities and tools. Ultimately, this could suggest that starting with designing, developing and testing the actual tools and activities for innovation and creativity at the workspace gives the company valuable feedback and understanding about what spatial environment to develop supporting the employees. As developing and building on site can be a high investment regarding setting aside space and investing money, this method of first developing the tools and activities can prove to be valuable.

As noted in the literature study, Scott and Bruce (1994) conducted a study in which they found no relationship between resource supply and innovative behaviour. During this master’s thesis, the participants have expressed a need and want regarding being able to utilize tools and be taught methods and activities for supporting, stimulating and visualising innovation and creativity. These tools and methods all require resources. Perhaps it can be argued that the innovative behaviour might not change or be stimulated by merely offering resources for innovation. It could be that the resources must be made meaningful by simultaneously offering tools and activities as well as teaching the employees how to be innovative and creative. Again, this could be related to offering spatial environment as a resource for innovation and creativity which then might not raise innovativeness and creative thinking. However, offering tools, activities and methods for being innovative and creative could support the spatial environment and make it meaningful.

In the result of the literature study plenty of triggers for innovation and creativity were presented. However, these were not always matched by what was practically identified as triggers of innovation and creativity and thus not further discussed. This was due to that I aimed for designing solutions and develop prototypes for a specific context; the practically identified triggers reflected the context in a genuine way. However, some of the practically identified triggers could be perceived as relating to the theoretically identified triggers in more or less explicit ways. For example, the theoretically identified trigger “reward and recognition” could be related to the practically identified trigger “visualisation” in regard to that efforts such as creative ideas and innovations could be displayed at the workspace offering recognition and sometimes reward, if the ideas and innovations are used or celebrated. The practically identified trigger “solidarity” could be related to the theoretically identified trigger “facilitator (people)” as it brings up mutual competitiveness, mutual reinforcement, mutual support, and knowledge sharing. In conclusion, it could be possible to connect more theoretical triggers to the practical context depending on how we interpret and understand the triggers. I’ve decided to focus mainly on the practical triggers and how the employees have expressed them for the sake of caring for the context.
6.2 Methods

I've experienced that the methods I've used have helped me to keep a flexible relationship with the participants as well as building empathy between us. Using ethnography enabled me to come close to the participants and I want to believe that they experienced that our conversations included openness, as I did. Due to being close and co-designing the prototypes from the very beginning I experienced that the participants felt committed to the success of the prototypes. This enabled them to take on the roles as motivators and encourage other employees to use the prototypes. Thus, the role of the participants was not only as contributors of data but also as front-runners and co-designers. I believe this was made possible only due to that the methods invited the participants to be part of the designing of the prototypes and feel invested in the results.

One complication that I experienced with committing to ethnography was the amount of time and effort it required. First, the planning and organising of the ethnographic studies was important and time consuming. Not only did I need to learn some basic information about the organisation to be able to ask meaningful questions, I also needed to spend time on shaping open questions that also gave the participants the opportunity to further develop their answers. However, being able to adjust and add questions during the interviews did prevent that I lost valuable data even though I had not been able to think of the question in beforehand. Second, I had to plan for dates to meet with the participants both for the actual ethnographic studies but also for introduction-sessions, such as the kick-starter held to introduce the participants to the photo ethnographic study. It was directly crucial to the results that the participants understood the meaning of the photo ethnographic study, thus it was important to introduce them to the method. Lastly, the analysis and synthesis of the result required me to interpret a wide arrange of data and create meaning out of it by looking for patterns between the data from the ethnographic studies and the literature study. Despite the ethnographic methods being time-consuming and hard work, the benefits outweighs it.

6.3 Ethics

Using ethnographic methods means getting close to the personal opinions and experiences of the participants. There is a risk of asking too personal questions during the ethnographic studies or receiving delicate information that the participants trust you not to bring forward. It also involves having the responsibility of interpreting information and understanding it in the way intended by the participant. Should I interpret anything in a way that was not intended by the participant, their experiences and opinions might be faultily used in the results. Thus, making sure to take time to talk with the participants and ask additional questions to gain clarification is obligatory, however I do not believe that I can fully ensure that I've interpreted and understood all the information, opinions, and experiences shared by the participants in the correct way and thus acknowledge that the human factor might have affected the results.

Another very important and delicate aspect that I was confronted with was what was shown in the pictures contributed by the participants. I had received directions regarding not including pictures in the published
material that showed any information about the automotive manufacturing company that could hurt them if put in the wrong hands, such as pictures including early prototypes of products. This confidentiality makes it more difficult for me as a researcher to remain transparent with my methods and results while it is of utter importance that the company and participants are not mistreated during my research and that our trust is not broken.

