

OPPORTUNITY IDENTIFICATION FOR SUSTAINABLE DEVELOPMENT IN SMALL AND MEDIUM- SIZED ENTERPRISES



MSC THESIS MANAGEMENT STUDIES

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ABSTRACT

The unprecedented rate of urbanization, climate change, environmental destruction, resource scarcity, exacerbated with exponential population growth, pose unknown challenges for humanity. The world calls for change agents, who are able to come up with ways to satisfy the needs of the present without compromising the survival of future generations. To achieve this target, humanity's environmental footprint needs to be reduced and for that major changes are needed in the global economy. Much of the responsibility is placed on the corporate sphere where small and medium- sized enterprises (SMEs) dominate. Employees of SMEs (intrapreneurs) are expected to fuel pattern-breaking change so that businesses can move towards a sustainable future. Entrepreneurship is viewed as a panacea for sustainability despite the fact that the underlying mechanisms of opportunity identification (OI), the very start for any change that is realised, are not yet fully understood. In order to contribute to this gap and unlock the variables impacting intrapreneurial identification of sustainable development opportunities we delve into the application of the Opportunity Identification Competence Assessment Test (OICAT) in Dutch and German SMEs. Specifically, we focus on the role of diversity (prior knowledge on the natural/ communal environment and entrepreneurship) both on individual and team level. We model the entrepreneurial journey in its entirety and establish an 'idea trail' that marries theory with vast empirical data. The final sample comprises of 985 business ideas by 212 intrapreneurs forming 48 teams. The study delivers a novel approach with the empirical 'idea trail'. It outlines possible avenues for further research with the aim to rationalize why no direct correlation is found between prior knowledge and the sustainability score of business ideas. In addition, practical implications are outlined for practitioners to empower change agents and enhance their OI competences for Sustainable Development (SD).

KEYWORDS: Sustainable Development, Sustainable Entrepreneurship, Intrapreneurship, Opportunity Identification Competence, Business Idea Generation, Business Idea Evaluation, Small and medium- sized enterprise, Team diversity, Prior knowledge

PREFACE

This work, ‘Opportunity Identification for Sustainable Development in Small and Medium- Sized Enterprises’, is the end-product of my thesis project for the Management Studies specialization of the Master programme, Urban Environmental Management. I have chosen the topic based on an inspiration by my supervisors Valentina Materia and Thomas Lans. Given my own entrepreneurial interest and edge I was eager to jump on board to study a fundamentally important, still somewhat neglected competence: opportunity identification.

During the work I have had the blessing to receive constant feedback from two chair groups. Valentina embodied the Management Studies and Thomas stood for the Education and Competence Development chair group. Despite the formal tone of this paper I will dare to call them a ‘Dynamic Duo’, as they have pushed me for the better and have always complemented each other’s strengths. Special thanks to Valentina, for her patience, support and giving me time and space to find my appropriate angle on the thesis. I am grateful to have had such a reliable and caring supervisor. Throughout the work she rooted me with her stability and analytical mastermind. Furthermore, I would like to acknowledge Thomas. His brightness and out-of-the-box thinking strikes me every time we meet. His fresh, creative energy was also essential during the months leading up to the final product. I would like to thank them both for not letting me take the easy way out.

I would also like to acknowledge Yvette Baggen for her ever-positive approach towards the continuation of her work. She responded to every question with a smile and a straightforward solution. In addition, I would like to thank Tom Tilleman for his support and supply of data that I could build on. Both of them have contributed greatly to letting me take the OICAT research forward.

After having conducted this study, I can happily say it has been the highlight of my master’s degree. The time spent with researching and analysing the matters at hand has greatly enabled me to unveil and dive into certain parts of my own entrepreneurial aspirations. Even though I have doubted Valentina and Thomas’ word on this period being ‘one of the best times of my life’...I can honestly say it has been and it has massively shaped me and my abilities for the better.

Last but surely not least, special appreciation for everybody that picks up this thesis and takes interest in reading my words. I hope you enjoy the ride!

Réka Gugán

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ABBREVIATIONS

SME	Small and Medium- Sized Enterprise
OICAT	Opportunity Identification Assessment Test
OI	Opportunity Identification
BIG	Business Idea Generation
BIE	Business Idea Evaluation
SD	Sustainable Development
CC	Climate Change
UN	United Nations

DISCLAIMER

This thesis was written by a MSc student of Wageningen University as part of her study Urban Environmental Management. The work is not an official publication of Wageningen University and the content within does not represent any formal position or representation of the institution.

1. INTRODUCTION

1.1. THEORETICAL BACKGROUND

Today's rapidly changing world calls for change agents. People with high entrepreneurial skills to tackle complex contemporary environmental challenges facing the ecosystem. The ever-increasing urgency is well depicted by the 'Earth Overshoot Day', 2 August 2017. This metaphorical day stands for the threshold when humanity has used more resources than the Earth can produce in one year (Network, 2017). This translates to the fact that, despite the confronting reality that we have only one to host us, in 2017 we have used resources equivalent to 1.7 planets. The threatening level of resource intensity and its consequences, such as greenhouse gas emissions, can offset irreversible changes and tipping points in our ecosystem. Climate Change (CC) is happening and has been declared as the single greatest challenge facing environmental regulators by the United Nations (UN) Secretary General (UNEP, 2017). UN General Assembly (2012, p.6) proclaims CC as *"a cross-cutting and persistent crisis, and [...] impacts of climate change affect all countries and undermine the ability of all countries, in particular, developing countries, to achieve sustainable development and the Millennium Development Goals¹, and threaten the viability and survival of nations"*. Along these lines, business as usual cannot be a prerogative for a sustainable future (Bocken, Short, Rana, & Evans, 2014).

The 'second wave of urbanisation', with more than half of the global population living in urban areas, UNEP (2012) brings about unknown challenges. Especially for the overpopulated urban areas of the planet. This wave brings about the prognosis of 3 billion additional people living in cities in 80 years. Bill and Melinda Gates (2016) state that the world's poorest will be hit the hardest, sinking them deeper into poverty. They stress that we need to get started now in order to make a change. Jansson, Nilsson, Modig, & Hed Vall (2017) report that in the debate of ecosystem degradation much responsibility is placed on businesses and that they are seen as key players on the path towards sustainability. Clear signs indicate that the corporate sector is increasingly realising the repercussions of their operations regarding sustainability (Jansson et al., 2017). Besides, more and more researchers from diverse disciplines are studying innovations with a clear environmental aim or angle (Van Den Bergh, Truffer, & Kallis, 2011).

CC is a complex challenge with long term, global consequences, which also makes it a controversial one. Nevertheless, on a global scale CC remains by nature a collective challenge due to the accumulation and dispersion of greenhouse gases. This indicates that only cooperative action can pave the way for overcoming the complex challenges we face (IPCC, 2014). A mix of technical, organizational, economic, institutional, socio- cultural and political changes will be needed for a solution (Van Den Bergh et al.,

¹ The Millennium Development Goals (MDG) are the predecessors of Sustainable Development Goals (SDG). SDG's built on the MDG's success, whilst incorporating new pressing matters such as climate change, innovation, etc. (UNDP, 2017). These goals aim to transform the world into a sustainable one (UN, 2016).

2011). In sum, we are in grave need of a transition that differs from any historical transition so far: it addresses persistent environmental problems (Geels, 2011). Geels (2011) stresses that sustainability transitions require the interactions between technology, policy/power/politics, economics/business/markets, and culture/discourse/public opinion. Against the background of the discussion above, the next paragraph zooms in on the fields from which cross-cutting interaction is expected of.

1.1.1. The need for change agents for Sustainable Development

The overarching goal for policy makers and businesses around the globe, Sustainable Development (SD) (Parris & Kates, 2003), depicts a developmental pathway where countries can reconcile their desires for economic prosperity, social welfare and environmental abundance. *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (World Commission on Environment and Development, 1987). Despite, the awareness of the need to value ecological systems and natural capital it is not yet a common practice to do so (Bocken et al., 2014). The fact that ecosystem services are not adequately quantified (they often come for free) in contrast to economic services and manufactured capital, might compromise the sustainability of humans (Costanza et al., 1997). This antagonism conceals the reality that all economies on planet Earth would crumble without the ecological life-support systems (Costanza et al., 1997). Hoekstra & Wiedmann (2014) report that major transformative changes are needed in the global economy to reduce humanity's environmental footprint to a sustainable level.

Jansson et al. (2017) underline that ecosystem degradation and social sustainability have become crucial issues in the corporate sphere during the last decades. Notwithstanding, research discussing corporate social responsibility and related concepts often focuses on larger companies neglecting small and medium- sized enterprises (SMEs). Reality suggests that SMEs, compared to larger firms, are lagging behind on commitment towards sustainability despite their vital role on the road towards SD (Jansson et al., 2017). The dominance of SMEs in the business arena leads to considerable impact on the environment. Figures between 60-70 % of total pollution levels have been presented so far (Jansson et al., 2017). For instance, SMEs represent 99% of all businesses in the European Union (European Commission, 2017). The pervallance of such businesses underlines considerable impact and potential in tackling contemporary environmental challenges.

Against the background of the discussion above, change is expected from SMEs. Hall et al. (2010) outline that entrepreneurship has been recognized as a major conduit for sustainability and as a panacea for social and environmental concerns. Along these lines, employees of SMEs are expected to transform or design the business landscape according to the guidelines of SD. Thus, act as intrapreneurs, i.e. individuals that exert entrepreneurial behaviour within existing firms in order to challenge the status-quo.

Intrapreneurs are employees who engage in ‘pattern-breaking’ change (Light, 2006) bottom-up, proactive work-related new business activities (Bosma, Stam, & Wennekers, 2012). They think outside the box, take charge, find solutions and take risks to a certain extent (Bosma et al., 2012). Intrapreneurship is a special type of entrepreneurship and is also part of the domain of employee behaviour (Bosma et al., 2012). Dean & McMullen (2007) outline that environmentally relevant market failures embody ample opportunities for achieving profitability while reducing environmentally harmful economic actions. Intrapreneurs in SMEs are challenged to do so. Consequently, the focus is on sustainable entrepreneurship while also tapping into social and environmental entrepreneurship: three distinct but related, sometimes overlapping scientific fields (Thompson, Kiefer, & York, 2011). Sustainable entrepreneurship is the leading theory, as it addresses not only the social or the environmental context, but the Triple Bottom Line, the core principle of Sustainable Development. Due to the fact that literature is emerging but still small (Patzelt & Shepherd, 2011) our study also utilizes findings from the field of social, environmental and mainstream entrepreneurship.

Intrapreneurs fuel change in the corporate sphere. According to Baggen (2017), Opportunity Identification (OI) is the starting point for any change that is realised in an entrepreneurial process. OI is a competence domain and is defined as: *“The ability of individuals to identify ideas for new products, processes, practices or services in response to a particular pain, problem or new market need”* (Baggen, 2017, p.29). Pinchot III (1987) calls intrapreneurs ‘dreamers who do’. Accordingly, Bosma et al. (2012) distinguish two phases of intrapreneurship: dreaming relates to phase one ‘vision and imagination’, whereas doing can be attributed to phase two ‘preparation and emerging exploitation’. Baggen (2017) breaks down OI into two components: business idea generation (BIG) and business idea evaluation (BIE). Through her tool, Opportunity Identification Competence Assessment Test (OICAT), she aims to assess these two competences. The two phases outlined by Baggen (2017) complement the classification of Bosma et al. (2012) building on Shane & Venkataraman (2000). BIG relates to ‘vision and imagination’ and BIE taps into ‘preparation and emerging exploitation’. McMullen & Dimov (2013) call entrepreneurship a multi-level creative process of information integration that starts with individuals but eventually requires multiple agents. The process being socially constructed is also recognized by Dutta & Crossan, (2005), who outline that individuals, groups and organizations are all involved.

Schjoedt & Kraus (2009) report that entrepreneurial teams have more human and social capital at their disposal compared to individuals. In modern economies, Entrepreneurial Teams (ETs) are ubiquitous and are seen as the major catalysts of new venture creation. Furthermore, their enterprises are more resilient and grow faster (Harper, 2008). ET prevalence is an emerging economic reality (Chowdhury, 2005) which comes with the recognition of their importance. ET performance is dependent on the external environment, team composition and processes (Schjoedt & Kraus, 2009). ET composition refers to the collective characteristics of its members. Along these lines, heterogeneous teams proved to perform better in situations that included novel problems, whereas homogenous teams were more

efficient in dealing with routine tasks (Schjoedt & Kraus, 2009). Baggen (2017), building on Foo et al. (2006) and Hmieleski & Ensley (2007), backs that team diversity can indeed impact team performance. In the context of this thesis, the understanding of team performance is restricted to the flexibility (i.e. measure of sustainability) of business ideas for SD, adopted from the work of Tilleman (2017).

The fact that CC is a collective challenge supports the call to utilize the resources and capital of entrepreneurial teams rather than only expecting individual intrapreneurs to make a difference. In line with the reasoning above, the ability of intrapreneurs to generate and evaluate business ideas for SD and the role of the team seems to be of importance when expecting change from ‘dreamers who do’ (Pinchot III, 1987).

1.2. PROBLEM STATEMENT

Entrepreneurship is being advocated as a panacea for many social and environmental concerns and is said to be significant conduit for fostering transition towards sustainability (Hall et al., 2010). Nevertheless, literature on SD within mainstream entrepreneurship remains to date meagre and the uncertainty surrounding the nature of entrepreneurship’s role in the field is apparent (Hall et al., 2010). According to Hall et al. (2010), entrepreneurs have long been seen as the vehicles to exploit new opportunities in regards of societal needs. In addition, Patzelt & Shepherd (2011) outline that scholars claim that entrepreneurial action can counteract CC, preserve ecosystems and diminish environmental degradation. Yet, the way *how* entrepreneurs are supposed to identify and develop sustainable development opportunities is only understood to a limited extent. Translating this to our context, the ability of SME employees (intrapreneurs) and teams to identify sustainable development opportunities is to date unexplained. As described above, Baggen (2017) states this ability comprises two distinct competences: BIG and BIE. Both are necessary for new value creation. Therefore, organisations need employees that are able to generate business ideas and also ones that are able to evaluate them. Individual intrapreneurs can possess one or both of these competences (Baggen, 2017). Patzelt & Shepherd (2011) propose that prior knowledge of problems in the natural and communal environment, perception of threat and altruism towards others are important antecedents in the recognition for opportunities that sustain the environment. In addition, literature suggests there is a positive relationship between entrepreneurial knowledge and opportunity recognition (Patzelt & Shepherd, 2011).

Baggen (2017) suggests that bringing the BIG and BIE competences together, i.e. creating teams, could be one solution for the successful identification of opportunities. The emerging importance of entrepreneurial teams is also pointed out by Harper (2008), stating that ETs are omnipresent. ETs have more human and social capital at their disposal compared to individuals (Schjoedt & Kraus, 2009). In order to address the emerging reality of ETs on opportunity identification, it would be beneficial to investigate the role of the team when business ideas for SD move one step further in the entrepreneurial journey. Previous studies on OI (i.e. business idea generation and evaluation) suggest that teams indeed

may add value to the entrepreneurial journey. Especially in the phase where ideas are being evaluated and shaped for further exploitation (Baggen, 2017). Nonetheless, the exact role of teams in the context of sustainable opportunity identification and the impact of teams' composition remains an area in which research is clearly needed.

Gaining a better understanding of the two competences (BIG, BIE) of individuals and ETs to identify business opportunities for SD in SMEs could substantially accelerate innovative processes within corporate settings. This in turn, could speed up to the global economy's journey on the pathway towards Sustainable Development. Nonetheless, it remains unexplained how these competences relate specifically to SD. In order to contribute to this knowledge gap we introduce an 'idea trail' approach which allows us to study OI holistically. By tying BIG and BIE together, we observe in a "simulated environment" how ideas move from the individual to the team level, while keeping SD in the forefront.

1.3. AIM OF RESEARCH

The aim of this study is to investigate OI for Sustainable Development, specifically focusing on diversity and teams in the context of SMEs. We approach OI for SD as a ‘trail of sustainable business ideas’. A trail that maps the entrepreneurial journey for SD in its entirety, from individual to the team level, i.e. a ‘holistic sequence of events’, as put by McMullen & Dimov (2013). We aim to break down the OI process in different stages and establish an idea trail. Firstly, we explore the competence of employees to generate business ideas for SD, i.e. BIG by monitoring the degree of sustainability within the initial pool of ideas. Consequently, we investigate what happens to these ideas when they move from the individual to the team level. Specifically, the study researches how individuals and teams rank self-generated business ideas about SD. Hence, the focus here is on the second component of OI, which is business idea evaluation. Baggen (2017) building on Foo et al. (2006) and Hmieleski & Ensley (2007), stresses that team diversity can impact team performance and with that, also business idea generation and evaluation for SD. Building on Patzelt & Shepherd (2011), prior intrapreneurial knowledge on the natural/ communal environment and entrepreneurship are possible antecedents for the sustainability measures of the ideas. Thus, the relations between team diversity (i.e. prior knowledge on natural/ communal environment and prior knowledge on entrepreneurship) and BIG and BIE for SD are further researched and elaborated on. Moreover, the goal is to contribute to the existing body of literature. We aim to address some of the research gaps, pave the way for future research and provide practical suggestions for SMEs. The main and sub research questions (RQs) are outlined below.

1.3.1. Research Questions

1. What is the degree of sustainability of the business ideas that are generated by SME employees?
 - Can differences between the BIG competence of employees be explained by prior knowledge on the natural/communal environment or prior knowledge on entrepreneurship?
2. How does the sustainability score of the self-generated business ideas change throughout the idea trail?
 - What is the final degree of sustainability of business ideas that move from the individual to the group level and “survive” initial group evaluation (BIE)?
 - Can differences between the sustainability score of the idea trail stages be explained by prior knowledge on the natural/communal environment or prior knowledge on entrepreneurship?

1.4. RESEARCH FRAMEWORK

Figure 1 depicts the phases of this particular study in a step-wise manner. The framework represents a schematic overview of the steps that needed to be taken in order to complete this study. The colours help to distinguish different theoretical and empirical phases throughout the research. The arrows on top indicate the flow of the work and the arrows on the bottom signal the recurring considerations of new information.

