

University of Twente  
School of Management and  
Governance

Faculty of Behavioral, Management  
and Social Sciences

Master of Science in Business  
Administration: Innovation Management &  
Entrepreneurship

**Full name** : Maurice Smulders  
**Student no** : s1556061  
**Email:** m.c.r.smulders@student.utwente.nl

**TITLE:** *antecedents for idea quality in intra  
corporate crowdsourcing for ideas*

**Supervisors UTwente:**

**Lead:** Dr. Matthias de Visser

**Co-Reader:** Dr. Michel Ehrenhard

**Supervisors TU Berlin:**

**Co-Reader:** Daphne Hering





## Management Summary

The interest in crowdsourcing, and intra-corporate crowdsourcing in specific, has been on the rise. Primarily to tap into the need of companies for constant innovation. Though seemingly highly beneficial, the practice is posed with problems in terms of the ratio between low quality and high quality ideas. The sheer amount of bad ideas hamper the continuous stream of innovation as well as the efforts of idea evaluators. It has been argued that only one in 3000 ideas become a commercial success. A comparable meagre percentage of successful ideas has been found at the partnering company. It is known that there are interpersonal differences in the provision of ideas but the actual factors that generate this discrepancy is rather unknown. Therefore this study aims to discover the most influential individual traits and contextual factors that promote idea quality in intra-corporate crowdsourcing initiatives. The related research question therefore is: *“What are the traits and contexts of the individual employee profile that generate the highest rated ideas in intra-corporate crowdsourcing for idea initiatives?”* The study, based on an empirical dataset of 189 employees within the perimeters of the Spark Innovation platform at Liberty Global, yielded interesting results. The discovery of these results could attributed to the scoping approach that used the experiences of platform managers in combination with academic knowledge to find the most relevant traits and contexts. By exercising ordinal logistic regression the individual traits and contexts that promote idea quality were exposed. More specifically, the traits and contexts that provide increased odds of generating high quality ideas are found to be task autonomy, proactive personality, information sharing and trust. The predictors that were found non-significant were task variety, task identity, feedback, entrepreneurial self-efficacy and networking ability. With this knowledge practitioners can deploy measures to enhance the factors on a holistic level to increase the overall average idea quality, but also set up ideation task forces with people that score high on the factors that were discovered. As a collateral effect, the strain of work on evaluators can be diminished by the improved ratio of good to bad ideas. In general, the findings point to the importance of explicitly considering the broader innovation and/or task context to effectively manage intra-corporate innovation platforms.

**Keywords:** Idea Quality, Innovation, Internal, Idea generation, trust, feedback, proactive personality, information sharing, autonomy, variety, identity, entrepreneurial efficacy

## Preface

This master thesis heralds the end of an era, my life as a formal student. This research effort is the terminal of the dual degree program Innovation Management and Entrepreneurship. The research at hand did not only enhance my researching skills but also provided me with profound knowledge about the field of corporate innovation management and prepared me for a professional career in this direction.

During the research I have received great support from various persons in several ways, by means of this preface I would like to take the opportunity to thank them.

First of all, I would like to express my gratitude to my supervisor Matthias de Visser from the University of Twente. His constructive feedback and guidance gave me the necessary support to complete this thesis. It was a rough but cultivating journey.

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## 1. Introduction

The need for innovation is vital (Ancona & Caldwell, 1986) and consistently a top business priority among CEOs (Andrew, Manget, Michael, Taylor, & Zablitz, 2010; Jaruzelski & Dehoff, 2010) and a key issue in academic research (Hauser, Tellis, & Griffin, 2006; Krishnan & Ulrich, 2001). Given the need for a continual stream of new products and services, firms have traditionally relied on an internal staff of professional inventors to generate ideas (Ernst, Leptien, & Vitt, 2000; Schulze & Hoegl, 2008). Despite these investments in traditional innovation activities, firms continue to be disappointed with their innovation outcomes and resort to new means (Chesbrough, 2006; Jaruzelski & Dehoff, 2010). Crowdsourcing is a new prodigy on the horizon that is able to solve this issue.

Crowdsourcing helps firms and individuals find novel solutions for their key problems and enable them to source for ideas in a highly effective manner (Bayus, 2013; Blohm, Leimeister, & Krcmar, 2013; Y. Zhao & Zhu, 2014). Crowdsourcing has heralded new ways of acquiring knowledge and ideas from large numbers of individuals and groups alike in the last decade (Leimeister, Huber, Bretschneider, & Krcmar, 2009). Although this approach has worked for some companies, issues arise with intellectual property, tacit knowledge, and the transfer thereof (Pisano, 2006; Von Hippel, 1994). To resolve these, they resorted to intra-corporate crowdsourcing (ICC): sourcing for ideas within the perimeters of the organization, often enabled by web 2.0 applications via the internet (Musser & O'reilly, 2006). These applications set a new social dynamic, offering inclusion of the socially challenged (McKenna & Bargh, 2000, p. 200).

The success of ICC is at the same time a vice as the extensive amount of ideas that are being generated amass to such proportions that they are hard to assess by managers for quality and provide a low ratio of high quality ideas. Indeed, in many cases the vast amount of ideas that are generated have detrimental effects on the proper identification of the best ideas and thus the initiative could result in a fiasco (Di Gangi, Wasko, & Hooker, 2010). Concrete evidence can be found in the initiatives of Dell Ideastorm where 8,801 ideas have been generated and only 348 ideas were implemented, a meagre 4% (Bayus, 2013). Steven & Burley (Stevens & Burley, 1997) ascribe this notion and postulates that only one in 3000 ideas becomes a commercial success. Looking at the companies that are considered in this study, a score of 3% of all ideas posted got implemented. This exorbitant failure rate might be ascribed to the lack of empirical studies in the field (Villarroel & Reis, 2010). As a result, managers have to resort to their personal, often highly incomplete, knowledge on idea generation. While, in fact, this is one of the core jobs of the innovation manager (Di Fiore, 2014). Hence, the effectiveness of ICC leaves something to be desired and managers are searching to find ways to increase the quality of the idea generation efforts.

When organizations endeavour in ICC for ideas they aim for the best ideas: the ideas that are getting implemented and cause a return on investment (ROI). In assessing idea quality two challenges arise: (1) a reliable way to scrutinize every idea must be devised and (2) a total score should be developed to assess the ideas (Briggs, Reinig, Shepherd, Yen, & Nunameker, 1997; Dennis, Minas, & Bhagwatwar, 2013). Review of idea generation literature has revealed that terms used to assess idea quality can be grouped into four constructs: novelty, feasibility, relevance and elaboration (Kipp, Bittner, Bretschneider, & Leimeister, 2014). These outcomes of idea quality in crowdsourcing for idea initiatives are mainly attributed to the innovativeness



or creativity of the employee (Elerud-Tryde & Hooge, 2014). Therefore, as precursors for idea quality, creativity and innovation are considered to be vital (Ouakouak & Ouedraogo, 2017; Rietzschel, Nijstad, & Stroebe, 2010), and the reason why organizations are continually pursuing ways to nurture them (Gu, Tang, & Jiang, 2015). Clearly, understanding creativity and innovation in the organization, and thus the identification of the most important factors that lead to this, is of strategic importance to organizations (George & Zhou, 2007). Ample studies have been conducted to investigate contextual and individual factors that relate to employee creativity and innovation (Anderson, Potočnik, & Zhou, 2014; Hammond, Neff, Farr, Schwall, & Zhao, 2011). Yet, a particular gap has been identified in this context aiming at the individual-level of analysis of antecedents predicting employee creativity and innovation. Deriving from the future research guidance of Girotra and her peers it can be said that there are significant personal differences in ideation that could differ from existing research as “*the dynamics of the interaction between these high performing individuals may differ significantly from the existing evidence and need to be explored in further experiments.*” (Girotra, Terwiesch, & Ulrich, 2010, p. 13). Hence, even though there are assumptions on the existence of dissimilarities, the actual factors causing these differences need to be discovered.

For this reason this study focuses on finding factors that are deemed to be of major importance to influence creativity or innovation, and thus idea quality at the individual level. Through scrutinization of a comprehensive review of antecedent for creativity and innovation by an expert panel in the field, seven factors are identified that are believed to be instrumentally influencing idea quality: task identity, task variety, autonomy, feedback, proactive personality, information sharing, trust, entrepreneurial self-efficacy and networking ability.

This study adheres to the research requests for the emerging academic field of ICC for innovation, by investigating the individual differences that result in high quality ideas, within an environment where changes in social behaviour are apparent. The new digital (web2.0) and intra-organizational environment demands a new analysis for antecedents for innovation. Furthermore, in response to the importance of innovation for organizations ample studies have been conducted to investigate contextual, job specific and individual factors that relate to employee creativity and innovation. Regardless of the magnitude of studies performed in this domain (Mumford, 2003; Shalley, Zhou, & Oldham, 2004; Zhou & Shalley, 2003), little emphasis has been laid upon quantitative approaches. Also, the analysis will answer the call for empirical real-world (idea) data, for which the accumulation of data is often challenged by intellectual property rights management by the facilitating company (Majchrzak & Malhotra, 2013). Hence, getting access to this type of idea related data is a hardship for researchers. Moreover, I venture forth on the assumption from Girotra and his peers that various factors have an influence on idea quality and make a first effort in the identification and testing of these factors. Lastly, this research also taps into the limitation of many studies of only considering a limited amount of factors as exclaimed by Axtell et al. (2000).

In practice this research aims to yield the following results. First of all, an enhanced understanding of the antecedents that promote idea quality is vital, as creativity and innovation is key in attaining a competitive advantage (Agars, Kaufman, & Locke, 2008). In starting a crowdsourcing for ideas campaign the community managers might employ the identified antecedents for creativity and innovation to enhance the effectiveness of their efforts. Moreover, this selection practice could also be used to pre-select potential individuals for a particular job, as have been identified with external crowdsourcing (Frey, Lüthje, & Haag,

2011). More specifically, referring back to Giotra and her colleagues, looking at the persistence of the optimal personal ideation characteristics leading to an ideal pool of ideators *“If they are, an optimal process may be to first screen the pool of individuals for the highest performers and then employ only those individuals in subsequent idea generation efforts.”* (Giotra et al., 2010, p. 13). Persistency in these factors can lead to potential ideation task-forces. Moreover, these ideators might be the right persons to support current ideators to develop their ideas and reach a higher submission quality. Also, the before mentioned problem of excessive low quality ideas and the resulting increase of tedious grading work within idea campaigns can be combatted with the possibility to enhance idea quality. Finally, innovation managers can use the measures and scales that have been assembled for this study for assessment.

With these aims in mind the following research questions have been developed. The focal research question in this study is:

- *What are the traits and contexts of the individual employee profile that generate the highest rated ideas in intra-corporate crowdsourcing for idea initiatives?*

To be able to answer this main research question the following sub research question have been set-up.

- *How can the quality of ideas be assessed?*
- *What are the various antecedents that are estimated to influence creativity and innovative behavior?*
- *To what extent do the most influential factors affect the quality of ideas in intra-corporate crowdsourcing?*

The remainder of this study is organized as follows: first of all, the study takes on a broad starting position with a review of the relevant literature on the topic of inter-organizational crowdsourcing and the corresponding factors that enhance creativity and innovation. Subsequently, I then focus the research on the most critical elements and provide an into-depth analysis of the various factors that have been selected by means of the scoping interviews with the Innovation Platform managers. I then proceed with the discussion of the salient features that promote idea quality through a selection by means of the interviews and the literature. Next, I will present my results on how these factors have empirically influenced the idea quality within the intra-corporate crowdsourcing for innovation campaigns. I conclude with a summary of the results and a discussion on the implications of the findings for both academics and practitioner audiences. When any ambiguity on the terminology used in this thesis should arise, please refer to appendix 1 for a glossary of key terms.

## 2. Literature review

To achieve a coherent understanding of the various concepts and variables that are dealt with in this study, a literature review of the relevant academic publications is deemed vital. In the next section, please find an elaboration on the research context, the dependent and independent variables that play a role in this study. This chapter will therefore illuminate the antecedents that were found to be of major importance for idea quality.

### Crowdsourcing for Ideas

As the term encompasses a great variety of activities, there has been quite some discussion on the definition (Heer & Bostock, 2010; Singh, 2014; Y. Zhao & Zhu, 2014). Scholars have even revised their own definition (Brabham, 2008a, 2008b) and complete publications have been devoted to the definition of crowdsourcing (Estellés-Arolas & González-Ladrón-De-Guevara, 2012). This delineates the elusiveness of the term. Moreover, the practices related to crowdsourcing are equally ambiguous. For example literature has used various definitions to label related phenomena like collaborative systems, groupware, community systems, peer production and crowd wisdom (Doan, Ramakrishnan, & Halevy, 2011). Other terms that are used interchangeably to define the same phenomenon are user innovation (Von Hippel, 2005), collaborative innovation (Sawhney, Verona, & Prandelli, 2005), customer empowerment (Fuchs & Schreier, 2011) and the before mentioned open innovation (Chesbrough, 2003). As this study is concerned with the intra-organizational approach of crowdsourcing the following definition of Mazzola and Distefano (2010, p. 3) is adopted as it incorporates the internal nature and the focus on ideation: *“An intentional mobilization, through Web 2.0, of creative and innovative ideas or stimuli, where all employees are included within an organization in the ideation phase of the innovation process”*. The majority of these definitions is concerned with the activity of an open call to external parties. As said before, the impetus for crowdsourcing activities originates from web 2.0 developments, in which individuals are active contributors instead of passive users (Y. Zhao & Zhu, 2014). Evidence for this use can be found at companies on a complete spectrum of industries (Andriole, 2010).

The topic of crowdsourcing for ideas has gained considerable interest in the past decade as can be elucidated with a search on Web of Science with “crowdsourcing” and “ideas” (see fig. 2.1). Several studies have investigated crowdsourcing for external uses like marketplaces for online work (Chandler & Kapelner, 2013; Kaufmann, Schulze, & Veit, 2011), contests (Y. Zhao & Zhu, 2012; Zheng, Li, & Hou, 2011), external ideation (Hossain, 2012; Leimeister et al., 2009), start-up (D. Smith, Manesh, & Alshaikh, 2013), e-government (Cupido & Ophoff, 2014) and not for profit contexts (Alam & Campbell, 2012; Pilz & Gewald, 2013). Yet, the practice of employee based- or internal (intra-corporate) crowdsourcing for ideas, facilitated by web 2.0 applications, is rather under exposed (Stephens, Chen, & Butler, 2016; Stieger, Matzler, Chatterjee, & Ladstaetter-Fussenegger, 2012).

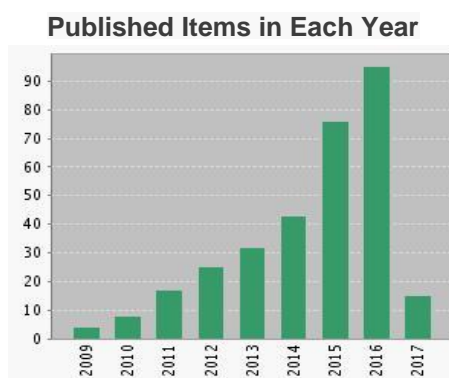


Fig. 2.1 – Published items crowdsourcing for ideas (April 2017)

## **The role of Web 2.0 applications**

Web 2.0 is the next generation internet that facilitates participation and openness via internet applications (Musser & O'reilly, 2006). Within the sphere of innovation, web 2.0 technologies aid the ability to syndicate innovation, improve successful hit rates, increase innovation initiatives and productize more cost effectively (Andriole, 2010). Next to its practical benefits, it has also set a new setting for research as it has changed social equilibria between individuals. Personalities are able to compensate for social handicaps in the short term. More specifically, *“the internet may facilitate the creation of relationships among the anxious that might not otherwise have occurred because of their lack of comfort with interpersonal situations, but that emerge to look very much like other real-world relationships”* (McKenna & Bargh, 2000, p. 200). This change in social dynamics via web 2.0 create a new playing field.

The use of IT-enabled crowdsourcing within organizations has increased tremendously over the recent years. This phenomenon has produced a literature stream focusing on many aspects (Zuchowski, Posegga, Schlagwein, & Fischbach, 2016). This abundance in attention has also produced insights into its drawbacks. The exorbitant numbers of ideas generated in crowdsourcing campaigns often produce only a meagre amount of *“winning”* ideas (Bayus, 2013; Stevens & Burley, 1997). These winning, or *exceptional opportunities* according to Terwiesch and Ulrich (Terwiesch & Ulrich, 2009), are the ones searched for. The authors propose three fairly straightforward solutions to enhance the idea quality in a campaign, namely (1) increasing the average quality of participants, (2) increasing the quantity of the participants and (3), and increasing the variance of participants. I argue that these solutions are rather general and don't offer any concrete assistance to innovation platform managers.

### **2.1 The criteria for Idea quality (DV)**

As noted before, the fuzzy front end of innovation is concerned with the epiphany of a creative idea (Kristensson, Gustafsson, & Archer, 2004). Ample efforts have been exerted to define the concept of creativity. It has generally been placed within organizational premises in the creation of novel products, business strategies, solutions to problems, service offerings and procedures (Perry-Smith & Shalley, 2003). Though creativity is a complex concept and a such has multiple possible interpretations with many divergent definitions (Quitério et al., 2010). Relatedly, Meusburger, Funke, and Wunder (2009) argue that in the vast body of literature covering creativity, more than a hundred versions of the definition are articulated. Often it is associated with the generation of new and valuable ideas that can bring an organization further (Amabile, 1996; Oldham & Cummings, 1996; Zhou, 1998). It is described as the ability to generate new and valued ideas (Zhu, Djurjagina, & Leker, 2014).

