Hackathons: An Effective Communication Tool for Innovation within an Organization?

A qualitative study

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ABSTRACT

Organizations need to innovate in order to survive in the current fast-paced and competitive markets. However, next to the external environment, the internal environment of an organization also demands a need for change. To be more precise, organizations are encouraged to foster innovation internally as the human dynamics within an organization are constantly shifting, and the formation of silos and deadening routines need to be prevented. An innovation ''tool'' that is increasingly implemented by organizations for the purpose of managing innovation is the hackathon. More specifically, internal hackathons, involving employees of the organization itself, are implemented for the purpose of fostering innovation within an organization. Internal hackathons, like hackathons in general, are mainly driven by creativity, talent-recruitment, and PR and marketing purposes. Therefore, this research aimed at finding out to what extent these internal hackathons were effective, as a communication tool, for implementation of innovative ideas within the organization. In fulfilling this aim, the role of communication in innovation management and employee commitment and engagement, were taken as variables for determining the intention to implement. The behavioral intention was suitable in predicting actual behavior as explained by the theory of reasoned action. In order to answer the research question, a qualitative approach was taken as ten in-depth interviews were conducted. Three different groups of interview respondents, all in possession of well-grounded experience with internal hackathons, were chosen for the purpose of this research. As for processing the collected data, a qualitative thematic content analysis was conducted. In the end, the results indicated that hackathons have the potential to act as a communication tool for the purpose of innovation, when the role of communication in innovation management and employee commitment and engagement are kept into account. Additionally, organizational structures were revealed to play a prominent role in the implementation of innovation as well. In fact, even when the intention to implement was strongly present it was found that the implementation of innovation could still be challenging due to the size of the organization, interdependencies, and bureaucracy in general.

KEYWORDS: *Internal Hackathons, Organizational Communication, Employee Commitment and Engagement, Organizational Structures, Innovation*

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[Preface]

The following report is my Master Thesis for the Master in Media & Business part of the Media Studies at the Erasmus University in Rotterdam. It is intrinsic to acknowledge the people who helped me throughout this concluding step to obtain my master's degree.

First of all, I would like to thank my supervisor, dr. Sarah van der Land, for her guidance and support during this process.

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1. INTRODUCTION

It is generally acknowledged that organizations need to innovate in order to survive (Crossan, & Apaydin, 2010). Especially when the business environment demands change, organizations prompt to invest in innovation purposes (Cassiman & Veugelers, 2006). However, an organizations internal business environment is just as important and inhibits the same necessity for change (Vermeulen, Puranam, & Gulati, 2010). The researchers continue to explain that the human dynamics within an organization are constantly shifting and therefore require the organization to change along with them. Internal change thus prevents the formation of silos and deadening routines that will build over time (Vermeulen et al., 2010). Therefore, the question is no longer whether innovation is needed but of how innovation can be managed in organizations (Sánchez, Lago, Ferràs & Ribera, 2011).

An innovation ''tool'' that is increasingly implemented by organizations for the purpose of managing innovation is the hackathon (Irani, 2015; Lampel, Jha & Bhalla, 2011). Hackathons can be defined as events organized for the purpose of testing and generating new ideas, with either external or internal participants involved in the solving of a specific problem within a restricted amount of time (Briscoe & Mulligan, 2014, p.1). Moreover, as hackathons have their roots in software development, the word hackathon itself is a combination of the words ''hack'' and ''marathon'' (Briscoe & Mulligan, 2014). The example of Facebook's beginnings clarifies how hackathons can aid the innovation process. Facebook's beginnings reflect the essence of hackathons, considering that a lot of ordinary nights at Facebook were like hackathons. When and if someone decided to stay up all night and build a prototype, they just went ahead and did it (Keyani, 2012). This led to some of the most well known products of Facebook, including Video, the Like button and Timeline. Facebook still organizes hackathons as a way to stimulate collaboration and innovation. The difference between then and now is the size of the company. The large number of people involved in the company requires a more structured organization (Keyani, 2012).

However, apart from the digital technology industry, hackathons are now increasingly used for different purposes by a variety of different organizations (Lampel et al., 2011). From financial consultancies, to recruitment agencies and even governmental institutions, everyone is organizing hackathons (Ganguly, 2015; Irani, 2015, p. 6; Johnson & Robinson, 2014; van de Sande, 2015). The main drivers for organizations organizing hackathons are found to be fostering creativity, recruiting talent, and PR and marketing purposes (Gurion, 2012; Lampel et al., 2011; Pedersen, 2014;). The latter thus helps in explaining the overarching drivers of

hackathons to be organizations' general necessity for change (Cassiman & Veugelers, 2006; Vermeulen et al., 2010).

According to Lampel et al. (2011) hackathons are not an entirely new concept and have been taken place in slightly different formats and labels ever since the 18th century. Moreover, it is not that traditional, hierarchical business models are deemed ineffective (Kotter, 2012). However, as the current digital age does require a lean and agile approach (Lim, 2014), hackathons do bring game-changing benefits along for innovation (Lampel et al, 2011). Lim (2014) explains the agile approach as one in which organizations adopt the principles of, continues improvement and responsiveness to change. Moreover, according to Kotter (2012) agility can solve the challenges that hierarchical organizations face, especially in a fast paced digital world where continues assessment, speed, and creativity are required for an organization to survive competition. Considering the purpose of a hackathon, which is the rapid testing and generation of new ideas in the solving of a specific problem (Rosell, Kumar & Shepherd, 2014), and open innovation that allows looking beyond departmental or even company borders (Lampel et al., 2011; Möller et al., 2014), hackathons are considered to be a tool for agility. The latter is increasingly recognized by traditionally bureaucratic organizations, such as the financial industry and governments (Johnson & Robinson, 2014), considering that they are organizing hackathons as well. Therefore, a better understanding of agile tools such as hackathons is prominent as it serves the understanding of the broader phenomenon of the occurring change in organizational culture.

Considering this interest in better understanding organizational cultures, specifically company-internal hackathons will be focused on within this research. These types of hackathons involve participants from within the organization (Briscoe & Mulligan, 2014). However, it can still be considered open innovation as it has been proved that internal hackathons bring people together from different disciplines within the organization, strengthens their collaborations, and spreads ideas and best practices in a variety of ways (Möller et al., 2014; Terwiesch & Xu, 2008). Furthermore, in relation to the latter mentioned prominence of collaboration, communication cannot be forgotten (Vermeulen et al, 2010). Persuasion of relevant stakeholders through communication is in fact one of the most important determinants of effective implementation of innovation (Fernandez & Rainey, 2006). Hackathons can therefore also act as a communication tool for the purpose of innovation. Therefore, taking an organizational perspective centered on communication, and zooming in on hackathons as an agile communication tool, will allow to look more in-depth into how innovation within an organization is impacted and led to the formulation of the

following research question: "*To what extent are internal hackathons effective as a communication tool for the implementation of innovative ideas within an organization?*" This research thus focuses on the effectiveness of hackathons, which will be determined by the extent to which the hackathon-generated ideas are actually implemented internally. Moreover, this study will focus on idea-generation (fostering creativity) as the driver for organizing a hackathon, and defines innovation as the actual implementation of the hackathon-generated ideas (Hennessey & Amabile, 2010, p. 585).

The scientific relevance of this study is made apparent considering that research on hackathons potential as a tool, of any kind, for innovation is still in its nascent stage (Armisen & Majchrzak, 2015; Lampel et al., 2011). This study will thus fill in the existing gap and track the phenomenon's effectiveness for innovation as it occurs. Moreover, as Johnson and Robinson (2014) state that in theory hackathons should result in beneficial innovation, the reality is inconclusive because of the scarcity of empirical evidence and consequently also that of implementation of hackathons (Johnson & Robinson, 2014). Therefore, the findings of this study will serve a relatively longer-term considering the linkage to the broader phenomenon of increased implementation of agility (Johnson & Robinson, 2014; Lim, 2014), and with that be beneficial for future hackathon implementations. The practical relevance of this study is related to the growing societal interest in innovation contests (Zwetsloot, 2014), and the increased recognition of the specific benefits that internal hackathons can bring forth (Johnson & Robinson).

This research paper will begin with a theoretical framework, which will introduce the main concepts and line of argumentation. More specifically, this section will provide an overview of the most recent literature with regard to hackathons and organizational innovation. Next, a thorough explanation for methodological choices, such as a detailed overview of the sample and the specific (qualitative) method of analysis, will be provided. Following the method chapter, an elaborate report and discussion on the results of the research will be provided. Lastly, a discussion will be provided in order to link the findings back to literature and set the base for the conclusion, in which the implications that the research has for organizations that plan to organize internal hackathons will be provided.

2. THEORETICAL FRAMEWORK

Organizational external and internal environments demand innovation, often taking creativity and idea-generation as a starting point (Cassiman & Veugelers, 2006). However, successful implementation of innovation requires more than just idea-generation (Hennessey & Amabile, 2010). In relation to the challenges attached to the implementation of innovation it is necessary to consider external factors.

Therefore, this theoretical framework will discuss the challenges and external factors that need to be taken in to account when implementing innovation. Starting with the general and further conceptualization of internal hackathons, explaining what internal hackathons are, where they come from and in what forms. Followed by an explanation of the more specific expected relationships between internal hackathons and the role of communication in innovation management and employee commitment and engagement. Concluded with an explanation of the intention of a variety of stakeholders to implement hackathon-generated ideas and with that to what is here considered effective innovation (actual implementation). Finally, at the end of this chapter, the discussed concepts will be integrated in a conceptual model that visually displays the relationship between the different variables (see p. 18).

2.1 Hackathons

In light of organizations' need for innovation (Crossan, & Apaydin, 2010) in a dynamic and competitive environment (Wang & Wang, 2012) hackathons are considered to be efforts to help nurture the needed innovation (Briscoe & Mulligan, 2014). According to Boudreau, Lacetera and Lakhani (2011), these types of contests are appropriate mechanisms for inducing innovation. Whether you call it a hackathon, a code fest or sprint, what it comes down to is that a stimulating atmosphere is provided in which participants are encouraged to join and collaboratively brainstorm and tackle problems (Möller et al., 2014). Moreover, even though these innovation initiatives capture headlines only recently, they are not new and go back to the 18th century when governments and organizations were already organizing similar natured events (Lampel et al., 2011). However, the reason why 'hackathons' are considered to be game changers now is mainly related to their inherence of open innovation (Lampel et al., 2011). Open innovation causes for a larger, more diverse solver population and with that to more optimal solutions coming from those with the most relevant expertise (Lampel et al., 2011; Terwiesch & Xu, 2008). Organizations are thus in fact shifting from closed innovation processes towards a more open way of innovating (Lampel et al., 2011). Where, new

business development processes traditionally took place within the firm's boundaries, this has now extended to outside of the firm as well (Ye, Xu, Jia & Jiang, 2012).

As organizations are now increasingly recognizing the potential of open innovation practices (Lampel et al., 2011), and are implementing similar initiatives across a variety of industries (Briscoe & Mulligan, 2014), hackathons can be considered to be tool for innovation. Moreover, according to Ye et al. (2012) the two recognized models of open innovation involving communities concern 1) competition based 2) collaboration based open innovation (Ye et al., 2012). One could argue that as external hackathons involve participants from outside of the company, they fall under the specific type of open innovation referred to as crowdsourcing (Lampel et al, 2011; Ye et al., 2012). Crowdsourcing is the act of taking a job traditionally performed by an employee and outsourcing it to generally a large group of people outside of the organization in the form of an open call (Ye et al., 2012). On the other hand, internal hackathons involve people from within the organization, appropriately conceptualized as company-internal by Briscoe and Mulligan (2014). However, according to Ye et al. (2012) internal hackathons can be considered to be collaboration based open innovation, in which the internal community of the organization is the audience to which an open call is made.

Moreover, as external and internal hackathons are different in their form, they can cause for differing outcomes. Research on the complementarity between innovation activities, internal research and development and external knowledge acquisition has found that internal R&D and external knowledge acquisition are complementary innovation activities (Cassiman & Veugelers, 2006). However, as acquiring external knowledge (e.g. consultant agencies) falls under the criteria of external hackathons and is often more costly, the incentive for organizations to organize hackathons internally increases. Next to the monetary incentive to organize hackathons internally, the room for exploration that hackathons create, is predicted to be beneficial in terms of making strategic shifts, utilizing opportunities and staying ahead of competition (Gersch, 2013). Moreover, internal hackathons are found to be fostering organizational collaboration on an interdisciplinary level. This can be explained by the focus on bringing people together and encouraging mutual dependencies between people from different departments and disciplines as explained by Möller et al. (2014). The latter, once again, making it a relatively more attractive choice for organizations to implement company-internal hackathons.