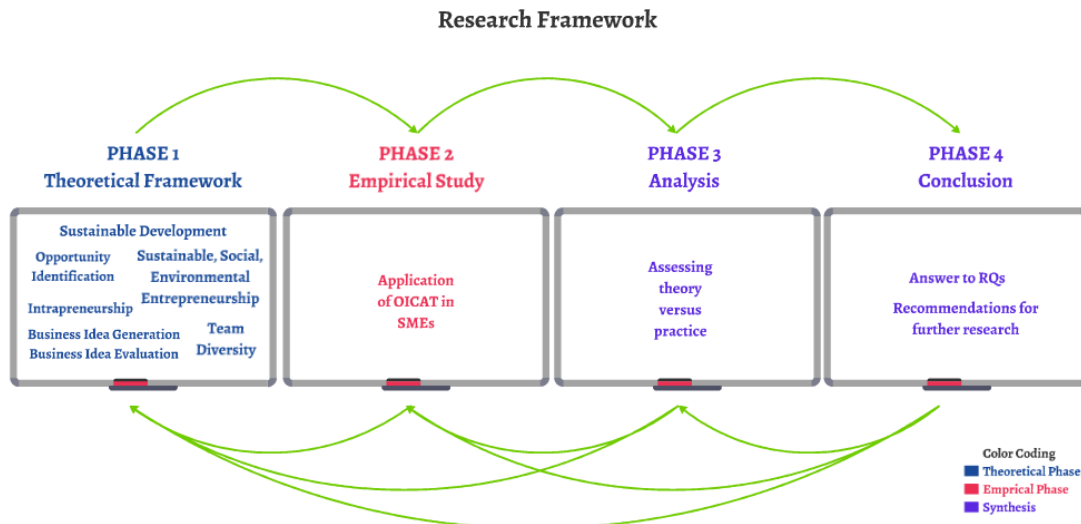


Figure 1: Research Framework (Own work)

1.4.1. Phase 1: Theoretical Framework

The theories surrounding the topic of Opportunity Identification for Sustainable Development serve as the foundation of this research. In this phase respective theories are looked at closely. Scientific literature is consulted on sustainability and the competence of employees to generate and evaluate business ideas for SD. Due to their aforementioned relevance, other specific types of entrepreneurship literature are reviewed besides sustainable entrepreneurship: social, environmental and mainstream entrepreneurship literature. In addition, aspects of team diversity (i.e. prior knowledge) in relation to ET performance on sustainability are also elaborated on. All this knowledge forms a solid foundation for further evolution of this study.

1.4.2. Phase 2: Empirical Study

In the empirical study, theory is tested by applying the OICAT in a business setting, namely in SMEs. The quantitative data is a representation of the actual state of affairs, which requires our deep understanding, i.e. a detailed analysis.

1.4.3. Phase 3: Analysis

In the third phase of the study, theory versus practice is further investigated. Results from the empirical study are analysed and elaborated on. Econometric models and statistical software are of help next to the literature that forms the foundation for the research.

1.4.4. Phase 4: Conclusion

In the last phase of the research, the answers to the research questions are summarized and recommendations for future research are drawn. Where possible research gaps are addressed.

Systems- thinking and circularity was adopted in the whole approach to this research. Systems- thinking relates to the holistic approach towards the entrepreneurial journey and circularity symbolises the implications of all findings; new information for the whole research. Figure 2 ‘Roots to Rise’, Research Tree is added to help visualize the circular logic behind the research framework. When this particular research is completed the conclusions and recommendations will hopefully contribute to the foundation of another study. The leaves fall on the ground and the organic matter gets absorbed by the soil. The soil then provides a nutrient rich environment where roots can evolve organically. Thus, continuing the circle of life and future studies on OI for SD.

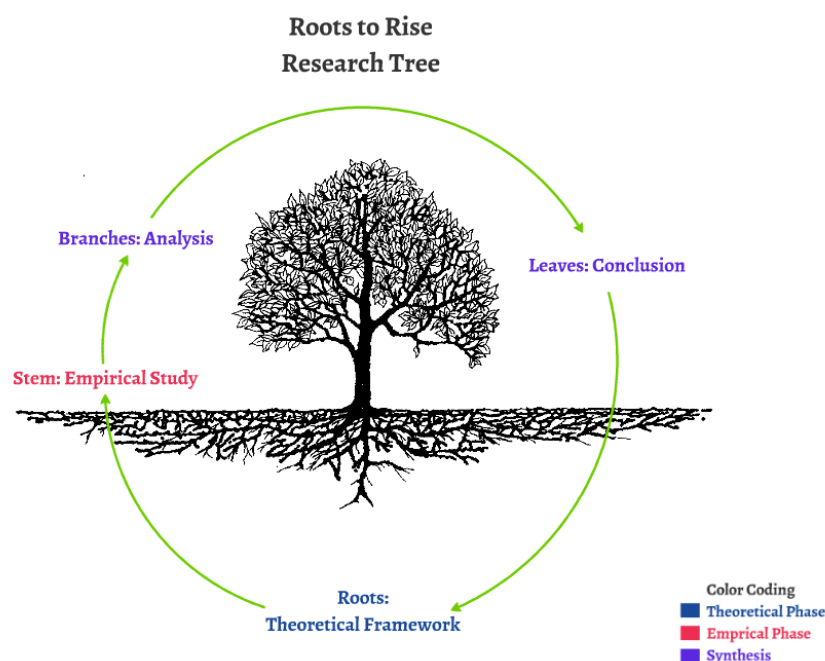


Figure 2: ‘Roots to Rise’, Research Tree (Own work)

2. LITERATURE REVIEW

2.1. THE ENTREPRENEURIAL JOURNEY

The aforementioned, systems- thinking underlines our approach towards the process of opportunities. This is embodied by our study's foundation on recent work of Vogel (2016) also adapted by Baggen (2017). We aim to get a better understanding of the entrepreneurial journey in regard to opportunity identification for Sustainable Development. Vogel (2016) takes insights from literature on opportunities, creativity and innovation management and proposes a new framework that allows tracing new ventures from first insight to exploitation.

2.1.1. Ideas vs. Opportunities & Assessment Method

It is of paramount importance to disentangle the concept of ideas and opportunities when delving into the entrepreneurial journey. Opportunities come into existence as the outcome of a dynamic and complex process involving ideas. In this process ideas are generated, elaborated upon, adapted, refined and they might even get abandoned (Baggen, 2017; Dimov, 2007; Vogel, 2016; Wood & McKinley, 2010). Thus, ideas can be seen as stepping-stones towards opportunities. Along these lines, business idea generation and business idea evaluation together stand for opportunity objectification, also named as opportunity identification (Baggen, 2017). These two distinct but related competences can be measured by the Opportunity Identification Assessment Test, an assessment method developed by Baggen (2017) on which we build on in this study.

Baggen (2017) describes how the OICAT tasks regarding business idea generation and evaluation relate to the stages of Vogel's (2016) framework. BIG, OICAT Task 1, where participants are asked to generate business ideas for SD relate to the 'intentional idea generation' path of the 'venture idea generation' stage in Vogel's framework (2016). Even though Vogel (2016) doesn't explicitly address BIE, the OICAT's task regarding this competence can be placed between the 'idea generation' and 'incubation' sub-stage. Figure 3 depicts the relevant stages. By the time of incubation, ideas have already been objectified into opportunities. At this point, we are no longer speaking of a 'venture idea', but a defined concept, which is like an initial business model (Baggen, 2017; Vogel, 2016). When the venture concept is formed the framework continues with 'opportunity evaluation' and 'exploitation'. As there is a difference between ideas and opportunities, there is also a clear distinction between the evaluation of ideas and that of opportunities. Baggen (2017) outlines that business idea evaluation has to do with third-person beliefs and opportunity evaluation refers to first-person beliefs. This translates, in OICAT Task 2, participants are asked to evaluate SD business ideas for a hypothetical other person, whereas opportunity evaluation would refer to evaluating for themselves or the organizations they work for.

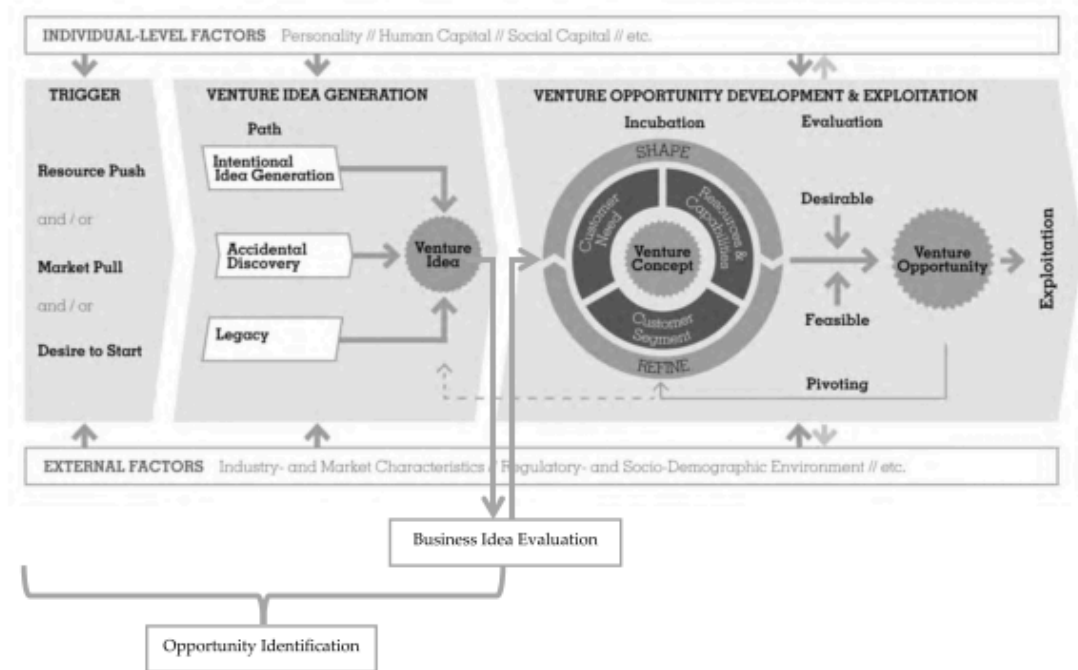


Figure 3: The framework of Vogel (2016) adapted by Baggen (2017, p.109)

2.1.2. Opportunity Identification Funnel

Just as well as in Baggen's work (2017), the conceptual framework of Vogel (2016) serves as a point of departure and orientation. It helps in showing how results can be placed in the context of the opportunity process from a holistic viewpoint. Given the aim of establishing an 'idea trail', further adaption of this conceptual framework was deemed necessary, see figure 4. Our conceptual model builds on Baggen's adaption (2017) of Vogel's framework (2016) and adds insights from Stevens & Burley (2003). The Opportunity Identification Funnel depicts the OICAT tasks in light of the whole entrepreneurial journey while mimicking the shape and essence of the 'universal industrial success curve' of business ideas by Stevens & Burley (2003, p.17).

The OI Funnel depicts the entrepreneurial journey in the shape of a funnel in which the different stages, variables, trends are indicated between two axes. The vertical axis stands for the number of ideas, whereas the horizontal signals the passing of time. The funnel contains a pool of business ideas for SD, these are depicted as bubbles in the pool. They differ in quality and quantity, which is signaled by their size and color. The ideas move through different stages of the entrepreneurial journey, these stages are outlined with purple on the horizontal axis: 'trigger', 'venture idea generation', and 'venture opportunity development and exploitation'. The process of opportunity identification taps into the 'venture idea generation' phase of Vogel's conceptual model (2016) and the related OICAT tasks (BIG, BIE) are outlined in red brackets within this phase. According to Vogel (2016) individual-level factors and external factors impact all mentioned stages. Individual-level factors are variables in personality, human and social capital, whereas external factors encompass differences in industry, market characteristics,

regulatory and the socio-democratic environment (Vogel, 2016). These variables are shown on the side of the funnel as two blocks with the color blue. As seen in figure 4 with time, the funnel narrows, thus the number of ideas gets filtered. At the stage of incubation (sub-stage of venture opportunity development and exploitation) there is one selected idea that is ready to be transformed into an opportunity. Our conceptualization of the entrepreneurial journey in the shape of the Opportunity Identification Funnel, i.e. figure 4 will be re-visited throughout our study and will guide the elaboration. Our conceptual model illustrates the OI process for each group. This translates, the last idea (red bubble) at the end of the funnel stands for the best idea for a specific group.

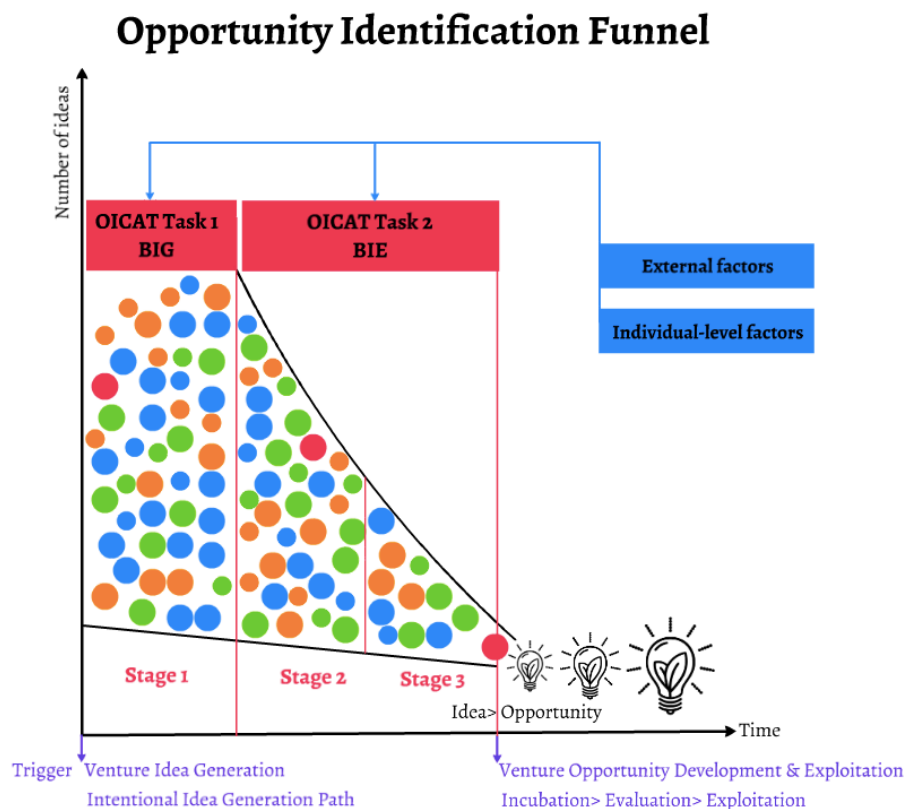


Figure 4: Opportunity Identification Funnel (Own work)

The proposed model is in line with the proposition of McMullen & Dimov (2013), i.e. to shift from entrepreneurship as an act to entrepreneurship as a journey. In line with their proposition, the model attempts to view variables and events in light of a holistic process, that is entrepreneurship. In this research, the process and the entrepreneurial journey perspective is applied to the context of OI and the two terms are therefor used interchangeably. McMullen & Dimov (2013) stress that prior work has tended to factor time out of the equation when studying entrepreneurship as an act. Figure 4 tends to McMullen & Dimov's (2013) view on entrepreneurship as a journey that transpires over time.

2.2. CONTEXT – SUSTAINABLE DEVELOPMENT

Sustainable Development is utilized as a developmental pathway and the ultimate goal in our study. We acknowledge the term's ambiguities, conflicts, oxymoron-like character and debated nature, as outlined by Parris & Kates (2003). Diving deeply into the term is out of the scope of this research. Rather, we focus on its link with entrepreneurship. As argued previously, scholars see entrepreneurial action as a panacea to counteract climate change (Patzelt & Shepherd, 2011). This notion brings us to the focal point of this thesis: Sustainable Entrepreneurship, a concept that specifically addresses the Triple Bottom Line. This translates, the same amount of attention is given to economic, social and environmental gains. Patzelt & Shepherd (2011, p. 632) define Sustainable Entrepreneurship in the following way: “[...] *the discovery, creation and exploitation of opportunities to create future goods and services that sustain the natural and/or communal environment and provide development gain for others.*” The definition builds on the three pillars of SD: Economy, Environment, Society.

2.2.1. Economic Gains

In terms of the economy, sustainable entrepreneurship creates economic gain in the form of, for example: employment, consumption or economic wealth. These are all factors that improve the socioeconomic status of people and lead to psychological and physical health (Patzelt & Shepherd, 2011).

2.2.2. Environmental Gains

Environmental gains are for instance, diminished air pollution, decreased deforestation, increased quality of drinking water. These gains relate to the improvement of conditions in the natural environment that can threaten the mental and physical health of communities living in societies around depleted resources (Patzelt & Shepherd, 2011).

2.2.3. Social Gains

Last, but not least social gains denote all positive impacts on society, e.g. increased child survival, life expectancy, education, equality, etc. These are gains that improve the well-being, security and ties of communities (Patzelt & Shepherd, 2011).

2.3. SUSTAINABLE DEVELOPMENT OPPORTUNITIES

Dean & McMullen (2007) report that through addressing environmentally relevant market failures it is possible to achieve profitability while reducing environmentally degrading economic behaviors. According to Pastakia (1998), one of the major failures of the market has been the inability to deal with negative environmental externalities. Sustainable entrepreneurship is all about seizing environmentally relevant market failures in an inherent pool of opportunities (Dean & McMullen, 2007). In this study we build on Baggen's (2017) elaboration and acknowledge the two approaches towards Opportunity Identification: subjective and objective. In line with the objective approach we assume that sustainable

development opportunities, i.e. “opportunities that sustain the natural and/or communal environment as well as provide development gain for others.” (Patzelt & Shepherd, 2011, p.632) exist in the economic environment as objective entities awaiting change makers to identify them. Given the focus of this study, the objective approach seems to relate, due to the fact that it gives space to identify factors (such as prior knowledge) that characterize the identification and exploitation of opportunities as outlined by Baggen (2017). Furthermore, she states that Opportunity Identification is the starting point for any change that is realised in an entrepreneurial process. Hence, we turn to the two competences required to recognise sustainable development opportunities: business idea generation and business idea evaluation.