#### **Interpretations of quality**

The evaluation of idea quality is closely connected to their inherent creativity (Blohm, Bretschneider, Leimeister, & Krcmar, 2011). Due to the ambiguity of both concepts, a broad range of evaluation methods is known to assess the idea quality in idea competitions. Ideas are often rated by peers or other contributors, but also expert panels are brought to life to support this purpose. Because of the vast amount of apparent idea evaluation practices, with corresponding varying rating criteria, the determination of best practices is daunting. Yet, ample research has been executed into the metrics that are used for quality assessment of creative productions and ideas. In general there are two main categories of the idea quality

definition: novelty-based and multi-attribute based (Dean, Hender, Rodgers, & Santanen, 2006). These definitions zoom in on several aspects of quality. E.g. feasibility and originality (Diehl & Stroebe, 1987, 1991), effectiveness (Taylor, Berry, & Block, 1958), the importance of an idea in a certain context (Valacich, Dennis, & Connolly, 1994) and the magnitude of the impact the idea might have. All these measures are based on the identification of a specific quality score per idea. Another well-known measure is the NUF method. This method operationalizes four dimensions, viz., novelty, relevance, workability and specificity. Novelty is determined as not being expressed by anybody before, workability as not interfering or violating constraints or easily implemented, relevance with the ability to satisfy goals for the problem solver and specificity as the notion that the idea is worked out in detail (Dean et al., 2006). A thorough review of the literature elucidates that the lion share of the various measures can be grouped into either one of four dimensions. Namely: novelty, relevance, feasibility and elaboration. Please refer to table 2.1 for a complete overview of the literature study on quality assessment of ideas and fig 2.1 for a visual representation for the relationships.

**TABLE 2.1**  
**Idea quality assessment literature**

<u>Dimension</u>	<u>Publications</u>
<b>Novelty</b>	(Amabile, Conti, Coon, Lazenby, & Herron, 1996; Ang & Low, 2000; Barki & Pinsonneault, 2001; Besemer & O'quin, 1986; Cady & Valentine, 1999; Dean et al., 2006; Franke & Hienerth, 2006; Diana Horn & Salvendy, 2006; D. Horn & Salvendy, 2009; Im & Workman Jr, 2004; Kristensson et al., 2004; Lilien, Morrison, Searls, Sonnack, & Hippel, 2002; Lüthje, 2000; MacCrimmon & Wagner, 1994; Rochford, 1991; Verhaegen, Vandevenne, Peeters, & Dufloy, 2013; Walcher, 2007; White, Shen, & Smith, 2002)
<b>Relevance</b>	(Amabile et al., 1996; Ang & Low, 2000; Barki & Pinsonneault, 2001; Besemer & O'quin, 1986; Cady & Valentine, 1999; Im & Workman Jr, 2004; Kristensson et al., 2004; Lilien et al., 2002; MacCrimmon & Wagner, 1994; Niu & Sternberg, 2001; Rochford, 1991; White et al., 2002)
<b>Feasibility</b>	(Amabile et al., 1996; Ang & Low, 2000; Barki & Pinsonneault, 2001; Besemer & O'quin, 1986; Cady & Valentine, 1999; Dean et al., 2006; Franke & Hienerth, 2006; Diana Horn & Salvendy, 2006; Im & Workman Jr, 2004; Kristensson et al., 2004; Lilien et al., 2002; MacCrimmon & Wagner, 1994; Niu & Sternberg, 2001; Rochford, 1991; Soll, 2006; Walcher, 2007; White et al., 2002)
<b>Elaboration</b>	(Amabile, 1996; Besemer & O'quin, 1986; Cady & Valentine, 1999; Dean et al., 2006; Franke & Hienerth, 2006; Kristensson et al., 2004; Lüthje, 2000; MacCrimmon & Wagner, 1994; Niu & Sternberg, 2001; Rochford, 1991; Soll, 2006; Walcher, 2007; White et al., 2002)

The output that is generated on crowd sourcing for idea initiatives are the contributions that are delivered by the participants (the crowd). These contributions, in the form of ideas, are subject to quality assessment (Schenk & Guittard, 2011). To achieve an understanding of a potential assessment scheme, the four concepts are clarified below.

### **Novelty**

In general there is consensus that creativity is an expression of an idea that is novel and useful (Amabile, 1996; Mayer, 1999; Niu & Sternberg, 2001; Plucker, Beghetto, & Dow, 2004). The traits of a novel idea are that it is unique and rare and thus, not previously articulated (MacCrimmon & Wagner, 1994). Hence, novelty is closely associated with originality and

therefore is also concerned with imagination and unexpectedness (Ang & Low, 2000; Dean et al., 2006; Verhaegen et al., 2013). Originality is often considered to be a key element of creativity (Besemer & O'quin, 1986; Runco & Sakamoto, 1999; Walcher, 2007). Novelty is further supplemented by paradigm relatedness (Besemer & O'quin, 1986; Nagasundaram & Bostrom, 1994; Ward, Smith, & Finke, 1999). Paradigm Relatedness is the innovative character of the idea and the degree to which it is able to tear down current structures, this construct is often characterized as *radicality* in innovation literature (Besemer & O'quin, 1986; Christiaans, 2002).

### Relevance

Though, the novelty of an idea is no sufficient condition for quality. An idea should also be useful as to which an idea is relevant and it solves a particular problem for the initiator (Amabile, 1996). It should be a means that “*satisfies the goals set by the problem solver*” (Dean et al., 2006, p. 650). An idea's relevance is frequently associated with the financial (Cady & Valentine, 1999; Kristensson et al., 2004) or market potential that it possesses (Blohm et al., 2011). In new product development relevance is often described as proposing a customer benefit (Piller & Walcher, 2006; Walcher, 2007).

### Feasibility

In the context of business success feasibility is another instrumental aspect of the quality of an idea. Kristensson et al. (2004) argue that feasibility is the ability or simplicity with which the business can convert the initial idea into the reality of a commercialized product. Moreover, the goodness of fit between the idea and the business is also considered to be vital (Cady & Valentine, 1999; Lilien, Morrison, Searls, Sonnack, & Hippel, 2002; Rochford, 1991). Goodness of fit is assessed with two types of perspectives: the internal and external lens. The internal perspective evaluates the capabilities and resources of the initiator. The external perspective, on the other hand, gauges the fit with the image and brand of the initiator.

### Elaboration

The last element that is encompassed in the evaluation of ideas is the elaboration. This refers not only to the completeness and understandability of the description of the idea, but also the stage in which the idea is currently situated (Dean et al., 2006; Franke & Hienerth, 2006). Thus it discusses the maturity of the idea for implementation and the proper description of its development and potential execution.

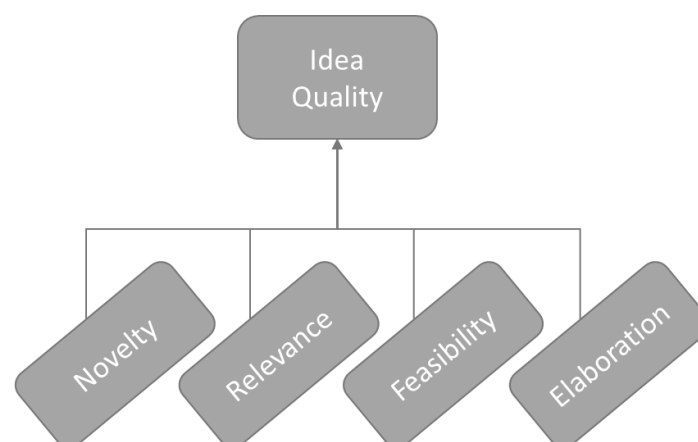


Fig 2.1 – Idea quality assessment

## 2.3 Creativity and innovation

In the management of creativity and innovation literature, both concepts are often regarded as separate steps in a development. Creativity is often seen as the first step in the process of generating products/services and processes (Scott & Bruce, 1994; Shalley & Gilson, 2004; Shalley & Zhou, 2008). On the other hand, innovation is clearly segregated from creativity as it can be defined as “*the implementation of a new and possibly problem-solving idea, practice or material artifact (e.g. product) which is regarded as new by the relevant unit of adoption and through which change is brought about*” (Martins & Terblanche, 2003, p. 67). Conversely, Anderson and his peers (2014) argue that there is not a precise delineation of where creativity ends and where innovation starts. Also others postulate that creativity and innovation happen throughout the complete innovation process and adopt a cyclical, iterative process (King, 1992; Paulus, 2002). Hence, a general agreement of what constitutes creativity and what innovation is lacking and different operationalizations exist for each concept (West & Farr, 1990). Nascent research argues that the boundaries between the two concepts are unclear. Therefore, Anderson et al. (2014) propose an integrative definition of creativity and innovation at work. They argue that: “*Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things.*” Thus, innovation and creativity are related constructs. Quite recently, Hon, Hon, Lui, and Lui (2016) also adopted this view and united creativity and innovation as concepts. In conclusion, creativity and innovation should rather be joined than separated. With this narrative in mind the following section will provide a literature review of the factors that influence creativity or innovation.

### 2.3.1 Determinants for Creativity and Innovation

Ample research has been performed into the locus of creativity within organizations and how firms can tap into the creative potential of employees to enhance innovative capabilities (Mumford, 2003; Shalley et al., 2004; Zhou & Shalley, 2003). Recent research has attempted to gain insight into the personal characteristics (traits) that promote crowdsourcing performance. Zhu, Djurjagina & Leker (2014) already took a first step into investigating antecedents of crowdsourcing performance, though they recommend that future research should focus on cause-effects relationships between personality and capability. Quite recently Terwiesch, in cooperation with Wooten (2017), expanded on his own recommendation for future research by studying the *feedback* factor on idea quality within innovation contests.

### Three levels of analysis for creativity and innovation

The vast amount of explanatory literature on creativity entices the development of a comprehensive gestalt. As an influential starting point, Scott and Bruce (1994) postulate that there are several lenses through which innovation can be analysed. The authors see innovative behaviour as the outcome of four systems in interaction – climate for innovation, work group, leadership and individual. All of these systems possess individual characteristics, job factors, intrinsic factors, organizational-, relational- and motivational factors (West & Farr, 1989). Over time the interest and research in creativity and innovation has been on the rise (Anderson et al., 2014). Over 16 reviews in seminal management journals have been found at the individual (Shalley & Gilson, 2004; Shalley et al., 2004), group (Hülshager, Anderson, & Salgado, 2009; Sivasubramaniam, Liebowitz, & Lackman, 2012; West, 2002), organizational (Camisón-Zornoza, Lapedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Crossan & Apaydin, 2010; Damanpour, 1991, 1992, 2010; Damanpour & Aravind, 2012) and mixed level

(Anderson, De Dreu, & Nijstad, 2004; Anderson et al., 2014; Axtell et al., 2000; Hammond et al., 2011).

### **Creativity and innovation at the individual level**

Recall that the study at hand is concerned with an ego-centric view in mind and therefore the factors are assessed from the perspective of the individual. For this reason all results that were obtained were filtered with the individual perspective in mind. The seminal publication of Scott and Bruce (1994): *“Determinants of innovative behavior: A path model of individual innovation in the workplace”* provided a holistic perspective on the set potential influential factors (e.g. support for innovation, leader-member exchange, intuitive problem solving style). The before mentioned review publications on the individual level were used to sketch a comprehensive picture of the individual traits and contexts that promote creativity or innovation. Additionally, Baer (2012) adds factors concerning networks including networking ability, type of ties and implementation instrumentality. More recently, knowledge sharing, person-organisation and ethics, with moderating roles for trust and culture were analysed. A positive impact on creativity has been found for person-organizational fit and moderating roles for personal trust and initiative friendly cultures (Ouakouak & Ouedraogo, 2017).

### **Traits and contexts for individual innovators**

The complete review of factors in creativity and innovation research can be categorized under four main topics: Individual factors, tasks and social contexts and other research. The individual factor analysis examined the individual abilities, knowledge, identity, thinking styles, traits, self-concepts and values that lead to creativity. Relatedly, research has shown that the activities and social dynamics that employees are dealing with also have a profound impact on their creativity. Hence, task contexts are vital as well to assess with job complexity, routinization, goals and job requirements and rewards. The social contexts at hand consider leadership and supervision, customer influences and other influences including feedback, evaluation and justice. Also, social contexts networks are of equal importance and received quite some attention (M. Baer, 2012; Björk & Magnusson, 2009; Erez & Nouri, 2010; Obstfeld, 2005). The combination of these meta-analyses and state-of-the-art review papers provided a comprehensive picture of what is known. Ex post literature search endeavours on Web of Science and Scopus did not yield any additional factors that would contribute to the accumulated set.

## **2.4 Individual contextual variables on idea quality**

As said, research has shown that the contextual situation of both social and task environments in which participants are embedded can have a profound influence on their personal creativity and innovative behavior. This effect can be seen both directly and interacting with other variables (Anderson et al., 2014). In the following section I zoom closer in on the shortlist of factors that have been predefined by the innovation platform experts to be of major influence on idea quality related to employee contexts.

### **2.4.1 The effects of Task identity, Task variety, Autonomy and Feedback (Job Characteristics) on idea quality**

Four of the selected variables are part of the Job Characteristics Theory, therefore it is presented as a whole to generate an understanding of its dynamics. With the job enrichment approach and related motivational theories at its core (Herzberg, Mausner, & Snyderman, 2011; Porter &



Lawler, 1968; Turner & Lawrence, 1965; Vroom, 1964), Hackman and Oldham (1976) proposed the Job Characteristics Model (JCM). The corresponding Job Diagnostics survey explains how the motivation of employees to perform were linked to perception of the job. Hackman and Oldham pose that there are five job characteristics that lead to related psychological states and work outcomes. These five job characteristics are: (1) skill variety, (2) task identity, (3) task significance, (4) autonomy and (5) feedback (see fig 3.2 for an overview). This measure of job characteristics has been prevalently used in research to study the influence of job characteristics (De Jonge & Schaufeli, 1998; Frese, Garst, & Fay, 2007).

A variety in the necessary skills for the job, the connected task identity and task significance lead to experienced meaningfulness of work. Nota bene that in this study task significance is not taken into consideration for analysis. The perceived autonomy over a task leads to an enhanced experience of responsibility for work outcomes, and feedback initiates a state of being knowledgeable about the results of the work. The outcomes of the connection to psychological states result in higher motivation, higher performance and enhanced satisfaction. Subsequent research has suggested that the outcome of meaningfulness of work might be considered as the most influential mediator between work characteristics and its outcomes. Two decades later than the initial publication of the JCT, Humphrey, Nahrgang, and Morgeson (2007) verified this notion. Indeed, the experienced meaningfulness at work employs an instrumental role affecting work outcomes.

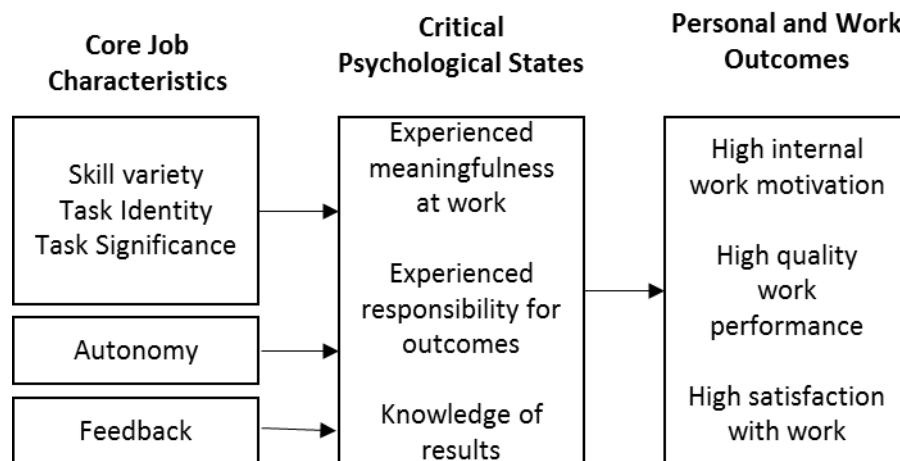


Fig. 2.2 - Job Characteristics Theory (Hackman & Oldham, 1976)

Autonomy can be defined as “the degree to which employees are free to determine the schedule of their work and the procedures and equipment they will use to carry out their assignments” (Coelho & Augusto, 2010, p. 3). Enhancing the autonomy of a job could result in job enrichment, coined by Fredrick Herzberg (Herzberg, 1968). Autonomy is regarded as the dimension that evokes employee sensations of responsibility for the outcome of their work (Hackman & Oldham, 1976). The dimension of autonomy has received paramount attention in work motivation and job design research (Morgeson & Humphrey, 2006). In relation to other dimensions, autonomy has a close link to variety, both in theory and in practice (Dodd & Ganster, 1996). It is argued that his relationship is apparent as the amount of variety predetermines a boundary on the amount of autonomy that can be ascribed to the job at hand (Dodd & Ganster, 1996). As autonomy is servicing a sense of freedom in the employee it invokes a feeling of control, freedom and responsibility for the delivery of quality work, it makes the job more stimulating (Amabile, 1996). Empowering and thus granting autonomy to

employees can, according to Bowen and Lawler, result in creative rule-breaking that can result in extraordinary creative outcomes (Bowen & Lawler III, 2006). Or like Amabile puts it: autonomy empowers employees “in ways that make the most of their expertise and their creative-thinking skills” (Amabile, 1998, p. 82). Hence, autonomy makes employees more empowered to tap into their own creative capabilities (Cools, Van den Broeck, & Bouckennooghe, 2009). Moreover, when employees possess an enhanced control of their jobs, they are likely generate ideas that matter (Damanpour & Schneider, 2006). Thus, I hypothesize:

*H1: there is a positive relationship between task autonomy and idea quality*

The dimension skill variety refers to the extent to which a particular job requires a range of activities and skills to be completed (Hackman & Oldham, 1976). In general the task-diversity of a job, and therefore the skills necessary, make it more challenging and attractive (Sims, Szilagyi, & Keller, 1976). On a critical note, the jobs that are high in task variety might result in complexity overload and thus inhibit the attractive traits of a varied task (Morgeson & Humphrey, 2006). Jobs that harness a high degree of variety inflict an increased level of intrinsic motivation on the employee and let them perceive their work as meaningful. In the light of the componential model of creativity, variety induces creative performance. Moreover, employees in these type of jobs have enhanced opportunities to “to explore and manipulate their environments and to gain a sense of efficacy by testing and using their skills” (J. R. Hackman & G. R. Oldham, 1980, p. 78). Relatedly, these jobs that have high variety characteristics drive the employee into seeking new abilities and skills, which enhances domain-relevant skills. As has been established, domain-relevant skills also increase creativity (Amabile, 1996).