Considering the scarcity of research and the above explanation it is likely that by now a rather vague perception of hackathons is realized. Irani (2015, p.5) provides a clear

description of what the hackathon process entails in broad lines. This description is provided here in order to further illustrate and clarify the hackathon event as referred to in this research. In the most basic form a hackathon entails an intense, multiday event dedicated to rapid idea generation. It starts, with hackathon organizers inviting a variety of professionals with relevant skills to spend one to three days working on the solving of a particular problem and eventually towards the creation of a prototype. Organizers take care of facilitative aspects such as space, power, wireless Internet, and often food. Participants on the other hand, bring their production skills, their undivided attention, and perhaps their computers. Hackathons usually continue at night, as it is a multi-day even often planned during weekends, and thus not during working time. Due to the latter, hackathons are at times perceived as times away from routine obligations, including both family and work life. Participants form teams, explore ways to address the focal theme, and push toward a prototype. At the end of a hackathon, those who managed to build prototypes get the opportunity to showcase and pitch this to the rest (Irani, 2015). This is where the prominent process of decision-making will take place, related to the consideration of the ideas for actual implementation, which plays a prominent role in this research and is considered to be the definition of innovation (Hennessey & Amabile, 2010).

While there is substantial anecdotal knowledge and experience of hackathons, academic information is limited (Briscoe & Mulligan, 2014). Considering hackathons as a new label for what was recently referred to as think tanks (Baccarne, 2015) code fests or sprints (Möller et al., 2014), puts more weight to the discussion. It points out that the main thing that we are trying to figure out is how people can be most creative and generate new ideas. By assessing the effectiveness of internal hackathons as a communication tool for innovation, this study will address the latter mentioned discussion and focus on how hackathons may stimulate this creativity, and with that fill the specific gap in academic research on the topic.

2.2 Hackathons & the Role of Communication in Innovation Management

One of the main factors that challenge the effectiveness of internal hackathons could be what business scholars refer to as change management or innovation management. Change management is a theory that acknowledges the reality in which organizations are operating in changing environments (Kitchen & Daly, 2002). Consequently, this theory explains why people within organizations want to know how to cope with change (Kitchen & Daly, 2002). According to Fernandez and Rainey (2006) there are theories that downplay the significance

of human agency as a source of change. However, a significant amount of research also indicated that the capacity of managers to bring change in organizations is great, as they frequently actually do make change happen (Fernandez & Rainey, 2006).

The challenges that come with innovation management can further be extended to the number of occupational specialties, the intensity of scheduled and unscheduled communication and the decentralization of decision-making (Naranjo Valencia, Sanz Valle & Jiménez Jiménez, 2010). Moreover, Naranjo Valencia et al. (2010) have concluded that an organic form of organization is the solution when it comes to innovation. However, Bodewes (2002) argues that research on formalization inhibiting organizational innovation needs to be revisited, as there is more than one effective way to organize for innovation. Also, it has been stated that the reason that companies are not good at innovation is because few understand what it really takes to integrate innovation throughout the entire organization (Loewe & Dominiquini, 2006). This understanding of the innovation problem requires companies to not only treat the symptoms but to act on the root causes. The root causes are found in four main areas; leadership behavior, management processes, people and skills, and culture and values (Loewe & Dominiquini, 2006). These four areas imply the challenges to be related to organizational communication and managers ability to implement change across the organization. On top of that, Koschmann's (2010) constitutive model of communication further supports the prominence of the role of communication in innovation management. This line of thinking entails that communication is the constitutive and major force behind all organizational activities, structures, and processes, and is often referred to as 'organizations as communication' (Koschmann, 2010).

Based on the above, integration of innovation requires effective organizational communication. In the original sense, organizations realize the importance of communication in innovation management, but usually fail in practice (Kitchen & Daly, 2002). Fernandez and Rainey (2006) explain how persuasive communication can play a powerful role in organizational change. In fact, among the prominent determinants of effective implementation of innovation, is the persuasion of every important stakeholder into verifying that the change is needed (Fernandez & Rainey, 2006). The researchers explain that it is important to build internal support and commitment through persuasion both from a top-down as well as bottom-up approach (Fernandez & Rainey, 2006). Meaning that even though executive support is sensibly prioritized, it is also important to minimize your employees or co-workers resistance to change, as they will be the ones actually carrying it out.

Exploring the prominence of internal communications to an effective implementation of change (innovation) management programs is therefore considered to be a logical next step for further research (Invernizzi, Romenti & Fumagalli, 2012). For the purpose of this study the latter mentioned will be referred to as the role of communication in innovation management. As for internal hackathons, it can be considered an effective tool for communication for change in the sense that it involves the collaboration of employees, allows cross-departmental communication (Möller et al., 2014), and provides a salient platform for employees to convince everyone involved in the organization from a top-down as well as bottom-up approach (Irani, 2015, p. 6).

2.3 Hackathons & Employee Commitment and Engagement

For an organization to change, especially for large organizations with great number of employees, each individual must be involved and convinced (Hirschhorn, 2002). Moreover, studies examining the institutional motivations for innovation state that the topic is still empirically understudied and theorize that organizational motivations may be linked to a variety of factors (Jun & Weare, 2011). As established earlier, one of the most prominent determining factors for organizational change is (persuasive) communication (Ahuja, 2016; Fernandez & Rainey, 2006; Vermeulen et al., 2010). However, this section will specifically focus on employee commitment and engagement as the determining factor for organizational change. The following paragraphs will elaborate and explain why.

Organizational commitment entails the extent to which the employee identifies with and is involved in a particular organization (Van den Hooff & de Leeuw van Weenen, 2004). Moreover, the researchers have found that organizational commitment is an antecedent for the willingness to share and acquire knowledge (Van den Hooff & de Leeuw van Weenen, 2004). As for engagement, research defines it as an employee's vigor, dedication and absorption (Kassa & Raju, 2015). Moreover, some even go to the extent of referring to the latter as employee satisfaction, as it is about the feeling that you are part of an extraordinary team, that you are learning and growing, and that you can make a real impact (Garton & Mankins, 2015). Hackathons in their essence being collaborations, not only encourage knowledge sharing and community building, but also organizational change. As organizations do not want to change but often have to change the automatic expectation is that changing is something difficult (Hirschorn, 2002). However, change does not have to be difficult. It is a matter of campaigning appropriately and coherently for the change you want

and thus need to act as a change agent (Hirschhorn, 2002). The latter is exactly where hackathons are considered to be potentially effective as a communication tool.

This campaigning for change is inherent to corporate entrepreneurship, considering that you have to convince the organization to implement your idea. Corporate entrepreneurship, often referred to as intrapreneurship, is a broad term used to describe the ability to develop and implement new ideas into the organization as an employee (Hayton, 2005), and is reported to be present and encouraged by established firms (Kacperczyk, 2012). In relation to this ability, it has been reported that employees' engagement is influenced by monetary or reputational rewards, management support and a supportive organizational structure (Hayton, 2005; Kassa & Raju, 2015; Yuan & Woodman, 2010). Moreover, Hayton (2005) states that employees who exhibit a high desire for rewards are relatively more committed to the organization.

As external hackathons usually include giving out prizes to the winning team or person, and internal hackathons can include either monetary rewards or reputational rewards, the inherency of rewards and competition in hackathons is demonstrated (Briscoe & Mulligan, 2014, p. 2). Considering the latter, hackathons, as a communication tool, potentially have a meaningful role in the context of intrapreneurship. Moreover, as research suggests that situational factors such as organizational support play a major role in explaining intrapreneurial spirit (Hayton, 2005), the relationship between the organization and its employees can be viewed as a mutually beneficial arrangement. Where a supportive work environment is expected to have the strongest role in promoting corporate entrepreneurship, and with that enhances employee commitment and engagement (Ahuja, 2016; Kassa & Raju, 2015). Therefore, companies that want to engage these innovators, and encourage the behaviors in others, should offer incentives to keep them engaged and present them as role models for the rest of the organization (Ahuja, 2016).

To sum up, the extent to which intrapreneurship is inherent to an organization determines the extent to which employees are committed and engaged. In fact, Ahuja (2016) refers to industrious intrapreneurs, the committed and engaged employees, as corporate hackers. Considering the purpose of hackathons, in which the focus is on collaboration, community building, knowledge sharing, opportunities, and ability to innovate, it can be argued that hackathons have the potential to foster employee commitment and engagement (Rosell, Kumar & Shepherd, 2014).

2.4 The Role of Communication in Innovation Management & the Intention to Implement Hackathon-generated Ideas

According to Sánchez et al. (2011) communication and information dissemination within an organization are inherent and prominent innovative practices. Especially when it comes to reusing existing knowledge and information for innovative purposes, poor communication can lead to repeating mistakes and wasting scare resources (Sánchez et al., 2011). Studies have presented the prominence of internal and more specifically persuasive communication to an effective implementation of innovation (Ahuja, 2016; Fernandez & Rainey, 2006; Invernizzi et al., 2012). Moreover, Kitchen and Daly (2002) state that if internal communication is key for the implementation of successful change management programs, then understanding that link could prove crucial for all ventures, as they adjust not only to new circumstances locally but also internationally.

Therefore, the aim here is to understand the link between persuasive organizational communication and implementation of innovation. In an attempt to provide advise for organizational innovation management, Cormican and O'Sullivan (2004) have identified several key factors for successful product innovation, in which the final key factor identified is: communication and collaboration. Moreover, as innovation is a knowledge intensive process, it can be described as an information transformation process where information is gathered, processed and transferred creatively throughout the organization (Cormican & O'Sullivan, 2004). More importantly, research has made evident that communication is vital for project success (Doloi, 2009). In fact, Kitchen and Daly (2002) conclude that employee communication does not just have a role in the management of change; it has the most essential role.

Naturally, it becomes interesting to study the innovation process. However, in light of this research's topic, namely hackathons, in order to determine whether a hackathon is effective it is important to investigate whether the generated ideas were actually implemented. Especially, considering that innovation is defined as the actual implementation of creative ideas (Hennessey & Amabile, 2010, p. 585). In order to investigate and uncover the implementation of innovation Ajzen & Fishbein's (1970) theory of reasoned action is used. This theory explains the extent to which behavioral intention is prominent for predicting actual behavior (Ajzen & Fishbein, 1970). The latter makes the requirement to further investigate what the possible influencers of intention in this case are, evident. One of the influencers of the behavioral intention to implement hackathon-generated ideas is

expected to be the role of communication in innovation management, communication for change, as demonstrated in this section.

2.5 Employee Commitment and Engagement & The Intention to Implement the Hackathon-generated Ideas

As for the second influencer of the behavioral intention to implement hackathons, and the need to further investigate this, this section will elaborate on employee commitment and engagement.

Research on innovation contest participants suggests that a very high as well as a very low degree of cooperative orientation result in a high degree of innovativeness (Bullinger, Neyer, Rass & Moeslein, 2010). Here, a low degree of cooperative orientation can be interpreted as a high degree of competitiveness. Meaning that both high degrees of competitiveness as well as that of collaboration result in innovation (Bullinger et al., 2010). The latter is in line with the very nature of hackathons, being both collaborations and competitions (Ye et al., 2012). After all, hackathons are collaborations, that inherent competition to some extent considering that rewards in some form are involved. Nevertheless, both collaborative as well as competitive oriented innovation contests are argued to be increasing employee commitment and engagement (Hayton, 2005; Kassa & Raju, 2015; Van den Hooff & de Leeuw van Weenen, 2004).

It has been established earlier in this chapter that the extent to which intrapreneurship is inherent to an organization, determines the extent to which employees are committed and engaged. In fact, as Ahuja (2016) explains, companies need to identify these extra engaged, corporate hackers, and find out what drives them in order to foster internal innovation. These employees being resilient draw others to their cause and utilize existing resources and lean approaches to realize their ideas (Ahuja, 2016). Therefore, this has now led to the argumentation that employee commitment and engagement are predicted to play prominent roles in the shaping of the behavioral intention to implement hackathon-generated ideas.

2.6 The Intention to Implement Hackathon-generated Ideas & Effective Innovation

A vast majority of research has demonstrated that behavioral intention is a good predictor of actual behavior. Moreover, the theory of reasoned action (TRA) explains that a person's behavior can be predicted by their behavioral intention (Ajzen & Fishbein, 1970). However, before the intention to effectively innovate can be investigated, it is essential to establish a definition of effective innovation and theoretically substantiate it.

According to Wang & Wang (2012) almost every industry has to deal with competition in the current dynamic and knowledge-based economy. There is a lot of strong competition between companies, where markets are adapting quickly and making it impossible for a single company to keep a competitive advantage for a long time. The latter is what makes companies realize that the base for competitive advantage is innovation (Wang & Wang, 2012). Moreover, Abou-Zeid & Cheng (2004) explain that there are two perspectives of innovation, the thing-oriented perspective where innovation is considered a product or outcome, and the process-oriented perspective in which innovation is understood as the process of introducing something new (Abou-Zeid & Cheng, 2004).