2.4. COMPETENCES & TASKS: BIG & BIE

2.4.1. Competence of Business Idea Generation

Tilleman (2017) summarizes the conceptual problems with respect to analyzing the differences in the quality of business ideas, i.e. differences in the competence of idea generation. Attempts so far have fallen short on specifically addressing the idea generation phase of the OI process and have also been subject to retrospective and recall biases. According to Tilleman (2017), we are in need of a method that can take both the quantity and quality of business ideas into account when looking at one’s ability to generate business ideas. In this thesis we adapt Tilleman's (2017) approach, in line with Baggen (2017), which builds on the notion that the quality of a business idea is subject to one’s creativity. Baggen (2017) assesses one’s creativity based on three factors: ‘comprehensibility’, ‘concreteness’ and ‘flexibility’. Comprehensibility refers to the degree to which the idea can be understood in the context of the question. Concreteness is a score about how well the idea can be visualized or applied. Last, but not least the flexibility score signals to what degree participants generated ideas in different categories based on examples of Sustainable Development. It can be deducted that business ideas will differ in terms of their quality in regard of sustainability. Thus, there will be differences in how much gain these ideas can create for the environment, society and economy.

2.4.2. Competence of Business Idea Evaluation

In order to explore entrepreneurs’ competences of BIE we need to turn to the cognitive frameworks they use to evaluate business ideas’ potential success. Cognitive frameworks are the outcome of experiences in OI that help individuals and teams to recognize the ideas that are of good quality (Baggen, 2017). West III (2007) makes a clear distinction between individual and group cognition and states that team cognition is more than just a collection of individual perspectives. Team cognition comes into being by an interplay of the individual cognition of each team member and the team’s process behaviors (de Mol, Khapova, & Elfring, 2015). Baggen's (2017) results prove that the cognitive OI frameworks of teams differ significantly from those of individual employees. That is, the cognitive OI framework of teams corresponds more closely to the cognitive OI framework of an independent

entrepreneur. This translates, the team is indeed more than a sum of individual cognitions. Cognitive diversity is understood as differences in beliefs and preferences among team members. The result of such diversity can impact how a group interprets and formulates problems, issues (West III, 2007). Baggen's (2017) findings stress the positive impact of involving teams already in the early stages of the OI processes.

2.5. VARIABLES

Building on McMullen & Dimov (2013), entrepreneurship is a complex and messy, disruptive journey that transpires over time. Vogel (2016) states that two entrepreneurs are likely to evaluate the same venture concept differently with all factors being the same, and another entrepreneur evaluating it differently with different circumstances and contexts. The entrepreneurial process is deeply embedded in the social and environmental context of the entrepreneur. Thus, individual-level factors and external factors are fundamental in explaining differences between entrepreneurs' competences in BIG and BIE.

Vogel's (2016) framework enables a 'process' understanding of the entrepreneurial journey by distinguishing various concepts and factors. At the same time, it triggers intriguing questions for research on ideas and opportunities. Vogel (2016) delineates possible avenues for further research by linking individual-level factors with venture idea generation and venture opportunity development. Specifically, by raising the questions: *"How does prior experience (industry experience, startup experience, or breadth of functional knowledge) influence the path of venture idea generation and the type of venture ideas being generated?"* and *"How does prior experience (e.g., industry experience, startup experience, or breadth of functional knowledge) influence the incubation and evaluation process (in time and complexity)?"* (Vogel, 2016, p.19). Our research is rolled out in line with the suggestions above. It adds on existing literature by studying how prior knowledge impacts the generation and evaluation of sustainable development opportunities.

2.5.1. External factors

External factors denote all factors that are external to an entrepreneur. These can stem from industry, market characteristics, regulatory and socio-democratic environment (Vogel, 2016). All entrepreneurs operate in a system where, according to the objective approach, sustainable development opportunities occur. These systems have a continuous impact on the entrepreneurial journey and with that, on the OI process (Vogel, 2016). Shalley & Gilson's (2004) review distinguishes social and contextual factors that can foster or hinder creativity at the work place. Their classification about contextual factors includes job-level factors (e.g. job characteristics), team or work group factors (e.g. group composition) and organizational-level factors (e.g. organizational climate).

McMullen & Shepherd (2006) reflect nevertheless, that the two dominating approaches in literature: individual-level approach and system-approach are conceptually overlapping and therefor

complementary. As there is no market independent of the actors who create it and drive it. Along these lines, the boundary between individual-level factors and external factors is not stringent.

2.5.2. Individual-level factors

Personal factors encompass all factors that are internal to an entrepreneur, e.g. human capital, cognitive style, etc. These factors relate both to single founders, as well as founding teams (Vogel, 2016). Shalley & Gilson (2004) report that the creativity of an individual is a construct of personality traits, cognitive style and ability, motivation, relevant task domain expertise and social contextual influences. Personal factors include all characteristics that make an individual the way he or she is. These are the factors that make teams diverse. Team diversity is described as “*differences between individuals on any attribute that may lead to the perception that another person is different from self*” (van Knippenberg et al., 2004, p.1008). Aspects of diversity include for example educational level, background, gender, age, prior knowledge, personality traits, skills, competences, etc. Due to the limited scope of this research, team diversity is restricted to prior knowledge on the natural/communal environment and prior knowledge on entrepreneurship.

Patzelt & Shepherd (2011) explain the variance in the ability to recognize third-person sustainable development opportunities based on different input factors. Figure 5 suggests that an individual is more likely to recognize SD opportunities when prior knowledge on the natural/ communal environment, motivation for personal gains and motivation for creating gains for others is higher. All three relations are further strengthened with prior entrepreneurial knowledge. Due to the aim of this study (i.e. to explain differences in the degree of sustainability of ideas across employees by prior knowledge on the natural/communal environment and prior knowledge on entrepreneurship) we zoom into the highlighted parts of the conceptual model introduced by Patzelt & Shepherd (2011). See figure 5.

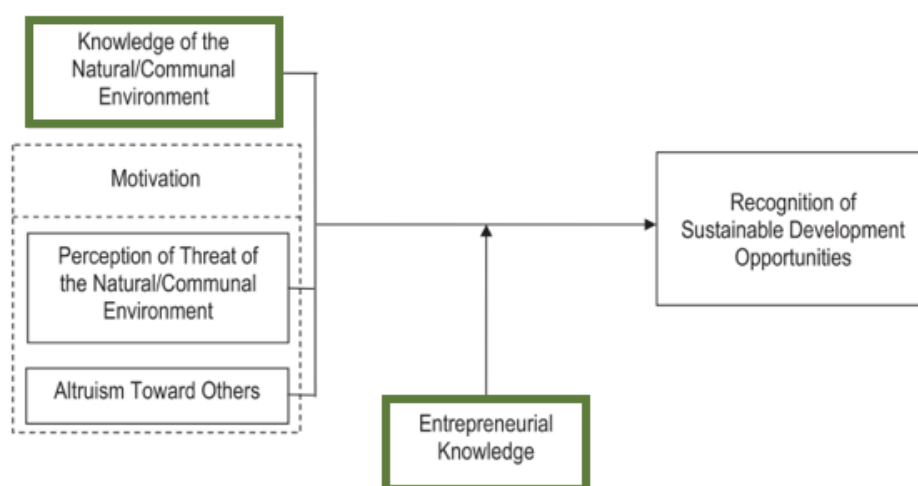


Figure 5: Model of Recognition of Sustainable Development Opportunities
 (Patzelt & Shepherd, 2011, p.634)

2.5.2.1. Prior knowledge on the natural/ communal environment

Patzelt & Shepherd (2011) denote ‘natural environment’ as the source of resources and services for the life support of humans and the ‘communal environment’ as the communities where people live in. Both concepts are central to SD. Patzelt & Shepherd (2011) propose, the greater the entrepreneurs’ knowledge in this domain, the greater the likelihood will be to recognize opportunities for SD.

2.5.2.2. Prior knowledge on entrepreneurship

Scott (2000) outlines three major dimensions of prior entrepreneurial knowledge that are crucial for entrepreneurial discovery: prior knowledge of markets, prior knowledge of ways to serve markets, and prior knowledge of customer problems. Patzelt & Shepherd (2011) adopt the approach in their model. They propose that the positive relationship between prior knowledge on the natural/ communal environment and the likelihood to recognize sustainable development opportunities increases with greater prior knowledge on entrepreneurship.

Baron & Ensley (2006, p.1331) suggest, *“new business opportunities are identified when entrepreneurs, using relevant cognitive frameworks, “connect the dots” between seemingly unrelated events or trends and then detect patterns in these connections suggestive of new products or services.”* Patzelt & Shepherd (2011) translate this into the context of SD and suggest that the identification of sustainable development opportunities demand entrepreneurs to connect their prior knowledge on the natural or communal environment with their prior knowledge on markets, how to serve these and how to solve customer problems. When this happens, change makers successfully identify sustainable development opportunities.

2.6. OUTPUT - QUALITY OF BUSINESS IDEAS

The quality of business ideas can be defined and perceived in multiple ways. Given the focus of this research, quality here refers strictly to the ‘sustainability’ indicator of the idea. This is a score that aims to assess how much gain ideas generate for all three pillars of sustainability: the economic, the environmental and the social. This is the ‘flexibility’ score, adopted from the work of Tilleman (2017), where every idea was assigned a unique score based on the archetypes developed by Bocken et al. (2014).

2.7. PROCESS - ‘IDEA TRAIL’

Alongside the recent focus on entrepreneurship as a process rather than an act, such as Vogel's work (2016) on the entrepreneurial journey, Perry-Smith & Mannucci (2017) applied a similar holistic perspective to the evolution of ideas. In their work, they distinguish different phases of the idea journey: generation, elaboration, championing and implementation.

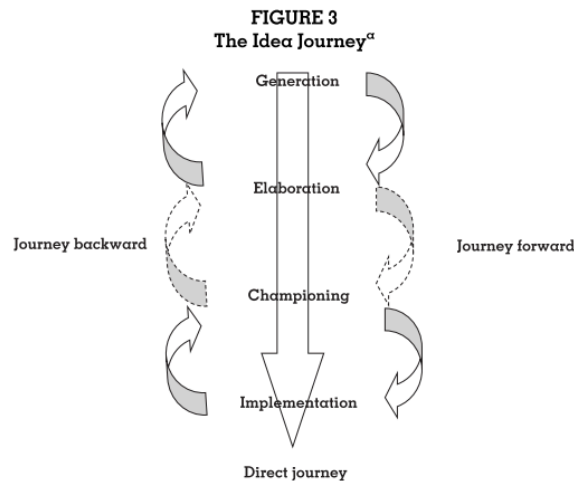


Figure 6: The Idea Journey (Perry-Smith & Mannucci, 2017, p.66)

The creators of ideas have different needs in different stages of the idea journey. These needs are by-products of resources that are accessed through social networks. The first phase, idea generation: the process of generating novel and useful ideas is specifically relevant to our assessment of the OICAT's application in SMEs. The outcome of this phase is a core concept of an idea. In the phases of elaboration, championing and implementation the idea gets further elaborated on, developed and eventually the outcome of the idea journey is a detailed blueprint or a finished product (Perry-Smith & Mannucci, 2017). In our research, we tap into the first stage of the idea journey, i.e. idea generation. Perry-Smith & Mannucci (2017) state that cognitive flexibility is the primary need in the idea generation phase of the idea journey. Cognitive flexibility is the ability to shift schemas and cognitive categories, such as making links between distinct topics and connecting dots. This proposition aligns well with our focus on the flexibility score from Tilleman's work (2017).

Once the flexibility score is assigned to each idea there is a possibility to track and trace these ideas through the Opportunity Identification Funnel, i.e. during the different tasks participants were asked to complete during the SME application of the OICAT. Figure 7 gives visual aid in comprehending how this 'idea trail' is envisioned. Similar to Perry-Smith & Mannucci (2017), we anchor on the ideas and study them through the different stages of the entrepreneurial journey. By assigning a flexibility score to each idea, we have the ability to track and trace their survival throughout the process of OI. This is shown in figure 7, with black connectors of various ideas. Some ideas get abandoned (they don't get through the top selection of OICAT's participants) and don't enter stage 2 and 3. Other ideas may however survive all stages and end up in the top selection.

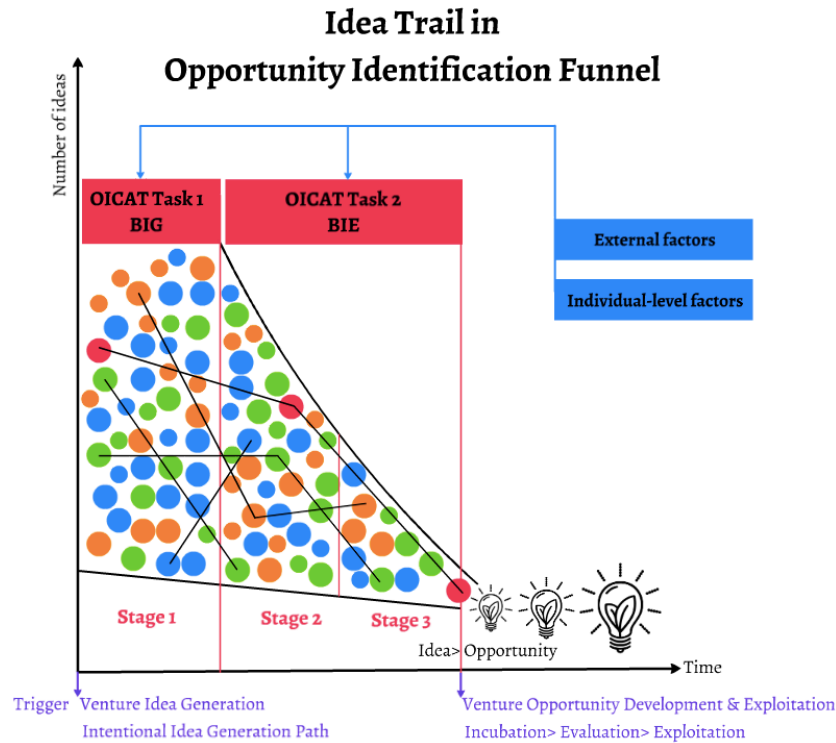


Figure 7: Idea Trail (Own work)

2.8. CHANGE AGENTS

As Dean & McMullen (2007) report sustainable development opportunities that derive from market failures are inherent in our societies. Due to increased environmental degradation, population growth, etc. the call for change agents to seize these opportunities is perhaps more pressing than ever. Furthermore, entrepreneurship is seen as a lifeline for addressing social and environmental problems (Hall et al., 2010). Eklington (2008) reports that an exciting new age of social intrapreneurship has begun. Passionate change makers are combining business pragmatism and visionary agendas and making positive impact to businesses and for the world (Eklington, 2008). In our study, we aim to explore the competences of these change agents from SMEs in making the world more sustainable.

Entrepreneurship is a multi-level creative process that involves multiple agents. It starts with individuals, but eventually involves several agents, who must immerse in social negotiations (McMullen & Dimov, 2013). Light (2006) also supports that social entrepreneurship does not have to start with individual commitment. It can also originate from groups, teams, organizations, networks and communities. The crucial part is the union with the aim of a pattern-breaking change.

Light (2006) urges research to address knowledge gaps in the field so that entrepreneurs can flourish and answer the greatest calling of our time. We identify the understanding of the exact role of individuals and teams in the entrepreneurial journey as one of the apparent ambiguities in the field. Specifically, how change agents relate to the survival of business ideas for SD.

2.8.1. Individuals

Substantial work is done by researchers to explore the depths of the individual visionary. Kiefer & York (2011) state that sustainable entrepreneurs are individuals who holistically combine the Triple Bottom Line into their organizations. Vogel's (2016) framework acknowledges that both individuals and teams can be part of different phases of the entrepreneurial journey that transpires over time. Figure 8 shows that individuals worked alone during Task 1, i.e. business idea generation for SD. In addition, they all selected their top two business ideas (in the first part of Task 2) for the highest potential for the group ranking to come. Individuals are the sole actors of stage 1 and 2 in the Opportunity Identification Funnel.

2.8.2. Teams

The notion that creativity is a social process has increasingly gained more prominence in the scientific field (Perry-Smith & Mannucci, 2017). Light (2006) stresses the problem with only looking at the sole visionary: it ignores to recognize and support thousands of other individuals, groups, organizations that contribute to the outcome of the entrepreneurial journey. Building on McMullen & Dimov (2013) and Dutta & Crossan (2005), there are indeed multiple agents involved in the identification of sustainable development opportunities. Participants worked in teams on the evaluation of business ideas for SD in the second part of the OICAT's Task 2, which corresponds with stage 3 in figure 8.

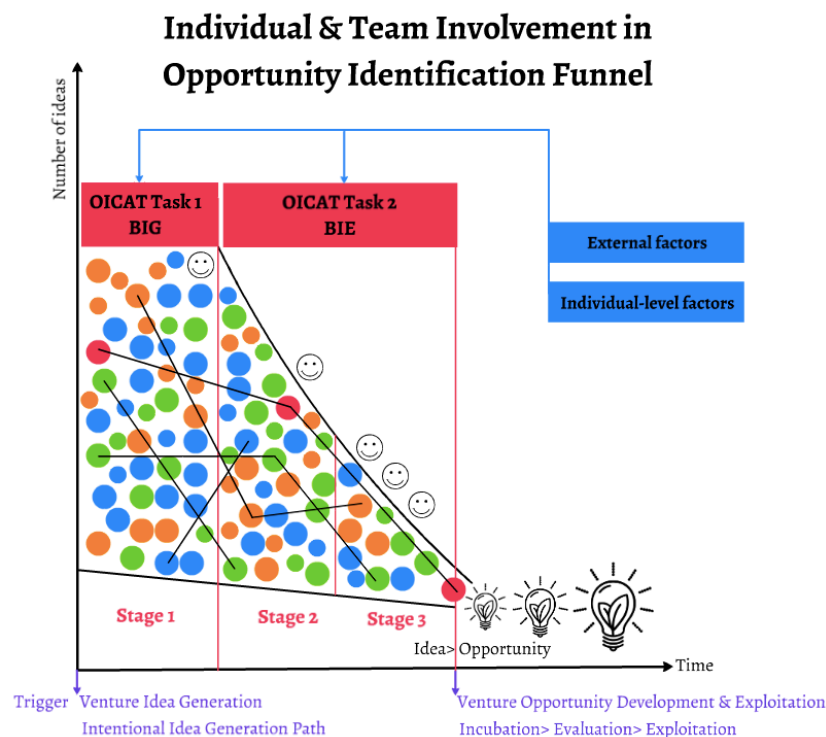


Figure 8: Individual and team involvement throughout the entrepreneurial journey (Own work)

Thus, during our journey through the Opportunity Identification Funnel we study venture idea generation on individual (stage 1) and business idea evaluation on individual (stage 2) and team level

(stage 3). As seen in figure 8, OICAT Task 1, and the first part of OICAT Task 2 are completed on the level of the individual idea creator and the second part of Task 2 is performed by teams. During our analysis the focus is on the sustainability of the ideas (flexibility score), nevertheless the prior knowledge of individuals and groups are also variables that are of explicit interest.