*H2: there is a positive relationship between skill variety and idea quality*

The third core dimension, identity of a task, is the extent to which a task comprises of a “complete” identifiable piece of work, carried out from start to finish and resulting in visible outcomes (Hackman & Oldham, 1976). It has been said that jobs that comprise a complete task (e.g. the microbrewer making a complete beer by himself, from hops and barley to beer) are often more rewarding and interesting than jobs that contribute only a fragment of the whole production chain (J. R. Hackman & G. R. Oldham, 1980). Hackman and Oldham already indicate the importance of task identity, similarly to variety, that the job is important and worthwhile (1976; Morris & Venkatesh, 2010). The identity of a task can be defined when the task is an identifiable piece of work and the related results can be traced back to the employee. Research in the domain of task identity in service-employees has found that identity fosters domain –relevant skills and thus enhances the understanding of a particular situation in which the employee is (Coelho & Augusto, 2010). Again, this is in line with claims that creative skills are improved through flexibility and imaginative approaches, which require a coherent understanding of the situation (Amabile, 1998). In sum, by having a defined task identity, employees are more inclined to develop domain-relevant skills and generate a coherent understanding of the business situation. They are more inclined to explore new possibilities and create associations between concepts. Indeed, there is a strong relationship between domain proficiency and creativity (Amabile, 1996).

*H3: there is a positive relationship between task identity and idea quality*

Feedback, the last characteristic, is regarded as the amount of information employees receive about the performance they are portraying in their job (Hackman & Oldham, 1976). The awareness of activities and their impact (e.g. efficiency and quality) enhances overall knowledge about their work. In relation to other concepts, Humphrey et al. (2007) argue that having both autonomy and feedback on the job is of vital importance to pursue personal goals. On the one hand employees need decision freedom to in the process for their accomplishments, they will have higher levels of fulfilment. Relatedly, employees need feedback to have an approximation of their vicinity to their personal goals (Locke & Latham, 1990). Humphrey and his peer's meta-analysis of the Job Characteristics Model (2007) indicate that the complete arsenal of five dimensions relate to its anticipated outcomes, with feedback as an integral part. When employees receive direct information on how they perform on their activities this is regarded as feedback (J. Hackman & R. Oldham, 1980). In the absence of this feedback employees are in limbo for having positive or negative feelings about their performance. Consequently, this reduces their motivation and creativity. In the presence of feedback employees may engage in the quest for improved efforts and thus use their creativity to achieve better results (Earley, Northcraft, Lee, & Lituchy, 1990). With the course of receiving information employees generate an understanding of their actions and are stimulated to find different ways of doing something. Recent empirical work by Wooten and Ulrich (2017) has investigated the impact of feedback on quality in idea tournaments (e.g. 99 designs). They postulate that an idea poster is likely to use the feedback from the administrator to help update the quality of his submission. They suggest that *"feedback schemes that increase the amount of accurate, accretive information will reduce misconceptions, enhance learning related to the quality function, and thereby improve the average quality of submissions."* (Wooten & Ulrich, 2017, p. 9)

*H4: there is a positive relationship between feedback and idea quality*

#### 2.4.2 The effect of Information sharing on idea quality

The initiation of an idea is closely related to the information, skills and experiences that an employee's possesses in the value creation process. The sharing of information is one of the fundamental vehicles through which employees, business units and organizations are able to exchange to contribute to knowledge application, innovation, and in the end achieving a competitive advantage (Carmeli & Paulus, 2015; Mangiarotti & Mention, 2015; S. Wang & Noe, 2010; Z. Wang & Wang, 2012). To achieve this competitive advantage creative ideas are necessary to be developed, which is facilitated by the positive relationship between knowledge sharing and creativity (Chae, Seo, & Lee, 2015). Following this train of thought, the sharing of information can be assumed to have a profound impact on idea generation and innovation (Carrillo, Brachos, Kostopoulos, Eric Soderquist, & Prastacos, 2007; Chiang & Hung, 2010).

Indeed, sharing information among members is deemed to be vital to spark innovations (Hu & Randel, 2014; Mehrabani & Shajari, 2012). The transaction of information, or knowledge can be divided in two segments: tacit knowledge and explicit knowledge. Tacit knowledge is can be denoted as the knowledge that is possessed by individuals that is difficult to communicate via written or spoken words or symbols (Polanyi, 1962).

It is estimated that employees generally possess a considerable amount of tacit knowledge that is rather hard to imitate or transfer. Hence, this form of information can be a source of sustainable competitive advantage. Explicit knowledge, as the name implies, is explicit in its form and comprises all of the institutionalized information sharing within the company. Explicit knowledge can be easily be put in words and symbols, and therefore transferred within the organization. Handbooks, guides, and information technology systems like an innovation platform will promote the motivation of employees to share their knowledge. (Q. Huang, Davison, Liu, & Gu, 2010; P. A. Smith & Coakes, 2006)

Initiatives that are focused on innovation depend heavily on employees' knowledge, experiences and skills. Relatedly, the power of a firm to transform itself into new competencies and ideas may define its level of innovativeness. Organizations can only effectively use information, when employees are willing to share their knowledge (Z. Wang & Wang, 2012). The constant sharing of knowledge has a contribution to the ability of teams and whole firms to innovate. To acquire these innovation tasks, they need to tap into the tacit knowledge of their colleagues (in the form of skills and experiences) or find explicit knowledge in the form of (codified approaches and practices) within the company (Svetlik, Stavrou-Costea, Lundvall, & Nielsen, 2007).

*H5: there is a positive relationship between information sharing and idea quality*

## 2.5 Individual trait effects on idea quality

Also, individual traits have an impact on creativity and innovative behavior (Anderson et al., 2014). In this thesis I consider traits to holistically encompass self-concepts, knowledge and values. Even though these factors have been investigated only sporadically, the results are rather interesting (Anderson et al., 2014). In this section I will dive deeper into the short-list that has been preselected by the innovation platform experts to be of major influence on idea quality related to employee traits. The traits that are considered are proactive personality, trust, entrepreneurial self-efficacy and networking ability.

### 2.5.1 The effect of Proactive personality on idea quality

The degree to which a person takes action to alter their environments is defined as the proactive component of personality (G. Chen, Farh, Campbell-Bush, Wu, & Wu, 2013; Crant, 1996). In 1993, Bateman and Crant (1993) heralded the measure of a "proactive personality". These personalities are relatively unconstrained by surrounding forces and bring about environmental changes. These people spot new opportunities, act on them and persevere until they set in motion the change they had in mind (G. Chen et al., 2013). Juxtaposing, personalities who lack a proactive personality are normally unable to spot new opportunities, let alone act on them (Bateman & Crant, 1993). In short, proactive behavior is self-initiated anticipatory action that has a purpose to alter and enhance the situation or self (Parker, Williams, & Turner, 2006). It is considered to be an instrumental trait, since part of a personality class that enables individuals to have an impact on the environment (Buss & Finn, 1987). The concept of a proactive personality has also been discussed in the entrepreneurship domain. For example, Shapero and Sokol (1982) discussed the trait as a tendency towards action in their reflection of the social dimensions in the entrepreneurship field. More specifically, proactive persons are more inclined towards entrepreneurial venture than their less proactive peers (Chan, Uy, Chernyshenko, Ho, & Sam, 2015).

In line with the context of corporate innovation, Parker (1998) found that proactive personality was positively and significantly associated with contribution towards organizational improvement initiatives. Relatedly, the seminal publication by Seibert, Kraimer, and Crant (2001) heralded the claim that proactive personalities are positively associated with someone's innovative behavior like developing new ideas and displaying innovation on the job. More recently this relationship was restudied and acknowledged (Li, Liu, Liu, & Wang, 2016). Evaluating the definition of proactive personality it is intuitively appealing to hypothesize that proactive personality enhances idea quality, yet consistent with the provided academic arguments the following hypothesis is offered:

*H6: there is a positive relationship between proactive personality and idea quality*

### 2.5.2 The effect of Trust on idea quality

As posited, generally trust has been claimed as the personal willingness to take on a position of vulnerability with the expected positive outlook of obtaining helpful intentions and behaviors from other people in instances where people hold a dependency or situation of substantial risk (Rousseau, Sitkin, Burt, & Camerer, 1998). Because of this risk, trust highly influences innovative behaviour (Clegg, Unsworth, Epitropaki, & Parker, 2002; Nienaber & Schewe, 2014). Due to the interdisciplinary nature of the fields in which trust has been analysed, one might expect that there are specific operationalisations of the concept of trust. This is not true, though is not regarded as a limitation. The differences are not indispensable, but are of potential value. Following (Bigley & Pearce, 1998, p. 415) who claim that *“efforts to incorporate existing trust perspectives under one conceptualization are likely to result in concepts that are either unreasonably complex or inordinately abstract for organizational science research purposes. In addition, attempts to force disparate approaches together may result in misapplications of previous approaches”*. The narrative is influenced by the thinking of (Clegg et al., 2002) that propose a novel conceptualisation, based on three strands of literature. They combine the perspective that argues employees perception that the company values their contributions, which were found to be positively correlated to idea suggestions (Eisenberg, Fasolo, & Davis-LaMastro, 1990). Additionally, it was postulated that the supportive climate for innovation as vital to ideation (Siegel & Kaemmerer, 1978), and following (Cook & Wall, 1980) they argued that interpersonal trust at work, meaning the confidence in the ability of others and their good intentions promoted ideation activities. These three strains of literature can be coalesced into two concepts: trust that heard and trust that benefit (Clegg et al., 2002). Trust that heard as *“expectancy that the organisation takes one's ideas and suggestions seriously”* and trust that benefit as *“the expectancy that those managing the organisation have one's interest at heart, and that one will share in the benefits of any changes”* (Clegg et al., 2002, p. 5).

The before mentioned reasoning from (Clegg et al., 2002) argues that individuals are more likely to engage in innovation efforts through the creation of qualitatively good ideas when they expect a reasonable and positive responses by their peers and evaluators. This notion is built upon three strains of research in which it is posited that employees belief that the organisation values their contribution (Eisenberger, Huntington, & Hutchison, 1986), employees feel support for innovation (Clegg et al., 2002; Siegel & Kaemmerer, 1978) and there is

interpersonal trust between the employee, his colleagues and his supervisors (Cook & Wall, 1980; Seo, Kim, Chang, & Kim, 2016).

*H7: there is a positive relationship between trust and idea quality*

### 2.5.3 The effect of Entrepreneurial Self-Efficacy on idea quality

The concept of entrepreneurial self-efficacy (ESE) has received considerable attention in entrepreneurship due to its effect on entrepreneurial outcomes and intentions (C. C. Chen, Greene, & Crick, 1998; Hmieleski & Corbett, 2008; H. Zhao, Seibert, & Hills, 2005). Relatedly, Markman et al. (2002) argue that as “*self-efficacy appears to be one of the characteristics that is strongly linked to entrepreneurial pursuits, new venture growth [...] and personal success, scholars, and investors may be wise to invest more attention into this factor.*” The perception or beliefs of self-efficacy, the extent to which an individual is convinced that he or she can successfully fulfil a task, may enhance their job performance (Wood & Bandura, 1989). Hence, employees that have a high degree of self-efficacy for a task are more likely to actually initiate and endure than their lower self-efficacious peers (Bandura & Walters, 1977). Current studies have predominantly focussed on the effects of entrepreneurial self-efficacy on entrepreneurial intentions (C. C. Chen et al., 1998), intra-preneurial activities (Douglas & Fitzsimmons, 2013) and opportunity recognition (Ozgen & Baron, 2007).

Existing literature suggest that the perceptions of the entrepreneurial efficaciousness of oneself appear to be of higher importance than actual skill (N. Krueger & Dickson, 1994), and innovation mangers like Linde Muller argue that employees with entrepreneurial self-efficacy are in a better position to judge their own idea for value (Muller, 2017). As “*they have a better understanding of what is necessary for an idea to succeed*”, I hypothesize the following:

*H8: there is a positive relationship between entrepreneurial self-efficacy and idea quality*

### 2.5.4 The effect of networking ability on idea quality

The networking ability of an individual is defined in this study as the degree to which ideators are skilled in generating and employing intrafirm social networks to support change at work (Ferris et al., 2007), or the ability to connect with peers to build relationships, alliances and coalitions within the perimeters of the organization (Mu et al., 2016). The people in these networks often hold valuable information that is vital for effective operation and successful personal functioning (Chelagat & Korir; Mu et al.). Due to the deliberate structure of networks, employees that are high in networking ability are often at times well positioned within the company to spot opportunities and reap information access benefits (Baron & Markman, 2000). Thus, a person that is able to network, the potential to get hold of instrumental information is enhanced due to the fact that access to the sources of information is obtained via this skill. Ferris et al. (2007) claim that extraversion is an important component for networking ability as they are more successful at starting and maintaining relationships.

To enhance one’s ability to spark an idea and successfully push the innovation process, starting and developing relationships with other people is rather important (Kanter, 1983). Having the ability to nurture relationships and build networks is vital to have access to these assets (Obstfeld, 2005). As a result, lacking the skills to network and acquire additional knowledge from others inhibit the cultivation of ideas. Networking ability can be defined as the degree to

which employees are skilful in fostering and employing social networks to initiate change (Ferris et al., 2005; Ferris et al., 2007). These establishment of social networks has been beneficial for the acquisition of new knowledge (Howells, 2002), learning (Liebeskind, 1996) and the generation of new innovations (Brown & Duguid, 1991). Indeed, these networks of employees “*share expertise and knowledge in free-flowing, creative ways that foster new approaches to problems*” and therefore foster the generation of quality ideas (Wenger & Snyder, 2000, p. 147). It is argued that the ability to network and create, and therefore tap into these sources of information are beneficial for idea quality.

Therefore it is hypothesized that:

*H9: there is a positive relationship between networking ability and idea quality*

## 2.6 Hypothesis overview

In sum the total of hypothesis are as follows:

**TABLE 2.2**  
**Hypotheses**

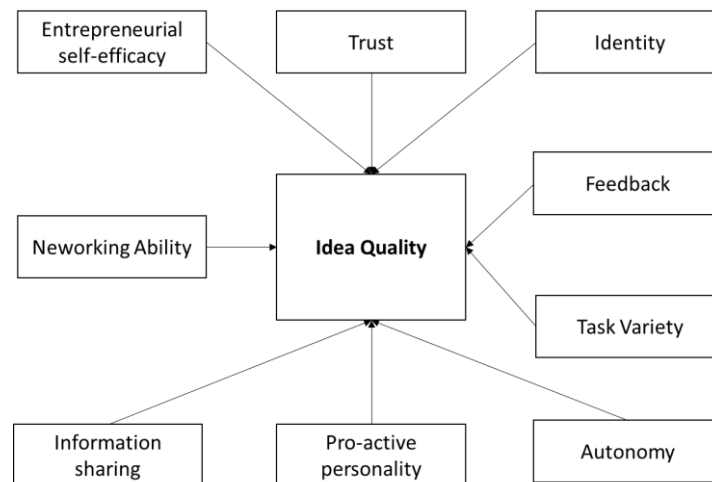
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<i>H1: there is a positive relationship between <b>task autonomy</b> and idea quality</i>
<i>H2: there is a positive relationship between <b>task variety</b> and idea quality</i>
<i>H3: there is a positive relationship between <b>task identity</b> and idea quality</i>
<i>H4: there is a positive relationship between <b>feedback</b> and idea quality</i>
<i>H5: there is a positive relationship between <b>information sharing</b> and idea quality</i>
<i>H6: there is a positive relationship between <b>proactive personality</b> and idea quality</i>
<i>H7: there is a positive relationship between <b>trust</b> and idea quality</i>
<i>H8: there is a positive relationship between <b>entrepreneurial self-efficacy</b> and idea quality</i>
<i>H9: there is a positive relationship between <b>networking ability</b> and idea quality</i>

## 2.7 Conceptual Model

The theoretical framework presented before provides us with the opportunity to execute research that investigates the effect of various contextual variables and personal traits and the quality of ideas, generated on ICC platforms. In order to answer the proposed research question the conceptual model below has been developed. In this particular figure, the various hypothesis that have been derived from literature are represented in a model.



*Fig 2.3 – Conceptual model*

As can be seen, solely direct relationships between the various factors and idea quality have been derived from literature. Within the contextual domain I hypothesize that skill variety, task identity, task autonomy, feedback and information sharing have a direct positive effect on idea quality. With regard to personal traits, I estimated that proactive personality, trust, entrepreneurial self-efficacy and networking ability have a direct positive effect on idea quality.



### 3. Methodology

The next section will provide insight into the research design. The set-up of this research employs a rather unconventional approach. Before the research at hand was executed the most important factors that could promote idea quality were to be analysed were accumulated. This was done by developing a complete overview of the potential factors influencing idea quality (see chapter 2). Subsequently these factors (64) were tested with the most appropriate experts in the field to make a relevant selection of factors for this study. In this chapter the complete reasoning behind this approach will be discussed. Also, this chapter will provide insight into the statistical method of ordinal logistic regression with corresponding assumptions and test.

#### 3.1 Preliminary study

This thesis included a preliminary study that defined the scope of the research. As can be seen in the overview of figure 3.1, two steps precede the actual testing of hypotheses in step 3. The first two steps were used to make the research more relevant to both practice and academia. Adopting an inductive approach by empathizing with the situation and sketching possible hypotheses, and a deductive approach by using existing theories and testing these in the particular context of intra-corporate crowdsourcing. The reasoning behind this approach revolves around the fact that there is a lack of established knowledge on the front of intra-corporate crowdsourcing. Unquestioningly adopting relationships from other fields of study related creativity and innovative behaviour could result in false assumptions since the web 2.0 environment could cater for wildly different social dynamics. Haphazardly forming hypothesis on the basis of solely existing literature could, in this case, result in research executed in vain.

The complete process is depicted below.