The adoption of innovation, which is part of the process-oriented perspective (Abou-Zeid & Cheng, 2004), is usually intended to contribute to the performance or effectiveness of the organization (Damanpour & Schneider, 2006). According to Damanpour and Schneider (2006) the innovation process consists of several stages, the most common investigated ones being generation and adoption. The innovation generation stage includes problem solving and decision-making in the development of new products or processes. The innovation adoption stage, referring to the implementation of new products, processes or practices into an organization, has been conceptualized as a multistage process. The three widely recognized phases of the innovation adoption are: initiation, adoption decision, and implementation (Damanpour & Schneider, 2006). The adoption phase of innovation, the actual implementation, will be conceived as effective innovation for the purpose of this study.

In conclusion, within the scope of this study effectiveness is perceived as the actual implementation of the innovation that resulted from internal hackathons. Considering that internal hackathons involve people, employees, from the organization itself, the employees' behavior will be the subject of investigation. The behavioral intention to implement will thus be measured as a way of predicting actual behavior. After all, organizations can organize internal hackathons, but if they have no intention to actually implement the suggested outcomes of the hackathons, it will still remain ineffective.

2.7 Conceptual Model

As it is allowed to formulate expectations in qualitative research (Janssen & Verboord, 2015), a conceptual model of how phenomena are related is included (see Figure 1). This will be done for the purpose of providing an overview of the line of argumentation, and thus will not be aimed at testing the relations or providing ''hard'' evidence. This first version of the conceptual model (see Figure 1) integrates the discussed literature and demonstrates how

internal hackathons could influence innovation within an organization, by illustrating the relations between the different variables and the possible behavioral outcomes. Moreover, the model visualizes the relations between different dimensions and the possible behavioral outcomes initiated by a company-internal hackathon.
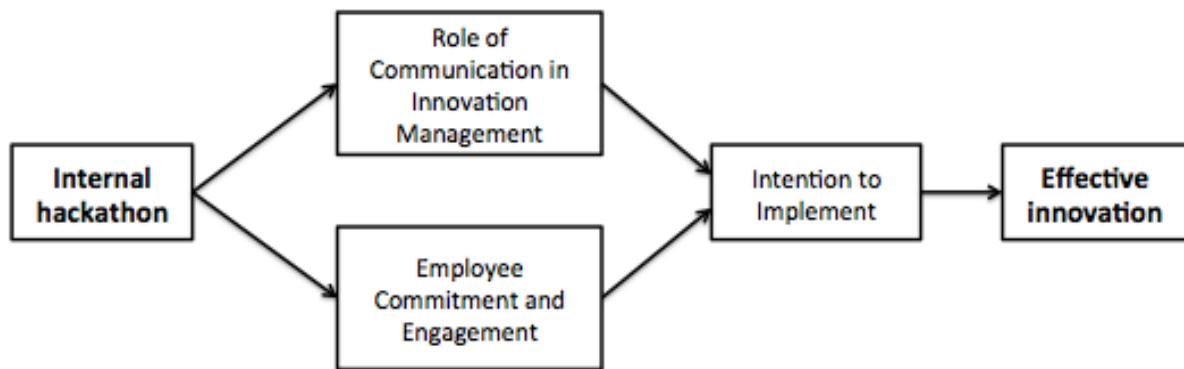

Figure 1. Conceptual Model

As demonstrated above in Figure 1, this conceptual model proposes that the occurrence of an internal hackathon is the initiator of all relationships. Therefore, it is expected that this will have influence on the role of communication in innovation management as well as on employee commitment and engagement. Internal hackathons are considered an effective communication tool for innovation seeing that they enhance the ability to convince the employees of the change you want to implement. Moreover, employee commitment and engagement are expected to increase through the implementation of a hackathon, as hackathons focus on collaboration, provide rewards, and the ability to innovate. Here, the hackathon can be considered a tool for communication due to its ability to foster employee commitment and engagement. Consequently, both the role of communication in innovation management and employee commitment and engagement are expected to have an influence on the behavioral intention to implement ideas obtained from hackathons. This behavioral intention can be used to predict actual behavior following the theory of reasoned action (Ajzen & Fishbein, 1970). The behavior is conceptualized as effective innovation (see Figure 1*)*, referring to actual implementation of the innovative, hackathon-generated ideas.

3. METHODOLOGY

The purpose of this study was to investigate the effectiveness of internal hackathons for innovation within organizations. Considering the newness of hackathons and lack of existing research on the topic, a qualitative study was conducted. The following sections will justify choices made in the design process of this research. More specifically, firstly arguments for the research design and sample will be provided. Secondly, the procedure and the operationalization of the research will be discussed. And last but not least, data analysis and reliability and validity will be elaborated on as well.

3.1 Sample

Considering that this research intended to determine the effectiveness of innovation, through hackathon implementation, or in this case the behavioral intention towards implementation of hackathons, the subject of investigation were the employees of organizations that implement internal hackathons. Considering that these companies are already familiar with the tool, it made sense to investigate the extent of effectiveness here. Using criterion and snowball sampling methods, three different groups were selected for conducting in-depth interviews for the purpose of this study and the following sections will explain which groups and why. Additionally, Appendix B provides an anonymous yet detailed overview of the sample, including their gender, age and official occupation.

The first group concerned all employees who had participated in a company-internal hackathon in the past year. Internal hackathons require collaboration of employees, however inhere an extent of competition when rewards, in whatever format, are involved. In this particular competition, where the initial and eventual goal is implementation, communication is required in the sense that the organization needs to be convinced of the greatness of one's idea. The latter is also line with the notion of intrapreneurship (Kacperczyk, 2012), in which an employee's ability to develop and implement new ideas in to the organization are made prevalent. This is relevant for all, but especially for organizations with an agile business model, in which it is possible for any employee to initiate a hackathon and follow through on the implementation of the ideas that came out of it, thus any employee of such an organization was suitable to be interviewed for the purpose of this research.

The second group concerned employees who were in charge of decisions related to implementing innovation. This was especially relevant for more traditional and bureaucratic organizations. In these types of organizations the decision to implement hackathon-generated ideas are often allocated to a certain and small group of people. Therefore, for companies

with a bureaucratic business model, it was necessary to assess the respondent's role and responsibilities in advance, ensuring that the collected data was relevant. However, as it was quite challenging to get a hold of people with upper or middle management positions only, meaning people in power to make final decisions, this group also included employees from relatively lower ranked positions. However, here knowledge and expertise was assured due to the respondent's high involvement in the hackathon process internally, ranging from organization and facilitation to initiation.

The third group concerned the so-called hackathon experts, people who have organized a number of hackathons for a variety of organizations, involving both internal as well as external hackathons. In the search for interviewees I came across the fact that there was an entire industry of those who organize hackathons, including communication agencies but also specialized innovation agencies. Moreover, it is not only agencies that take part in the facilitation of hackathons, but also consultants and external advisors specialized in the topic. This third group of interviewees served to provide yet another, but more importantly and insightful perspective.

Furthermore, the suggestions of Broom, Hand and Tovey (2009) to pay greater attention to the intersectionality of gender, environmental, biographical and psycho-social factors in qualitative data analysis were followed, but unfortunately not optimally realized. The latter was mainly due to the acquisition of interviewees turning out to be a greater challenge than initially expected. Moreover, as it was difficult to interview a specific kind of informant (Mikecz, 2012), such as employees of companies who implement hackathons internally for the purpose of innovation within the organization, (purposive) criterion sampling was used to recruit participants (Babbie, 2011). Furthermore, it was soon made apparent by the very first couple of interviews that there is a whole community of hackers and hackathon-goers, which was extremely helpful and made snowball sampling possible. Thus, both personal as well as professional networks were used offline and online for the purpose of recruiting research participants. Dr. Sarah van der Land was kind enough to suggest and support in the acquisition of a couple of interviewees.

In the end out of the total of ten interviewees (N=10), eight were male and two were female. In terms of division of the interviewees to the three mentioned groups above, respondent 1 and 8 belonged to the first group, respondent 2, 4, 6, and 7 belonged to the second group, and respondent 3, 5, 9, and 10 belonged to the third group (See Appendix B). The age of the interviewees ranged from 19-54 years old, ensuring that the focus was not on a

specific age group but rather on an in-depth understanding of the behavioral outcomes of those partaking in internal hackathons.

Last but not least, despite the ideal of collecting data until the point of saturation, practical limitations were kept into account in the design of this research. Based on the estimations provided by the ESHCC methodological guide (Janssen & Verboord, 2015), ten interviews ranging between 45 and 60 minutes, conducted at 9 different organizations, is considered to be a sufficient, rich and meaningful amount of data for a master's thesis.

3.2 Research Design

To answer this study's research question, qualitative in-depth interviews were conducted. This choice can firstly be justified due to the inherent exploratory nature of qualitative (Lindlof & Taylor, 2011). Qualitative research is in general characterized by being more flexible than quantitative research, with the premise of having a good balance between structure and flexibility (Janssen & Verboord, 2015).

Secondly, as interviews allow the researcher to have an interactive role, knowledge is co-constructed in interaction with the participant (Legard, Keegan & Ward, 2003). The latter added to a clearer and more in-depth understanding of the participants' views. Especially considering that the gathered data was captured in its natural form, the interviewee had little time to design their answers, but was rather forced to some extent to give a natural and immediate response (Legard et al., 2003). Moreover, according to Legard et al. (2003) the method of in-depth interviews is one of the most powerful methods in qualitative research, as it allows the researcher to observe the mentality of individuals and to obtain an in-depth understanding of their experiences. Moreover, by conducting face-to-face interviews, online and offline, the ability to go more in-depth than the pre-formulated questions was provided. This being another advantage over quantitative research, where it is not possible to ask follow up questions where necessary and reveal potentially added insights (Minter, 2003).

Furthermore, as it is allowed to formulate expectations in qualitative research (Janssen & Verboord, 2015) a conceptual model (see Figure 1) of how phenomena are related was included and supported by academic research. This was done for the purpose of providing an overview of the line of argumentation, and thus was not aimed at testing the relations. The in-depth interviews and along going open-ended questions utilized this conceptual model as a basis for analyzing the behavioral processes related to: the role of communication in innovation management, employee commitment and engagement, and the behavioral intention to implement. On top of that, the conceptual model provided the right

balance of flexibility and systematicity required for good qualitative research (Janssen & Verboord, 2015). Moreover, the interviews were transcribed verbatim, and the data was analyzed according to qualitative thematic content analysis for the purpose of obtaining a rich and in-depth understanding of the data (Boeije, 2010). Additionally, the findings were compared with existent literature on the topic and led to formulate an answer to the research question.

All in all, considering all of the above, especially in relation to the lack of research on and recency of the topic of hackathons, the decision to conduct an explorative and in-depth study can further be supported.

3.3 Procedure

As indicated earlier, the criteria on which the respondents were chosen was mainly dependent on their experience and expertise in relation to company-internal hackathons. Therefore, it was also important to establish the recency of their experience, not only in relation to their eligibility, but also for the relevancy of this research. Especially considering that hackathons are a rather new phenomenon for most companies, a preliminary condition for respondents was that their experience with hackathons should not have taken place longer than a year ago. The interviews for this research were conducted in the period between March 29th and May 12th 2016. This was a bit longer than initially planned, but again considering the rather high dependence on busy professionals it could not have been avoided.

Furthermore as Mickecz (2012) pointed out, gaining the interviewee's trust and establishing rapport is of importance in the accurate obtainment of their personal interpretation. In line of the latter, the respondents were reassured of their anonymity and confidentiality of the research beforehand. Additionally, their informed consent was once again officially given and recorded at the beginning of the interviewee itself. Furthermore, interviews were planned in settings that were most comfortable for the interviewee as well. All interviews were conducted either face-to-face at agreed upon destinations ranging from offices, public libraries and restaurants, or online via Skype or Google Hangouts. The interviewees were all given the choice to choose the method of communication in order to ensure their convenience but also to indicate what they were most comfortable with. Moreover, as some interviewees preferred to do the interview in Dutch opposed to English, this was realized by translating the questions (See Appendix A) to Dutch.

Evidently, as presented in Appendix A, the interviews were semi-structured and followed an appropriate protocol. However, probing was used in order to facilitate a dialogue

that captured the essence of the study more accurately, and achieved a greater amount of breadth and depth (Legard et al., 2003). The interviews were digitally recorded and afterwards transcribed verbatim by the researcher. To be more precise, the Philips DVT 11500 voice recorder was used to record the interviews. However, notes were taken during the interview as well, particularly when the researcher felt that something beyond text and voice needed to be captured. The data obtained from the interviews, through the comprehensive process of preparing, conducting, and transcribing interviews, is therefore considered the main source in answering the research question. Last but certainly not the least, the interview transcripts were qualitatively analyzed by conducting a thematic content analysis as this allowed to explore detailed data, create order, find themes and patterns, and with that define the result of this study (Boeije, 2010).