3. METHODS

3.1. RESEARCH DESIGN

In the following a procedural plan is presented about the study. The aim of this blueprint is to conceptualize an operational plan to complete the study and to ensure that processes are fit to obtain valid, objective and accurate answers to the research questions. The study strives to explore an area where little is known and to explain the relationship between OI for SD and team diversity.

The study is based on a cross- sectional design and a mixed- method approach. The mode of enquiry is both qualitative and quantitative. The units of analysis are the business ideas for SD. The research kicks off with a literature study where secondary sources help to gain a deeper understanding about OI for SD. Consecutively, theory is tested in a business setting where the tasks of the OICAT, developed by Baggen (2017), are applied. In this phase, the qualitative and quantitative data collected by Baggen (2017) is analysed. Lists of self- generated business ideas, idea rankings based on potential business success, self-assessments and background information are the cornerstones of this data. Our study specifically focuses on how ideas about SD move from the individual to the group level. When analysing the data, the aim is to establish an ‘ideal trail’. Thereafter this trail is put under scrutiny in relation to team diversity. Finally, conclusions and recommendations are drawn based on the sum of the qualitative and quantitative research conducted. The study is developed in line with the research of Baggen (2017) and builds on Tilleman's work (2017).

Our research aims to describe and explain what role diversity (i.e. prior knowledge) plays in OI competence for SD. It contributes to the exploration of intrapreneurial antecedents to generate and evaluate sustainable business ideas. Furthermore, the objective is to establish an ‘idea trail’ that can visually map the survival of business ideas throughout the entrepreneurial journey, from the individual to the team level. The study can be regarded as a cross- sectional one, where the relationship between team diversity (prior knowledge on the natural/ communal environment and prior knowledge on entrepreneurship) and the sustainability of business ideas is investigated.

3.1.1. Mode of enquiry & analysis

3.1.1.1. *Literature review*

Scientific literature is consulted in order to get a better understanding about the competence of OI for Sustainable Development, team diversity and the antecedents of SME employees to generate and evaluate sustainable business ideas. Here the framework (to score business ideas based on sustainable development archetypes) used by Tilleman (2017) is adopted. Furthermore, secondary sources of literature are investigated to study the reality of intrapreneurs in SMEs. The main underlying theory is Sustainable Entrepreneurship. Nevertheless, literature from related fields: social, environmental and

mainstream entrepreneurship are also reviewed. This has to do with the scarcity of literature in the field of Sustainable Entrepreneurship and with the fact that findings in the other fields are regarded as relevant. The academic library of Wageningen University & Research and other scientific search databases, such as Scopus, Google Scholar are of help when searching for fitting background literature on the topics mentioned. Helpful key terms and connectors such as AND/OR/AND NOT enable to acquire relevant literature in the process. Besides, search filters help to further narrow search results. For example: searching in specific type of documents, journals of interest, recent publications, etc.

3.1.1.2. *Quantitative research*

Two tasks are subject to this research from the OICAT's application in the context of SMEs. Data generated from the first individual and first group task is analysed. In the first, individual task (Task 1) participants were asked to generate business ideas about SD in 10 minutes. Tillemann (2017) evaluated and scored all ideas based on sustainable development archetypes, i.e. flexibility. The flexibility score assigned to each idea by Tillemann (2017) is of help when establishing the 'idea trail'. The objective is to see whether team diversity impacts the sustainability of score when ideas move to through the entrepreneurial journey. Consecutively, the first group task of the OICAT is studied (Task 2). Here, participants were asked to select the two best self-generated business ideas for SD individually. Then, they were instructed to rank these ideas based on their potential success as a group. The idea with the highest business potential was supposed to be on top and the list descended towards the idea with the least potential. Groups were asked to complete this task in 15 minutes. Building on Baggen (2017), the first individual task deals with BIG, whereas the first group task taps into BIE (first on individual, then on team level). The 'idea trail' aims to tie these two components together, study them holistically and see how certain variables regarding team diversity influence the process. With the help of fitting econometric models, functions data is analysed in a spreadsheet program. Data is exported from SPSS and then merged with data from MS Office Excel. The modelling, analysis and visualization is executed with MS Office Excel.

3.2. RESEARCH SAMPLE

The data for the study is retrieved from the application of OICAT in several corporate settings. The data was collected in twelve SMEs, all from the manufacturing industry, specifically from the paper, agricultural, food and metal industry. All businesses introduced something new to the market in the last three years, may that be a product, a service or process (Baggen, 2017). The participation in the study was strictly voluntary. One business was German, and rest of the companies were from The Netherlands. Altogether 234 employees forming 53 teams participated. Participants came from various roles, jobs, as entrepreneurial skills are needed in diverse areas of businesses (Baggen, 2017; Toner, 2011). Thus, the sample resulted in a widely diverse group. Educational background, personality traits,

etc. varied greatly. The age of the participants ranged from 21 to 60 years old, resulting in a mean of 41. Regarding gender, females represented the minority with 24.6% and males the majority with 75.4%.

During the course of evaluation and analysis of the data, some groups were disqualified. Five groups were disregarded from the sample due to different reasons that called the validity and the comparability of data into question. For example: some participants joined their groups later, resulting in less time to work on the tasks. Another disqualified case included two participants reading the tasks beforehand. Due to reasons as such, the research sample shrank from 234 participants to 212 and the number of groups from 53 to 48. Group number 6, 16, 40, 41 and 50 were disqualified from the sample. The majority of groups (46) included 4-5 members, one group consisted of three and another one of six members. The restriction of data did not affect the mean age of participants but did so (to a small extent) in terms of gender distribution. Women accounted for 23.6% of the participants and male respectively for 76.4%. Table 1 gives an overview about the companies that participated in OICAT research. The last column indicates the valid number of participants based on the validity restrictions that are elaborated on above.

Company Number	Main Product	Country	Number of Employees	Number of valid Participants
1	Paper	The Netherlands	185	16
2	Paper	The Netherlands	40	4
3	Seeds	The Netherlands	220	25
4	Chrysanthemum	The Netherlands	100	24
5	Union seeds	The Netherlands	62	28
6	Trade & distribution vegetables and fruits	The Netherlands	38	16
7	Orchids	The Netherlands	70	30
8	Substrates	Germany	370	20
9	Trade & distribution vegetables and fruits	The Netherlands	43	12
10	Champignons	The Netherlands	100	15
11	Trade & distribution vegetables and fruits	The Netherlands	450	9
12	Metal	The Netherlands	70	13

Table 1: Overview of participating companies and number of valid participants in final sample (based on Baggen, 2017, p.66)

3.3. PROCEDURE

The data analysed in our study was collected by Baggen (2017) for her doctorate dissertation at Wageningen University. All participants were thoroughly briefed about the procedure upon arrival and signed a declaration of consent. This statement ensured that all data is processed confidentially and requested their permission to use results for scientific purposes. Afterwards, participants completed the questionnaire and tasks. As mentioned above, there are two tasks from the assessment that are specifically relevant for our research.

3.3.1. Task 1 – Business Idea Generation

The first individual task taps into BIG regarding Sustainable Development. First, participants were provided a definition of SD and then they were asked to generate business ideas for new start-ups in the area of Sustainable Development. Figure 9 is a snapshot of the specific formulation of Task 1. Participants had 10 minutes to read the case and complete the task.

Please note your personal code:

1. Please take 10 minutes to list any and all business ideas for new start-ups in the area of sustainable development that come to your mind. You do not need to worry about whether the ideas have a high or low potential for success. Do not limit yourself; the more ideas you can list, the better.

Use the following space to list all ideas that come to mind and list each idea separately as #1, #2, and so forth.

.....

Figure 9: Snapshot of 'Task 1' (Baggen, 2017)

3.3.2. Task 2 – Business Idea Evaluation

In the first group task, participants were asked to evaluate their self-generated business ideas and rank them based on potential for success. Groups had 15 minutes to complete this assignment. As a result, they constructed lists that ranked self-generated business ideas for SD based on potential success. Figure 10 represents the exact formulation of this task. The first part of the assignment taps into individual BIE by asking participants to select two of their best ideas, whereas the second part of the task relates to group BIE by asking the group as a whole to rank the selected ideas based on their potential for success. Participants were randomly assigned to groups.

Please note the group number and the personal codes of all the group members:

.....

.....

.....

4. Now, we ask you to arrange the 2 best business ideas for new start-ups of all group members. Please, compare the ideas of all group members (so when the group consists of 5 persons, you have to compare 10 ideas). Arrange the business ideas in order of their potential for success, with the idea with the most potential for success on top and the idea with the least potential for success at the bottom.

Please, take 15 minutes to arrange the self-generated business ideas. Do not forget to mention each personal code belonging to the ideas.

Figure 10: Snapshot of ‘Task 2’ (Baggen, 2017)

3.4. MEASURES

3.4.1. Flexibility as a measure of sustainability

Bocken et al. (2014) provide a categorisation of sustainable business model archetypes to define groupings of mechanisms and examples that may in turn create options to build business models for sustainability. By developing these, the authors specifically aimed at addressing the shortcomings of alternative categorisations in literature and kept the Triple Bottom Line in the forefront. In turn, they’ve provided a categorisation that specifically focuses on Sustainable Development. In line with Tilleman (2017) the categorisation of Bocken et al. (2014) is adopted in our study. The choice seems fitting, due to the model’s specific focus on sustainability and its detailed nature. In addition, building on Van Den Bergh et al. (2011) and Geels (2011) we acknowledge that a mix of different disciplines is required for business ideas to deliver solutions that are in line with sustainable development. Thus, the premise of the analysis is: the more archetypes assigned to a business idea, the higher degree of sustainability the solution should conceptually result in. This is the reason why we propose that flexibility can be utilized as an indicator of sustainability in this specific case.

Building on Tilleman (2017), each idea from the dataset is assigned to one or more categories from the eight archetypes. The eight archetypes are not mutually exclusive; one idea can be assigned to multiple categories (which we argue translates to a higher degree of sustainability). In Tilleman’s work (2017) one point is given to each category an idea can be assigned to. Hence, the flexibility score of ideas can theoretically range from 0-8. Figure 11 depicts the chosen conceptual model. As seen, the eight archetypes relate to three major groupings: technological, social and organizational. Furthermore, different examples are listed under each archetype. These clarify the meaning and content of each archetype. For example, archetype number 2, ‘Create value from waste’ includes examples, such as

‘Circular economy, closed loop’ and ‘Cradle-2-Cradle’, etc. All ideas from the final sample (985) are assigned a respective flexibility score by Tillemann (2017). We adopt these flexibility scores and utilize them as measures of sustainability.

Groupings	Technological			Social			Organisational	
	Archetypes			Archetypes			Archetypes	
Examples	Maximise material and energy efficiency	Create value from waste	Substitute with renewables and natural processes	Deliver functionality rather than ownership	Adopt a stewardship role	Encourage sufficiency	Repurpose for society/ environment	Develop scale up solutions
	Low carbon manufacturing/ solutions Lean manufacturing Additive manufacturing De-materialisation (of products/ packaging) Increased functionality (to reduce total number of products required)	Circular economy, closed loop Cradle-2-Cradle Industrial symbiosis Reuse, recycle, re-manufacture Take back management Use excess capacity Sharing assets (shared ownership and collaborative consumption) Extended producer responsibility	Move from non-renewable to renewable energy sources Solar and wind-power based energy innovations Zero emissions initiative Blue Economy Biomimicry The Natural Step Slow manufacturing Green chemistry	Product-oriented PSS - maintenance, extended warrantee Use oriented PSS- Rental, lease, shared Result-oriented PSS- Pay per use Private Finance Initiative (PFI) Design, Build, Finance, Operate (DBFO) Chemical Management Services (CMS)	Biodiversity protection Consumer care - promote consumer health and well-being Ethical trade (fair trade) Choice editing by retailers Radical transparency about environmental/ societal impacts Resource stewardship	Consumer Education (models); communication and awareness Demand management (including cap & trade) Slow fashion Product longevity Premium branding/ limited availability Frugal business Responsible product distribution/ promotion	Not for profit Hybrid businesses, Social enterprise (for profit) Alternative ownership: cooperative, mutual, (farmers) collectives Social and biodiversity regeneration initiatives ('net positive') Base of pyramid solutions Localisation Home based, flexible working	Collaborative approaches (sourcing, production, lobbying) Incubators and Entrepreneur support models Licensing, Franchising Open innovation (platforms) Crowd sourcing/ funding "Patient / slow capital" collaborations

Figure 11: Sustainable Business Model Archetypes (Bocken et al., 2014, p.48)

3.4.2. Prior knowledge on natural/ communal environment

Along the lines of Patzelt & Shepherd (2011), it is crucial to review the questionnaires and assess the questions that tap into the degree of prior knowledge on natural and communal environment. They argue that these variables impact the recognition of sustainable development opportunities. Figure 12 is a snapshot of all OICAT questions that revolve around this topic. The first general question asks for a self-assessment of knowledge about sustainable development and the rest of the questions expand on different topics, such as energy, climate change, sustainable water supplies, etc. Responses to all questions regarding prior knowledge on sustainable development and its topics are scored on a five-point Likert scale. In our analysis, we take all responses to all questions into account and construct a composite score for prior knowledge related to sustainable development (SQ Composite). We utilise the ‘SQ Composite’ score as an indicator for prior knowledge on the natural/ communal environment as the topics and components of the questions all revolve around the environment and conditions humans live in.

Prior knowledge

3. The following questions concern your prior knowledge (related to sustainable development and entrepreneurship). Please answer the questions by using the following scale:

- = No knowledge
- = Very little knowledge
- +/- = Somewhat knowledge
- + = Reasonable knowledge
- ++ = Considerable knowledge

Prior knowledge	--	-	+/-	+	++
a. Before taking part in this survey, how much did you know about sustainable development?					
Before taking part in this survey, how much did you know about the following themes concerning sustainable development?					
b. Affordable and adequate food supply					
c. Decent housing					
d. Energy					
e. Climate change					
f. Economic wealth					
g. Education					
h. Sustainable water supplies					
i. Personal health and safety					

Figure 12: Snapshot of questions tying into prior knowledge on natural/ communal environment (Baggen, 2017)

3.4.3. Prior knowledge on entrepreneurship

Besides prior knowledge on natural/ communal environment Patzelt & Shepherd (2011) also highlight the positive correlation between SD opportunity identification and prior knowledge on entrepreneurship. Figure 13 outlines the questions in the OICAT questionnaire that tap into this topic. The first four questions reflect on entrepreneurial intentions in the future and measure responses on a five-point Likert scale. Whereas, the last four questions fall under the topic of past and present entrepreneurial behaviour and knowledge. The first three questions are scored on a nominal (yes or no) scale, while the last question again utilizes the five-point Likert scale. In our analysis, we specifically zoom in on two questions about past and present entrepreneurial experience (j, k) and the familiarity with the Business Model Canvas (BMC) (l), as we believe that these are the questions that relate best to the literature we base our analysis on (e.g. Patzelt & Shepherd, 2011).

Please answer the questions by using the following scale:

- = Definitely will not
- = Probably will not
- +/- = Maybe
- + = Probably will
- ++ = Definitely will

Prior knowledge	--	-	+/-	+	++
i. What is the likelihood that you will be involved in an entrepreneurial venture sometime...					
i. In the next 12 months					
ii. In the next 5 years					
iii. In the next 10 years					
iv. Sometime in your lifetime					
	Yes		No		
j. Do you have an entrepreneurial venture at this moment?					
k. Did you have an entrepreneurial venture in the past?					
l. Before taking part in this survey, were you already familiar with the Business Model Canvas?					

4. In your job, how often are you involved in activities related to innovation?

- A. Never
- B. Less than once a month
- C. Less than once a week but at least once a month
- D. At least once a week but not every day
- E. Every day

Figure 13: Snapshot of questions tying into prior knowledge on entrepreneurship (Baggen, 2017)

Despite addressing seemingly only two tasks (Task 1- BIG, Task 2- BIE) the analysis will revolve around three stages and will be structured accordingly. Stage 1 is about individual BIG (based on Task 1), stage 2 about individual BIE and stage 3 focuses on group BIE (based on different parts of Task 2). Measures, such as flexibility, prior knowledge on natural/ communal environment and entrepreneurship are put under scrutiny for all stages in the following chapter.