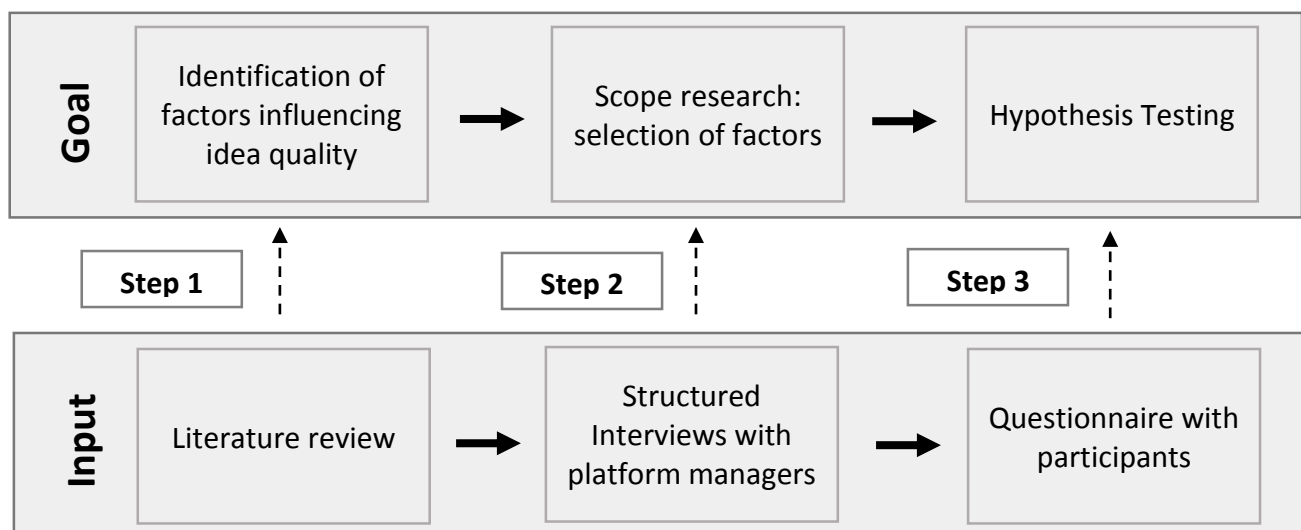


Fig. 3.1 – process map

**Step 1** - First, a literature review was conducted to achieve a fundamental understanding of the topic and get a grasp of the most influential factors that promote creativity. This served as an input for a comprehensive list of both seminal and contemporary literature has been constructed and analysed to determine the most influential factors. A total of landscape of 64 traits and contexts were accumulated from the literature review (see appendix 3.5). As we are dealing with a rather new environment in which other variables might be of importance, scoping

interview sessions were planned. These interviews had an aim to discover additional variables and make a selection of the most important variables, fitting for this type of research. In total structured interviews with seven platform managers have been conducted to learn about their perceptions of the traits and contexts that lead to high quality ideas on their platforms. These platform managers were selected as a fitting target group to gain insight into this information since they are in close contact with participants, both face-to-face and online. Moreover, they are able to assess the relationship between quality of ideas and the individuals behind it because they have an facilitating function in the whole process of motivating people, getting them online and post ideas. Hence, they are the most appropriate persons to get a grasp of the relationship between the ideators and the quality of their associated idea.

**Step 2** – second, to discover additional factors, scope the study and enhance both academic and practical relevance, structured interviews were held with experts in the field. In the next section I will provide insight into the process of these structured scoping interviews.

### 3.1.1 Setting and participants

The research is performed with innovation platform managers at four global companies operating an innovation platform with offices in the European Union: Liberty Global, Airbus, VodafoneZiggo and Essent (Innogy). Liberty Global is an American television and telecommunications company employing 47,000 employees. Their innovation platform is called Spark, to which 11.000 employees have an active account, who posted 15.400 ideas and 1100 ideas have currently been implemented, resulting to a ROI of 10 million. Airbus, a global leader in aircraft engineering operates an innovation platform called IdeaSpace, it currently serves 27.680 employees to post ideas, of which 5209 have been submitted and 66 ideas have been implemented. The platform of Essent (Innogy) is called Idea Lab, they have only just started, with 250 ideas posted and 6 implemented ideas.

Via snowball sampling, new interview cases were obtained. Via my contact person Roel de Vries, who is the Innovation platform manager at Liberty Global, new connections were formed with other platform managers from the other companies. These companies included Liberty Global, Airbus, VodafoneZiggo and Essent/Innogy. The snowball sampling methods was appropriate as it was tremendously difficult to identify individual cases, the purpose of the study was exploratory and no statistical inferences would be made from the collected data (Saunders, Lewis, & Thornhill, 2009). The interview pool consisted of Sarah Kelly (Liberty Global), Roel de Vries (Liberty Global), Konstantin Gänge (Airbus) Bern Riechers (Airbus), Neila Rahmani (Airbus), Linde Muller (Vodafone Ziggo), Marcel Brouels (Essent / Innogy).

### 3.1.2 Interview conduct and analysis

The interviews were conducted in English and lasted about 40 minutes long each. First, to minimize bias I inquired on their experiences with the platform and the influence of character traits and contexts on idea quality. The aim was to discover additional factors that were not yet identified by means of the literature study. Afterwards, I redirected them to the Qualtrics® data collection environment where a questionnaire was prepared that presented the complete list of factors that were collected during the literature review. The participants were inquired to grade the influence on idea quality for the found factors on a 7-point likert scale ranging from extremely positive (1) to extremely negative (7). Due to the broadness of topics and potentially difficulty of concepts I provided a glossary of terms and when I felt that there was doubt about the concepts, I elaborated on them with clear examples. This provided not only an enhanced

validity of the questionnaire, but also offered the participant to offer insights into their reasoning. The structured interview approach enabled me to scope the research and select the most influential factors, increasing the meaningfulness within the practical context. The interviews were conducted either face to face, skype or phone call, recorded and transcribed (Cohen & Crabtree, 2006). Transcription has been done in a denaturalized approach to make the input cleaner for analysis (Oliver, Serovich, & Mason, 2005). I have refrained from note-taking as it diminishes focus, leading to poor results. The questions of this structured interview are to be found in appendix 3.1. The transcribed interviews were coded and analysed with Atlas.ti™.

### 3.1.3 Results of the scoping interviews

This study produced two lists of variables, one short-list from the academic literature study and one from the interviews (see table 3.1 & 3.2). The analysis and filtering of the lists selected 7 variables to be considered for the study. A comparison between the outcomes of the literature review of traits and contexts and the practical counterpart by expert-interviews with the insights of the platform managers, yields interesting results. The traits of *proactive personality* and *information sharing* are identified by both academics in the creativity/innovation field and the platform managers. Therefore, these are chosen to be part of the independent variables that will be tested influencing idea quality. Then, the first five variables on both lists were selected: *trust*, *autonomy*, *variety*, *identity*, *feedback* and *entrepreneurial self-efficacy*. Convergent and divergent thinking are omitted as they require different psychometric testing than a survey instrument (Guilford, 1967; Sarnoff Mednick, 1962). Moreover, from the platform managers it was found that intrinsic motivation was of importance. Though, as people are not compensated for their efforts on the platform it can be said that intrinsic motivation is inherent to platform participation. The sample, therefore, will only comprise of intrinsically motivated cases. For this reason, intrinsic motivation was omitted.

**TABLE 3.1**  
**Traits & Contexts Experts**

<b>Traits</b>	<b>Average Questionnaire Score (Likert)</b>
Intrinsic motivation	1.29
Networking ability	1.43
Trust	1.43
Information Sharing	1.57
Autonomy	1.57
Openness to experience	1.57
Team-Member Exchange	1.86
Proactive personality	1.86
Organizational Citizenship Behaviour	1.86
Presence of Creative Co-Workers	1.86

**TABLE 3.2**  
**Academic Literature**

<b>Traits</b>	<b>Average significant correlation coefficient</b>
Divergent Thinking	0.82
Convergent Thinking	0.81
Information Sharing	0.58
Variety	0.53
Identity	0.53
Supervisory Creativity Expectations	0.51
Feedback	0.45
Entrepreneurial Efficacy	0.45
Feeling of energy & vitality	0.45
Proactive personality	0.43
*This is a 10-item shortlist, for the full list see appendix 3.5	

**Step 3** - The last step is the actual preparation, collection and analysis of the data and testing of the formed hypotheses, which will be discussed next.

### 3.1 Sample and Sampling technique

A premise for the crowdsourcing for ideas study is the identification of relevant companies that operate an inter-organizational crowdsourcing platform. The search for these companies have been executed via various resources: LinkedIn pages on ideation, the Crowdsourcing Conference 2016 in Brussels, the network of TwynstraGudde, current research at TU Berlin and own acquisition calls. The selection criteria have been set up in an iterative fashion. Where companies willing to give access to this sensitive data had been found, other restrictions (e.g. anonymous idea generation) that hampered the execution of the intended research came afloat. With this strategy in mind, the selection criteria were refined to the conditions mentioned above. The criteria on which these companies have been selected are as follows:

- Organizing or facilitating crowdsourcing for ideas initiatives
- No external input for ideas, solely internal initiatives
- Use of online web 2.0 facilitated software platforms
- >100 ideas generated
- No anonymous idea generation

The intellectual property sensitivity that is connected to this type of data made the susceptibility to participate in this study a limiting factor that highly influenced the access to data. The final sample of companies boiled down to one holding company, with multiple companies under its umbrella. The context of these companies will be discussed next.

### 3.2 Research context

The research is performed at Liberty Global, a British television and telecommunications Company employing 47,000 employees. It emerged out of a merger between Liberty Media and UnitedGlobalCom. The company is made up of distinct brands including UPC, Virgin Media, Telenet, Unity Media and VodafoneZiggo. Their Innovation platform, called Spark, has been awarded as one of the most successful intra corporate innovation programs (Ivanov, 2017).

The platform was initiated in 2011, with 1500 participating employees and designed to “[...] *source and refine ideas in response to real business challenges by tapping into the collective creativity of its employees*” (R. De Vries, 2017). Currently, 11.000 employees possess an active account and posted 15.400 ideas. Of these ideas, 1100 ideas have been successfully implemented with a Return on Investment of 10 million as a result.

### 3.3 Participants and procedure

The participants in this study were the employees of Liberty Global (and its subsidiaries) that were active on the platform. The first requirement was that they posted ideas on the platform. As a second criteria they had to post a single idea that ended up in a single idea quality category (see paragraph 3.4.1). The individuals in this study originated from various organizations that fell under the umbrella of LibertyGlobal, namely UPC, VodafoneZiggo, Telnet, Virgin Media or Unity Media. As these subsidiary companies hold their offices in different countries, consequently the respondents originated from different countries. The individuals had their residence in either Austria, Belgium, Germany, Hungary, Ireland, The Netherlands, Poland, Puerto Rico, Romani or Switzerland.

The total targeted population that belonged to these criteria was 1663: best ideas (164- 9.9%), medium ideas (239-14.4%), worst ideas (1260 – 75.7%). The operationalization of the data was as follows:

- *Best ideas*: the best ideas are the ideas that passed through the whole evaluation process and were either selected for implementation or already implemented
- *Medium ideas*: the idea with medium quality are the ones that are evaluated but rejected. These ideas were evaluated, but archived.
- *Worst ideas*: the worst ideas were ideas that were rejected after the first evaluation stage. These were ideas that ended up in discussion or were voted as interesting but were not promoted.

These groups were considered for this research. A list of potential participants with names and emails was provided by Liberty Global, segregated per idea quality category adhering to the set criteria. As such, stratified sampling with idea quality as stratification variable would be the most suitable sampling method. From the 164 best idea respondents, 18 emails bounced amounting to 146. From the 239 medium idea participants, 59 emails bounced totaling 180 potential respondents. From the 1260 worst idea respondents 229 emails bounced, resulting in a total potential reach of 1357 respondents. Out of the 1357 employees that were reached to participate, 476 started the survey a total of 270 prematurely dropped out of the survey resulting a response rate of 35.07%. Moreover, 17 people did not consent to lend their input for the study. Due to the unfinished questionnaires and the people that opted-out due to consent issues, the total amount of cases that were considered for analysis accumulated to **189**. The respondents followed the same distribution as the population: 27 best ideas, 58 medium ideas, 104 worst ideas. To determine the appropriate sample size, multiple approaches are known, that range from rather sophisticated calculations to general rules of thumbs (Dattalo, 2008; Green, 1991; Peterson & Harrell Jr, 1990). In this case a rule of thumb approach is adopted. Tabachnick and Fidell (1996) argue that samples with 100 cases are poor, 200 are fair, 300 are good, 500 are very good and 1000 are excellent. Another estimator is the 10 events per variable (EPV) rule of thumb which applies to logistic regression (Ogundimu, Altman, & Collins, 2016). In another

approach, (Roscoe, 1975) proposed the rules of thumb (Sekaran & Bougie, 2010, pp. 296-297) postulating that samples larger than 30 and under 500 are appropriate and the sample size should be several times (ideally 10 times or more) as large as the number of variables in the study at hand. All these rule of thumb approaches are met to be at least “fair” for a confident analysis.

The demographics that were requested from the participants included gender, age and highest attained degree. These demographics are summarized in table 3.3. The respondents consisted of 117 (61.9%) male respondents and 64 (34.4%) female respondents, 7 persons (3.7%) picked the option to not disclose gender. The age distribution of the respondents was as follows: the mean age was 38 years, with a minimum of 23 and a maximum of 64.

**TABLE 3.3**  
**Sample descriptive**

	Mean (standard deviation)
<b>Age</b>	
	37.85(8.726)
<b>Gender</b>	
<i>Male</i>	61.9%
<i>Female</i>	34.4%
<i>Choose not to disclose</i>	3.7%
<b>Highest attained degree</b>	
<i>Some high school, no diploma</i>	5.3%
<i>High school graduate, diploma or the equivalent</i>	17.5%
<i>Some college credit, no degree</i>	11.6%
<i>Trade / technical / vocational training</i>	10.1%
<i>Associates degree</i>	3.2%
<i>Bachelors degree</i>	23.3%
<i>Master's degree</i>	13.2%
<i>Professional degree</i>	3.2%
<i>Doctorate degree</i>	1.6%

N=189

Via email the participants were invited to part-take in the study. This was done via the Qualtrics distribution tool, through which also the invitation letter was sent (see appendix 3.2). The individuals from the different idea quality segments were approached with the same email, but redirected to the relevant questionnaire. On opening the questionnaire the participants were presented with the aim of the study and the use of the data for which they are asked consent. When a participant did not consent to the terms of use of the data, he or she was thanked for their time and removed from the opt-in list. After a week, when responses stagnated, a reminder email was sent out to the participants that did not fill out the questionnaire yet (see appendix 3.3).

### 3.4 Measures

To acquire the data for this study the ideas generated on the intra-corporate crowdsourcing for ideas initiative will be analyzed. In this study, items used to operationalize the constructs were mainly adapted from previous studies and when needed modified for use in this particular context. In order to be able to provide sound answers to the research questions, variables need to be defined. First, the dependent variable is outlined and second, the independent variables are discussed. There were no relevant control variables found in the literature study that were practically relevant.

#### **Dependent variable**

The dependent variable in this study is the outcome of idea quality, as the aim is to find out which traits and contexts contribute to enhanced idea qualities. The quality outcome defines in which category the quality of the idea falls. Possible quality outcomes are low (1), medium (2) and high (3) quality ideas. Where the outcome of having a high quality idea is ranked higher than the outcome of a low quality idea. These characteristics label the variable as categorical with an ordinal level of measurement. Relatedly, the dependent variable in this study is placed at the ordinal level of measurement since the outcomes can not only be situated in one of three groups, but also those groups imply a ranking order. High quality ideas have the highest ranking, followed by medium and low quality ideas.

#### 3.4.1 Idea quality

Referring back to the quality evaluation of idea, an idea evaluation scale was developed comprising of the four defined dimensions of *novelty*, *relevance*, *feasibility* and *elaboration* (see appendix 3.4). Although the evaluators are in dire need of a comprehensive assessment scheme, as exclaimed by one of the managers who argues that *“especially the ones who have the responsibility to make selections often have the questions: how should I do it. How should I select an idea? How should I compare them, on what kind of criteria”*, it is not often used (Gänge, 2017).

In practice the assessment of the ideas isn't guided by a strict set of criteria to evaluate the quality that could be used with every campaign. It is rather subject to changes and is adapted for every campaign to its needs. It is *“something we set up case by case so for each it is part of the setup phase of the campaign, so for each campaign together with the campaign leaders and the sponsor we define what are the evaluation criteria (Gänge, 2017)*. Interestingly, this practice was found across all the companies in the interviews. As per Liberty Global : *“So, it really depends, the criteria depend on what the question is”*(R. K. De Vries, Sarah, 2017) and at Airbus *“[..]it's the evaluators, these people who decide what are the criteria of evaluation”* (Rahmani, 2017).

While these criteria are sensitive to the type and purpose of the campaign that is launched a holistic view can be adopted to sketch heuristics. According to the platform managers the criteria will always be along the lines of feasibility, impact, relevance and desirability. Like de Vries (2017) states: *“The campaign is different, so the grading is different. I think if you on, on a high level, you could say something like: relevance, feasibility and impact”* and Gänge



(2017) “it is really about explaining your idea more detailed from the viability and desirability point of view”.

Because this discrepancy between campaigns with regards to the analysis of the idea quality, a division was made based on the outcome of the idea evaluation process: rejection before evaluation, rejection within evaluation, accepted but not implemented and accepted and implemented.