3.4 Operationalization

As presented in the interview protocol (see Appendix A) the interview consisted of three parts: introduction, main and final part. The introductory part served to ask general and demographic questions in order to find out more about the interviewees: "What is your name, age and official occupation?'' However, before these questions were even asked, a general and short introduction as to what the research was about was provided.

The main part of the interview referred to the theoretical framework and conceptual model (see Figure 1). Consequently the interview questions were put in an order that followed the flow and argumentation of the conceptual model presented in Figure 1. Additionally, the formulation of the questions inquired about the links made in the conceptual model as well. Moreover, open-ended, semi-structured questions were prepared in order to make sure that all aspects that were significant for the research were covered (Ritchie, Lewis, Nicholls & Ormston, 2013). Additionally, the researcher put an effort in making sure that the questions were clear by providing contextual information before the beginning of each set of questions. The following section will operationalize the five main variables related to the research design: internal hackathon, the role of communication in innovation management, employee commitment and engagement, intention to implement, and actual implementation (effective innovation). Next to providing an exemplary question for each of the five concepts, the relationship with the previously discussed theory will also be explained.

Starting with questions asked with the aim of finding out more on what hackathons exactly meant to the interviewee: "What has your experience been with internal hackathons?'' (Appendix A). These questions were linked to the concept of *internal*

hackathons, which was previously referred to as company-internal hackathons by Briscoe & Mulligan (2014). Additionally, questions on the effectiveness and perceived goal of internal hackathons were asked as research had found that hackathons were open contests appropriate for inducing innovation (Boudreau et al., 2011; Irani, 2015; Lampel et al., 2011; Möller et al, 2014; Rosell et al., 2014; Terwiesch & Xu, 2008).

Questions centered on the link between hackathons and the role of communication in innovation management were complex, in-depth, elaborate and often twofold: "What is the role of communication when it comes to internal hackathons? Why?'' (Appendix A). The complexity of these questions had to do with the prominence of the concept of *the role of communication in innovation management* throughout this research. The discussed literature led to the argumentation that communication is vital for project success (Doloi, 2009; Kitchen & Daly, 2002; Koschmann, 2010), and that effective communication requires collaboration (Cormican & O'Sullivan, 2004; Möller et al, 2014) and persuasion (Fernandez & Rainey, 2006; Irani, 2015). The questions in this section thus served to find out whether organizational communication lived up to these statements when it comes to internal hackathons.

The questions centered on the link between hackathons and employee commitment and engagement were formulated in a similar complex manner as this was the second, expected, core independent variable of this research: "Do you feel there is room for you to develop and implement new ideas within your organization? If so, how?'' (Appendix A). These questions were linked to the concept of *employee commitment and engagement*, as previous research had established that employee commitment and engagement was fostered through the enablement of corporate entrepreneurship (Ahuja, 2016; Hayton, 2005; Kassa & Raju, 2015; Yuan & Woodman, 2010), which in turn was realized by hackathons as they allowed employees to develop and implement new ideas (Irani, 2015; Rosell et al., 2014).

Next were the questions on the intention to implement hackathon-generated ideas: "To what extent does having engaged and committed employees, influence the intention to implement according to you? Why?'' (Appendix A). These questions were linked to the concept of *intention to implement* as they investigated the expected relations with communication and commitment and engagement (see Figure 1) that were developed based on the theory discussed in the theoretical framework. The latter set of questions consequently led to the most prominent and conclusive questions focusing on *effective innovation*, in this case being actual implementation of hackathon-generated ideas: "For the purpose of this study effective innovation is perceived as the implementation of hackathon-generated ideas.

What are (next to communication and employee involvement) other things to consider when it comes to implementation of this innovation according to you? Why?'' (Appendix A). The conceptualization of effective innovation as provided in the above question was responsibly based on previous research (Abou-Zeid & Cheng, 2004; Damanpour & Schneider, 2006; Hennessey & Amabile, 2010). Moreover, as these were rather important question in relation to the research's aim as a whole, they were strategically asked near the end of the interview. This was done in order to avoid implications made by the researcher to influence the respondents' answer.

Last but certainly not least, a concluding question was asked in order to create room for input from the interviewee: "Would you like to add anything that has not been discussed so far?'' This concluding question reassured that whatever had been possibly overlooked by the researcher and thus not included in the interview, still got a chance of inclusion and added value to the scope of the study as a whole. The results of the main section were the main source of analysis; it is what led to find the common patterns among the respondents' answers, and in turn allowed comparison with relevant literature presented in the theoretical framework.

3.5 Data Analysis

The expected relationships (see Figure 1) were used to create an interview topic list and protocol (see Appendix A). Aside from taking notes during the interviews, the interviews were recorded as well. After the interviews were conducted, the recordings served to transcribe the interviews verbatim. After these steps had been completed, it was time for data analysis. It should be noted that the researcher of this study completed all of the above-mentioned actions alone. The latter allowed absorbing and getting absorbed by the data, and with that acquiring a richer insight. Therefore, the researcher is considered to be the measurement instrument of this investigation.

For processing the collected data a qualitative content analysis was conducted, as this allows going beyond counting words and provides a richer and more in-depth understanding and interpretation (Hsiu-Fang & Shannon, 2005). Moreover, as qualitative approaches are considered to be highly diverse, complex and nuanced, thematic analysis is seen as a foundational method (Braun & Clarke, 2006). The method of analysis was thus inspired by the grounded theory approach to the analysis of qualitative data (Strauss & Corbin, 1998). To be more precise, a thematic content analysis was conducted using Boeije's (2010) steps of open, axial, and selective coding. This method allowed refining the bulky data, creating

order, and eventually defining what the data described (Boeije, 2010). Additionally, Boeije's (2010) approach to analysis was used based on the researcher's previous experience with the method.

This process started with open coding. The purpose of open coding was to explore the field, create initial codes in order to manage the data files, and familiarize with the data (Boeije, 2010, p.107). As the researcher spent quite some time transcribing the interviews, familiarization with the data was not an issue. However, the transcripts were printed out one-sidedly on paper and read through carefully once again during the open coding stage. The latter was important considering that thorough reading of the data is required for the purpose of dividing it into fragments and categories. As this was an open and flexible process, a large variation of codes emerged. The word 'open' indicates the broadness of the given category labels. However, once every fragment was provided with a code referring to its content, it also became clear that there were quite some recurring codes, which paved way for the next stage of coding.

Axial coding, then served to describe and align categories, determine the relevance of categories to the research, and increase the level of a conceptual abstraction (Boeije, 2010, p. 114). The recurrent and relevant codes that were found during the open coding stage, led to the development of categories. Categories were developed based on the difference or resemblance of codes found during the open coding stage, by combining those codes to form a category and refine until distinction of categories was achieved. The resemblance, in this case referring to the amount of times a code recurred or was similar to another code, helped in determining the prominence as well as relevance of the category to the research as a whole. Moreover, the context of fragments was important to keep in mind while thinking about the data and coding in this stage. Signal words and silences were thus attended to in this stage, as were facial expressions and respondents' tone of voice (with the help of notes made during the interview itself). Consequently, at the point at which a detailed description and definition of categories was then realized, the data was ready for the final stage of coding.

Finally, selective coding, known as the final stage of analysis, allowed the shaping of definitive finding as the data was reassembled into findings. Moreover, the purpose of selective coding was to further determine the importance of categories (core categories), formulate the theoretical model, and reassemble the data in such a way that it allowed answering the research question (Boeije, 2010, p.118). Core categories are central to the research as a lot of other categories are linked to them. Selective coding was thus the heart of the analysis, as it required the researcher to thoroughly think about how the core categories

were linked and about what the data was saying (Boeije, 2010, p. 116). Here, the researcher investigated which themes turned up repeatedly, what the main message was that the respondents tried to bring across, how different themes were related to one another, and what was important for the description and understanding of the respondent's perspective and behavior. In other words, the categories that were developed during axial coding, now led the researcher to determining core categories and with that to the formulation of over-arching themes. Evidently, this stage was the most challenging and abstract one, as it resembled putting a complicated puzzle together, while still keeping the bigger (research) question in mind.

In conclusion, as the collected textual data (interview transcripts) was indexed in order to generate analytical categories and theoretical explanations, a thematic content analysis of this data was used to find common patterns and an answer to the main research question (Hsiu-Fang & Shannon, 2005). Furthermore, in order to provide a clear overview of the discovered patterns and themes, a thematic overview was developed (see Figure 2). These themes and their attribution to variables will be discussed in more detail in the results section of this paper. The interview protocol in Appendix A shows the specific questions that were asked per variable. The thematic overview in Appendix C presents how the themes were extracted from the respondent's answers, by including a list of exemplary quotes per concept and theme.

3.6 Reliability

According to Daymon and Holloway (2010) reliability has to do with the ability to replicate a study and is assessed differently in qualitative and quantitative studies. The subjective nature of qualitative research makes it difficult to assess reliability. However, according to Golafshani (2003) there are ways to ensure reliability in qualitative research.

As reliability relates to the consistency of data and the ability to replicate a study, describing the research strategy and data analysis in a detailed manner is a way to ensure this (Golafshani, 2003). Therefore, the methodology sections above provided a sound description of how the collected data was analyzed through means of a thematic content analysis (Boeije, 2010), and interpreted in relation to the study's main operationalized variables. Furthermore, in order to add to the stability, consistency, and equivalence of the data collection process, the researcher made sure to stick to the interview protocol (Appendix A) and ask the same questions to all of the respondents (Long & Johnsen, 2000). Moreover, in the case that a question was still asked differently, the researches assured that the question still searched for

similar information. Even when respondents went off topic, the researcher put an effort into gearing them back to the topic of discussion.

All of the above, together with the availability of recordings and detailed transcriptions of the interviews, of which long extracts are presented in the result section of this paper, were adopted for the purpose of ensuring reliability. According to Silverman (2015), the latter mentioned steps aid in satisfying the need for reliability in the case of qualitative in-depth interviews

3.7 Validity

Validity is again differently assessed in qualitative and quantitative studies (Daymon & Holloway, 2010). Assessing generalizability or external validity, the trustworthiness of the report, is difficult due to the inherent uniqueness of a qualitative study (Golafshani, 2003). However, Merriam (1995) argues that there are ways to ensure external validity in qualitative research, which are employed in this study for the purpose of ensuring validity. External validity is ensured by means of a detailed description of the sample (Silverman, 2011). Therefore, the section titled 'sample' provided an elaborate description as to why the different groups of respondents were chosen in terms of the aim of the study, and how this was based on the theoretical framework. Additionally, Appendix B provides an overview of the respondents, including their age, gender and official occupation.

As for internal validity, the soundness of the results, the expectations that were formulated by the researcher were validated by the alignment of the research findings (Silverman, 2011). Moreover, internal validity was assured as axial coding allowed constant comparison, and selective coding allowed deviant case analysis of the data (Silverman, 2011). Furthermore, internal validity was also assured by the nature of interviews as a research method as it allowed the respondents to give personal answers to the questions. Moreover, the ability to ask follow-up questions increased the researcher's chances of covering all relevant aspects with regard to the research. Therefore, considering that the information is coming directly from the source, the representation of reality can be considered as valid. In other words, the fact that the findings came directly from the actual answers from respondents, adds to the research's validity.

The researcher being the measurement instrument in this study makes it extra difficult for findings to be generalized. However, as explained several measures were taken in order to prevent bias on the researchers side. On a final note, as generalizability here is challenging considering the uniqueness of qualitative research, and the prominence of the role of the

researcher as the data gatherer and interpreter, one ought to keep in mind that the aim of this qualitative study was not to generalize facts but processes (Silverman, 2011). In other words, it is about the validity of theoretical notions, rather than that of empirical findings.

However, in relation to the influential role of the researcher, an additional effort in acquiring knowledge and expertise was made. In order to make more competent interpretations the researcher participated in an online hackathon, the McKinsey Agility Hackathon, from March 8 until April 18. The researchers participation thus actually occurred during the data collection phase. This particular external hackathon focused on the 'hacking' of agility challenges within organizations and involved a diverse group of business leaders, academics, and consultants. In six online sessions spread over 6 weeks, the researcher gained insight into the organization aspect of hackathons required before, during, and after the event itself. Moreover, it became evident that bringing a group of people with diverse backgrounds is challenging. Especially considering that this can be categorized as an external or 'open' hackathon, the lack of appointed ownership caused for a lot of silences and everyone looking at each other when it came to doing actual work. However, at times people were surprisingly dedicated and took the initiative and time out of their personal schedules to take on responsibilities, for example by representing their team in the final pitch of the competition. All in all, even though this was a snippet of experience, it is still considered a valuable and unique experience. It provided the researcher with a more personal angle, something that aroused more in-depth thinking about hackathons and its many forms.