4. RESULTS

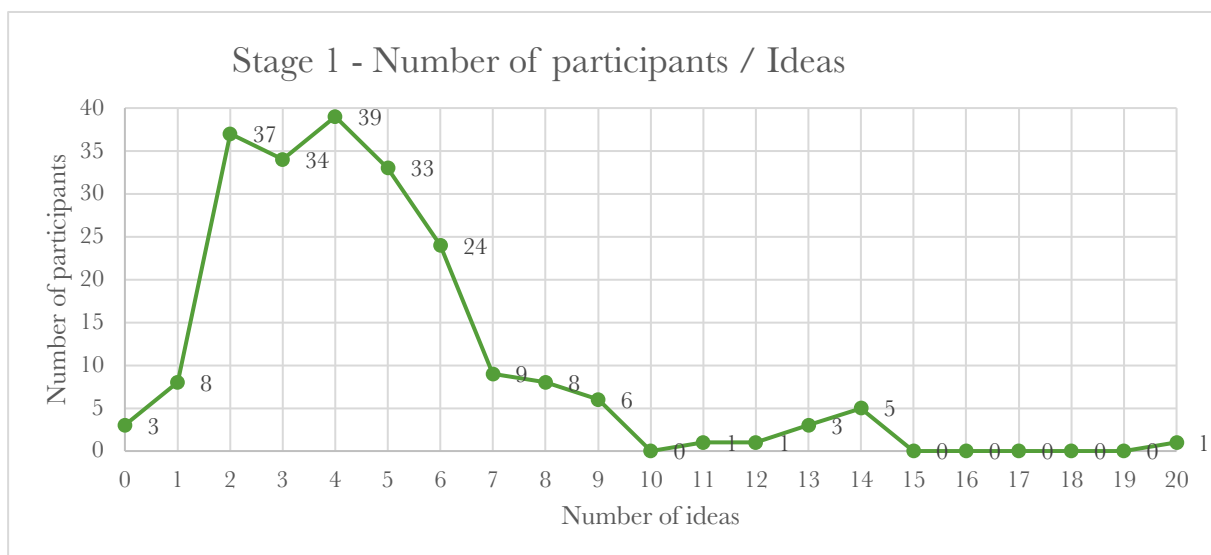
4.1. PART 1- DESCRIPTIVE STATISTICS

Our analysis is carried out in line with Opportunity Identification Funnel, i.e. three stages within the OICAT process. Results are thus broken down accordingly. In the first part of this chapter, the main results are described and placed in the context of the process as a whole. The second part of the chapter focuses on correlations between different variables regarding prior knowledge and the flexibility score of ideas.

4.1.1. Stage 1, OICAT Task 1 – Individual BIG

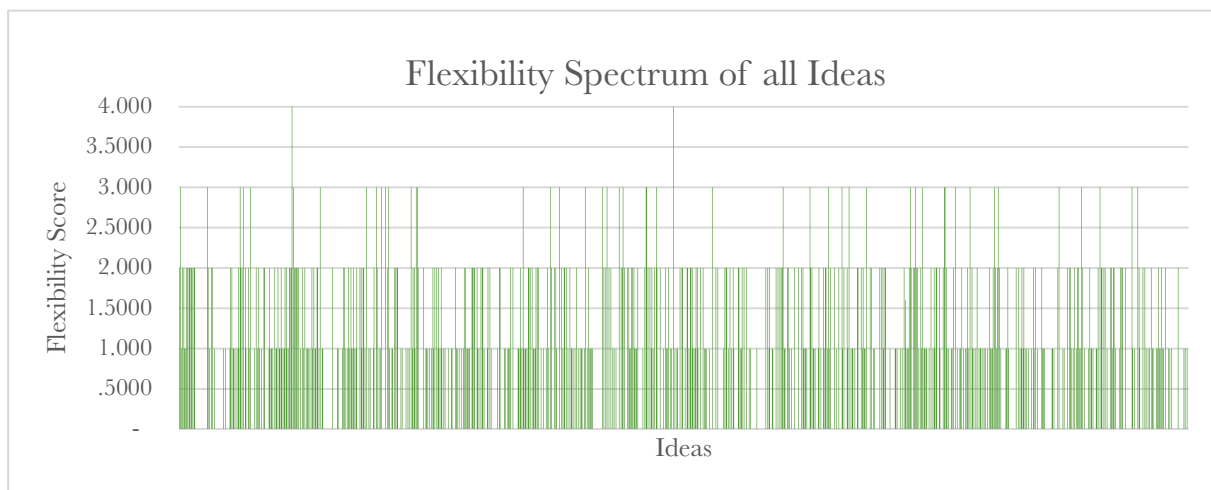
Stage 1 encompasses all ideas that were generated in response to the first individual assignment (Task 1). A wide diversity characterises the self-generated business ideas in the first stage. For further details and correlations between various factors in this sample Tillemans's work (2017) can be consulted. 985 business ideas formed the final sample for our research that stemmed from 212 individuals.

Amongst the 212 participants, individuals generated between zero to 20 business ideas in the span of 10 minutes during task 1. (Annex 8.1.: Graph 14 - Overview of the number of ideas per participants.) On average, participants generated 4,63 business ideas during the OICAT's BIG task individually. Three individuals failed to come up with any ideas in regard to SD, whereas one participant managed to generate 20 ideas in the span of 10 minutes. Most participants noted down 2-6 business ideas. Graph 1 assigns the number of individuals to the number of ideas for further clarity.



Graph 1: Stage 1 - Number of ideas / Participants

The composite score for flexibility in stage 1 was calculated based on the flexibility scores assigned to each of the 985 ideas by Tilleman (2017). For stage 1, this score reads 0,98. In order to internalise the meaning of this score, we turn back to Bocken et al. (2014). As described before, the flexibility score reveals the number of archetypes an idea can be related to. Thus, ideas can be related to less than one archetype on average in stage 1. Graph 2 shows the spectrum of business ideas with respect to flexibility. The highest flexibility score, 4,0 was assigned to two business ideas, whereas the lowest score, 0 was attributed to 370 business ideas.



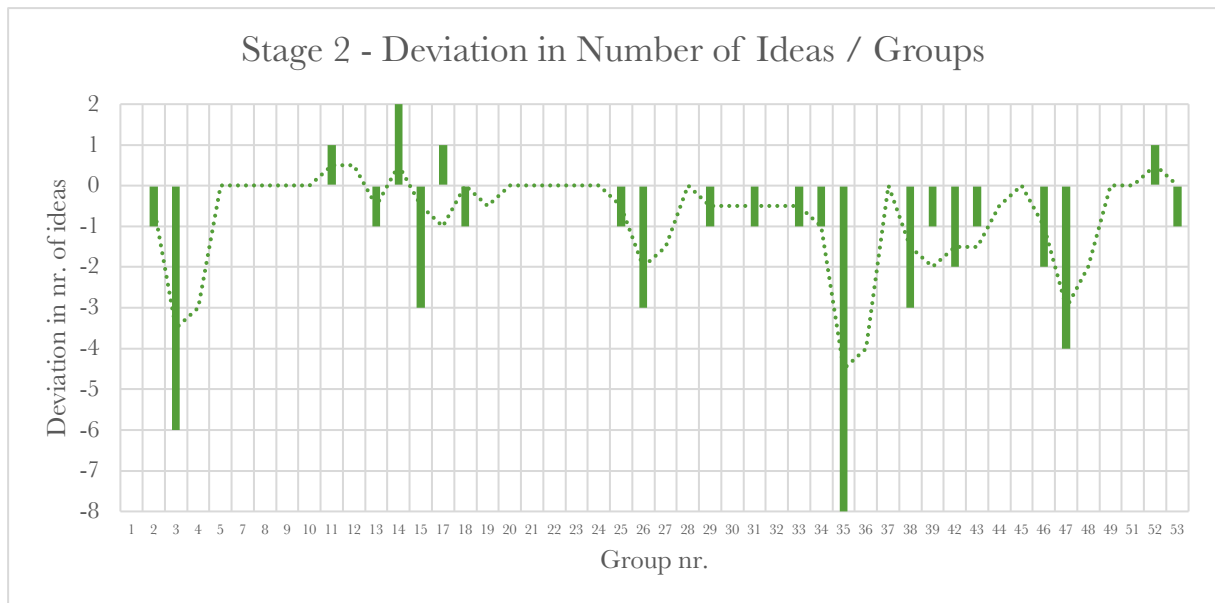
Graph 2: Flexibility Spectrum of all Ideas

The most popular archetype was nr. 1: ‘Maximise material and energy efficiency’ with 325 related ideas, followed by nr. 3: ‘Substitute with renewables and natural processes’ with 260 related ideas. ‘Develop scale up solutions’, i.e. archetype nr. 8 ranked last. Only 16 business ideas could be related to this category. (Annex 8.1.: Graph 15, Dispersion of business ideas among archetypes in Stage 1).

4.1.2. Stage 2, OICAT Task 2 – Individual BIE

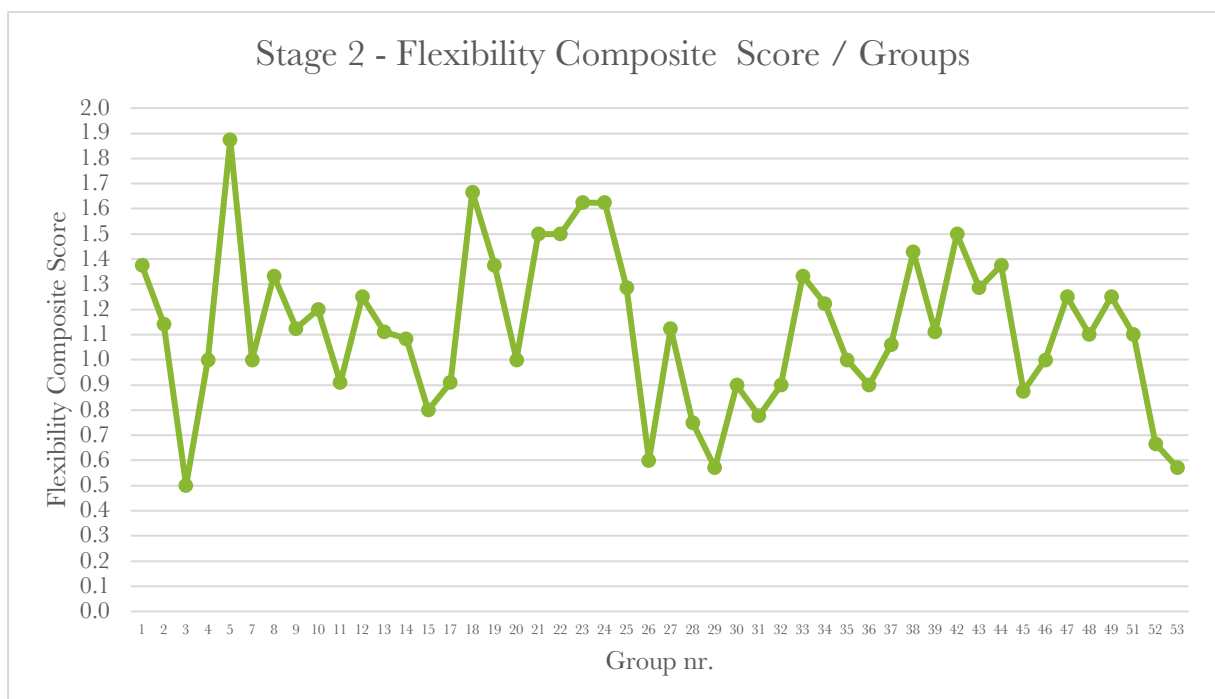
Stage 2 stands for the individual selection of the top two self-generated ideas. Here, we track which ideas enter the group process based on individuals’ evaluation from the pool of self-generated business ideas (stage 1).

In this stage the number of ideas drops significantly, from 985 to 387. In task 2, all individuals were asked to select two self-generated ideas for the group process. Consequently, the number of ideas for 212 individuals should be 424. In contrast, we arrive at the brink of stage 3 with 37 ideas less than the assignment called for. If translated to individuals, this means that 18,5 participants did not select and take ideas with into the next stage. Graph 3 visualizes the deviation in number of ideas per groups. Special attention was given to the differences in groups sizes, i.e. the formula was designed in a proportionally solid way.



Graph 3: Deviation in number of ideas / Groups

The average flexibility of the business ideas in stage 2 increases compared to stage 1. The composite flexibility score rises from 0,98 to 1,13. This means, the self-generated ideas can be related to more than one category on average in stage 2. Graph 4 shows the composite flexibility score for each group. The group with the highest mark scores 1,88 and the one with lowest scores 0,50. The composite flexibility score for each group is calculated based on all valid ideas that appear in stage 2.



Graph 4: Flexibility Composite Score / Groups

Just as in stage 1, the most popular archetypes are nr.1 'Maximise material and energy efficiency' with 144 related ideas, followed by nr. 3: 'Substitute with renewables and natural processes' with 117 related

ideas. The least relevant archetype remains to be nr. 8: ‘Develop scale up solutions’ with 8 attributed business ideas. (Annex 8.1.: Graph 15 - Dispersion of business ideas among archetypes in Stage 2.)

4.1.3. Stage 3, OICAT Task 2 – Group BIE

Stage 3 is where the Opportunity Identification Funnel really narrows. Here, we substantially limit our analysis and only address the best idea based on each groups’ judgement, i.e. the business idea with allegedly the highest business potential. The final sample includes 48 groups, which equals the number of ideas that should rank highest. In reality, 56 ideas were ranked as number one. Thus, eight more ideas were allowed to rank first, opposed to the assignment.

The composite flexibility score of the ideas increases from 1,13 to 1,32 between stage 2 and 3. The scores vary from 0 to 3 if looked at from the perspective of groups. Five ideas score 3 on flexibility, whereas 15 business ideas cannot be related to any archetypes. Graph 5 shows the flexibility score of the top idea(s) for each group. As mentioned above, certain groups included more ideas in their top selection. For these groups, a composite score is calculated based their selection of ideas with highest business potential.



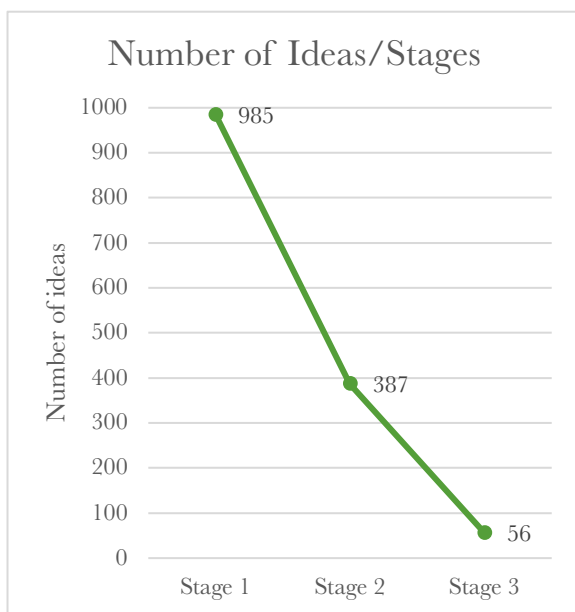
Graph 5: Stage 3 - Flexibility Score / Groups

The prevalence of different archetypes does not change significantly compared to the previous stages. Nr 1: ‘Maximise material and energy efficiency’ with 22 related ideas, nr. 3: ‘Substitute with renewables and natural processes’ with 18 ideas and nr. 2: ‘Create value from waste’ with 17 ideas stay in the forefront. Whereas nr. 8: ‘Develop scale up solutions’ disappears completely, and nr. 7: ‘Repurpose society/ environment’ and nr. 4: ‘Deliver functionality rather than ownership’ archetypes each only relate to one business idea (Annex 8.1.: Graph 17 - Dispersion of business ideas among archetypes in Stage 3).

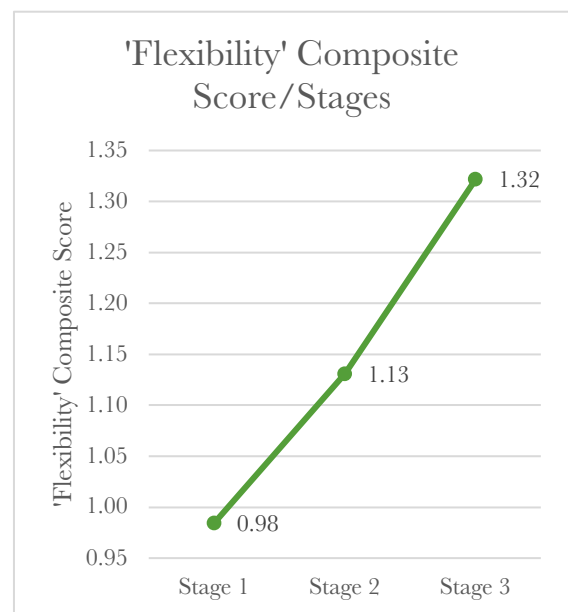
4.1.4. The whole process – All Stages, Individual and Group level

All three stages differ regarding the necessary competences for completing their respective tasks. In stage 1 it is all about individual idea generation, in stage 2 about individual idea evaluation and stage 3 stands for group business idea evaluation. The understanding of the different nature of the required competences is crucial in comparing results.

Graph 6 shows the foundation of the gradual narrowing of the Opportunity Identification Funnel, i.e. decrease in number of ideas throughout the three stages. From 985 ideas, the sum digresses to 387 and consequently to 56. This translates, after the individual BIE (stage 2) only 39% of the original ideas persist and consequently after the group BIE (stage 3) only 6% of the initial ideas survive. Ergo, 94% of the initial pool of ideas (stage 1) is discounted by stage 3.