6.4 Generalisability and Limitations

As stated earlier, I have attempted to take the context of the automotive manufacturing company in regard during the whole master’s thesis. This approach has by all means forged the methods used and the results in a certain way, to make sure that the outcome is as close to the real context as possible. Traditionally, we would say that this makes the results limited to the specific context and not easily applicable in any other case. However, I would like to argue that if the results are true in this context, even if it is specific to one organisation, it could also be true for another. The designed solutions, the prototypes, could still be utilized by employees in other automotive manufacturing companies as well as be fitted into other types of organisations such as the public sector and non-profit organisations. The need for having support, stimulation and visualisation for innovation and creativity is not specific to the one automotive manufacturing company.
7. Conclusion

Within this master's thesis is argued that triggers of innovation and creativity concerning spatial environment and culture found in previous literature could be re-interpreted and applied to physical artefacts. Examples of such artefacts have been designed as part of this master's thesis to support certain triggers identified within the workspace that are desirable according to the employees. Thus, the main focus has been on how to use an artefact as a container of these triggers, much like how a computer screen is used as a container of information to help us fulfil our needs and take action. The artefacts are only prototypes at this stage, however they arguably raise consciousness about necessary change processes in relation to innovation and creativity within the organisation and the relating work approaches. Hopefully, this new consciousness results in a collective effort to visualise, support, and stimulate innovation and creativity further within the organisation. By raising awareness, the prototypes themselves also aim to visualise, support, and stimulate incremental innovation and creativity. Thus far, this is achieved by providing dedicated tools for innovative and creative work, such as a bean bag and a noise reducing screen to provide the employees with a tool for reflection, which is a new approach to work in the context of the automotive manufacturing company. Moreover, should the company want to further invest in innovation and creativity the prototypes could be used in developing and trying out new approaches to work within the organisation; such as incorporating design-thinking into the organisation and using idea generation in a more diverse, inclusive and creative way. Overall, the prototypes could be used to provide a foundation for raising consciousness about necessary change processes in relation to innovation and creativity to learn more about how the organisation and the employees can develop their innovative and creative work.
8. Recommendations for Future Research and Work

This master’s thesis leaves many different adaptations, tests, and experiments left to future work and research since it has focused on identifying triggers and designing channels for these triggers (artefacts) in co-design with a group of participants. Future work or research could with benefit revolve around gathering long-term, real data about the implementation, utilisation, and further development and adaption of the artefacts in their natural environment and with observations from actual users. This concerns deeper analysis of particular aspects of the artefacts, such as the users’ different approaches to work when using the artefacts and how the artefacts can be further re-designed in an iteration to better suit the users’ needs. It also concerns further work and research regarding triggers and developing a framework for defining what kind of triggers concerns this kind of work and how they could best be understood and defined or described. Thus, my main two recommendations for future research and work are as follows:

1. For future research and work, I recommend implementing the artefacts in their natural environment and letting the actual users grow familiar with them for you to gather long-term, real data about the implementation, utilisation, and course of natural change such as further development and adaption. It would also be curious to see if the same artefacts used by different departments would be utilised and adapted in different ways or if aspects such as position within the workplace affects the results. This however requires time and thorough analysis.

2. I also recommend developing a framework regarding what kind of triggers concerns this area of research and in what way they could be understood and defined. As of now, there has been little to no consideration as to if the triggers used are implicit, explicit, intangible, touchable, and so forth. It would be beneficial to develop this framework to systemise and clarify the area of research as well as making it easier to be transparent and equal when talking about triggers in this particular context.

Furthermore, I recommend looking into considering the methods used by the users when in contact with the artefacts. There is a possibility, as in the case of this master’s thesis, that there are no already established methods for visualising, supporting, and stimulating innovation and creativity in place. If so, it could be beneficial to provide at least a few methods to go along with the artefacts to ensure that the users can in fact utilise the artefacts in an efficient way. Looking into co-designing these methods and approaches for innovative and creative work with the employees while using the actual artefacts would be desirable.

Finally, I have chosen to co-design artefacts and keep a human centred design perspective in combination with innovation management and creative methods in an automotive manufacturing context. Other fields, research traditions, perspectives, and contexts could surely be adopted to this kind of research as well. For instance, I have already mentioned service innovation as a possible alternative. Other more varying alternatives would be to apply this kind of research to health-and welfare, engineering, art, or economy and thus also look at different context with other needs and triggers as well as traditions.
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Figures

Figure 1: The Fuzzy Front End. (2018). Illustration inspired by Sanders and Stappers (2008), design process inspired by Ambrose and Harris (2010), both processed by Von Morgen, 2018-05-12.

Figure 2: The design process. (2018). Illustration inspired by Ambrose and Harris (2010), processed by Von Morgen, 2018-05-12.


Figure 4: Inspirational pictures regarding photo ethnographical study. (2018). Photos collected at https://www.pexels.com/, collage created by Von Morgen.


Figure 6: Memory-game in action and sketches. (2018). Von Morgen.

Figure 8: Kokongen, sketch. (2018). Von Morgen.

Figure 9: Stormen, sketch. (2018). Von Morgen.

Figure 10: Flex-mattan, sketch. (2018). Von Morgen.

Figure 11: Insopo-hyllan, sketch. (2018). Von Morgen.

Figure 12: Kreativen, prototype. (2018). Von Morgen.

Figure 13: Kreativen in action as used by employees. (2018). Employee contribution from feedback.

Figure 14: Reflakten, prototype. (2018). Von Morgen.

Figure 15: Loggen, prototype. (2018). Von Morgen.