**TABLE 3.2**  
**Idea Typologies & Operationalization**

Category	Typology	Operationalization
Category 1	Rejected ideas (lowest idea quality)	<ul style="list-style-type: none"> <li>• Community Discussion (not graduated)</li> <li>• Community discussion (archived)</li> <li>• Hot! (archived)</li> </ul>
Category 2	Evaluated but rejected ideas (medium Idea quality)	<ul style="list-style-type: none"> <li>• Evaluation (archived)</li> </ul>
Category 3	Evaluated and accepted ideas (highest idea quality)	<ul style="list-style-type: none"> <li>• Selected for implementation</li> <li>• Implemented</li> </ul>

This division adopts an ordinal segregation between the qualities of ideas ranging from the lowest quality of ideas in category 1 to the highest quality of ideas in category 3. The operationalization of the categories are as follows. Category 1 consists of ideas that are discussed, graduated or archived, and Hot! Ideas. Hot! ideas are ideas that are voted up by the Spark platform participants. Category 2 are the ideas that entered the evaluation stage, but are archived. Category 3, the best ideas, are the ideas that are selected for implementation and implemented. A similar approach of operationalizing quality as the degree of acceptance of the idea has been adopted in the crowdsourcing studies of (Zhu et al., 2014) and (Bayus, 2013). This removes quite some bias that is seen in studies that employ subjective measures like raters (Girotra et al., 2010)

### **Independent variables**

All the independent variables were measured using existing validated scales from literature. A complete overview of the used scales can be found in the appendix.

#### **3.4.2 Job Characteristics**

To measure the relevant elements of job characteristics, the Job Diagnostic Survey (JDS) was deployed in the form of a survey to the participants. This measure was developed by Hackman and Oldham (J. R. Hackman & G. R. Oldham, 1980). The original JDS measures the five core dimensions for jobs: skill variety, task identity, task significance, autonomy and feedback. These dimensions are derived from previous work of Turner & Lawrence (1965) and Hackman & Lawler (1971). The identical questionnaire was used in a similar study of Coelho (Coelho & Augusto, 2010), looking at the creativity of frontline employees. For the study at hand the



“significance” variable is eliminated from the measure. The survey is built as a multiple-item 7 point Likert scale ranging from strongly disagree to strongly agree. An example item is: *“I have many opportunities to take the initiative in this job”*. Please refer to appendix 3.6 for the complete instrument.

#### 3.4.3 Proactive personality

The measurement of proactive personality has been done with multiple scales. Krueger and his peers (N. Krueger, 1993; N. F. Krueger & Brazeal, 1994) used the desirability for control scale to measure proactive personality. However, they argued that other measures might be useful. The proactive Personality scale might be such a scale. The proactive personality measure (Bateman & Crant, 1993) may be employed in vocational choice and entrepreneurship domains and is therefore suitable for the context at hand. Therefore, concept of proactive personality was measured by using the 17-item measure of Bateman and Crant (Bateman & Crant, 1993), called the Proactive Personality Scale.. The responses are measured by means of a seven-point Likert scale with a range from 1, indicating strong disagreement towards 7, meaning strong agreement. Example items are *“if I see something I don’t like, I fix it”* and *“I love to challenge the status quo”*. The Proactive Personality Scale was successfully used in several studies over a substantial time-span (Parker & Sprigg, 1999; Parker et al., 2006; Williams, Parker, & Turner, 2010). Please refer to appendix 3.8 for the complete instrument.

#### 3.4.4 Information sharing

As said, information sharing is measured along two concepts: explicit- and tacit knowledge sharing. The measuring scale was adopted from (Z. Wang & Wang, 2012) as they provide a holistic overview of the potential sources for knowledge sharing. Explicit knowledge sharing was assessed with the use of formal documents and reporting (Reychav & Weisberg, 2010), the use of Information Technology (Alavi & Leidner, 2001) and training (Liebowitz, 1999). The explicit knowledge scale encompasses six items. On the other hand, tacit knowledge is measured on a seven-item scale probe on the sharing and acquisition of experiences of past failures, professional expertise and experiences and where or from whom to get information. Also this scale was adopted from Z. Wang and Wang (2012). Please refer to appendix 3.9 for the complete instrument.

#### 3.4.5 Trust

Various scales to measure trust have been developed over time (Ouakouak & Ouedraogo, 2017; Seibert et al., 2001; Siegel & Kaemmerer, 1978), though we are most concerned with the notion that people are heard and that they perceive a benefit from posting their ideas. Clegg et al. (2002) has translated these views into “trust that heard” and “trust that benefit”. Trust that heard is defined as the expectation that the posted ideas and suggestions will be taken seriously, a sample item in the measure is: *“Do you believe your ideas and suggestions are taken seriously?”* Trust that benefit is perceived as the expectation that the people managing the organization and the ideas have the idea posters’ best interest at heart. A sample item of trust that benefit is: *“Do you think those managing change in your company have your interests at heart?”* The scale is graded on a 5-point Likert scale. Please refer to appendix 3.10 for the complete instrument.

#### 3.4.6 Entrepreneurial self-efficacy (ESE)

The measurement of ESE is often conducted with the scale developed by Chen et al (C. C. Chen et al., 1998). Although this measure was, and still is, often used it is rather unidimensional and of minor value in the context of online idea generation (McGee, Peterson, Mueller, & Sequeira, 2009). It assesses the ability of the respondent to be able to start a business on an operational level. A sample item from the measure of Chen and his peers is for example: *"I am able to control costs."* and *"I am able to define organizational roles."* More recently a refinement of the measure by McGee et al. (2009) more profoundly assesses entrepreneurial self-efficacy in a business savviness sense. The scales measures ESE on a 7-point Likert scale covering 7 dimensions: searching, planning, marshalling, implementing people and implementing financials. With as an example measure: *"How much confidence do you have in your ability to clearly and concisely explain verbally/in writing my business idea in everyday terms?"* Please refer to appendix 4.3 for the items considered in the scale. Please refer to appendix 3.11 for the complete instrument.

#### 3.4.7 Networking Ability

The original Political Skill Inventory (PSI) as developed and validated by (Ferris et al., 2005) measured social astuteness, personal influence, networking ability and apparent sincerity. As this inventory measures some constructs that are beyond the scope of this research, we restrict ourselves to the networking ability concepts. In this regards, we follow M. Baer (2012) in extracting the networking ability measure from the scale. Thus, networking ability was measured by means of the 6-item networking ability scale from the PSI. The items were rated on a scale that ranged from 1 ("strongly disagree") to 7 ("strongly agree"). Example items were: *"At work, I know a lot of important people and am well connected"* and *"I spend a lot of time at work developing connections with others."* Please refer to appendix 3.7 for the items considered in the scale.

### 3.5 The statistical Analysis of Ordinal Logistic Regression (OLR)

As stated before, the dependent variable in this study is segregated in three unique categories, which are rank-ordered and it is estimated that the outcome of the dependent variable is influenced by more than one independent variable. Given this, regression analysis of the data should be conducted by employing ordinal logistic regression (OLR). Therefore, in this case, OLR can identify which of the independent variables influences the dependent variable. Put differently, OLR can help to discover which of the explanatory variables has a significant influence on the response variable, and to what degree. Due to the fact that the explanatory variables are continuous, the analysis with ordinal logistic regression can elucidate how incremental increases in one of the explanatory variables influence the odds of the dependent variable. Indeed, OLR seems to be the most appropriate analysis (Kleinbaum & Klein, 2010; Ltd., 2017). Reverse coded items were taken into account in the analysis within SPSS.

Even though the appearance of the variables guide towards OLR as the most suitable method of analysis, four specific assumptions need to be checked to validate the use of OLR to be valid. Without the fulfilment of these four assumptions, the results from the various tests will not be valid. In order to assess these assumptions the SPSS statistical software is used. This program has been widely accepted to execute OLR tests (Kleinbaum & Klein, 2010; O'Connell, 2006). Next I will discuss the four assumptions that need to be checked with relevant tests.

1. The assumption of proportional odds – the assumption of proportional odds incorporates that the influence of the explanatory variable(s) on the response variable are stable in all different ranks in the response variable. SPSS calls this *the assumption of parallel lines*, though both concepts are identical (Restore, 2017). In the case of this study, with three categories, it implies that the odds ratio that compares high quality ideas (3) with medium quality ideas (2) is deemed to be identical as to when comparing medium quality ideas (2) with low quality ideas (1) (Kleinbaum & Klein, 2010). As such, this test of proportional odds (i.e. parallel lines) is estimated with SPSS (Ltd., 2017; Restore, 2017).
2. Fit of the model – to test if the OLR can be used one needs to estimate the performance over the model over the null model. Thus, the fit of the model tests if “*the fitted model improves predictions over those presented by the null [...] model*” (O’Connell, 2006, p. 35). The null model estimates the prediction power of the model on only the intercept. Hence, in order to have any explanatory value, over the null model, this test should be significant. If not, the explanatory variables (i.e. predictors) don’t perform any better than the model as-is, based on the intercept. The provided test by this model is a Chi-Square test and ought to be significant ( $p < 0.05$ ), since only then incorporating the predictors in the model add explanatory value. In case the test turns out to be not significant, the explanatory variables don’t have any value over just looking at null model with only the intercept.
3. Goodness of fit – to estimate whether the developed model explains the observed data well enough, the Goodness of Fit test will provide the necessary insights. In the case of this test the H0 hypothesis is that the developed model fits and that the observed data is in line with the model. This test is performed with a Chi-Square statistic. Therefore, in the most ideal situation the Pearson’s Chi-Square test should be not significant ( $p > 0.05$ ) (O’Connell, 2006; Restore, 2017).
4. Multicollinearity effect - After these four tests have been executed and positively checked, the practice of OLR is suitable for the dataset. Firstly, the influence of each explanatory variable is tested (e.g. it is tested whether there is an effect of task variety to the quality of ideas outcome). Although, this needs to be tested singularly for each individual variable the aim of the analysis is to develop a collective odds model that concurrently assesses the effect of an aggregation of explanatory variables on the idea quality outcomes as the response variable (Restore, 2017).

Indeed, it is vital to test whether multicollinearity is apparent. The effect of multicollinearity is existent in case at least one of the independent variables is affected by variables of the same kind. Thus it needs to be determined that the explanatory variables do not correlate too much with each other.

## 4. Results

In this chapter I will discuss the results of the questionnaire that has been deployed at Liberty Global. The collection of the data took a total of 2.5 weeks to amass the desired amount of 189 cases. The survey was deployed using the online questionnaire program *Qualtrics*. The analysis of the data was executed via SPSS. First, in paragraph 4.1 I will present the descriptive statistics that are found on the data set. Next, in paragraph 4.2, I will discuss reliability and validity. Last, in paragraph 4.3 I will debate the various hypotheses that were constructed, scrutinization of these results will be provided in the discussion.

### 4.1 Descriptive statistics

Table 4.1 depict the descriptive statistics for the considered variables analysing the sample of 189 individuals with their respective ideas. The table portrays the correlations among all the combinations of variables in the study. Examining the various correlations is vital to ensure that there is no multicollinearity present between the variables. This test is part of the assumption checks that need to be fulfilled to underline ordinal logistic regression possibilities. The bivariate analysis investigates if there are any variables that highly correlate to each other (i.e. between  $\pm 1.0$  and  $\pm 0.7$ ) and thus hamper ordinal logistic regression analysis. For the continuous variables the Pearson correlations are considered whereas for the ordinal and nominal variables the appropriate Spearman rank correlation is measured (De Veaux, Velleman, Bock, Vukov, & Wong, 2005; Simon, 2010).

As can be derived from the table, there are no significant relationships between variables above the  $\pm 0.7$  level. The strongest relations that can be derived is entrepreneurial self-efficacy – proactive personality (0.69), followed by task variety – task autonomy (0.62), task identity – task autonomy (0.60) and trust – task autonomy (0.60). Hence, no correlations trespass the threshold value of 0.70. In this study, there are no strong significant correlations, which allows for the application of ordinal logistic regression. Looking at row 8 of table 6.0, one can see that all four explanatory variables are positively correlated to the response variable and are statistically significant at the level of 0.01. The strongest correlation can be found between solution and the funding outcome with a correlation of 0.64. This is followed by growth (0.54), partnership (0.44) and social impact (0.37). The correlations between the independent variables and the dependent variable underline that information content provided on solution most strongly correlates with the outcome, when all four independent variables are observed separately

**TABLE 4.1**  
**Means, Standard deviations, Cronbach's Alphas, and Correlations**

	<b>M</b>	<b>SD</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
<b>1. Task Autonomy</b>	5.48	1.16	<i>1</i>													
<b>2. Task Variety</b>	5.77	1.20	.62**	<i>1</i>												
<b>3. Task identity</b>	5.28	1.23	.60**	.56**	<i>1</i>											
<b>4. Feedback</b>	5.38	1.04	.29**	.37**	.38**	<i>1</i>										
<b>5. Proactive Personality</b>	5.42	0.85	.18*	.17*	.17*	.25*	<i>1</i>									
<b>6. Information Sharing</b>	4.74	1.07	.43**	.43**	.46*	.24*	.20	<i>1</i>								
<b>7. Trust</b>	4.59	1.30	.60**	.50**	.53**	.25**	.13	.66*	<i>1</i>							
<b>8. Entrepreneurial Self-Efficacy</b>	5.15	0.86	.15*	.18*	.17*	.21**	.69**	.23**	.17*	<i>1</i>						
<b>9. Networking Ability</b>	4.96	1.17	.29**	.33**	.36**	.23**	.38**	.40**	.33**	.58**	<i>1</i>					
<b>10. Gender</b>	1.42	0.565	-.09	.01	-0.05	.10	.01	.03	.01	.02	.01	<i>1</i>				
<b>11. Age</b>	37.85	8.73	.20**	.21**	.15**	.05	.12	.12	.15*	.09	.13	-.03	<i>1</i>			
<b>12. Country of residence</b>	143.85	60.63	-.08	-.02	.02	.06	.11	.12	.02	.15	.10	.06	-.07	<i>1</i>		
<b>13. Highest degree</b>	43.24	2.86	.17*	.13	.063	.10	.062	.12	.17*	.09	.18	-.10	.14	.12	<i>1</i>	
<b>14. Idea Quality</b>	2.41	0.73	-.12	-.07	-.06	-.03	-.13	-.14	-.19*	-.07	-.03	.10	-.06	.11	-.07	<i>1</i>

N=189 - \* p < .05; \*\*p < .01 – <sup>a</sup>Spearman's rank correlation co-efficient is calculated for ordinal variables

## 4.2 Reliability and validity

As estimated, the total amount of respondents surpassed the necessary amount to achieve a confidence level of 90 percent. In the end, 189 respondents completely filled out the questionnaire. To assess the measurement instruments that were used for reliability, construct validity was measured by Cronbach's alpha. Cronbach's alpha is measure as a value between 0 and 1, where a value higher than 0.6 would label a question as valid. Table 4.1 presents the Cronbach's alpha for each construct.

**TABLE 4.4**  
**Cronbach's Alpha**

<u>Construct</u>	<u><math>\alpha</math></u>
<b>Task Autonomy</b>	0.854
<b>Task Variety</b>	0.875
<b>Task identity</b>	0.858
<b>Feedback</b>	0.910
<b>Proactive Personality</b>	0.927
<b>Information Sharing</b>	0.937
<b>Trust</b>	0.894
<b>Entrepreneurial Self-Efficacy</b>	0.926
<b>Networking Ability</b>	0.921

As can be seen from table 4.1 the variables used in the study demonstrate a high internal consistency estimate of reliability.

## 4.3 Ordinal logistic regression

As denoted in chapter 3, there are three assumptions that are relevant to ordinal logistic regression that need to be tested first. First of all, the model fit statistic is deemed to be significant at the 0.05 level to establish that the included explanatory variables improve the ability to estimate the result in comparison to only looking at the intercept (O'Connell, 2006). Subsequently, the test of goodness of fit needs to be ran and turn insignificant, as the null hypothesis is that the model is a good fit to the data, to guarantee that the model is a proper fit (i.e. that the observed data reflects the model (O'Connell, 2006; Restore, 2017)). Finally, the proportional odds assumption needs to be checked. This is done with the test of parallel lines, which tests the null hypothesis that the odds for each explanatory variable are consistent across the different outcome variables. Meaning that they are the same. This test of parallel lines is notoriously conservative, and other methods are needed when the test turns out to be significant (Restore, 2017). After executing all these test, with the test of parallel lines included, the power of the established model is accentuated.

**TABLE 4.1**  
**Model Fitting Information**

<b>-2Log</b>				
<b><u>Model</u></b>	<b>Likelihood</b>	<b>Chi-Square</b>	<b>df</b>	<b>Sig.</b>
<b>Intercept only</b>	336.293			
<b>Final</b>	264.915	71.378	30	.000

As can be derived from the statistically significant chi-square statistic ( $p < .0005$ ), the Final model will provide a significant enhancement over the intercept-only baseline model. Hence, the model provides better estimations on the outcomes than just basing guesses on the marginal probabilities for the different idea quality categories.

**TABLE 4.2**  
**Goodness-of-Fit**

	<b>Chi-Square</b>	<b>df</b>	<b>Sig.</b>
Pearson	261.979	300	.945
<b>Deviance</b>	264.915	300	.929

Next, the fit with the model needs to be assessed, see table 4.2. As said before, when we do not reject the null hypothesis (large p value), it can be concluded that the data and model predictions are similar (i.e. a good model). As is the case here ( $p = 0.929$ ), and it is suggested that the model fits very well.

Last, the test of parallel lines needs to be fulfilled, which checks if the general models provides an enhanced fit in comparison to the ordinal model. See table 4.3 for an overview.

**TABLE 4.3**  
**Test of Parallel lines**

<b>-2Log</b>			
<b><u>Model</u></b>	<b>Likelihood</b>	<b>df</b>	<b>Sig.</b>
Null hypothesis	264.915		
General	223.054	30	0.074

Even though the test is notoriously conservative we can check it off here. Hence, we accept the null hypothesis and therefore accept the assumption of proportional odds. As all the tests fulfil the predetermined requirements, with the conservative test of parallel lines included, the strength of the model is acknowledged (O'Connell, 2006).