Graph 6: Number of Ideas throughout Stage 1,2,3



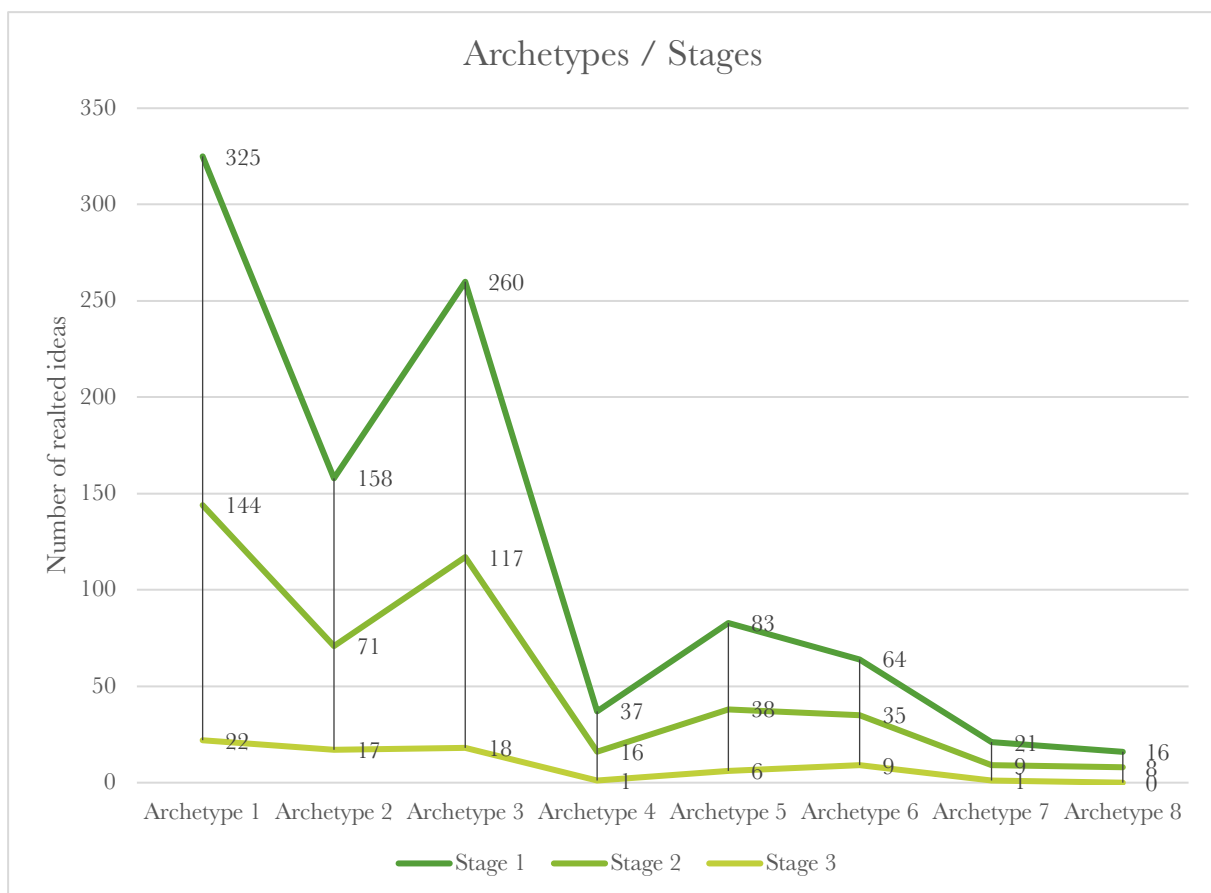
Graph 7: 'Flexibility' Composite Score throughout Stage 1,2,3

Along the lines of Geels (2011) and Van Den Bergh et al. (2011), we argue that the flexibility score based on Bocken et al. (2014) is an indicator of solutions for sustainable development. Throughout the three stages an increase in the flexibility composite score can be observed. Graph 7 visualizes the rise of flexibility score. From 0,98 the score increases to 1,13 in stage 2 and peaks at 1,32 in stage 3. This translates to first a 15% increase (by stage 2) and another 17% rise in flexibility (by stage 3). This equals to a 34% rise in flexibility for the overall process. This means that the average idea can be attributed to ever- more archetypes compared to previous stages, which we argue is favourable for SD.

The eight archetypes are also tracked throughout the three stages of the OICAT. Graph 8 shows the prevalence of archetypes, specifically the number of ideas that can be related to each of them along the three stages. As mentioned earlier, there is no significant change in the archetypes prevalence throughout the three stages. Table 2 underlines the respective percentages. The most popular ones remain the same. Archetype nr. 1 ‘Maximise material and energy efficiency’, nr. 2 ‘Create value from waste’ and nr. 3 ‘Substitute with renewables and natural processes’ rule the top three spots throughout the whole OICAT process. All three archetypes relate to technological changes. The least favoured archetypes are nr. 8 ‘Develop scale up solutions’ and nr. 7 ‘Repurpose for society/ environment’, both relate to organizational changes. Archetype nr. 4 ‘Deliver functionality rather than ownership’, nr. 5 ‘Adopt stewardship role’ and nr. 6 ‘Encourage sufficiency’ remain in the middle with moderate numbers of related ideas. All three archetypes favour social solutions as an answer to sustainability related challenges.

	Technological (Archetype 1-3)	Social (Archetype 4-6)	Organizational (Archetype 7-8)
Stage 1	77%	19%	4%
Stage 2	76%	20%	4%
Stage 3	77%	22%	1%

Table 2: Archetype dispersion amongst stages



Graph 8: Archetypes with respective number of ideas / Stages

Throughout the stages there is a shift from individuals to groups. In stage 1 and 2, tasks are carried out by individuals, whereas the entity of stage 3 is the group. Yet, as we have the data to track ideas in all three processes, we also have the ability to compare how the flexibility score changes for each group between each stage. In the first two stages we have large pools of ideas. Hence, in these stages a composite score is calculated from all ideas for each group. In stage 3, the majority of the groups selected a single idea, here the flexibility score of that idea is utilized. For five groups that had more than one idea in their top rank a group a composite score is calculated. Graph 9 shows how the composite flexibility score of each group changes due to first individual BIE and thereafter due to group BIE. Stage 3 shows more extreme peaks and lows than the first two stages do. This observation makes sense, as most groups opted for a single idea in stage 3. This means that other, more or less flexible ideas could not counterbalance the score. Nevertheless, it is apparent that in stage 3 certain groups opted for a business idea that was much more or much less flexible than their average pool of ideas.



Graph 9: Flexibility Score / Groups / Stages

4.2. PART 2 – EXPLORATORY STATISTICS

In the second part of the chapter, we attempt to unveil the underlying reasons for the results described in part 1. Thus, correlations are investigated and visualized. Data is organized either based on individuals or groups and results are presented accordingly.

4.2.1. Level of individuals

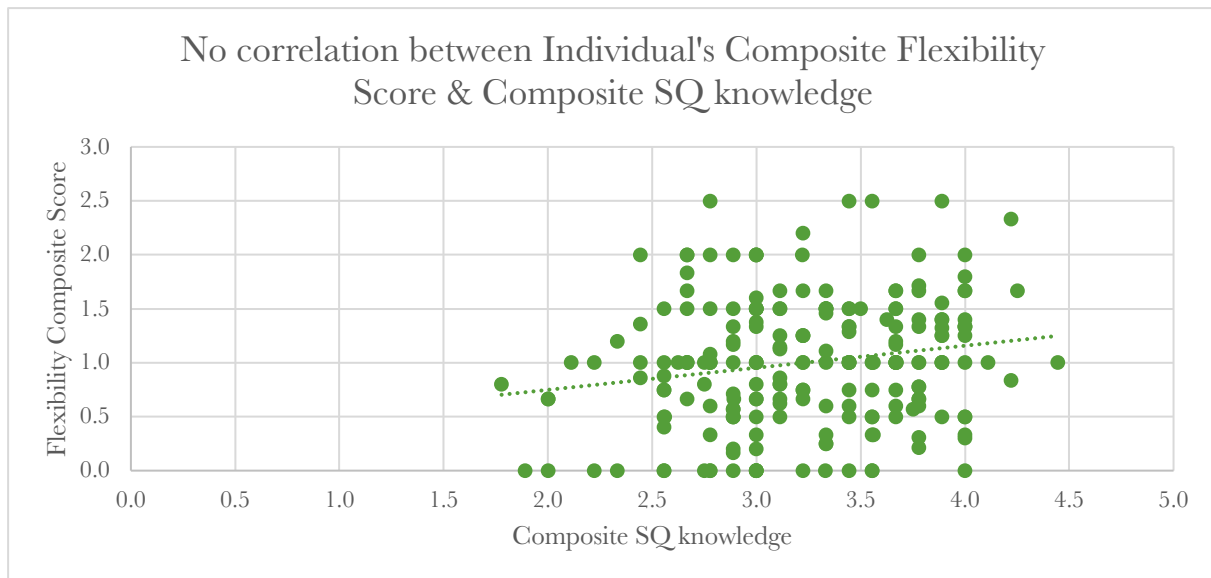
In the individual analysis a correlation test is carried out on all variables against the flexibility composite score that is generated based on each person's ideas.

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>
<i>(1) Individual's Composite Flexibility Score</i>	1,00				
<i>(2) SQ Composite</i>	0,18	1,00			
<i>(3) EQ5 - Involved in E venture now</i>	0,06	0,08	1,00		
<i>(4) EQ6 - Involved in E venture in the past</i>	0,02	-0,01	0,19	1,00	
<i>(5) EQ7 - Familiarity with BMC</i>	0,07	0,11	0,02	-0,01	1,00

Table 3: Correlations between individual flexibility and individual-level factor variables

4.2.1.1. Prior knowledge on the natural/ communal environment

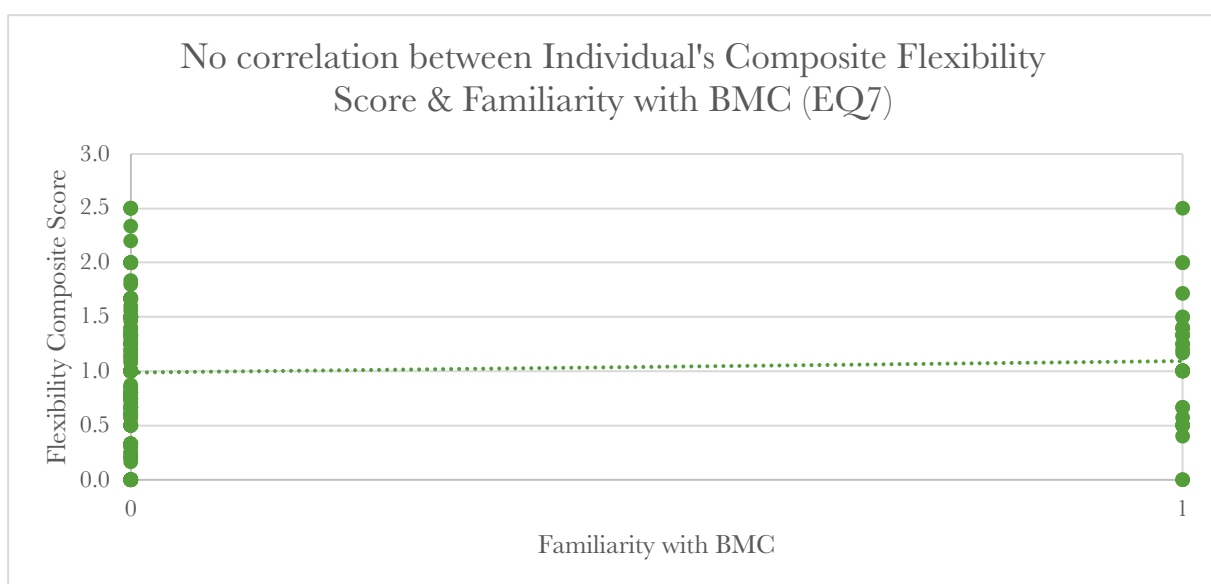
As Table 3 indicates, no correlation can be found between prior knowledge on the natural/ communal environment and sustainability ('SQ Composite') and the composite flexibility score of individuals' ideas. The correlation coefficient for the two variables reads 0,18. A coefficient so close to zero reflects that there is no seeming correlation between the two investigated variables. Graph 10 visualizes the correlation on a scatter graph.



Graph 10: Correlation between individual knowledge and composite flexibility score

4.2.1.2. Prior knowledge on entrepreneurship

Besides prior knowledge on the natural/ communal environment and sustainability, questions tapping into entrepreneurial behaviour, intentions and knowledge are also tested for correlations. Similarly, no correlations can be found between flexibility and the investigated entrepreneurial variables. The first two questions (EQ5, EQ6) tapping into entrepreneurial experience in the past and present yield correlation coefficients of 0,06 and 0,02, i.e. no correlations. Respectively, the correlation analysis between ‘Familiarity with the Business Model Canvas’ and ‘Individual’s Composite Flexibility Score’ returns a value of 0,07. Graph 11 visualizes this relationship. In sum, our data set does not prove that there is a positive correlation between prior entrepreneurial knowledge and the composite flexibility score of individuals’ ideas.



Graph 11: Correlation between individual's familiarity with BMC and composite flexibility score

4.2.2. Level of groups

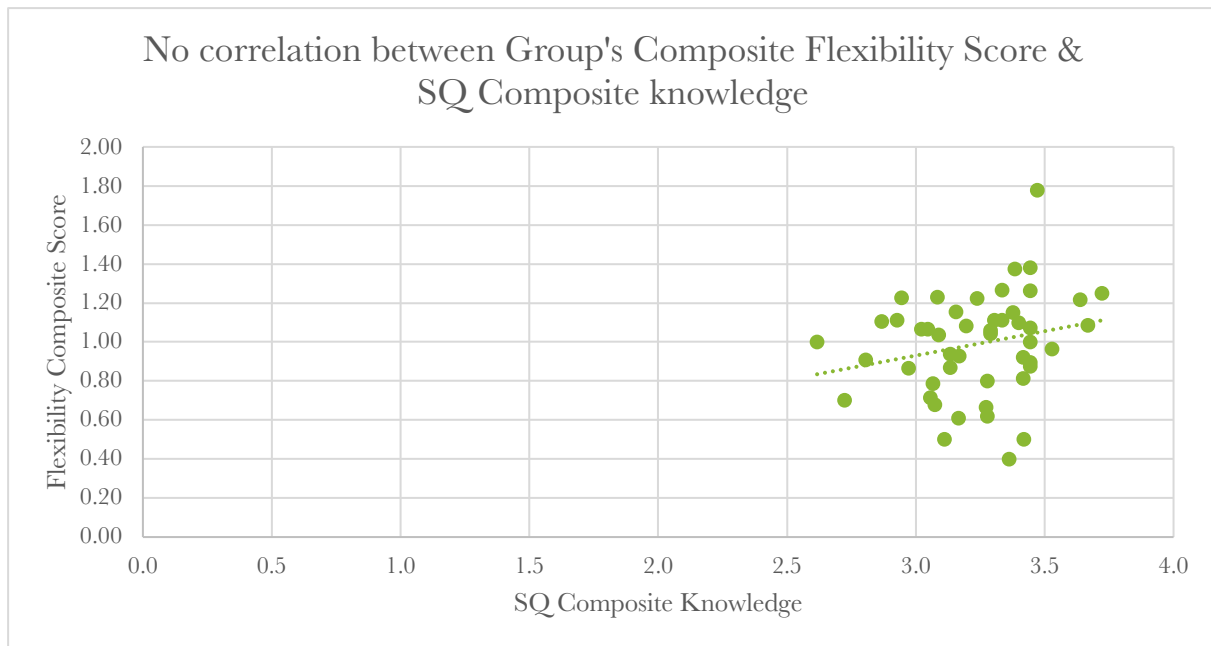
Subsequent to the individual level, the same variables are explored on the level of groups. For the groups' correlation analysis, we calculated a composite score for all variables for each group.

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>
<i>(1) Group's Composite Flexibility Score</i>	1,00				
<i>(2) SQ Composite</i>	0,23	1,00			
<i>(3) EQ5 - Involved in E venture now</i>	0,44	0,19	1,00		
<i>(4) EQ6 - Involved in E venture in the past</i>	-0,08	-0,21	0,21	1,00	
<i>(5) EQ7 - Familiarity with BMC</i>	0,12	-0,03	0,11	0,25	1,00

Table 4: Correlations between group flexibility and individual-level factor variables

4.2.2.2. Prior knowledge on the natural/ communal environment

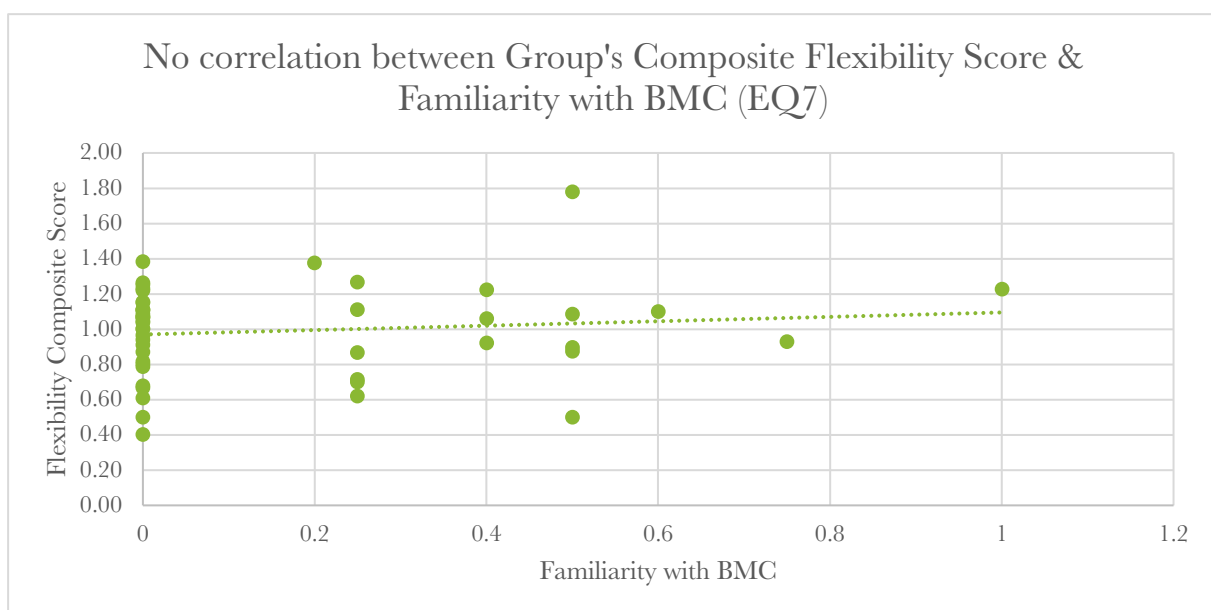
No correlation can be proven between the groups' composite score regarding prior knowledge on natural/ communal environment and the composite flexibility score. The correlation analysis returns a value of 0,23 for the correlation coefficient. Graph 12 visualizes this relationship.



Graph 12: Correlation between group prior knowledge and composite flexibility score

4.2.2.3. Prior knowledge on entrepreneurship

The correlation analysis on three entrepreneurial variables (EQ5, EQ6, EQ7) and flexibility also fails to yield a significant correlation coefficient. Firstly, the value for the variable about current entrepreneurial venture experience (EQ5) and flexibility returns a value of 0,44. The correlation coefficient for past entrepreneurial venture experience (EQ6) and flexibility is -0,08. Similarly, the familiarity with the BMC and composite flexibility score does not seem to correlate either. A value of 0,12 is returned for their correlation coefficient. Graph 13 shows the relationship between EQ7 and the composite flexibility score for groups.