4. RESULTS

In total, ten professionals were interviewed from nine different companies and a variety of industries (see Appendix B), for the purpose of investigating whether company-internal hackathons, as a communication tool, had the potential to be effective for organizational innovation. Logically, all ten respondents had thus recent experience with company-internal hackathons.

In the following sections the results of these interviews will be described along with the themes that were found through conducting a thematic analysis (see Figure 2). More specifically, the focus was on the role of communication in innovation management and employee commitment and how these two factors could influence the intention to implement innovation. As the behavioral intention is established as a good predictor of actual behavior, it was included as an intrinsic step for implementing innovation, for effective innovation. This line of argumentation, that followed the initial conceptual model that was developed based on the discussed literature in chapter two, also inspired the order of the results presented in this chapter. Therefore, we will start with the themes that were found to be most prominent for *internal hackathons.* Followed by the themes that were most prominent for concepts of this research in the following order: *the role of communication in innovation management, employee commitment and engagement, intention to implement,* and *effective innovation* (actual implementation). Lastly, a new conceptual model (see Figure 3) will be introduced and explained based on the results of the analysis (see Figure 2 and Appendix C).

4.1 Interviewees

The ten interview-respondents were all professionals with hackathon experience as mentioned before. The youngest interviewee was 19 years old and the oldest 54 years old (see Appendix B). The wide range in age is quite fitting the hackathon phenomenon in general as all respondents expressed that interdisciplinary collaboration is important, but five out of ten respondents also expressed that adding the mixture of young and old is at least equally important if not more. In fact to quote Respondent 3: *"I think it should be a combination. So as I said before age doesn't matter. It's good to also have older people because they are more experienced in some things and young people yeah they don't always have a lot of experience, but they have fresh ideas of course. So I think it's good to make a combination''*(male, 19*).*

Moreover, the respondents all had positive experiences with company-internal hackathons. The role that they played during these hackathons ranged from organizers

(internal and external), to initiators, to participators. However, what can be said with certainty is that all respondents were invested in the hackathon scene in general. This is demonstrated in the following quote by Respondent 2: *"There is also this entire community that arouse, because we started with a small group, last time there were 50 or 60 youngsters participating and then other companies started to organize hackathons as well. What you notice then is that you come across the same people a lot. I have been to a couple of these other hackathons as well and then I come across a lot of familiar faces, which is nice to see''* (male, 54). Respondent 2 is explaining here how the positive experiences led him to further invest time in hackathons. Additionally, all respondents agreed with the statement that company-internal hackathons are effective in diverse ways and thus should be implemented more often as put to words by Respondent 6: *"I think everybody should do hackathons within their company and everybody should talk about it, share their experience and knowledge. We can learn from each other''* (male, 26).

4.2 Thematic Overview

The thematic overview in Figure 2 serves to further clarify and illustrate the discovered themes and their linkages to this research's variables. Evidently, it shows that a total of seven themes were found for the five concepts (see Figure 2). Three themes recurred in more than one variable: collaboration, communication as innovation-tool, and organizational structures. The remaining four themes, hackathons as a communication-tool, appreciation, commitment and engagement, and future of organization, were only prominent for one variable at a time.

In the following section the themes will be interpreted per variable, while explaining the relation of the theme to the variable and making way to conclusions. On top of that, in order to further clarify the above-mentioned overview of themes, a thematic analysis per variable is presented in Appendix C, where for each concept and theme an exemplary quote is provided.
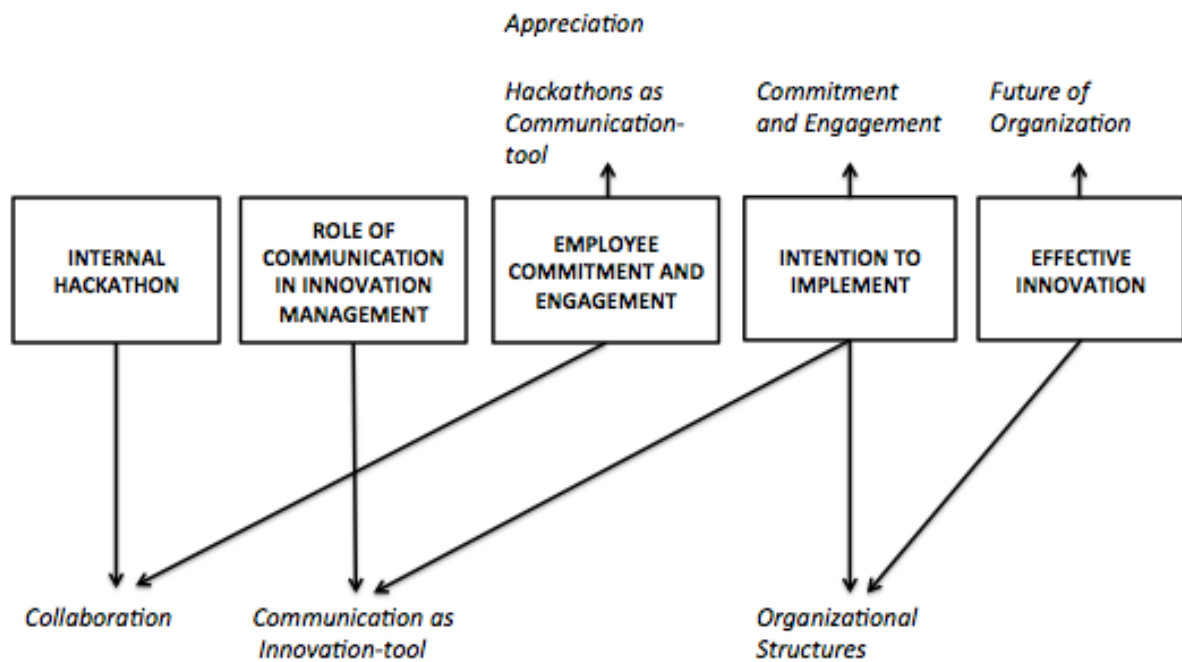
Figure 2. Thematic Overview

4.3 Internal Hackathon

Collaboration was found to be the most prominent theme when it comes to internal hackathons in that respondents expressed that hackathons were collaborations in their essence, which also appeared to be in line with what was discussed in the theoretical framework.

4.3.1 Collaboration

When it came to internal hackathons, the theme of collaboration became salient by all ten respondents expressing that internal hackathons are about innovation through collaboration. As Respondent 1 pointed out: *"It's really about the creativity and fun that you have together as a group while 'hacking' a certain issue, without having to worry about real-world constraints that an actual project would have. In a hackathon you are allowed to do thing the dirty way just to see results quickly''*. Similarly, Respondent 3 expressed that it is all about joining forces, a fun experience, being creative and sharing knowledge. *"First of all I think it's really important that all people who came that they are happy at the event and that they are really enthusiastic and could make something together in 24 hours that they didn't expect in the beginning that it was possible''* (Respondent 3).

All ten respondents stated that they perceive a hackathon to be successful when the collaboration is fun and the ideas actually get implemented as expressed by Respondent 6: *"The first thing is that everybody had fun and it was an interesting experience. Second of all,*

is basically that the results that came out of it were really interesting, that gave some insights that we didn't have before. It could be that we have a tool that we can now use which will improve the day to day work, or that we just have some incredible ideas that we can use to commercialize in the future for example''.

Thus, to conclude, the results demonstrate that collaboration plays a prominent role when it comes to internal hackathons, especially considering the perception that the success of the event is dependent on the strength of the collaboration. Success is here referring to the actual implementation of the ideas that were produced through the hackathon.

4.4 Role of Communication in Innovation Management

Communication as innovation-tool, as expected, appeared to be a prominent theme for the concept of the role of communication in innovation management. Respondents agreed that persuasive, organizational communication has the power to foster innovation. In turn, considering that hackathons foster organizational communication, they can be perceived as a tool for innovation.

4.4.1 Communication as Innovation-tool

It was not so surprising to find communication as innovation-tool to be a major theme for the variable of the role of communication in innovation management. Nevertheless, the respondents provided additional, more in-depth insight into how communication plays a role in innovation management. The majority of the respondents believed that hackathons fostered organizational communication: *"So I mean the hackathon is also a way of yeah bringing people together from different departments and let them communicate more with each other. I think normally a lot of people they just communicate only via email and with a hackathon of course we bring a lot of people together''* (Respondent 3). In fact, a strong majority of the respondents agreed on the fact that internally it is also about bringing people from different departments together as that appeared to be a common challenge for the rather large organizations in question. Respondent 9 described the latter as the following: *"It's [hackathon, LT] a great way to give energy to their organization and give new ideas…and also connect people because innovation is also about building an ecosystem and a hackathon is a great way to connect innovators within your company''* (Respondent 9).

Additionally, respondents also expressed how hackathons allowed breaking down traditional bottom-up challenges of getting your message to the top of the organization. The latter is what Respondent 10 for example put into words as, *"I noticed a big difference in how the involvement of management can change things. When we started with a group that*

sort of belonged to the bottom of the organization, things were quite a bit more challenging in getting messages to rise up''. For the respondents who worked in a traditional, bureaucratic organization this enthusiasm was greater than for those who worked in a lean and creative industry. Respondent 4 expressed his view and indicated how hackathons are a new way of working and how they are breaking old ineffective structures, explaining his enthusiasm: *"I think it's a way of accelerating and innovating, so change in a different way than just talking about it for centuries, but just changing by doing. That is how I experience it''* (male, 36).

Moreover, seven out of ten respondents stated that communication had a great potential for convincing the deciding jury or team of executives in question of your idea and thus increasing the implementation of innovation, *"Communication in that sense can be quite a powerful tool. I have experienced that hackathon ideas were implemented due to the creators convincing and persuasion skills rather than the quality of their idea. So communication can really make a difference for you, even when your idea is not that good, if you're good at selling your idea the changes of implementation will certainly increase''* (Respondent 1). The respondent explained that even though it is important that your idea is good, your persuasive communication skills could still play a rather impactful role when it comes to the implementation of ideas.

On another note, in which communication is also considered to be a tool for innovation, Respondent 6 said, *"I think it [communication, LT] can, if people see that other people are kind of innovating or having innovative ideas, I think that might also work motivating''*. What Respondent 6 meant with 'motivating' here is that communicating about the hackathon outcomes can be a source of inspiration for colleagues to also participate or take the initiative to come up with something for the organization. Some respondents even went to the extent to say that communication was essential for innovation, *"I don't think that it's just a tool, I think it's essential, something you need to have. Communication in written form only is not enough anymore these days''* (Respondent 7). In other words, Respondent 7 among others felt that effective communication was essential and thus something that you need to invest in more as an organization.

All in all, the respondents expressed that hackathons are a new way of working that have proven to foster organizational communication and innovation, especially because hackathons allowed breaking down traditional bottom-up challenges of getting your message to the top of the organization. Communication in the sphere of hackathons can therefore considered to be a tool for innovation.

4.5 Employee Commitment and Engagement

Three themes were attributed to employee commitment and engagement: 1) collaboration 2) hackathons as communication-tool and 3) appreciation. In order to interpret the findings accurately, it was necessary to examine the co-existence of the three themes in relation to employee commitment and engagement.

Firstly, collaboration was a prominent theme for employee commitment and engagement as the respondents agreed that collaborative hackathons and a collaborative work environment in general is what enhanced employee commitment and engagement. Secondly, hackathons as a communication-tool was a prominent theme, as expressed by the majority of respondents. Especially in relation to employee commitment and engagement, hackathons allowed employees to act as a change agent, helped in convincing the organization by showcasing their abilities, and provided a platform that enabled employees to present their idea to the rest of the organization. In other words, hackathons allow you to campaign for your idea as a corporate entrepreneur, which is in line with what was discussed in the theoretical framework. Thirdly, appreciation was a prominent theme considering that appreciation of work together with freedom and increased responsibilities were reported to be fostering employee commitment and engagement.

The following sub-paragraphs will explain in more detail what this entailed. Each section will provide quotes in order to back up arguments made.

4.5.1 Collaborative Environment

When it came to employee commitment and engagement, collaboration, played a prominent role in a similar manner as it did for the concept of internal hackathons. In other words, respondents believed that collaboration enhanced employee commitment and engagement. In fact, half of the respondents were certain that collaborative hackathons increased employee commitment and engagement opposed to competitive hackathons. *"Probably I would imagine the collaborative ones, because trying to be creative in a competitive environment, I'm not sure if that is very beneficial. Being collaborative feels more suited within a creative atmosphere instead of the competitiveness''* (Respondent 8). When another respondent, who agreed with the latter response, was then asked whether he thought that this had something to with the fact that it was a company-internal hackathon and you work with your colleagues, he answered: *"No, also for external ones. We think that competition ruins creativity and collaboration enhances it''* (Respondent 1).