#### 4.4 Regression of Independent variables

Since all hypotheses are based on a singular predictor, no interaction regression models need to be developed and tested. Therefore, the variables corresponding with the main effect hypotheses are presented below. To provide a better interpretation of the regression coefficients, they should be converted into odds coefficients. First of all the regression coefficients are displayed. In the analysis of ordinal logistic regression this is a regular practise (O'Connell, 2006). These are presented in the *odds* column. These odds coefficients will help to give meaning to the hypotheses. Subsequently the *pseudo R<sup>2</sup>* statistics are provided. Ordinal logistic regression does not employ, in contrast to linear regression, an *R<sup>2</sup>* statistic that defines the proportion of variance in the dependent variable that can be traced back to the effect of the independent variable. An *R<sup>2</sup>* that is high signifies that a large portion of the variance in the dependent variable is explained by the independent variable. As a substitute to the *R<sup>2</sup>* statistic, ordinal regression employs an approximation in the form of a *pseudo R<sup>2</sup> statistic*. In this study the Nagelkerke and McFadden statistics are considered. The Cox and Snell statistics are not used as they are restricted by low upper boundary ( $\leq 1$ ). Thus, for this type of research it is more suitable to employ the rather conservative McFadden Pseudo *R<sup>2</sup>* (Allison, 2013; Restore, 2017). The found statistics in table 4.4 will be debated in chapter



**TABLE 4.4**  
**Ordinal Logistic Regression – Parameter Estimates**

<u>Independent variables</u>	<b>Regression Coefficient</b>	<b>Odds</b>	<b>Pseudo R<sup>2</sup></b>		<b>Wald <math>\chi^2</math></b>	<b>Lower</b>	<b>Upper</b>
			<b>Nagelkerke</b>	<b>McFadden</b>			
<b>Task Autonomy</b>	0.126*	0.882*	0.018	0.008	3.203	0.769	1.012
<b>Task Variety</b>	0.041	0.959	0.003	0.001	0.381	0.841	1.094
<b>Task identity</b>	0.053	0.948	0.004	0.002	0.644	0.833	1.080
<b>Feedback</b>	0.072	0.931	0.005	0.002	0.838	0.798	1.085
<b>Proactive Personality</b>	0.282**	0.754**	0.047	0.021	8.405	0.624	0.913
<b>Information Sharing</b>	0.170**	0.844**	0.027	0.012	4.845	0.726	0.982
<b>Trust</b>	0.143**	0.867**	0.029	0.013	5.089	0.765	0.981
<b>Entrepreneurial Self-Efficacy</b>	0.140	0.869	0.010	0.005	2.142	0.721	1.049
<b>Networking Ability</b>	0.059	0.943	0.004	0.002	0.713	0.822	1.081

N= 189

\*p<0.1, \*\*p<0.05

## 4.5 Hypothesis Testing

The central research question examines which personal traits and contexts enhance the idea quality in intra-corporate crowdsourcing for idea campaigns. In light of this question 189 employees were inquired. To test the formed hypotheses, ordinal logistic regression was applied.

*Hypothesis 1* argues that there is a positive relationship between task autonomy and idea quality. Task autonomy measured having opportunities for independent thought and initiatives. The regression analysis indicates that an increase in task autonomy is associated with an increase in odds of improving idea quality (i.e. rising from a low quality idea to a medium quality idea or from a medium quality idea to a high quality idea). For task autonomy this had an odds ratio of 0.882 (95%CI, 0.769 to 1.012), Wald  $\chi^2 = 3.203$ ,  $p < .1$ . Hence, H1 is supported. The more autonomy an employee has in his or her job, the more likely he or she will provide an enhanced idea quality.

*Hypothesis 2* claims that there is a positive relationship between task variety and idea quality. Task variety is associated with doing many different things on the job, performing different tasks or using multiple skills or talents on the job. After the analysis it was found that an increase in the variety of tasks does not increase the odds of improving the quality of posted ideas. *Hypothesis 3* questions the relationship between task identity and idea quality, and postulates that an increase in task identity will increase the outcome idea quality. Task identity revolved around the opportunity to start and complete an entire piece of work. Also here no significant result was found. And therefore the hypothesis is rejected.

*Hypothesis 4* postulated that an increase in task feedback would positively influence idea quality. Feedback considered the degree to which people know how they are performing on their job. Though, this relationship was found to be not significant as well and the hypothesis is not confirmed. This apparently does not provide impetus for the odds to increase idea quality.

*Hypothesis 5* reasons that an increase in proactive personality will positively influence the quality of an idea. Proactive personality is measured as, among other things, looking for new opportunities, having the ambition to turn ideas into reality, loving to challenge the status quo and helping people out. The analysis portrays that an increase in proactive personality is related to an increase in the odds of enhancing idea quality. The significant outcome underlines that an increase in proactive personality would produce an increase in odds of generating better ideas. For proactive personality this had an odds ratio of 0.754 (95%CI, 0.624 to 0.913), Wald  $\chi^2 = 8.405$ ,  $p < 0.05$ . Thus, hypothesis 5 is supported. The more proactive personality someone has, the better the chance an enhanced idea will be provided.

*Hypothesis 6* claims that there is a positive relationship between the sharing of information and idea quality. The concept of information sharing is regarded as the extent to which explicit and tacit knowledge is shared and collected, and people are encouraged to do so. The investigation elucidates that an increase in information sharing contexts also increases the odds of improving the quality of an idea. Again, this is the odds of promoting a low quality idea to a medium quality idea, or promoting a medium quality idea to a high quality idea. The odds ratio here was 0.844 (95%CI, 0.726 to 0.982), Wald  $\chi^2 = 4.845$ ,  $p < 0.05$ . Therefore, hypothesis 6 can be

supported meaning that the more of an information sharing context is present, the better odds there are to promote an idea towards a higher idea quality.

*Hypothesis 7* question the relationship between trust and idea quality, and argues that an increase in trust will result in an increase in idea quality. Trust is operationalized as the extent to which employees think that they are heard and that they will benefit from their ideas. The regression analysis signifies that an increase in trust can be associated with an increase in the odds of improving the quality of an idea. The odds ratio in this instance is 0.867 (95% CI, 0.765 to 0.981), Wald  $\chi^2 = 5.089$ ,  $p < 0.05$ . Thus, H7 is supported. The more trust an employees has that he or she will benefit from their ideas, the more likely it is that the quality of an idea will be enhanced.

*Hypothesis 8* postulates that the more entrepreneurial efficacious an employee is, the better the ideas will be. Entrepreneurial efficaciousness is measured as one's ability to search, plan, marshal and implement with regard to a business. Investigating the relationship between entrepreneurial efficaciousness and idea quality no significant relationship was discovered. This seemingly does not spur for the odds to increase idea quality.

*Hypothesis 9*, lastly, reasoned that the ability to network for an employees has a positive influence on the quality of an idea. The ability to network can be seen as the skill to form relationships easily, using your connections to get things done, putting effort in networking and having a lot of colleagues who an employee can count on. The rigorous study of the data concluded that this relation cannot be justified. Networking ability doesn't seem to benefit the idea quality of an employee. Thus, from the above it can be concluded that hypothesis 1, 5, 6 and 7 are supported and no significant relation has been found for hypothesis 2,3,4,8 and 9. For a critical analysis of the findings, please refer to chapter 5.1.

## 5. Discussion

Although the use of intra-organizational crowdsourcing activities is rising, problems emerged with the magnitude of ideas that are accumulated. More specifically, the amount of bad ideas that don't get implemented pose a problem (Bayus, 2013; Di Gangi, Wasko, & Hooker, 2010). Also, it is known that there are interpersonal differences in the provision of ideas but the actual factors that generate this discrepancy is rather unknown (Girotra et al., 2010). One of the reasons for this can be ascribed to the lack of empirical evidence from industry (Villarroel & Reis, 2010). One of the reasons for this lack of empirical evidence, which was also found to be a hurdle in this research, is the IP sensitivity of crowdsourcing for idea initiatives. Moreover, though there is research on the quality of ideas in this type of campaigns, quantitative approaches are lacking (Mumford, 2003; Shalley et al., 2004; Zhou & Shalley, 2003). In this particular study it is sought to fill this knowledge gap by studying the most interesting variables that are deemed to promote idea quality and their relationship towards the quality of an idea.

### 5.1 Specific Findings

The outcomes of this study indicate that the chances of improving the idea quality within intra-organizational crowdsourcing for ideas initiatives can be achieved by enhancing both personal traits and contextual factors. Significant relationships were found for task autonomy, proactive personality, information sharing and trust. However, no evidence was found that task variety, task feedback, task identity, entrepreneurial self-efficacy and networking ability have a significant positive effect on idea quality.

First, task autonomy was found to be significantly influencing idea quality in a positive way. Meaning that the more an employee is in a job in which he or she has autonomy the better an idea could be. The analysis reveals that jobs where there are many opportunities for independent thought and actions, there is encouragement to find solutions and there is a great deal of control the odds are significant that this will provide an enhanced idea. The effect of an autonomous job invoked the creativity and innovativeness in the employee necessary to provide substantial odds to generate a good idea. Indeed, an autonomous job can result in extraordinary creative outcomes (Bowen & Lawler III, 2006). The empowerment and autonomy of an employee are rather important to let them tap into their creative potential (Amabile, 1998; Cools et al., 2009). Prior research suggest that a substantial control over jobs for employees could result in generating ideas that truly matter (Damanpour & Schneider, 2006), as is the case in this study.

As a second significant finding it was found that proactive personality positively influences the quality of an idea provided by an employee. Thus, the more of an employee takes action to change the environment, the more likely it would be that he or she will provide a qualitatively good idea. They spot new opportunities and persevere on actions until they have an impact on the environment (Parker et al., 2006). Apparently, this is an instrumental trait that enables individuals to bring about changes in the environment through their ideas, which is in line with Buss and Finn (1987). Seemingly, individuals that portrayed traits of proactive personality highly contributed to the organization with their innovative behavior (Seibert et al., 2001) and quality ideas (Parker, 1998). A possible explanation for this can be ascribed to what Liu and Shi (2014, p. 751) call "cognitive redefinition, a psychological process in which proactive employees react to stress by challenging instead of avoiding. Which in turn affects the negative effect of stress on creativity (G.-h. Huang, Zhao, Niu, Ashford, & Lee, 2013; Seibert et al., 2001). Also, it has been recognized that proactive personalities are more inclined to endeavor

on entrepreneurial ventures (Chan et al., 2015) and thus are determined to provide adequate ideas.

Thirdly, information sharing was deemed to have a significant positive effect on the quality of an idea posted by an employee. Thus, a context (e.g. business culture) where both explicit and tacit knowledge are distributed and collected pose a beneficial environment for the generation of quality ideas. So indeed, the sharing of information is a fundamental vehicle for idea generators (Carmeli & Paulus, 2015; Mangiarotti & Mention, 2015; S. Wang & Noe, 2010; Z. Wang & Wang, 2012) and has a profound impact on the impact of an idea (Carrillo et al., 2007; Chiang & Hung, 2010). Since impact was seen as an important antecedent for idea quality in intra-organizational crowdsourcing campaigns this relation also holds within this environment (R. K. De Vries, Sarah, 2017; Gänge, 2017). In line with Svetlik et al. (2007) it can be said that the ability to constantly share and accumulate knowledge aids employees to innovate.

Last, trust was also found to be significantly influencing idea quality in a positive manner. In this sense, trust that one is heard and trust that one will benefit will enhance the probability that an idea will be of high quality. Meaning that when an employee believes that an idea will be taken seriously and he or she will be listened to, but also that credit will be awarded and that interests are cherished, the odds to generating a qualitatively good idea will be higher. Ostensibly, a climate that fosters innovation through trust that an employee is heard and will benefit promote quality ideation (Cook & Wall, 1980; Seo et al., 2016; Siegel & Kaemmerer, 1978). Indeed, the sense of trust of support for innovation enhances the odds of generating good ideas, which is in line with the reasoning of Clegg et al. (2002). This relationship was not only found in the short run, also in the long run for economic prosperity interpersonal trust was found to have a profound impact as an intermediary parameter (Szabo, Ferencz, & Pucihar, 2013).

Even though four out of nine factors depicted a significant relationship, five did not turn out to be influential as hypothesized. The analysis of task variety, task feedback, task identity, entrepreneurial self-efficacy and networking ability showed no significance in relation to idea quality.

Dodd and Ganster (1996) postulated that the amount of variety presented a boundary for the amount of autonomy that can be reached. Though, from the analysis of the construct, related to the significant finding of autonomy, this cannot be said in this setting. The range of skill and variety and variety did not result in evidential outcome of enhanced idea quality. This lack impact from doing many different things at work and using a number of skills could be ascribed to a higher degree of complexity, and resulting overload, that inhibits the beneficial characteristics of a varied job. The findings are therefore congruent with research pointing at factors that might inhibit the benefits of varied tasks (Morgeson & Humphrey, 2006). Anecdotal evidence for this was also found in the expert interview with Roel de Vries who claimed that people with lower rank and monotone jobs shared better ideas (R. K. De Vries, Sarah, 2017). Following Menon (2001) it might be assumed that the anticipated impact is unlikely to follow through in case there is no psychological empowerment. Accordingly, prior research indicated that task variety did not directly influence individual creativity and it is deemed highly probable that a knowledge interaction is fully mediating the effect (Chae et al., 2015).

Task feedback, the amount of information employees receive about the performance they are portraying in their job (Hackman & Oldham, 1976) was not found to be an influential factor in this model's setting. The extent to which an employee is self-aware about how he or she is doing on the job and the abilities to inquire on his or her performance did not significantly enhance the odds of generating quality ideas. Juxtaposing Earley et al. (1990) employees were not less motivated and creative with a lower degree of feedback than with clear indication of their performance. Similar findings of feedback were found having a neglectable impact on innovative work behavior (Battistelli, Montani, & Odoardi, 2013) and people's perceived competence (X. Wang, Schneider, & Valacich, 2015), and thus putting effort in ideation. Contradicting prior research, this study did not provide evidence that feedback entices employees on the quest for improved efforts and creativity to enhance business results (Earley et al., 1990).

By the same token, task identity was not proven to be a significant factor contributing to enhanced ideas in intra-corporate crowdsourcing campaigns. Seemingly, the ability to complete a job from end to end, rather than doing subtasks, did not yield the expected motivational and creative outcomes (Hackman & Oldham, 1976; Morris & Venkatesh, 2010). Moreover, the domain relevant skills that should be developed by working on an identifiable piece of work (Coelho & Augusto, 2010) did not bestow the ability to generate qualitatively superior ideas. One reason for this particular relationship can be found in the inclination towards the open innovation program. For example, Deegahawature (2014) found a direct negative relationship between task identity and the inclination to open innovation initiatives. Comparing the before mentioned study and Coelho and Augusto (2010) the differences can be due to contextual discrepancies.

Although the conviction of an employee to be entrepreneurial have been found to be highly influential on exceling in intra-preneurial activities (Douglas & Fitzsimmons, 2013) and intentions (C. C. Chen et al., 1998), this was not found in this study. No direct positive effect of entrepreneurial self-efficacy on the intra-preneurial excellence (i.e. providing high quality ideas) have been discovered. Apparently, the estimation that employees would excel at new venture performance relevant to ideation, as devised by Hmieleski and Corbett (2008), did not hold in this study. In line with the findings in this study prior research has found that the effects of self-efficacy on entrepreneurial performance were highly influenced by optimism. Low optimism was associated with moderate optimism, but were negatively associated with high optimism (Hmieleski & Baron, 2008). Therefore, the found effects could be highly susceptible to the degree of optimism that is vested in the participant. This could also be a reason why non-significant relationships were found between ESE and the number of opportunities and the innovativeness of opportunities found by Tumasjan and Braun (2012).

The convincing evidence of the importance of the networking ability skill to gather and accumulate relevant knowledge was not supported in this study. Having access to information from individuals (Howells, 2002; Kanter, 1983) to learn and generate novel innovations (Liebeskind, 1996; Wenger & Snyder, 2000) was found of less importance in generating quality ideas on corporate innovation platforms. With the assessment of quality in this study in mind, this outcome might be ascribed to the fact that idea of limited creativity tend to challenge the status quo in a lesser way (Subramaniam & Youndt, 2005), and therefore at times have a better chance to get implemented (Baer, 2012). In this particular research from Baer (2012) it was found that networking ability did not have a significant effect on the implementation of ideas, which he ascribed to the limiting factor of creativity. When creativity is low, one can have the

best network in place to get information and sponsorship, but the idea won't be of high standard. An interaction effect with creativity\*networking ability on implementation of ideas could be present here.

In sum, the findings indicate that when a job has a high degree of autonomy and employees are able to independent think and execute their work, they will have increased odds of finding superior quality ideas. The same goes for proactive personality, where in case an employee is determined to make change and have an impact on his or her environment this, within ICC activities this will result in enhanced odds of generating good ideas. Moreover, as instinctively as it might seem, the sharing of information, be it tacit or explicit will result in an elevated potential of posting ideas of higher quality. Finally, trust turned out to be the most significant predictor for quality ideas. Seemingly, when an employee has confidence that an idea will be taken seriously and he or she will be listened to, but also that credit will be granted and that benefits are considered, the chances of generating a qualitatively good idea will be higher. See figure 5.1 for a visual representation of the findings.

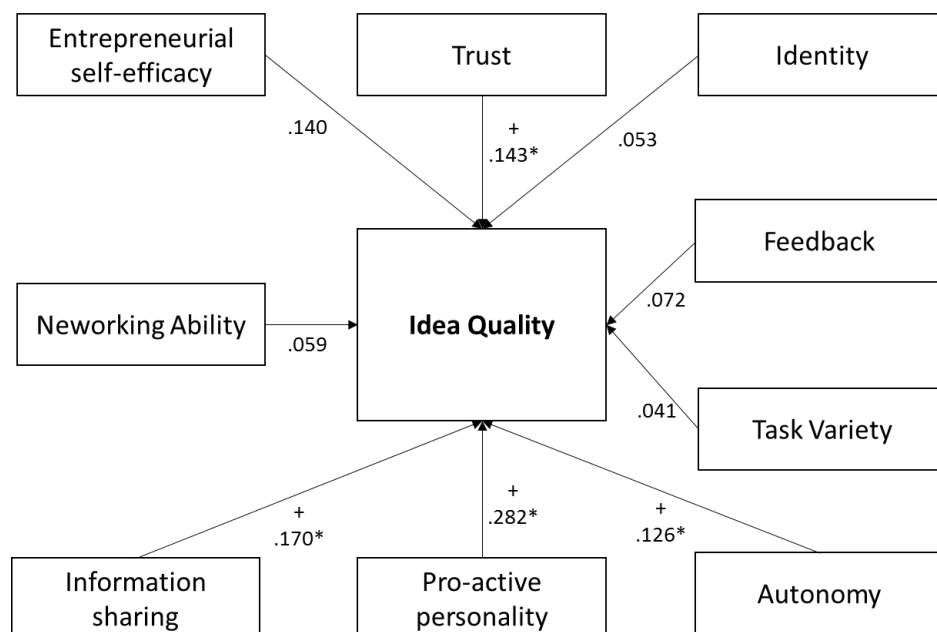


Fig. 5.1 – Variable relationships (\*significant)

## 6. Conclusion

The following chapter will offer a recap of the study design, an evaluation of the findings and relate them to practical and theoretical implications. Moreover, the limitations and the directions for future research will be highlighted as to enhance replications of this study and provide a research agenda for the future of this emerging topic.