Graph 13: Correlation between individuals' familiarity with BMC and composite flexibility score

In sum, no significant correlation can be found between the variables of either topics of interest: prior knowledge on natural/ communal environment and prior knowledge on entrepreneurship. Neither on individual, nor on group level. Thus, the investigated variables fail to provide a clear reason for the rising value of flexibility throughout different stages of the OICAT process.

5. DISCUSSION

Our work so far has identified the potential of intrapreneurs working in small and medium-sized enterprises to act as change agents for sustainable development. Entrepreneurship is seen as a magic trick to alleviate social, environmental and economic struggles. Nevertheless, competences that are fundamental for change to happen, such as idea generation and idea evaluation, are only understood to a certain extent. We have identified this gap in mainstream entrepreneurship, creativity and OI literature and came up with a conceptual approach that marries theory to date with vast empirical data. The novelty of our research lies in the holistic approach we have adopted through the Opportunity Identification Funnel and in testing actual empirical data from the OICAT's application. Reflecting on the notions of the 'entrepreneurial journey' by Vogel (2016) and the 'idea journey' by Perry-Smith & Mannucci (2017), time plays an important role throughout our model, i.e. OI Funnel, and we have therefor split our analysis into three stages. Each of these stages accounts for a specific competence: idea generation or idea evaluation. It keeps individuals and groups in the forefront, acknowledging the importance of multiple agents involved. We zoomed in on how the sustainability of business ideas changes along the different stages and whether or not prior knowledge impacts the process. In the following we elaborate on further insights and eventually close the chapter with a series of specific theoretical and practical implications.

5.1. SUSTAINABILITY ARCHETYPES – TECHNOLOGY PUSH

In terms of general observations regarding the context of business ideas for sustainable development it seems that there is a solid technological focus. In all three stages of the analysis technological archetypes dominated with 76-77%. In comparison, ideas that could be attributed to social archetypes prevailed between 19-22% and the organizational archetype grouping stayed consistently below 4% throughout all three stages.

In light of the findings above, we reflect on Hoekstra & Wiedmann (2014), who call for major transformative changes in the context of contemporary environmental problems. We also draw on Van Den Bergh et al. (2011), who urge for a mix of technical, organizational, economic, institutional, socio-cultural and political changes in order to reduce humanity's footprint to a sustainable level. How can we possibly expect disruptive innovations with a positive impact on the environment when intrapreneurs seem to be predominantly focused on technological fixes, possibly neglecting equally important domains, such as society and organizations? Jacobsson & Bergek (2011) draw on influences regarding the direction of search for opportunities. They claim that different institutional factors, such as incentive structures, cognitive frames and expectations, impact this direction. Along their reasoning, the weakness in this function, i.e. the weakness in search for diverse opportunities, is a form of institutional weakness. Thus, if intrapreneurs are expected to live up to their potential as 'change agents' for sustainable

development, then SMEs have an important role in supporting them by strengthening their institutions. The participants of our sample were employees from the manufacturing industry. It is without doubt that the context of their workplace influenced the generation and selection of ideas that revolved around technological solutions, which is their everyday reality. Our proposition is that by implementing changes, e.g. job rotation; financial incentives for novel, creative ideas; exposing employees to business solutions that focus on social and organizational aspects, SMEs could motivate intrapreneurs to stop looking for opportunities similar to previous experiences and in turn diversify their input for innovation for sustainable development. This remains an area where further research is clearly needed.

5.2. SUSTAINABILITY SCORE– INPUT AND PROCESS FACTORS

Throughout the three stages we have also observed an overall rise in the flexibility score. First, an increase of 15%, then another of 17% with an overall rise of 34% at the end of the funnel. Thus, as the number of ideas decrease, the composite flexibility (which equals the number of archetypes that ideas can be related to on average based on Bocken et al. (2014)), i.e. an indicator of sustainability, increases. As we go through the process of OI, different constructions of change agents shape the funnel. First individuals, followed by groups demonstrate their competences in terms of idea generation and evaluation. Hereby we would like to emphasise the complexity of OI by reiterating that we studied OI for SD strictly based on individual input factors (i.e. prior knowledge). We are uncertain about how other input and process factors impact the output (flexibility score) of this specific group. Based on Schjoedt & Kraus (2009), there is ample reason to believe that these factors have influenced team performance during the OICAT and thus our results. In the following we delve into some of these factors.

5.2.1. Team Processes

According to Schjoedt & Kraus (2009) team processes represent an important group of factors that influence team performance. Team processes encompass all activities of team members to work independently by using various resources to accomplish meaningful outcomes (de Mol et al., 2015). Schjoedt & Kraus (2009) deduct three categories that impact team performance: 1) conflict, 2) power and politics and 3) communication.

All three categories: conflict; power and politics; communication (or a lack thereof) can make intrapreneurs avoid risk and to not voice their ideas and simply abandon them just to ‘play it safe’. This can be an explanation for some groups selecting less ideas than the assignment called for. This relates to Graph 3 where we visualized that on average 18,5 participants didn’t take any ideas into the group process. The factors above can also create environments where ideas collide, and conflicts arise that need to be resolved in order to move on. In turn, ideas can be merged, combined or new ideas can emerge as a result of such processes. We observed the same in our sample: between stage 2 and 3 there were instances where ideas resembled or complemented one another. In some cases, intrapreneurs took

the liberty to merge ideas and create something novel. We underline the importance of these complex dynamics as it seems that they challenge change agents to develop ideas further or complement them with input from co-workers. Incorporating various fields into business ideas can enhance the quality of business ideas and with that the degree of sustainability. The question remains: *how to empower teams to excel and create high quality ideas by tapping into team processes?* Now, we delve into the three factors outlined above: conflict; power and politics; communication.

5.2.1.1. Conflict

To get high quality ideas, constructive conflict is required so that ideas can be challenged. Along Schjoedt & Kraus (2009), constructive conflict is enabled by team diversity. They state that both constructive and destructive conflicts are results of heterogeneity, i.e. diverse teams have more conflicts compared to homogeneous teams. Nonetheless, homogeneity (no conflict) leads to unchallenged group thinking and a limited range of ideas. Thus, for a team to be effective a certain level of diversity is required, but only to the extent that members can relate to each other and work together. Due to the scope of this research, we took prior knowledge as one measure of diversity. Nevertheless, van Knippenberg et al. (2004) outline that team diversity in fact includes all factors that lead to the perception that another person is different from oneself, e.g. gender, age, educational background, social capital, personality, etc. Based on our analysis we advise a conscious assembly of team members to see what is most desirable for the identification of sustainable development opportunities. For instance, it would be valuable to see how groups do where members have high scores of self-efficacy and diverse measures of prior knowledge and level of occupation.

5.2.1.2. Power and Politics

In terms of power and politics it is of paramount importance to reflect on members who have the capacity to influence others and at the same time seek to concentrate power through political, self-serving activities. This factor can be interesting for our research, because in stage 3 group members engaged in group discussions during the final ranking of business ideas. Thus, potential power games could have influenced the process. Schjoedt & Kraus (2009) report that certain individuals create a dynamic that is destructive for the performance of teams. We believe that individuals as such should be monitored and restricted if they exert their power in a way that hampers the group to function in favour of SD. Experts could teach employees to identify destructive power in the professional setting and equip them with tools to cultivate a constructive and safe environment (e.g. constructive feedback technique, etc.). In the academic setting, we see three ways to achieve this in action. Firstly, destructive individuals could be screened at the questionnaire and be grouped in teams where their power is counterbalanced. Secondly, a mediator could monitor group processes and intervene when these individuals exert destructive power and coach them to improve their behaviour. Last but not least, basic group rules could be established where unacceptable member behaviour is defined. This way all members of the

group would be equipped with the knowledge to recognize power games, self-serving activities and feel safe to speak their minds.

5.2.1.3. Communication

Communication can be seen as the heart of a team's behaviour (Schjoedt & Kraus, 2009). Effective team communication leads to better team performance, and in our case, to a higher sustainability score. Translated to our study, this means that active communication could improve team performance in stage 3 where groups immerse in BIE for SD by talking through the differences in the paradigms of intrapreneurs. This in turn would give a deeper reflection on business ideas. To stimulate this process a set of questions could be developed that would help change agents assess ideas for SD.

5.2.2. Cognitive Frameworks

Along the line of our reasoning, the rise of flexibility could indicate that the cognitive frameworks of groups are in favour of business development for sustainable development. Delving into the cognitive processes is another approach to unpack OI other than researching it based on individuals' knowledge and skills (Baggen, 2017). The shift between stage 2 and 3 offers an intriguing insight in terms of comparing individual and group cognition regarding business idea evaluation for sustainable development. Our results show a high increase in composite flexibility between stage 2 and stage 3. This indicates that groups selected ideas that had on average higher scores of flexibility. Baggen's research (2017) revealed empirical findings about the fact that individuals and groups use different cognitive frameworks and proved that the cognitive framework of teams relates more to those of experienced, independent entrepreneurs. These frames work as templates to spot meaningful patterns and links between seemingly independent events and information (Baggen, 2017). Thus, these frames are fundamental in what Baron & Ensley (2006, p.1331) call "*connecting the dots*" for SD. To assess and eventually improve these frameworks, one has to delve into related factors such as team member inputs, processes and outcomes. Based on the importance of shared knowledge in contextualizing team cognition it is presumed that the advantages of shared company experiences, common education or work experience increase entrepreneurial team cognition (de Mol et al., 2015). Hence, we return to the role of workplaces to foster and support change agents by positively impacting their individual and group cognitive frameworks in favour of SD. For instance, we assume that shared cognition could be impacted by the implementation of sustainability practices on a company level. This way, all intrapreneurs would live a shared reality, where the workplace strives for improved environmental performance. We expect that through working at an environmentally conscious SME, the sustainability agenda would sooner or later slip into the cognition of individuals and teams. It would be valuable to address how top-down approaches from management could create a shift in shared cognition and in turn cultivate bottom-up initiatives for SD.

5.3. SUSTAINABILITY & BUSINESS ETHICS

The rise of flexibility might seem unexpected when looking at literature in business ethics and social responsibility education. Specifically, when reflecting on work concerned with the economic mind-set and corruptibility in relation to harming the environmental conditions of planet Earth. In light of literature, one would expect that the sustainability score would decrease when intrapreneurs are asked to evaluate ideas based on their business potential. Reality suggests that businesses are primarily profit driven. Costanza et al. (1997) add that ecosystem services in contrast to economic services often come for free. This leads to the assumption that sustainability issues won't be leading priority when it comes to evaluating new business ideas. The hypothesis taps into the ongoing debate in literature about society/environment versus profit. Slater & Dixon-Fowler (2010, p.430) address this debate as the "*single minded pursuit of profits and accompanying assumptions of opportunism*" and its repercussion for the environment. Specifically, they research how the MBA educational background and the apparent profit-first mentality of CEOs impact the environment and find it curiously that CEOs with MBAs are making a positive contribution to the environmental sustainability. Despite the fact that our research sample was diverse in terms of occupation, we find it intriguing to reflect from their viewpoint. Moreover, Mitroff (2004, p. 185) delivers criticism on American business schools by stating that they endorse "*a mean-spirited and distorted view of human nature [and] a narrow, outdated, and repudiated notion of ethics*". Among others, Giacalone & Thompson (2006) and Frank & Schulze (2000) attempt to reveal how the profit-first-mentality impacts the environment and reflect on the role of education. Ploum, Blok, Lans, & Omta (2017) state that pro-environmental behaviour values and moral competences are important indicators of recognizing opportunities for sustainable development. They prove the importance of these two variables in the initial phase of sustainable entrepreneurship. We recognize the unclear, somewhat contradictory scientific views about the profit-first mentality and its implications for the environment. Our research contributes to literature by showing that groups provide a positive impact for sustainability in the initial phase of employee-driven sustainable entrepreneurship.

Tapping into employees' innovative capacity is often described as important for coming closer to the goal of ecological sustainability. Nevertheless, its potential for eco-innovation processes has hardly been examined in detail (Buhl, Blazejewski, & Dittmer, 2016). Unveiling mechanisms of profit-first-mentality and specifically researching how it could be utilized or transformed to a more societal and environmental logic would be of massive importance to accelerate the transition towards a sustainable world. In line with Ploum et al. (2017) we underline the importance of moral antecedents that empower change agents to deal with complex environmental challenges and identify sustainable business opportunities. As these moral antecedents do not develop overnight, literature suggests the importance of entrepreneurship education to build awareness of sustainable development opportunities (Ploum et al., 2017).

Next to formal education, we would also like to draw attention to intra-organizational factors that can influence the “mentality” of change agents and in turn foster opportunity identification for SD. Ordinary employees are key players in employee-driven entrepreneurship and reality suggests that many of them aren’t shaped by higher education. According to Buhl et al. (2016) there are four key factors that affect the probability and success of employee-driven innovation in an organization: leader support, autonomy, cooperation and innovation climate. As a follow-up research it would be interesting to study if these four factors could in fact create an organizational climate where OI for SD would flourish.

In sum, an apparent debate exists about profit versus society/environment that raises multiple questions regarding the ethics, mentality and morals of change makers. We contributed to the debate by proving that groups positively impact sustainability and provided some practical suggestions regarding how to achieve a shift in mentality that could yield positive results for eco-innovations.

5.4. PRIOR KNOWLEDGE & FLEXIBILITY

As the correlation analysis pointed out in the previous chapter, no correlation was found between prior knowledge and the flexibility of business ideas. Thus, our sample and analysis did not support the theory of Patzelt & Shepherd (2011), which states that prior knowledge of the natural and communal environment and recognition of sustainable development opportunities is positively correlated with one another and further strengthened by entrepreneurial knowledge. We have identified three options to rationalise this finding.

5.4.1. No effect

Firstly, accepting the contradictory nature of this finding, one option is to assume that in fact there isn’t any correlation between prior knowledge and the competences to identify opportunities for sustainable development.

5.4.2. Measurement error

Secondly, another possible explanation is that the correlation could not be proven due to a measurement artefact. Contemplating this option brings us to critically assess the limitations and assumptions of this research. Hereby, a quick overview.

5.4.2.1. Flexibility as a measure of Sustainability

The very first variable we need to put under scrutiny is the focal variable of this thesis, namely the flexibility score. In our work we utilise scores assigned by Tilleman (2017). His work can be consulted for a detailed description of the codebook development regarding data classification. In terms of data on ideas he focuses on four dimensions: ‘comprehensibility’, ‘concreteness’, ‘flexibility’, and ‘originality’. With respect to ‘flexibility’ the framework of Bocken et al. (2014) was deliberately chosen, as it gives an explicit focus to sustainable development. Even though validity measures and cross coding has taken

place, data was still exposed to the subjective coding process by Tilleman (2017). In addition, Bocken et al. (2014) points out three limitations regarding the chosen framework. Firstly, the approach is based on historical examples and might therefore exclude disruptive, radical innovations. Secondly, the social archetypes could be further refined with new views on systems level change. Lastly, the archetypes were exposed to a certain degree of subjectivity and did not yield a mutually extensive categorisation due to meagre literature on sustainable business models (Bocken et al., 2014). These limitations serve as ground when questioning how far flexibility can be understood as an indicator of sustainability. Updating the framework with cutting edge findings from last years would in turn contribute to a more accurate representation of degree of sustainability when it comes to assessing business ideas. Besides, Boons et al., (2013) state that radical and systemic innovations are necessary for sustainable development. The necessity to include radical innovations amongst ever-increasing novel research urges the revision of the framework by Bocken et al. (2014).

5.4.2.2. *Prior knowledge*

Another option is to turn to the variables originating from the questionnaires. We built our research on variables that were given in response to the questionnaire of the OICAT. The two points of focus were: prior knowledge on the natural/communal environment and prior knowledge on entrepreneurship. For prior knowledge on the natural/communal environment we have aggregated a composite score from all answers that were given in response to all the questions in the ‘prior knowledge on sustainable development’ section. These questions included various topics, such as climate change, decent housing, sustainable water supplies, etc. In order to get the most comprehensive representation we have taken all the questions into account. Nevertheless, the questions by Baggen (2017) were not explicitly constructed for this purpose, i.e. indicator of knowledge on natural/communal environment along Patzelt & Shepherd (2011). Perhaps other topics could have been included in this composite score that would have made the variable resemble more what Patzelt & Shepherd (2011) envisioned.

Similarly, the questions about entrepreneurial intentions, knowledge and experience in Baggen's (2017) work were also not explicitly constructed to test the theory of Patzelt & Shepherd (2011). This means that the questions could have been expanded to other topics in order to give a better representation of prior knowledge on entrepreneurship. Specifically, for the topic of entrepreneurship we had limited questions to work with. Hence, we acknowledge that this variable might not represent the entirety of the entrepreneurial knowledge construct.

5.4.2.3. *Self-assessment bias*

Besides the content of the questionnaires, it is also notable that most questions were asked in the form of self-assessments. This means that respondents had to self-assess their degree of knowledge about certain topics. Kruger & Dunning (1999) point out that people tend to overestimate their abilities in social and intellectual domains. Specifically, ones that are unskilled in given domains. This is attributed

to deficits in metacognitive skills or the capacity to distinguish accuracy from error. In this research all variables stemming from the questionnaires could be affected by this method bias. This creates a possibility for distortion in the dataset due to self-assessments. Kruger & Dunning (1999) state that skill improvement and increase of metacognitive competence leads to a higher accuracy of self-assessment. Thus, prior education or method adjustment could alleviate this bias as a possibility and enable change agents to perform better and/or to be more accurately assessed.

5.4.3. Indirect effect

Another option is that prior knowledge and the flexibility score are indirectly correlated. This could justify the underlying theory (Patzelt & Shepherd, 2011) and point towards future avenues of research. In fact, it could be possible that variables of prior knowledge are influenced by a confounding variable. According to Baggen (2017), different competences are required for different stages of OI. This could also indicate that different variables impact the different stages. It would be beneficial to further test which other variables are crucial for the beginning of the OI process, i.e. BIG on an individual level and then for BIE on individual and group level. Along Patzelt & Shepherd (2011) it appears that looking into motivation, altruism towards others and perception of threat could yield interesting results. Furthermore, Ploum et al. (2017) draw attention to pro-environmental behaviour and moral competences regarding opportunity identification for sustainable development by refining Patzelt & Shepherd's model (2011). In their papers they demonstrate that these variables are also positively correlated with OI for SD. Thus, it is possible that prior knowledge does play a role, either by being influenced by other factors or is simply relevant in later stages of the OI process.