The other half thought that a mixture of collaboration and competition was the recipe

for increasing employee commitment and engagement, *"I think eventually here the collaborative hackathons, because working together is a priority, but for kick starting something and striving to a higher goal competitive works better because then you are making people fight for something''* (Respondent 10). Moreover, a number of respondents indicated that even though it depends on the industry you work in, collaboration in general among things like appreciation, ownership, time, and room for creativity is what fosters employee commitment and engagement. For example when asked what increased employee commitment and engagement in general, Respondent 2 replied, *"Well a bit of the same things as I mentioned with the example of Facebook. So giving employees freedom to develop new ideas on their own, also getting the time to do it alongside your regular tasks. I think that this can enhance a lot of new innovations''*. Moreover, two respondents quite duly described the ideal scenario for a hackathon as one that is competitive but in a collaborative environment, *''I think it's hard to say and very much dependent on a lot of things, but I think in the end you know...a bit of competition in a collaborative environment, maybe that's a nice way to put it, is what works best''* (Respondent 5).

Even though, it was more than evident that collaboration played an important role here, it was also found to be a controversial topic when it comes to employee commitment and engagement. The majority of respondents agreed that collaborative hackathons and a collaborative work environment in general is what enhanced employee commitment and engagement. However, at the same time some respondents pointed out that competition actually gets the best out of people instead of paralyzing them.

4.5.2 Hackathons as Communication-tool

A majority of respondents agreed on hackathons being an effective communication tool, especially in relation to employee commitment and engagement as it allowed to act as a change agent and helped in convincing the organization to implement your idea. Respondent 9 phrased the latter as: *"Well in the end people join a hackathon because they are committed otherwise they wouldn't spend a weekend or a night working on a project. So it's really about engagement but it's also that people are able to show what they are able to do''*. Similarly Respondent 8 said: *"I think if the employer allows you to work on projects that you have proven during one of those game-jams, it can really boost engagement because at that point they will really feel strongly about this topic otherwise they wouldn't have spent their Friday on it''*. Respondent 1 added to that, that the reason why he took the initiative to come up with ideas is because he knew that the company would take it seriously and the chance of

implementation was high. As explained by Respondent 8 and 9, hackathons are a tool for communication in the sense that they allow you to showcase your abilities to the organization, but also to use the result of the hackathon, the prototype, for the purpose of pitching your idea to your colleagues and supervisors. *"Well after that one day you will need to use that project to convince the others that it's of value. But a lot of times after one of these Friday projects you get feedback from others because you are sending around emails people will start talking to you about that, about the feature that you created and they're going to be really interested in having this available. So if that happens you can sort of use those people to help you out, to convince management like hey we need this to happen, we need it to be a thing''* (Respondent 8).

However, hackathons as a communication tool while being inherent to corporate entrepreneurship (the ability to develop and implement ideas as an employee) were not the only determining factor here. In the latter quote by Respondent 8, there was already a hint to implementation being dependent on your ability to convince management as well as your colleagues, meaning organizational relationships, and your role within the company. Moreover, several respondents stated that the willingness to communicate for the change that you want to be implemented as an employee also depends on your personality and role within the company. Respondent 4 expressed that the reason he developed ideas is because he is the type of person that has a head full of ideas on a daily basis. Respondent 5 agreed with the latter to a large extent and added: *"So I think the advantage that I have is that when I started working I immediately started for the sort of the person in charge, in this case well in the marketing team, but thereby also involved in a lot of software sites and all that. So I have a good relationship with the right people that make the decisions, so that makes it a little bit easier for me to reach them, but in the end anyone can contact them, anyone can reach them''*.

All in all, the respondents agreed that hackathons are a tool for communication, all though not solely, when it comes to the act of fostering employee commitment and engagement. Hackathons allow showcasing your abilities through the creation of prototypes, bring people together, and provide a platform to present your idea. These characteristics are exactly what enhance the chances of making a persuasive case, through communication, and implement ideas within organizations.

4.5.3 Appreciation

Appreciation was found to be prominent theme as respondents expressed that it was a determining factor for employee commitment and engagement in a variety of ways. Respondent 3 and 7 explained that employee commitment and engagement can be enhanced by listening to your employees' needs, appreciating them and by providing them freedom: *"I think every company has a different culture and it's really important that everyone gives feedback to each other and just say what they want to say. I think that is something you need to train people in, often they are afraid to say what they think. So you need to stimulate an open culture ''* (Respondent 3).

In terms of satisfaction that employees get from their job Respondent 9 continued on how hackathons can improve the sense of appreciation: *"In the end people want to have value and in an hackathon it's very obvious that you have value and you can do something meaningful because if you have an end result within 24 hours or a weekend or whatever the time period is. In the normal work you don't always experience progress or you don't see what you contribute as a person to the whole organization and sometimes that is hard''* (Respondent 9).

On top of that, another respondent stated that increasing employees' responsibilities also fosters their commitment and engagement: *"I think it's [getting employees committed and engaged, LT] challenging, but if you give them enough power and enough responsibilities it is easy. Because I think if people get responsibilities they most likely get motivated and kind of create a bond with the company''* (Respondent 6). Moreover, seven out of ten respondents expressed that when employees are committed and engaged, the organization in which they work values this: *"It is majorly valued by company X. X invests in engaging their employees even before they are hired. X has a lot of merchandise for example that I as an employee proudly wear''* (Respondent 1).

In conclusion, respondents agreed that appreciation of employees work is of importance considering the long-term benefits that it brings with for the organization. As an organization you need to appreciate those who put in an extra effort and take the initiative, but also provide them the freedom and opportunity to take charge and makes great things happen. In this sense, putting effort into employee commitment and engagement is an investment with a strong potential to be mutually beneficial.

4.6 Intention to Implement

Three themes were attributed to intention to implement: 1) communication as innovation-tool 2) organizational structures and 3) commitment and engagement.

First, the theme of communication as innovation-tool was applicable here in a similar manner as when it came to the role of communication in innovation management. Respondents felt that persuasive communication increased the chances of implementation of hackathon-generated ideas. Communication informs, but when used strategically also has the power to convince and thus was reported to be an essential tool for those who had the intention to implement novelties. As for the second theme, organizational structures, respondents expressed that the intention to implement innovation was there and that implementation was always, all though in a varying extent, supported by the organization. However, it was also reported that actual implementation could be interfered due to organizational structures, including things like the size of the organization, internal networks and management support. Moreover, it was found that both traditionally bureaucratic as well as the relatively more adhocracy leaning organizations faced the same challenges here. Lastly, the theme of commitment and engagement (not to be confused with the variable) was attributed to the intention to implement considering that all respondents believed that having committed and engaged employees, caused for a stronger collective intention to implement and thus led to a higher chance of implementation.

The following sub-paragraphs will explain in more detail what this entailed. Each section will provide quotes in order to back up arguments made.

4.6.1 Communication as a Tool for the Implementation of Innovation

Communication is essential for the intention to implement ideas, it convinces, informs and with that strongly encourages implementation: *"If there is an idea from a hackathon that is being implemented, I think it's very interesting to communicate this across the company cause that really shows how valuable the hackathon was''* (Respondent 6). Respondent 6 explained that it is important to update the organization also because he beliefs that this provides an inspirational boost and helps with commitment. Moreover, as stated above communication also plays an important role in convincing others: *"It helps to sell your idea if you communicate it well, so I would say it definitely helps''* (Respondent 1). Also, reiteratively Respondent 8 stated: *"At that point you're using the product you made as a communication tool''*.

Furthermore, as established earlier with this theme (communication as innovation-

tool) communication has the power to increase the implementation of innovation. More specifically, respondents expressed that hackathons can function as a new way of working and allowed breaking down traditional bottom-up communication. The latter was also found to be true for the intention to implement, *"So we help them to get on the agenda of the important people, to pitch it to them, yeah we help them with the next steps. You need to get on the agenda of other departments also most of the time''* (Respondent 9). Respondent 9, while agreeing with what was said earlier about communication being a tool for innovation, reveals that hackathons require more effort after the idea-generation phase. In the implementation phase, or on the way to implementation in this case, it is necessary to make strategic communication decisions. As Respondent 9 explained, a strong and convincing pitch can help to get on the agenda of the right people.

In conclusion the intention to implement hackathon-generated ideas is dependent on the role of communication as an innovation tool. Meaning that when it comes to organizational innovation, it is important to be persuasive and convincing in your communication towards others in the organization. Moreover, within organizations there are often certain designated people in charge of the decisions to implement or not, executives, board of directors, upper management, etc. In relation to the latter, respondents explained how strategic decisions are required for the purpose of effectively communicating for the change you want. You have to get on the agenda of the "important people'', of other departments also, which is quite an effortful task in the implementation phase and therefore should be taken into account from the very beginning.

4.6.2 Organizational Structures

Even though all ten respondents believed that implementation is supported, it is not yet optimal for every organization. Respondents explained that a relative small percentage of hackathon ideas have been implemented within their organization. However, they also added that this often took a lot of time and effort due to people disagreeing with each other, everyone wanting to approve it, and general rules and regulations. Implementation as reported earlier, is relatively a more difficult phase for organizations. In fact, the barriers for not getting things implemented were reported to be mostly related to organizational structures and legalities, *"You need commitment at a high level within the governmental organization, in order to get things done. The top-down approach is easier to take so to say ''* (Respondent 2). Comparably, Respondent 7 added: *"Next to everything else, this is a Bank, so we are stuck to a couple of regulations and legalities, some commissions that need to approve things*

as well before we can even present things to clients''.

Moreover, respondents agreed on management support and one's internal network playing an influential role in the implementation phase, *"If you have done it a few times then it's [implementation, LT] much easier, but you need some senior support to even get on the agenda haha. So what we do is, we put senior…board of directors in the jury. So in the end if they think an idea is good they to commit, they will bring the idea further''* (Respondent 9).

However, even though organizational structures like presented here are expected to only be a challenge for traditional and bureaucratic organizations, it resulted otherwise. Respondents from the more creative organizations, that reported to be making a strong attempt to agility, also expressed that organizational structures and the growing size of their organization caused for challenges during the implementation phase.

It can be concluded that when it comes to the intention to implement, organizational structures played a prominent role. Organizational structures can be a barrier for implementation of innovation in the sense that one can get stuck in following strict company guidelines, rules and regulations, leading to all talk and no action. On the other hand, using your personal network within the organization and involving top management level people in your journey to change, is a way to use organizational structures to your benefit.

4.6.3 Commitment and Engagement

All ten respondents were positive about the influence of employee commitment and engagement on the intention to implement ideas. The argumentation was that when someone is committed and engaged they are passionate, they are willing to fight for their idea and thus are often also more successful in convincing the organization to implement it, *"Yeah, if people are more committed to an idea and they really want to make it happen, I think they work fasters of course and yeah because of that also the outcome is better''* (Respondent 3). In addition to that, Respondent 3, 4 and 5 believed that as a company you need to even start selecting employees based on their commitment and engagement in general, but also specifically for the purpose of hackathons, *"Yeah for sure [committed and engaged employees influence the intention to implement, LT]! Because it will help, it will make them more enthusiastic to actually go run for it and go fight to make it a success. Because you need some people that are really you know, all in with it, and are going to help in convincing other people to go on board as well''* (Respondent 5).

Evidently, there was no disagreement on the positive influence of having committed and engaged employees on the intention to implement innovation within organizations.

4.7 Effective Innovation

Two themes were attributed to effective innovation: 1) future of organization and 2) organizational structures.

Starting with the future of organization, this was a prominent theme for effective innovation in that respondents agreed that effective innovation refers to whatever that benefits the organization and its existence. Last but not least, organizational structures were found to be a prominent theme for effective innovation as well. Respondents expressed that effective innovation, being implementation of innovation, was mainly challenged by the complexity of organizations and their structures in which bureaucracy always seemed to play a role to some extent. Moreover, as found earlier with the behavioral intention to implement, the recurrence of this theme indicates that organizational structures are indeed an interfering factor standing between the intention to implement and actual implementation.

The following sub-paragraphs will explain in more detail what this entailed. Each section will provide quotes in order to back up arguments made.

4.7.1 Future of Organization

When asked what respondents perceived as effective innovation, the collective pointed towards effective innovation being that what benefits the organization and its existence in any way. Innovation is thus about survival, in which a variety of factors were reported to be playing lead roles. Most of the respondents indicated that effective innovation is often about providing value for the customer and revenue, *"Well that depends on the goals. We always align innovation with the goals of the company. So for example if…I guess most of them have goals like more revenue, happy customers, and a more high performance organization''* (Respondent 9). Three out of ten respondents more specifically described effective innovation as that what increases efficiency within the organization and makes jobs easier, *"For us it [effective innovation] was that what made our job easier''* (Respondent 4).