### 6.1 The research and its outcomes

The main research question is what the traits and contexts are of the individual employee profile that generate the highest rated ideas in the context of intra-corporate crowdsourcing for idea initiatives. The problem arises from the ever increasing need for innovation, in which crowdsourcing can help but also poses the problem of the exorbitant ratio of bad ideas that need to be evaluated. The enhancement of idea quality in intra-corporate crowdsourcing for idea initiatives is a well hailed wish of both companies striving for innovation and idea evaluators within campaigns. The theoretical foundation was sought in the literature for creativity and innovative behavior as to find the most influential factors contributing to idea quality. To combine seminal and recent academic literature with the emerging field of crowdsourcing via web 2.0 applications, expert interviews with innovation platform managers were performed. The combination of both academic literature and relevant industry information laid the foundation for the testing of 9 hypothesized variables to have a profound impact on the quality of ideas within ICC initiatives. For the testing of relationship between variables a quantitative approach was found to be the most appropriate. Although ideas are often regarded as IP sensitive. In order to answer the central research question, 189 valid questionnaires were collected and analyzed. As the quality of ideas as the dependent variable was segmented into three levels (low, medium, high quality) no standard regression methods could be employed. For this type of data ordinal logistic regression was found to be most suitable to investigate how the 9 predetermined factors influenced the quality of ideas. The results evidently indicate that an employee's task autonomy and proactive personality are traits that definitely enhance the odds of generating a higher quality idea. In terms of individual contexts it was discovered that the sharing of tacit and explicit knowledge within the organization benefits the chances of high quality ideation. Also, the sense of trust that employees have impacts the idea quality. Trust was as the feeling that their ideas will be listened to and that they will ultimately benefit from catering them to the organization.

### 6.2 theoretical & practical contributions

This study contributes to the so far rather under-exposed field of intra-corporate crowdsourcing for ideas, potentially due to the sensitive nature of the environment. The study adheres to research requests that inquire quantitative analyses with a large scope of variables at the individual level (Majchrzak & Malhotra, 2013). It has been indicated that there can be significant differences between high performing individuals and their peers within ideation (Girotra, Terwiesch, & Ulrich, 2010, p. 13). This research advances the knowledge by establishing the significant influence of task autonomy, proactive personality, information sharing and trust within ICC campaigns. Until today researchers have only focused on a limited amount of factors within an empirical study, where this research ventures forth and combines empirical data with a large amount of factors.

In practice this study aids both innovation platform managers and evaluators. Innovation platform managers can actively promote the factors that were found to be influencing the odds



to generate quality ideas. As said, increasing task autonomy and enhancing information sharing of tacit and explicit knowledge and ensuring trust that participants will be heard and benefit elevates the odds that employees will provide high quality ideas. These practical implications provide a significantly better helping hand in contrast to what Terwiesch and Ulrich (2009) advise: just increase the average quality, the quantity of participants or the variance of participants.

On the other hand, people that already possess these traits and contexts, like a proactive personality something that is hard to learn (Erdogan & Bauer, 2005), can be directly contacted to engage in ideation task forces. Or like Girotra and her peers put it *“if they are, an optimal process may be to first screen the pool of individuals for the highest performers and then employ only those individuals in subsequent idea generation efforts.”* (2010, p. 13). Moreover, these highest performers can be regarded as a great resource for other ideators to generate better ideas. For evaluators this research can help to diminish the ratio of low quality to high quality ideas in favor of high quality ideas. This will help to make the job less tedious and increase motivation. Moreover, the developed quality assessment scheme can be used to develop a quick scan feature on the platform based on novelty, relevance, feasibility and elaboration. In general, the findings point to the importance of explicitly considering the broader innovation and/or task context to effectively manage ICC platforms.

#### 6.4 Limitations

The measurement of idea quality was estimated to a process of focusing on the found relevant items of novelty, relevance, feasibility and elaboration. The expert interviews pointed out that every campaign is evaluated with different criteria, other than the predetermined set. Therefore the assessment would not work in this way. This shortfall was overcome by scrutinizing the quality of idea by the phase in which the idea ended up, from discussion to evaluation to implementation. Hence, three quality levels were assessed. An apparent flaw in the research was the fact that people can have more ideas in various categories. For this reason only people that generated an idea in a singular category were considered. Moreover, the sample-size determination was performed by a rule-of-thumb and not by accurate computation. Also, due to the large amount of factors that were tested in a questionnaire, the completion rate was rather low. This is, of course, a limitation of the research. The questions were self-reported and therefore are prone to bias (Stone, Bachrach, Jobe, Kurtzman, & Cain, 1999). The testing factors were determined by a combination of academic review and expert interviews. Due to this fact, not all potential characteristics were incorporated in the model. Living in academic utopia, this could be seen as a limitation. In a similar vein, the expert interviews were executed with individuals from various companies throughout Europe, though the actual research was executed in the Netherlands at Liberty Global due to data restrictions at the other companies. These individuals can of course also be prone to personal preferences for particular factors to be studied.

Looking at the variables, The concept of self-efficacy is inherently domain-specific, subjective judgement on the novelty and significance of an outcome of a self-imitated action (Ford, 1996; Wilson, Kickul, & Marlino, 2007). In other words, an employee could be highly self-efficacious in one domain, though portray a low degree of self-efficaciousness in another area. Thus, the measurement of entrepreneurial self-efficacy in one domain could be well different in another domain. Job Level was not controlled for: it has been found that people in higher

positions feel more responsible for change and innovate more because of the role expectations tied to their positions (Fuller, Marler, & Hester, 2006; Kanter, 1988). At the same time, they also have more job autonomy compared to those in lower positions (Fuller et al., 2006). As we aimed to examine the direct effect of job autonomy, controlling for job level is essential to distinguish the potential impact of felt responsibility for change resulting from role expectations, especially when analyzing managers and non-managers together.

Although some of the hypotheses are accepted, there is no significance test that underlines a linear relationship between the independent and dependent variable. Ordinal logistic regression can merely argue that the odds that an increase in the independent variable will result in a change of “rank” in the dependent (ordinal) variable.

### 6.5 Future research

This research has unearthed a small set of influential variables that enhance idea quality in ICC campaigns. Yet, the expert interviews did not yield any significantly new factors than were discovered through the extensive literature review. The answers that were given to the probing question to find additional factors were retorted with concepts that were identical or analogous to the found concepts from academia. One reason for this might lie in the fact that the experts (innovation managers), for any reason, were not able to think barrier free. Also academia has only identified a limited set of individual differences and contextual factors for creativity and innovation (Anderson et al., 2014). Future research should revolve around the identification and analysis of other factors that potentially could lead to quality ideas. Future research is needed to identify the full range of individual differences and contextual factors for both creativity and innovation; and one first step would be the analysis of culture on idea quality. In this same vein it would be interesting to see how convergent and divergent thinking can be assessed in this type of environment. As indicated in the literature review, the concepts of convergent and divergent have been posed to be rather important factors that facilitate innovation and creativity. Non-survey testing methods could be applied to measure the variance in the convergent and divergent thinking. To measure convergent thinking Mednick and Mednick's (1962) Remote Associates Test (RAT) could be used. In this test the participant is presented with unrelated words like “brush”, “shampoo” and “dresser”, and are asked to identify the shared associate (“hair”). To measure divergent thinking the Alternate Use Task (AUT) test could be employed (Guilford, 1967 #545). This test confronts the participant with a standard everyday item (e.g. paperclip) and are asked to list the different uses of that particular item (picking a lock, tying hair, etc.). In a similar vein, also the moderating effects of the various predictors are in need to be discovered (Damanpour & Schneider, 2006).

Abundant anecdotes are known about creativity, though well-executed longitudinal studies are lacking. One, quite dated, study performed by Hargadon and Sutton (1997), is the exception. Longitudinal study in digital environments is of value to both practice and academics to verify the anecdotal evidence that has been postulated in nascent research. Indeed, timing could be an influential factor. At different times companies are in need for equally different innovations. At some point incremental innovations are more important, and at other times a company is in dire need for a radical innovation. It would be interesting to see which personal characteristics, traits or contexts would invoke either of both types of innovation. It has been established that the different tasks demands of idea generation also inherently demand a different set of characteristics (De Jong & Den Hartog, 2010; Scott & Bruce, 1994). Thus, different ideators

might foster different types of innovations. It would benefit practice in their innovation strategy to know which persons would facilitate incremental or radical innovation.

Succeeding research efforts could also enhance the sensitivity of the analysis by either obtaining more levels of differentiation in the dependent variable (Idea Quality) or engage in the individual rating of a set of ideas based on predefined criteria. This could be done with the Consensual Assessment Technique (CAT), which is deemed to be one of the most effective tools to measure creative work. The CAT is regarded as the gold standard of creativity assessment and tested in a wide spectrum of environments ranging from products (2004) and processes (2008) to children's musical compositions (Hickey (2001)). This evaluation technique was developed by Amabile (Amabile, 1996) and has been identified as a proper means to evaluate ideas (J. Baer & McKool, 2009). In practice as well, this method has been used to evaluate ideas (Blohm et al., 2010; Franke & Hienerth, 2006; Kristensson et al., 2004; Matthing, Kristensson, Gustafsson, & Parasuraman, 2006; Piller & Walcher, 2006). This study was executed in the German, Dutch and Belgian geo-areas of Europe. It would be beneficial to see how these characteristics are influencing creativity in a wider context: holistic Europe or World perspectives might be of interest.

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## Appendix

### 1. Key Terms

This section will familiarize the reader beyond the necessary scope of the study with the concepts of crowdsourcing, internal crowdsourcing and web 2.0 applications. When a coherent understanding of crowdsourcing, internal crowdsourcing and web 2.0 applications is already vested in the reader, please feel free to skip this section.

#### Crowdsourcing

Crowdsourcing refers, as mentioned before, to tapping into the knowledge of crowds to solve problems which would normally be tackled by persons specifically designated to do this job (Brabham, 2008a). Indeed, the fundamental purpose of crowdsourcing is enabling the collection of these intangible knowledge assets and tap into the collective intelligence of a heterogeneous group of individuals instead of solely focusing on the wisdom of experts (Howe, 2006b; Surowiecki, 2005). These crowds are often comprised of internal and external participants. The term crowdsourcing was initially coined by Jeff Howe (2006b) in Wired Magazine and from that moment on received phenomenal attention from both practitioners and researchers. Yet, although quick uprising in interest in this topic it isn't something new on the horizon. Be it that the current understanding of crowdsourcing has at its core the online presence of the activity, there have been several evidences of crowdsourcing long before the inception of the World Wide Web. Although it wasn't called crowdsourcing, there are various examples of the use of the crowds to enhance decision making. One of the oldest examples stems from the time of rule of King Louis XVI, 1783 to be specific.

Crowdsourcing relates to multiple fields of innovation (i.e. user innovation, open innovation, open source innovation, financing) that inquire for input from the crowd. For this thesis the following definition is adopted: *“An intentional mobilization, through Web 2.0, of creative and innovative ideas or stimuli, where all employees are included within an organization in the ideation phase of the innovation process”* (Mazzola & Distefano, 2010, p. 3). This definition is chosen as it incorporates the internal and web 2.0 environment in which the study is embedded.

Several studies have investigated crowdsourcing for external uses like marketplaces for online work (Chandler & Kapelner, 2013; Kaufmann et al., 2011), contests (Y. Zhao & Zhu, 2012; Zheng et al., 2011), external ideation (Hossain, 2012; Leimeister et al., 2009), start-up (D. Smith et al., 2013), e-government (Cupido & Ophoff, 2014) and not for profit contexts (Alam & Campbell, 2012; Pilz & Gewald, 2013). Yet, the practice of employee based- or internal (intra-organizational) crowdsourcing for ideas is rather under exposed.

To enhance the understanding of the position of internal crowdsourcing within the various configurations, please see the picture below. The focal firm is the entity that is searching for new innovations, the contributor is the individual that is offering his or

her ideas to the focal firm and the broker is an intermediary that collects the ideas from the external parties to be handed over to the focal firm.

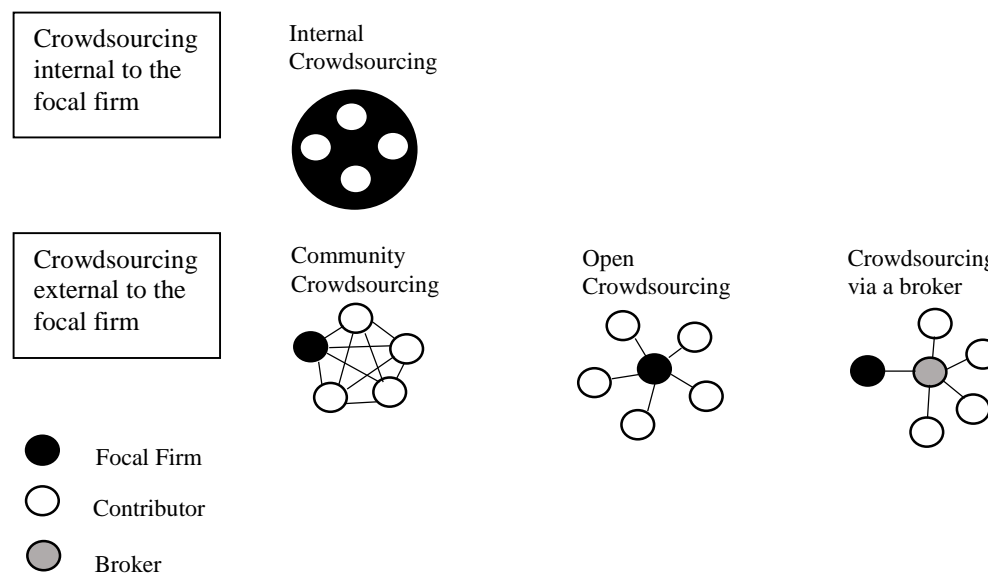


Fig. 1.1 – Crowdsourcing configurations

### Internal Crowdsourcing

Referred to as intra-corporate crowdsourcing (Villarroel & Reis, 2010), is a particular form of crowdsourcing that is exclusively executed within the perimeters a particular company. The concept is generally associated with the functionalities of an online platform that provides opportunities for employees and participants to submit their ideas, post comments, like or dislike ideas of others and in some cases buy and sell shares that are correspondent to an idea. The research executed by Villarroel & Reis (2010) elucidated the fact that there was a major performance increase in their innovation potential when participants were situated lower on the corporate ladder and were more geographically dispersed from the organizations' innovation centres. They add that the main aim of organizations implementing a crowdsourcing activity is to generate and get access to ideas from employees and members giving them the opportunity to provide a contribution to the innovation process.

From a management perspective, every employee has the potential to innovate and for the sake of their own survival and job they should do so in order to stay competitive (Carlson & Wilmot, 2006). Yap (2012) argues that job descriptions inhibit employees to search for solutions to problems outside of it. Internal crowdsourcing, he posits, can break this barrier and unveil innovations from employees that would in the ex-ante situation not be captured.

A continuum exists between the risk of a decision implementation and the power given to a person. Surowiecki (2005) claims that the more power is vested in a single person to execute a decision, the more risk is involved it being a bad decision. Therefore he postulates that companies should use methods of aggregation to harness the collective

wisdom of the crowd to make forecasts and develop future strategies. The employees or participants are the main asset in this as they provide a strategic competitive advantage to develop an innovation strategy with.

Although the practice of internal crowdsourcing is a rather unknown field to various companies and not used as extensively as external crowdsourcing and open innovation, the deployment of these initiatives is increasing (MissionMode, 2013). The results of internal crowdsourcing initiatives are considered to be less fruitful in comparison with external endeavours. Employees are extrinsically motivated and operate on traditional incentives including bonuses and salary. The often non-existent connection between the submission of ideas and monetary rewards discourages employees to seek challenges like these (Boudreau & Lakhani, 2013).

The collection of ideas internally, especially within larger companies, is often performed on platforms. These platforms are part of a technological area called Web 2.0 enabled web spaces.

### **Web 2.0 enabled web spaces**

To engage in crowdsourcing the participation of what Howe (2006a) denotes as a call to a generally large network of people has to be accomplished. The facilitator of this call for collective wisdom often is the internet. More specifically, advanced internet technologies or “web 2.0” applications. Web 2.0 was firstly described by O’Reiley Media (Musser & O’reilly, 2006) as a “*set of economic, social and technological trends, that collectively form the basis of the next generation of the internet – a more mature, distinct medium characterized by user participation, openness and network effects.*” The application provides a rich media source (Daft & Lengel, 1986) for which costs are neglectable, offer an easy user experience, provide interaction between actors and is decentralized (McAfee, 2006). These web applications, often characterized as platforms, are used to facilitate the convergence of crowds as a means to promote ideation. Hence, web 2.0 applications offer companies to tap into large-scale bodies of ideas that were previously unattainable. One of the exclusive capabilities of a web 2.0 enabled platform for crowdsourcing for ideas, is the potential to harness the aggregate tacit knowledge within the firm. (Saxton, Oh, & Kishore, 2013).

This all coalesces in the following visual representation of a typical crowdsourcing campaign.



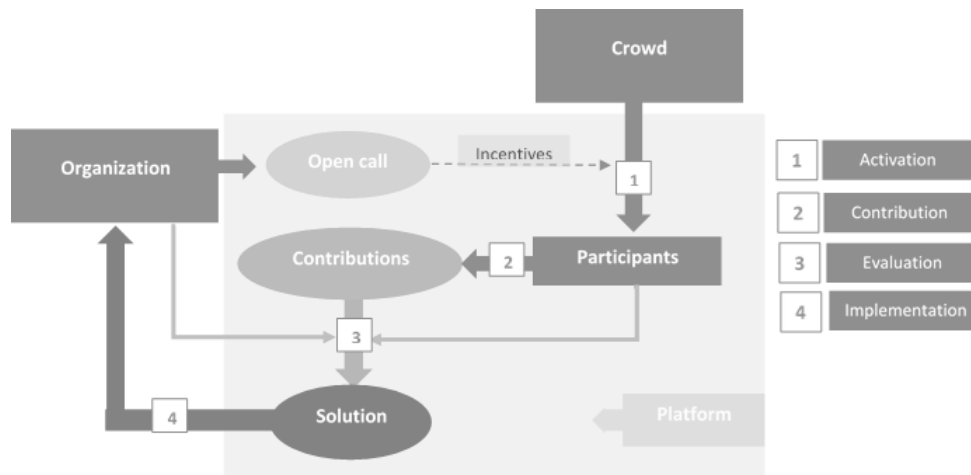


Fig. I.2 shows an overview of a typical crowdsourcing for ideas initiative

Typically, first the organization publishes a call for ideas or an idea campaign. The internal crowd consisting of employees then are attracted to the platform with potential incentives. In this stage they feel activated and are turned into participants. Subsequently, they provide their contributions in the form of ideas, likes and comments. These best contributions, weighed by an evaluative selection process, are chosen and proposed as solutions. The last step is implementation of the best ideas in the organization.

### Appendix 3.1 – Structured Interview

Name

Company Name

Role / Function

1. **Main:** can you give me a short introduction about yourself and the platform
2. **Main:** What are in your opinion personal traits that lead to enhance idea quality on the ideation campaign?
  - a. *Probe:* can you give examples of these traits? Critical incidents?
3. **Main:** are these traits learned by training or just the nature of people?
  - a. *Probe:* do you think these traits can be learned?
4. **Main:** Can you define how the quality of ideas is being measured?
  - a. *Probe:* why was this methodology chosen?

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of personality.**

	Extremely positive (1)	Moderately positive (2)	Slightly positive (3)	Neither positive nor negative (4)	Slightly negative (5)	Moderately negative (6)	Extremely negative (7)
Openness to experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conscientiousness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extraversion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neuroticism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agreeableness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive personality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creative Personality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer Orientation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of goal orientation.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Learning / Mastery Orientation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Growth Need Strength	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of values.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Congruence of Value with the firm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultural Differences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of thinking styles.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Need for Cognition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Systematic Problem-Solving Style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive Problem-Solving Style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Divergent Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convergent Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of self-concepts.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Self-Esteem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creative Self Efficacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Role Breadth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulatory Focus: Promotion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
regulatory Focus: Prevention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Self-Efficacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entrepreneurial Efficacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of Knowledge and abilities.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Leader Member Exchange	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Team-Member Exchange	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Networking ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of Psychological States and Motivation.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Positive affect / moods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling of energy & vitality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Negative affect / moods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
emotional ambivalence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intrinsic motivation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expected positive performance outcomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of Task (job) Context.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Job Complexity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routinization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Variety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autonomy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Significance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Required Innovativeness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rewards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supervisory Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supervisory Benevolence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supervisory Creativity Expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supervisor Expert Knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
leadership Role Expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Co-Worker Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creativity Expectations by Co-Workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
presence of Creative Co-Workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate to your opinion to what extent the following dimensions (traits / contexts) influence the quality of ideas on online ideation platforms in terms of other influences.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Evaluation / Justice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Willingness to take risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
career commitment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resources for creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
organizational identification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
conformity to norms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
organizational Citizenship Behavior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Location from HQ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix 3.2 – Questionnaire Invitation

Dear \${m://FirstName},

My name is Maurice Smulders, and I am currently completing my Master in Innovation Management & Entrepreneurship. I am fascinated by the activity and dynamics of the Spark platform and am performing my thesis on the efficiency of crowdsourcing platforms. The goal of the study is to find out what personal traits and contextual characteristics influence the stage of an idea in the ideation process. The aim is therefore, to enhance the experience and quality of the platform.

Roel de Vries and Sarah Kelly from the Spark team have connected me to you, since you have been an active participant of the platform. For this reason I would like to invite you to fill out a small survey (10 minutes).

By participating you have a chance to win one of the hand-crafted mystery gifts.

Please be assured that your responses will be kept anonymous and completely confidential.

In case you have any questions, please feel free to contact me on my email [m.c.r.smulders@student.utwente.nl](mailto:m.c.r.smulders@student.utwente.nl) or phone +31 (0) 6 13925144.

Your response is highly valued!

Please click on the link below to access the survey.

[\\${l://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${l://SurveyURL}](#)

If possible, please complete this survey by the 3rd of July.

If you wish not to be contacted again with regard to this research, please click the link below

[\\${l://OptOutLink?d=Click here to unsubscribe}](#)

With kind regards,

Maurice Smulders

### Appendix 3.3 – Questionnaire Reminder

Dear \${m://FirstName},

Recently we invited you to participate in a survey. We noticed that you have not yet responded or completed the survey. We know you have a lot of work, but when you get the chance please take a few minutes to fill out the survey. Thank you in advance!

**Please click on the link below to access the survey.**

[\\${l://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${l://SurveyURL}](#)

My name is Maurice Smulders, and I am currently completing my Master in Innovation Management & Entrepreneurship. I am fascinated by the activity and dynamics of the Spark platform and am currently performing my thesis on the efficiency of crowdsourcing platforms. The goal of the study is to find out what personal traits and contextual characteristics influence the stage of an idea in the ideation process. The aim is therefore, to enhance the experience and quality of the platform.

Roel de Vries and Sarah Kelly from the Spark team have connected me to you, since you have been an active participant of the platform. For this reason I would like to invite you to fill out a small survey (10 minutes).

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Please be assured that your responses will be kept anonymous and completely confidential.

In case you have any questions, please feel free to contact me on my email [m.c.r.smulders@student.utwente.nl](mailto:m.c.r.smulders@student.utwente.nl) or phone +31 (0) 6 13925144.

Your response is highly valued!

**Please click on the link below to access the survey.**

[\\${l://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${l://SurveyURL}](#)

If possible, please complete this survey by the 3rd of July.

If you wish not to be contacted again with regard to this research, please click the link below [\\${l://OptOutLink?d=Click here to unsubscribe}](#)

With kind regards,

Maurice Smulders



### **Appendix 3.4 – idea evaluation scheme adopted from ([I Blohm - 2011](#) )**

#### **Novelty**

1. The idea is novel
2. The idea is unique or at least uncommon
3. The idea is imaginative or surprising
4. The idea is revolutionary
5. The idea is radical
6. The idea is trendy

#### **Relevance**

1. The idea has a clearly described benefit
2. The idea enables the user to realize an attractive market potential
3. The idea enables the user to build Strategic Competitive Advantage

#### **Feasibility**

1. The idea is technically feasible
2. The idea is economically feasible
3. The idea fits the image of the initiator

#### **Elaboration**

1. The idea is precise, complete and exactly described
2. The idea is mature
3. The idea's utility is clearly described

### Appendix 3.5 - Overview of constructs on the individual level

#### OVERVIEW OF CONSTRUCTS INFLUENCING CREATIVITY ON AN INDIVIDUAL LEVEL

CONSTRUCTS	Dimension	Effect	Study
INDIVIDUAL DIFFERENCES: PERSONALITY	Openness to experience	+	Baer (2010); Baer & Oldham (2006); Madjar (2008); Raja & Johns (2010);
	Conscientiousness/ extraversion/ neuroticism/ agreeableness	0	Miron et al. (2004); Raja & Johns (2010)
	Proactive personality/ creative personality/ creative role identity	+	Farmer et al. (2003); Gong et al. (2012); Madjar et al. (2002); Tierney & Farmer (2011); Wang & Cheng (2010); Wu et al. (in press); Zhou (2003)
INDIVIDUAL DIFFERENCES: GOAL ORIENTATION	Learning orientation/ mastery orientation	+	Gong et al. (2009); Janssen & Van Yperen (2004)
INDIVIDUAL DIFFERENCES: VALUES	Growth need strength	+	Shalley et al. (2009)
	Conservation value/ congruence of values	+	Choi & Price (2005); Shin & Zhou (2003)
	Conformity value	-	Zhou et al. (2009)
INDIVIDUAL DIFFERENCES: THINKING STYLES	Need for cognition	+	Wu et al. (in press)
INDIVIDUAL DIFFERENCES: SELF-CONCEPTS	Systematic thinking style	-	Clegg et al. (2002)
	Self-esteem and self-monitoring/ (creative, role-breadth) self-efficacy	+	Axtell et al. (2006); Carmeli & Schaubroeck (2007); Clegg et al. (2002); Rank et al. (2009); Tierney & Farmer (2002, 2004, 2011)
	Regulatory focus: promotion	+	Zhou et al. (2012)
INDIVIDUAL DIFFERENCES: KNOWLEDGE	Regulatory focus: prevention	-	Zhou et al. (2012)
	Knowledge	+	Howell & Boies (2004); Krause (2004); Obstfeld (2005)
INDIVIDUAL DIFFERENCES: ABILITIES	Networking ability/ creative ability	+	Baer (2012); Choi et al. (2009)
INDIVIDUAL DIFFERENCES: PSYCHOLOGICAL STATES	Positive affect/ positive moods/ feelings of energy and vitality	+	Amabile et al. (2005); Atwater & Carmeli (2009); Binnewies & Wörnlein (2011); George & Zhou (2002, 2007); Kark & Carmeli (2009); Madjar et al. (2002); Madrid et al. (in press); Ng & Feldman (2009)

	Negative affect/ negative moods/ emotional ambivalence	mixed	Amabile et al. (2005); Bledow et al. (2013); Binnewies & Wörnlein (2011); Fong (2006); George & Zhou (2002, 2007); Madjar et al. (2002); Ng & Feldman (2009)
<b>INDIVIDUAL DIFFERENCES: MOTIVATION</b>	Intrinsic motivation/ expected positive performance outcomes		Eisenberger & Aselage (2009); Grant & Berry (2011); Mueller & Kamdar (2011); Shin & Zhou (2003); Yuan & Woodman (2010); Zhang & Bartol (2010a)
	Expected image risks	-	Yuan & Woodman (2010)
<b>INDIVIDUAL DIFFERENCES: OTHERS</b>	Strain/ psychological contract breach	-	Ng et al. (2010); Van Dyne et al. (2002)
	Trust	+	Clegg et al. (2002); Gong et al. (2012)
<b>TASK CONTEXTS: JOB COMPLEXITY</b>	Job complexity/ routinization	+	Baer et al. (2003); Farmer et al. (2003); Ohly et al. (2006); Shalley et al. (2009); Tierney & Farmer (2004)
<b>TASK CONTEXTS: GOALS &amp; JOB REQUIREMENTS</b>	Job required creativity/ innovativeness	+	Tierney & Farmer (2011); Unsworth & Clegg (2010); Unsworth et al. (2005); Yuan & Woodman (2010)
	Time pressure	mixed	Baer & Oldham (2006); Binnewies & Wörnlein (2011); Ohly et al. (2006); Ohly & Fritz (2010)
	Rewards	+	Baer et al. (2003); Eisenberger & Aselage (2009); George & Zhou (2002)
<b>SOCIAL CONTEXTS: LEADERSHIP &amp; SUPERVISION</b>	Transformational leadership	+	Bono & Judge (2003); Gong et al. (2009); Hirst et al. (2009b); Pietrese et al. (2010); Rank et al. (2009); Shin & Zhou (2003)
	Transactional leadership	-	Pietrese et al. (2010); Rank et al. (2009)
	Supervisory support/ supervisory empowerment behaviors/ supervisory benevolence	+	Janssen (2005); Madjar et al. (2002); Wang & Cheng (2010); Zhang & Bartol (2010a)
	Supervisory expectations for creativity/ supervisory developmental feedback and non-close monitoring	+	Carmeli & Schaubroeck (2007); Tierney & Farmer (2004); Zhou (2003)
	Influence-based leadership	mixed	Krause (2004)
<b>SOCIAL CONTEXTS: COWORKER INFLUENCES</b>	Coworker support/ creativity expectations by coworkers	+	Farmer et al. (2003); Madjar et al. (2002)
	Presence of creative coworkers	mixed	Madjar et al. (2011); Zhou (2003)
<b>SOCIAL CONTEXTS: CUSTOMER INFLUENCES</b>	Customer input/ customer affect-based trust	+	Madjar & Ortiz-Walters (2008)

<b>SOCIAL CONTEXTS: OTHER SOCIAL INFLUENCES</b>	Feedback	+	De Stobbeleir et al. (2011); George & Zhou (2007); Zhou (2003); Zhou (2008a)
	Evaluation / justice	mixed	George & Zhou (2007); Khazanchi & Masterson (2011); Yuan & Zhou (2008)
<b>SOCIAL CONEXTS: SOCIAL NETWORKS</b>	Social Network	mixed	Baer (2010); Obstfeld (2005); Perry-Smith (2006); Perry-Smith & Shalley (2003); Tortoriello & Krackhardt (2010); Zhou et al. (2009)
<b>OTHER RESEARCH</b>	Willingness to take risks/ career commitment/ resources for creativity/ organizational identification/ job involvement/ information privacy	+	Alge et al.(2006); Janssen (2003); Madjar et al. (2011)

### **Appendix 3.6 – Job Characteristics Measure (adapted from (J. R. Hackman & G. R. Oldham, 1980))**

#### **Task autonomy**

1. I have many opportunities for independent thought and actions in my job
2. I have many opportunities for to take the initiative in this job
3. I am encouraged to find solutions to problems
4. I have a great deal of control over the pace of my work

#### **Task variety**

1. I do many different things in this job
2. I perform different tasks during a typical workday
3. This job requires me to use a number of skills and talents

#### **Task identity**

1. I have many opportunities to complete the work I started
2. In this job I can see the entire piece of work
3. I have many opportunities to do a job from beginning to end (whole job)

#### **Task feedback**

1. I easily identify how well I am doing in the job I am working on
2. I can easily ascertain whether I am performing well or poorly in this job
3. I have many opportunities to find out how well I am doing in my job

### **Appendix 3.7 – Networking Ability (PSI) from (Ferris et al., 2005)**

1. I spend a lot of time and effort at work networking with others.
2. I have developed a large network of colleagues and associates at work who I can call on for support when I really need to get things done
3. I am good at building relationships with influential people at work.
4. At work, I know a lot of important people and am well connected.
5. I spend a lot of time at work developing connections with others.
6. I am good at using my connections and network to make things happen at work.

### **Appendix 3.8 – Proactive Personality Measure (adapted from (Bateman & Crant, 1993))**

1. I am constantly on the outlook for new ways to improve my life
2. I feel driven to make a difference in my community, and maybe in the world
3. I tend to let others take the initiative to start new projects\*
4. Wherever I have been, I have been a powerful force for constructive change
5. I enjoy facing and overcoming obstacles to my ideas
6. Nothing is more exciting than seeing my ideas turn into reality
7. If I see something I don't like, I fix it
8. No matter what the odds, if I believe in something I will make it happen
9. I love being a champion for my ideas, even against others' opposition
10. I excel at identifying opportunities
11. I am always looking for better ways to do things
12. If I believe in an idea, no obstacle will prevent me from making it happen
13. I love to challenge the status quo
14. When I have a problem, I tackle it head-on
15. I am great at turning problems into opportunities
16. I can spot a good opportunity long before others can
17. If I see someone in trouble, I help out in any way I can

\* reverse coded

## **Appendix 3.9 – Information sharing Measure**

*People in my organization (are) frequently .....*

### **Explicit knowledge sharing**

1. Share existing reports and official documents with members of my organization.
2. Share reports and official documents that they prepare by themselves with members of my organization.
3. collect reports and official documents from others in their work
4. Encouraged by knowledge sharing mechanisms.
5. Offered a variety of training and development programs
6. People in my organization are facilitated by IT systems invested for knowledge sharing.

### **Tacit knowledge sharing**

1. Share knowledge based on their experience.
2. Collect knowledge from others based on their experience.
3. Share knowledge of know-where or know-whom with others.
4. Collect knowledge of know-where or know-whom with others.
5. Share knowledge based on their expertise.
6. Collect knowledge from others based on their expertise.
7. Share lessons from past failures when they feel necessary.

## **Appendix 3.10 – Trust that heard (1) & Trust that Benefit (2)**

1. Do you believe your ideas and suggestions are taken seriously? (1)
2. Do you believe your ideas and suggestions are listened to? (1)
3. Do you believe you will take credit for any new ideas and suggestions? (1)
4. Do you think those managing change in your company have your interests at heart? (2)
5. Do you think that you share in the benefits of any changes that are made in your working environment? (2)

## **Appendix 3.11– Entrepreneurship Self-Efficacy Measure**

*How much confidence do you have in your ability to...*

### **Searching**

1. Brainstorm (come up with) a new idea for a product or service
2. Identify the need for a new product or service
3. Design a product or service that will satisfy customer needs and wants

### **Planning**

1. Estimate customer demand for a new product or service
2. Determine a competitive price for a new product or service
3. Estimate the amount of start-up funds and working capital needed
4. Design an effective marketing/advertising campaign for a new product or service

### **Marshalling**

1. Get others to identify with and believe in my vision and plans for a new business
2. Network, - i.e. make contact with and exchange information with others
3. Clearly and concisely explain verbally/ in writing my business idea in everyday terms

### **Implementing**

1. Supervise employees
2. Recruit and hire employees
3. Delegate tasks and responsibilities to employees in my business
4. Deal effectively with day-to-day problems and crises
5. Inspire, encourage, and motivate my employees
6. Train employees