Others stated that an attempt to implementation is already considered effective innovation, because if you do not try things it is certain that you will not innovate, *"Attempt to implementation [is effective innovation]. It cannot stay on the shelf. Because if we gave it a go and it failed or it was not successful, then as far as I am concerned that is still effective innovation''* (Respondent 7).

So effective innovation is that what preserves the future of the organization. What exactly preserved or fostered this future varied from (often) being revenue and satisfied customers, to making daily tasks easier.

4.7.2 Organizational Systems

When it comes to the relationship between the intention to implement and actual implementation, respondents reported that organizational structures played an influential role. With regard to the relationship between intention to implement and actual implementation Respondent 10 said: *"A group of people can genuinely have the intention to implement, but due to other groups of people saying no we don't have the budget for it or the hours or whatever, it can all collapse really quickly, or get lost due to daily routines in which people just continue with what they were doing in the first place''*. Here organizational structures refer to the organizational culture, attitude, and practicalities that were found to play a role in the implementation of innovation. Respondent 7 elaborated on the potential practicalities that could challenge implementation, *"Feasibility as a whole is key for implementation. I already talked about laws and regulations, but as a Bank we also wield a manifest that you could perceive as some sort of social status. Next to that other things to keep in consideration are the availability of resources, our partners, and our funds''*. Continuing on organizational structures, respondents agreed that traditional, big, hierarchical organizations caused for a lower implementation rate, *"Even when the boss says so, you still need some convincing here and there, you need to, you know, involve the right people, that remains the same''* (Respondent 5). What Respondent 5 is trying to say here is that even with senior level support, considering the many layers that exist within traditional, large organizations, it is still difficult to get to implementation of innovation.

Moreover, Respondent 1 and 3 added that when you are working in small, flexible, and relatively non-hierarchical teams, it will lead to a higher implementation rate, *"Yeah perhaps it helps that even though X is a big company, the internal teams are very small. So the team for animation tools in only 4-5 programmers, and they have quite a lot of authority''* (Respondent 1). In relation to the latter, a majority of respondents expressed their desire to resemble start-ups in order to increase implementation. However, respondents from the flexible and creative organizations stated that they also struggled with bureaucracy in the implementation phase, *"Yes, because there is still a lot of money involved. So I think there's still a lot, there's still bureaucracy and there is still relationships that you need to be careful about. So I think regardless of if it's creative or not, it still plays a role''* (Respondent 8).

Thus, organizational structures by being one of the main interferers of implementation, was found to be a prominent theme for effective innovation (actual implementation of innovation). Bureaucracy, internal hierarchies and relations, as well as legalities always seem to play a role, despite the nature of the organization.

4.8 New Conceptual Model

Based on the results of the conducted interviews and thematic analysis a new conceptual model is developed (see Figure 3). In order to dive deeper into the findings, an explanation of this new conceptual model and its line of argumentation will be provided in the following paragraphs.
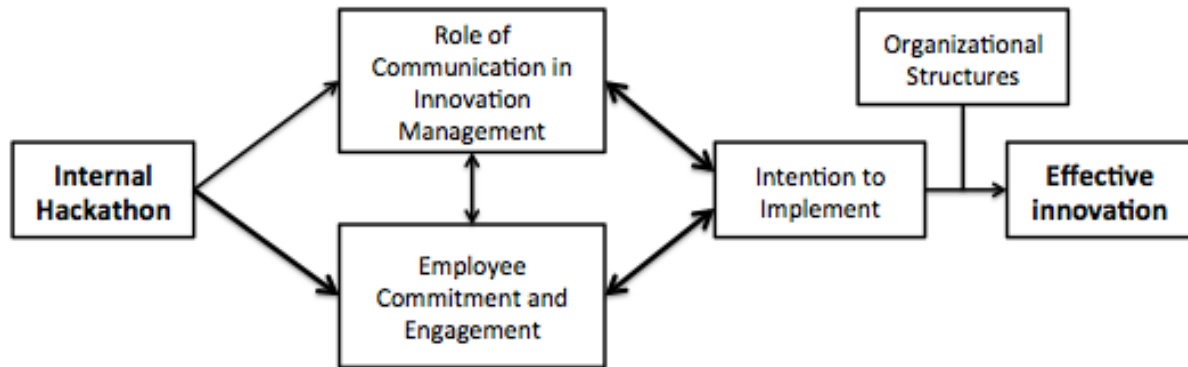

Figure 3. New Conceptual Model

Considering that respondents described hackathons in general to be collaborative in nature, they felt even more certain about internal hackathons to be collaborations in their essence by bringing people together and allowing the creation of teams. Moreover, this collaboration caused for hackathons to act as a communication tool, fostering not only organizational communication but also employee commitment and engagement. Thus, the arrow that was between internal hackathons and the role of communication in innovation management remained.

As for the arrow between internal hackathons and employee commitment and engagement, this is now relatively thicker than before, indicating the relative strength of the relationship that was found between the two (see Figure 3). On top of that, respondents explained that hackathons allowed campaigning for an idea and showcasing one's abilities in a whole new and distinct manner, while also being more effective in it. Therefore, there is an added arrow from employee commitment and engagement to the role of communication in innovation management (see Figure 3). This arrow indicates the relationship between the two variables; they are connected amongst themselves reciprocally considering that here it did not matter whether it was a bottom-up or top-down approach. Moreover, as commitment and engagement was found to be a prominent theme for the intention to implement, there is a thicker, two-directional arrow between the two variables in question (see Figure 3). The argumentation of the respondents was that the more committed and engaged an employee is,

the stronger the intention to implement, and therefore a higher chance of implementation. Moreover, this two-way street was further supported by respondents' consensus regarding organizations' appreciation of employees bringing long-term benefits for the organization. They explained that putting effort into employee commitment and engagement is an investment with a strong potential to be mutually beneficial.

Furthermore, communication as innovation-tool being a prominent theme attributed to both the role of communication in innovation management as well as to the intention to implement composes the fact that respondents were certain about communication increasing the chances of implementation of innovation. Communication was therefore accepted as a tool for innovation. Accordingly, as presented in Figure 3, the arrow between role of communication in innovation management and the intention to implement indicates a strong, two-directional relationship.

Moving forward from the point in which the intention to implement was existent, the recurrence of organizational structures as a theme for both intention to implement as well as effective innovation (implementation), caused for an added in-between step titled 'organizational structures' (see Figure 3). Respondents expressed that the intention to implement innovation was existent in a varying extent, and often challenged by organizational structures, but potentially fostered by organizational support for your ideas. Meaning that even though senior management support and your internal network cannot guarantee implementation, it can certainly make it easier. On top of that, it was explicitly mentioned that these organizational structures were a barrier for both traditionally bureaucratic as well as flat organizations.

As for the future of organization, a prominent theme for effective innovation, respondents explained that effective innovation refers to that what benefits the organization's existence and preserves a future. The latter is in line with the discussed theory stating that the implementation of innovation is intended to contribute to the performance or effectiveness of the organization (Damanpour & Schneider, 2006). Consequently, the final block in the new conceptual model remained to be effective innovation (implementation).

In conclusion, hackathons can act as a communication tool for the purpose of innovation in that they bring people together and strengthen collaborations internally. When it comes to the intention to implement innovation, communication and commitment and engagement indeed do play an influential role. However, organizational structures also appeared to play a role in the implementation of innovation, even when the intention to implement was strongly present.

5. DISCUSSION & CONCLUSION

This chapter will conclude the research report by linking back the research findings to the discussed theory and with that pave the way to answering the research question. Moreover, theoretical and practical implications as well as limitations of the research will be discussed. Consequently, suggestions for future research in a related field will be provided.

5.1 Discussion

The aim of this study was to investigate whether company-internal hackathons, as a communication tool, had the potential to be effective for organizational innovation. More specifically, the focus was on the role of communication in innovation management and employee commitment and how these two factors could influence the intention to implement innovation. As the behavioral intention is established as a good predictor of actual behavior (Azjen & Fishbein, 1970), it was included as an intrinsic step for implementing innovation, for effective innovation. The results of this study indicated that the expected relationships (see Figure 1) as developed by the theory discussed in chapter two, were evidently accurate to a large extent. However, the results did lead to additions and minor alterations with regard to the expected relationships between the core variables (see Figure 3).

First of all, it was found that internal hackathons are a tool for communication, in that they brought people together and fostered collaboration among employees, which in turn fostered organizational communication as well as increased the employees' commitment and engagement. Respondents of this study felt strongly about communication playing a vital role, one with great potential for innovation, meaning that it did require to be persuasive and thus careful consideration in order to be effective. The latter was in line with the discussed literature, as studies have found that communication is vital for the success of projects (Doloi, 2009; Koschmann, 2010), especially when persuasive (Ahuja, 2016; Fernandez & Rainey, 2006). Moreover, communication and collaboration have been identified as key factors for successful innovation and thus reported to require a better understanding (Cormican & Sullivan, 2004; Fernandez & Rainey, 2006; Kitchen & Daly, 2002; Loewe & Dominique, 2006; Möller et al., 2014; Vermeulen et al, 2010). Furthermore, this study found that communication was indeed a tool for innovation, as the majority of respondents believed that communication, when used strategically and in a variety of formats, had a great potential for increasing the implementation of innovation. Accordingly, research suggests that hackathons can act as a communication tool for the purpose of innovation in that they bring people together and strengthen collaborations internally (Boudreau et al., 2011; Fernandez &

Rainey, 2006; Irani, 2015; Lampel et al., 2011; Möller et al., 2014; Terwiesch & Xu, 2008).

Additionally, as hackathons (due to their collaborative yet competitive nature) inherent reward giving (Briscoe & Mulligan, 2014; Ye et al., 2012), studies argued that hackathons could increase employee commitment and engagement (Ahuja, 2016; Hayton, 2005; Kassa & Raju, 2015; Rosell et al., 2014). Respondents of this study felt similarly and agreed with the latter. In fact, respondents felt that regardless whether approached from a bottom-up or top-down perspective, having committed and engaged employees meant that they were more willing to communicate for their idea, the change that they desired, and also be more effective in it. The respondents explained that hackathons increased this ability to develop and implement ideas as an employee. The latter is again in line with previous research, as it suggests that hackathons provide a salient platform for employees to showcase their ideas to everyone involved in the organization, including those in the decision position, often referring to top management (Irani, 2015).

So when it comes to the intention to implement innovation, both communication and commitment and engagement play an influential role. However, respondents revealed that it is necessary to find support for your ideas via the relevant stakeholders within the organization. Meaning that senior management support and your internal network cannot guarantee, but can make the implementation of your ideas easier. Studies also pointed out that situational factors such as organizational support play a leading role in explaining employees' willingness to develop and push ideas into the organization, in which the relationship between the organization and its employees can thus be viewed as being mutually beneficial (Ahuja, 2016; Hayton, 2005; Kassa & Raju, 2015; Yuan & Woodman, 2010).

Moreover, it should be noted that the process-oriented perspective on innovation, in which innovation is understood as the process of introducing something new (Abou-Zeid & Cheng, 2004) is supported by the findings of this research. The, now substantiated, process-oriented perspective explains how the adoption of innovation is intended to contribute to the performance and effectiveness of the organization (Damanpour & Scheider, 2006). The findings of this research indicated that effective innovation includes everything that contributed to the organization in whatever way and preserved a future for the organization. In order to have a future, it is necessary to innovate. Innovation in turn is the base for competitive advantage in the current fast-adapting markets according to Wang and Wang (2012). All in all, the findings of this study are in line with the discussed theory as

respondents perceived internal hackathons to be a tool for communication, fostering collaboration, employee commitment and engagement, and more importantly innovation.

However, there were some insightful, unexpected findings. First, based on the discussed literature organizational structures were expected to play a role, but not one as big as indicated by the results of this research. It appeared that even when the intention to implement is strongly present, organizational structures still play a major role in achieving implementation. A majority of the respondents expressed the importance of taking into account organizational structures with regard to the implementation of innovation, as it resulted to be one of the main barriers here. Thus, the results revealed an additional step, something to keep into account when the intention for implementation exists because it can either hinder or foster actual implementation, namely organizational structures. The second revelation was the explicit mentioning of organizational structures being a barrier for both traditionally bureaucratic as well as flat organizations. As internal hackathons were originally implemented by the creative and digital industries (Briscoe & Mulligan, 2014; Irani, 2015; Möller et al., 2014) where a more informal approach was taken, the expectation was that these, often flat, organizations did not face the same challenges as traditional, bureaucratic organizations (Ahuja, 2016). However, this study found that bureaucracy, internal relations and hierarchies, and thus organizational structures played an influential role in the attempt to implementation of innovation despite the form of the organization or the industry. Respondents pointed out that this had to do with a growing size of organization, which was in line with Keyani (2011) stating that hackathons require a more structured organization when there are a lot of people involved. However, respondents also felt that there was more to this barrier than just size, as there were always higher, ulterior motives involved.

5.2 Theoretical Implications

The theoretical implications of this study are threefold. Firstly, the rich and insightful findings of this research contribute to literature considering the newness and lack of research on the topic of investigation. To be more precise, according to Johnson and Robinson (2014) research on this specific type of innovation contests, namely hackathons, and its result in beneficial innovation is rather scarce. Additionally, as surprisingly little researched has focused on how communication influences idea-generation (Hennessey & Amabile, 2010) this study focused on examining hackathons as a communication tool for the purpose of innovation. Moreover, the findings of the conducted research broadly speaking support the theory that was discussed in chapter two of this report, but more importantly also provided

additional insights. The roles of organizational communication and employee commitment and engagement in innovation management were validated as determining factors for the intention to implement. Next to that, it was revealed that organizational structures come to play as well when it comes to the implementation of innovation, which was something that was not accounted for initially. In fact the results indicated that even when the intention to implement is strong, organizational structures could still be a potential interfering barrier for implementation. Meaning that in order to achieve implementation of innovation, a variety of relevant stakeholders within the organization need to be convinced. Bureaucracy exists in all types of organizations, it has to do with the size of the organization, and the fact that the ideas have to go through several layers, departments, and people within the company before a final decision is made.

Secondly, this research provided a new angle to the existent, all though scarce, theory on hackathons by taking a process-oriented view on innovation (Abou-Zeid & Cheng, 2004; Damanpour & Schneider, 2006). The process-oriented view on innovation is one in which innovation is understood as the introducing of something new (Abou-Zeid & Cheng, 2004). It explains how the adoption of innovation (including initiation, adoption decision, and implementation) is intended to contribute to the effectiveness and performance of the organization (Damanpour & Schneider, 2006), making the definition of innovation as actual implementation more prominent (Hennessey & Amabile, 2010, p.585). The findings of this study, accordingly, indicated that effective innovation is that what contributes to the organization and preserves a future in whatever possible way. Moreover, as this perception of effective innovation holds when it comes to hackathons, it can be utilized in determining the effectiveness of hackathons in general for innovation.

Thirdly, as the respondents of this study came from a variety of industries and positions, ranging from financial institutions to video game companies, and from managers and employees to external organizing experts and consultants. The results are thus contributable in the sense that a variety of perspectives are provided and compared to each other, leading to an integration of the obtained insights on innovation and with that a wholly picture.

5.3 Practical Implications

The practical implications of this study are also threefold. Firstly, the results of this study can be considered beneficial for any organization that wants to innovate by organizing an internal hackathon. The findings not only provide an insight into how hackathons work, but also

advise in terms of making sure the effectiveness of hackathons. Moreover, for those who are not yet convinced of the effect and benefits that hackathons can bring along, this study can potentially be a turning point.

Secondly, this research took a look through the perspective of the employee, but also through that of an employer. In this sense, the results can be an eye-opener in that additional insight into the opposing parties perspective is provided. For example, managers are presented with a clearer view of what leads to more engaged and committed employees, namely appreciation, freedom and ownership. In turn, employees with a drive for corporate entrepreneurship are advised to take into account the prominence of management support, internal networks, and organizational structures based on the results of this study.

Last but not least, the final practical implication is related to the variety of industries and professional backgrounds of the respondents. As some respondents came from the more experienced, digital-technology industries, and thus have more experience with hackathons and new ways of working than those who came from traditional, bureaucratic organizations, there is an opportunity to learn from the former's best practices and mistakes.

5.4 Limitations and Future Research

As every research entails certain limitations, the limitations of this study are related to the chosen method, in which the researcher is the measurement instrument and thus leads to a certain amount of subjectivity. The latter challenged the external validity of the findings, as it increased the uniqueness of the way the study was conducted. The qualitative nature of this study in general makes it challenging to generalize the findings to a bigger population. Moreover, even though the interviews disclosed meaningful, in-depth answer from the respondents, in one particular instance the question scheme proved to be unfulfilling in providing clarity on the nature of organizations. The latter refers to the fact that it was not always clear what type of organization respondents belonged to. This had to do with the fact that a number of respondents who in the common sense would be categorized as part of a traditional organization, did not always agree with this categorization. They perceived their organizations to be relatively flat, but without indicating a clear reason for this perception. Lastly, it can be argued that considering the exploratory nature of qualitative research, taking a broader approach on the topic of investigation would have aided further in preventing the researcher to direct answers. Meaning that this research specifically looked at the role of communication in innovation management and employee commitment and engagement as the influencers of organizational innovation, but this focus could be widened further.

Consequently, future research is suggested to take a broader approach and focus on finding out more about more and other factors that influence organizational innovation when it comes to internal hackathons. One a different note, future research can also go more in-depth in investigating organizational structures as a barrier for the implementation of innovation based on the results of this study. Additionally, the developed conceptual model can be used as a point of reference for quantitative studies in the same sphere. Future research can thus empirically test the relationships discussed in this study and find out whether they still hold with larger sample sizes. On top of that, future research is also suggested to take a mixed method approach, considering that qualitative research can aid in acquiring rich and in-depth information and quantitative research in providing generalizable results, leading to more valid and reliable statement.

5.5 Conclusion

In order to discuss the main conclusions of the research, it is important to restate the research question: *"To what extent are internal hackathons effective as a communication tool for the implementation of innovative ideas within an organization?''* Based on the results of this study, the answer to the research question is that internal hackathons are potentially an effective tool for the implementation of innovative ideas within an organization. The potential lies in the two expected influential factors. First of all, it lies in the commitment and engagement of the employees from a bottom-up approach, in which the more committed the employee is to the innovation, the more persuasive and effective their communication towards the rest of the organization will be. Secondly, it lies in the understanding and accurate use of communication from a top-down approach, in which it is important for management to carefully consider and strategically make communication decisions. Thus, when these two factors are kept in mind, internal hackathons can be an effective communication tool for innovation. However, despite the fact that hackathons as a new way of working, in which often the opportunity is provided to pitch your idea to the rest of the organization and thus be more effective in communicating your idea to management or to whoever that eventually takes the decisions, organizational structures are still found to be a barrier for implementation.

In conclusion, hackathons can be an effective communication tool when the role of communication in innovation management and employee commitment and engagement are kept in account. However, when it comes to innovation, the implementation of new ideas, the process is more complex than anticipated. Hackathons are a tool for innovation, but they are

not the only tool. Organizations need to understand the reciprocity and interconnectedness of the bottom-up and top-down approaches, people need to be brought together, join forces and collaborate for a collective purpose.

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APPENDIX A. INTERVIEW PROTOCOL

Demographic questions

Q1: What is your name?

Q2: What is your age?

Q3: What is your official occupation? And can you explain your role within the company to me?

Internal Hackathons

Q4: How would you define hackathons?

Q5: How would you describe the purpose/essence of a hackathon? Why?

Q6: What is your experience with internal hackathons?

Q7: What has your role been in these internal hackathons?

Q8: When do you perceive a hackathon as a success? Why?

Role of Communication in Innovation Management:

Q9: What is the role of communication when it comes to internal hackathons? Why?

Q10: What is the role of communication when it comes to innovation management in general? Why?

Q11: To what extent do you think communication is a tool for innovation?

Employee Commitment and Engagement:

Q12: To what extent is getting employees engaged and committed challenging or easy for an organization?

Q13: To what extent do you think hackathons are a tool for communication, in relation to employee commitment and engagement? Why?

Q14: To what extent does the organizational culture in which you work value employee commitment and engagement? Why?

Q15: Have you ever tried to develop and implement an idea as an employee? Why? How?

Q16: Do you feel there is room for you to develop and implement new ideas within your organization? If so, how?

Q17: What kinds of hackathons are most effective for increasing employee commitment and engagement; competitive or collaborative? Why?

Q18: What do you think will increase employee commitment and engagement? Why?

Intention to Implement Hackathon-generated ideas:

Q19: In your experience, how much of hackathon-generated ideas that were intended to be implemented, were actually implemented? Why? Why not? What barriers were there?

Q20: What role did communication play in this incidence, according to you? Why?

Q21: To what extent does having engaged and committed employees, influence the intention to implement according to you? Why?

Effective Innovation:

Q22: What is considered to be effective innovation within your organization? Why?

Q23: For the purpose of this study effective innovation is perceived as the implementation of hackathon-generated ideas. What are (next to communication and employee involvement) other things to consider when it comes to implementation of this innovation according to you? Why?

Q24: What do you think about the relationship between the intention to implement and actual implementation? Can you describe a situation that illustrates this relationship?

Concluding Question:

Q25: Would you like to add anything that has not been discussed so far?

APPENDIX B. OVERVIEW OF THE SAMPLE

Respondent	Sex	Age	Occupation	Date
1	M	28	Senior Developer Relations Technical Artist - at Video Game Company	29 March 2016
2	M	54	Innovation Department – at Governmental Organization	7 April 2016
3	M	19	Freelance Growth-Hack Consultant	8 April 2016
4	M	36	Social Media/HR Specialist – at Police District	14 April 2016
5	M	21	Advisor – at Recruitment Company	18 April 2016
6	M	26	Scrum Master/Java Developer – at Media Company	19 April 2016
7	M	43	Senior IT Manager – at Dutch Bank	29 April 2016
8	M	26	Developer Support Engineer – at Video Game Company	2 May 2016
9	F	33	CEO – at Innovation Agency	11 May 2016
10	F	28	Founder and Owner – at Communication Agency	12 May 2016

APPENDIX C. THEMATIC ANALYSIS PER VARIABLE

Concept	Theme	Exemplary Quote
Internal Hackathon	Collaboration	*"For us at company X it is not only about the results of the hackathon, but about the experience and bonding. Especially for a creative company it is essential to bring your people together, share knowledge and with that join forces so to say. Where one lacks, another can compensate.''*

Concept	Theme	Exemplary Quote
Role of Communication in Innovation Management	Communication as Innovation-tool	*"So in that case it's very easy for a company or individuals to innovate within the company, because they don't have to sort of validate their time that they're spending. Because it's a specific day to do whatever you want so at that point they can just innovate in whatever direction they want and showcase that to their upper or middle management, like hey this is what we did, this is what you should pursuit. So I think that is an important way of driving innovation.''*

Concept	Theme	Exemplary Quote
Employee Commitment and Engagement	Collaboration	*"Collaboration [fosters commitment and engagement]! Because if people are not collaborating with each other everyone is doing things for their own only and yeah a company is teamwork.''*
	Hackathon as Communication-tool	*"So I think that if you put people through an intense high pressure experience for like 24 hours, something like that, I think that helps them to you know become friends or to have a better relationship with each other and thereby improve their communication over time after the hackathon.''*
	Appreciation	*"So it's hard to gage exactly how much they value it*

| | | *[commitment and engagement of employees, LT], but that is the general feeling that you have, yeah that they do value it and to want to make sure that you are able to spend the time the way you want it, as long as it adds value to the company.''* |

Concept	Theme	Exemplary Quote
Intention to Implement	Communication as Innovation-tool	*"Yeah I think it's important to sort of you know really communicate with all the people already before the hackathon that you're going to need after the hackathon to implement stuff. Like okay this is coming and make sure that they are all sort of involved in the process so they don't feel threatened and they don't have this 'not-invented-here' feeling, because you basically already sort of before the hackathon you got to gather them and got to say like okay you know guys we are going to need all of you to make this a success, the implementation part.''*
	Organizational Structures	*"So that's the biggest problem I think with hackathons, because I think most of the hackathons we did afterwards there were a lot of problems because yeah there are a lot of company guidelines most of the time, or it's more on the budget, or the company...especially the bigger companies they don't follow up really fast after a hackathon.''*
	Commitment and Engagement	*"It's probably if they, if they care about what they're working on at that point they will sort of fight for it. Even if there's a little resistance with management, because they care about it they will continue to fight and make sure that it actually get is. If they don't care about it then after the first hurdle they will just say okay never mind, don't care. So I think that's important, an important factor.''*

Concept	Theme	Exemplary Quote
Effective Innovation	Future of Organization	*"I think it really depends for yeah what kind of company, so every company has different challenges. So for example, yeah banks right now they really need to think about the bank of the future, cause there are a lot of alternatives for banks right now. So yeah if they don't innovate, maybe there is no bank in the future anymore and also no business model. So at every company they need to come up with new ideas for the problems that they are facing and it depends on the competitors, yeah on the market. So it really depends per company and sector.''*
	Organizational Structures	*"You just bump into the reality in companies, bureaucracy indeed. If you want to implement something well, you get to deal with security and everything that goes with the development of applications. Those are long tracks we are talking about, so eventually you are still losing a lot of time while trying to implement it. If you look at start-ups they don't have these challenges.''*