5.5. THEORETICAL IMPLICATIONS

Is prior knowledge then more important in later stages, such as idea elaboration, championing or implementation? It appears that due to different approaches in literature there is a lack of clarity in which stage of the OI process prior knowledge plays a crucial role. For the reasons outlined above, we urge future researchers to adopt a consistent approach to the entrepreneurial journey and map out in entirety which variables impact which stages specifically in regard to OI for SD. We suggest to build on the state-of-the-art research of Perry-Smith & Mannucci (2017) and Vogel (2016) that adopt a holistic approach and a process perspective to OI. Dismantling the entrepreneurial journey into smaller parts, while keeping the backbone of the process in mind would help to gain clarity on the specific variables that impact specific stages of opportunity identification for sustainable development. In addition, various literature fields and their findings should be better integrated, i.e. findings from OI, mainstream entrepreneurship, social/ environmental/ sustainable entrepreneurship, transition theory, business development, management, business ethics and psychology fields, etc. should all be accounted for and reviewed in future research. Based on our work, we now outline specific suggestions for further avenues of research.

Firstly, based on our reflection about the technological focus regarding opportunity identification for SD, we raise the question: *what are the underlying reasons why intrapreneurs predominantly focus on technological archetypes compared to social and organizational ones?* Besides Jacobsson & Bergek's (2011) suggestion on the directionality of search for new opportunities, another evident option is to turn to literature on education for sustainable entrepreneurship. What examples are being taught and set as blueprints for a path towards SD? A self-explanatory hypothesis would be that curricula are filled with examples of organizations from the technological industry, such as Apple, Google, Tesla, etc. This could possibly contribute to overlooking real-world examples where social and organizational innovations are more apparent. Our conclusion is that more theoretical research is needed in this area so that measures can be taken to diversify business ideas for SD and with that improve the proliferation of social and organization archetypes.

Secondly, after analysing the relationship between the sustainability scores and different input factors, we identify that team processes and cognitive frameworks are areas that are key for further research regarding OI for SD. Plenty of work is done on team processes in entrepreneurship and management literature. Yet, findings (e.g. conflict, power and politics and communication) do not seem to be integrated in the design of current OI studies. When designing new research, we advise to build on and experiment with different aspects of team processes. For instance, testing homogeneous and heterogeneous groups' performance in OI for SD would be an intriguing path to follow. Furthermore, we realise that research on individual and group cognitive frameworks specifically focused on sustainable business development remains to date missing. In order to unpack BIE in detail, we advise further research on cognitive frameworks with respect to sustainable development on multiple levels, i.e. on the level of individuals as well as teams. In line with Baggen (2017) we agree that the cognitive framework of intrapreneurs could be studied more specifically with a novel model that does not build on previous cognitive frameworks as a point of departure. This investigation would be a great addition to work already existing regarding group cognitive frameworks, e.g. de Mol et al. (2015), West III (2007), Baron & Ensley (2006) in OI, mainstream entrepreneurship and management literature.

Thirdly, when tapping into business ethics we were confronted with the scientific divide between society/environment and profit. Contradictory hypotheses and findings have been published regarding the human mentality and its repercussions for the environment and humanity. In this respect, we suggest to turn to Ploum et al. (2017) and carry the work forward by researching the moral antecedents that help OI for SD. Ploum et al. (2017) outline that only a few studies were conducted to research the learning processes, inputs and outputs of nascent entrepreneurs. Findings in this area would possibly give direction to educational institutions to shape change agents' mentality in favour of pursuing and realising opportunities for sustainable development.

Fourthly, after contemplating the sustainability score based on Bocken et al. (2014), it is important to note that scoring business ideas based on sustainability is a truly complex task. As mentioned before, the

framework of Bocken et al. (2014) would benefit from an update with new views on system level change and the incorporation of disruptive innovation. Nevertheless, the world is changing so rapidly that we believe it is going to be challenging for a framework to keep up with technological advancements. We urge gifted scientists to ponder over ways to overcome this challenge. Furthermore, we are curious what specific knowledge is to be obtained so that intrapreneurs are equipped to identify opportunities for SD. We assessed multiple topics of prior knowledge and are intrigued to know if there is a commonality between specific obtainable knowledge that makes intrapreneurs identify opportunities for SD more effectively. In this context, we suggest the ‘reverse engineering’ of prior knowledge, i.e. studying change agents who are proven to be great at OI for SD and their associations and specific context of their obtained knowledge on the natural/communal environment and entrepreneurship.

Last but not least, we reflect on the four factors that we believe our research would gain further clarity from: motivation, perception of threat of the natural/communal environment (Patzelt & Shepherd, 2011) and pro-environmental behaviour and moral competences (Ploum et al., 2017). We believe that by building on Ploum et al.'s (2017) refined model of Patzelt & Shepherd (2011), important antecedents regarding the initial phase of opportunity identification for SD can be unravelled. Here we point towards the existing data from Baggen's research (2017) on self-efficacy, social networks and perception of industrial and environmental opportunities. For instance, Piperopoulos & Dimov (2015) state that self-efficacy belief can strengthen or weaken entrepreneurial intentions. Thus, in our case, to increase the motivation to contribute and to be engaged in the OI process for the greater good: SD. Furthermore, it would be valuable to extend the research by also building on studies that have addressed entrepreneurial intentions, such as Lans et al. (2010). We sincerely hope to have sparked some scientific interest and curiosity by opening up future avenues of research.

5.6. PRACTICAL IMPLICATIONS

In this paragraph, our intention is to turn the spark into a flame, i.e. put theory into practice by providing real-world suggestions that can foster opportunity identification for sustainable development.

Firstly, regarding the diversification of the context of business ideas (i.e. fostering social and organizational archetypes) we draw on Jacobsson & Bergek (2011) and their suggestion for businesses to strengthen their institutions. The key is that businesses should empower employees to engage in activities that are out of the scope of their tasks and maybe even the company's profile. Furthermore, SMEs should also provide the resources to enable change agents to do so. Practically, this could be done by the introduction of financial incentives for novel and creative ideas, for instance by implementing job rotation so that employees would get to know different domains or by exposing them to examples of successful social and organizational innovations. By incentivizing innovative behaviour and creating experiences in other domains (not only in the technological one) change agents would have more diverse

previous experiences to build on in stronger organizational settings where innovation for SD could occur easier.

Secondly, theory has valuable findings about team processes and tools on how to improve team performance. We would urge organizations to adopt and embed theoretically solid findings into practical settings such as trainings, team building activities and innovation processes. For instance, as communication is key in team performance (Schjoedt & Kraus, 2009) we urge organizations to facilitate workshops and trainings on communication techniques, which would in turn help employees to work better together. Furthermore, based on de Mol et al. (2015), the cognitive frameworks of employees could be boosted with shared company experiences, common education and work experiences. All companies that organize team building activities or trainings at the workplace are already unconsciously empowering employees to ‘connect the dots’. Besides the fun factor, there is solid evidence about the fact that these events serve change agents in OI for SD. Hence, we urge organizations to keep on creating shared experiences and facilitating education.

Thirdly, in line with Ploum et al. (2017) we advise formal educational institutions to integrate entrepreneurship into their curricula as fundamental obtainable knowledge, as this could significantly impact the competences of future change agents. In addition, building on Buhl et al. (2016) we advise SMEs to implement the four key factors that are proven to positively impact employee-driven innovation: leader support, autonomy, cooperation, innovation climate. Hereby we list practical examples on how these can be ingrained in a business’ day-to-day operation. Leaders should support intrapreneurs by endorsing new ideas and giving constructive feedback on employee suggestions. Leaders should advocate that it is in fact okay to fail sometimes. It is important to celebrate daring ideas and leaders should understand their role in facilitating a safe environment for employees. As high levels of autonomy are crucial for innovation to occur, some flexibility should be given to employees. This might be in the form of time or resources. For instance, allocated innovation time and incentive structures could be suitable possibilities. The purpose is to empower employees to engage in the creation and realization of new ideas. Next, for innovation to occur it is also of paramount importance that employees have good cooperative working relationships with one another. In this regard, we draw on the importance of recruitment processes when selecting the right match for certain groups. In addition, we outline the value of competence building workshops and trainings to enhance the performance of teams. Last but not least, organizations should create a climate of innovation, so that employees can identify with it and function accordingly. Businesses should openly declare their innovation agenda so that employees feel that innovation is in fact priority.

Fourthly, based on the assessment based on Bocken et al. (2014) we can also reflect on SMEs’ strategic decisions. A similar scoring method for sustainability could also be transformed into scoring ideas for strategic management decisions. A scoring methodology as such would in turn stimulate managers to critically assess whether or not business decisions contribute to the firm’s environmental performance.

In addition, insights regarding what specific prior knowledge helps in OI for SD would contribute to effective skill improvement and workplace training. For example, every employee could be given a crash-course on the firm's environmental performance targets at the time of hiring. This could increase their metacognitive skills and in turn their OI competences.

Last but not least, based on Ploum et al. (2017) pro-environmental behaviour and moral competences are fundamental factors in the beginning of OI for SD. These findings stress that firms should invest in advocating pro-environmental behaviour and specifically address why it is important to engage in such activities. An increase in these two variables would in turn enhance employees' OI competences for SD. We advise companies to lead by example and adopt environmentally sound measures in their day-to-day operations so that employees can realise the importance and scale of marginal improvements. This in turn, can make them change their personal behaviour and adopt more environmentally friendly practices into their lives.

We hope to have captured the broad practical potential of this research for SMEs transitioning towards SD. The application of theory can improve the operations of businesses a great deal. It is of major importance that these findings be translated into real-life settings. Through our examples we hope to have demonstrated that there are endless options to improve OI for SD. Most of them do not even require major financial investments. Our hope is that leaders of SMEs will start to experiment more and more with employee-driven entrepreneurship and realise that investment in human and social capital is the one that will yield manifold positive gains in the future.

6. CONCLUSION AND RECOMMENDATION

The aim of this study was to research OI for SD and to establish an ‘idea trail’ that would map out the journey of ideas for SD. During this journey, the diversity of change agents was studied on multiple levels, both on individual and team level. Specifically, we zoomed in on how prior knowledge affected the sustainability of self-generated business ideas in SMEs. In order to achieve this, we used both qualitative and quantitative research methods and built on findings from diverse disciplines. We founded our research on data by Baggen (2017) and Tilleman (2017). Altogether 212 intrapreneurs, accounting for 48 groups were included in the final sample and 985 ideas were traced through the three stages of the opportunity identification funnel. To our knowledge our holistic ‘idea trail’ approach supported by vast empirical data is unprecedented in literature so far.

Regarding our research agenda and research questions, we observed a sharp decrease in the number of ideas and a substantial increase in flexibility, i.e. indicator of sustainability throughout the three stages of the OICAT. Results that relate to our first research question demonstrate that in the first stage (BIG individually) SME employees on average generated business ideas that related to less than one sustainable business model archetype from the eight mutually not exclusive categories. Due to the scarcity of empirical studies in the field, literature at this point does not offer basis for comparison or interpretation. Notwithstanding, this score could peak on eight and 370 business ideas did not relate to any archetypes. It is indisputable that work awaits to improve the competence of OI for sustainability of SME intrapreneurs. Differences in the degree of sustainability of ideas after stage 1 could not be explained by prior knowledge on the natural/communal environment, nor by prior knowledge on entrepreneurship.

Regarding our second research question we observed that the sustainability score, i.e. flexibility of self-generated business ideas increased along the idea trail and by the end of the opportunity identification funnel, 94% of the ideas were discounted and the flexibility score rose to 134% compared to the initial stage. The ‘best’ ideas after stage 3 related to 1,32 sustainable model archetypes on average. Similar to the individual level, differences in degree of sustainability could not be explained by prior knowledge on group level either.

In order to unveil the variables that do influence the flexibility scores in the first three stages, i.e. BIG individually and BIE individually and on group level, we suggest delving further into the motivational and moral aspects of intrapreneurs. It appears that the self-efficacy score from the OICAT is an intriguing place of departure. In addition, we urge future researchers to consistently adapt a holistic model for OI so that findings could be successfully compared and integrated. Our belief is that following through the suggested research agenda could substantially help businesses direct their efforts and utilize their social capital to transition towards a sustainable future. By understanding the competences of

intrapreneurs to innovate for SD and the variables that are at play, managers and leaders of corporations could mix and match intrapreneurs and teams for the greater good. In our work we drew on multiple scientific fields and outlined various theoretical and practical suggestions on how to ignite the fire of rapid transition on the path towards sustainable development.

Our research provides actionable insights about how to shape and equip conscious and responsible change agents so that the transition towards SD becomes a reality rather than a dream. The study's implications are therefore not only important for SMEs and educational institutions but also for humanity. We stand by the notion that SMEs and their change agents have a massive potential in tackling contemporary environmental challenges once they are equipped with the right tools and are placed in appropriate circumstances. To unlock their true potential, it seems however, that more support is required from businesses and further research from the scientific field. We sincerely hope to have effectively contributed by mapping out the OICAT's intrapreneurial journey with the Opportunity Identification Funnel and delineating theoretical and practical suggestions for scientists and practitioners.

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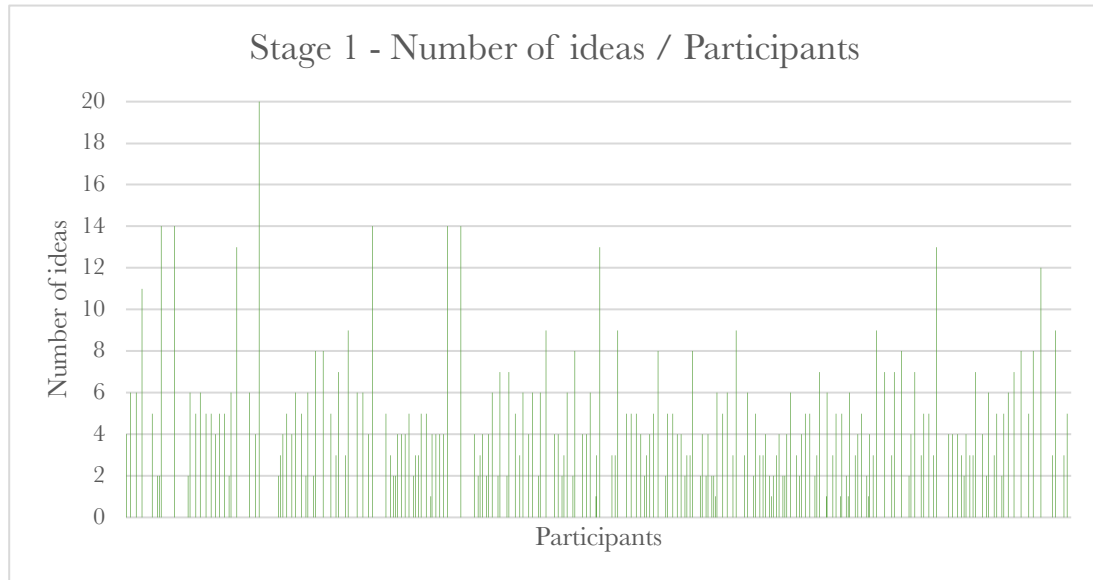
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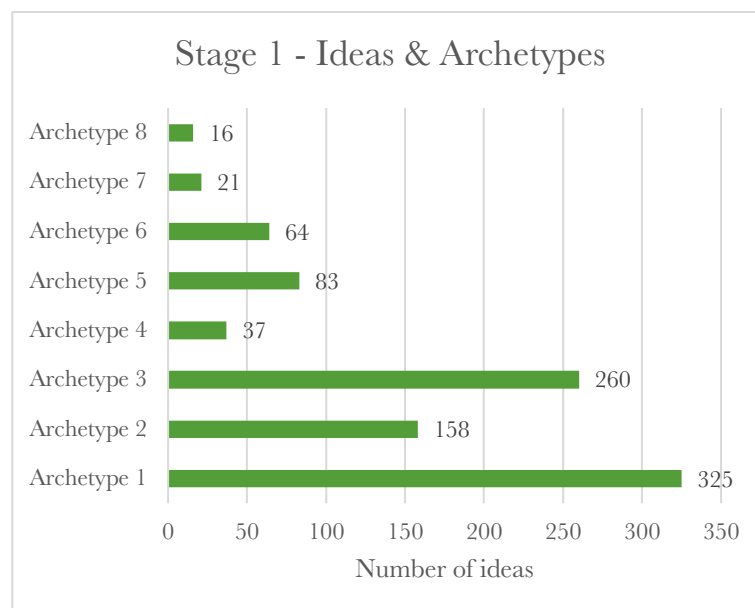
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8. APPENDICES

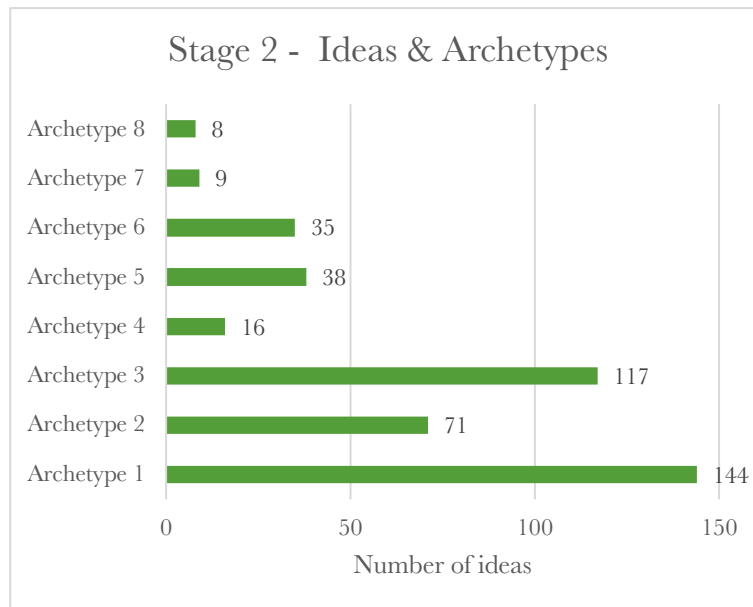
8.1. SUPPORTING GRAPHS, CHARTS, TABLES



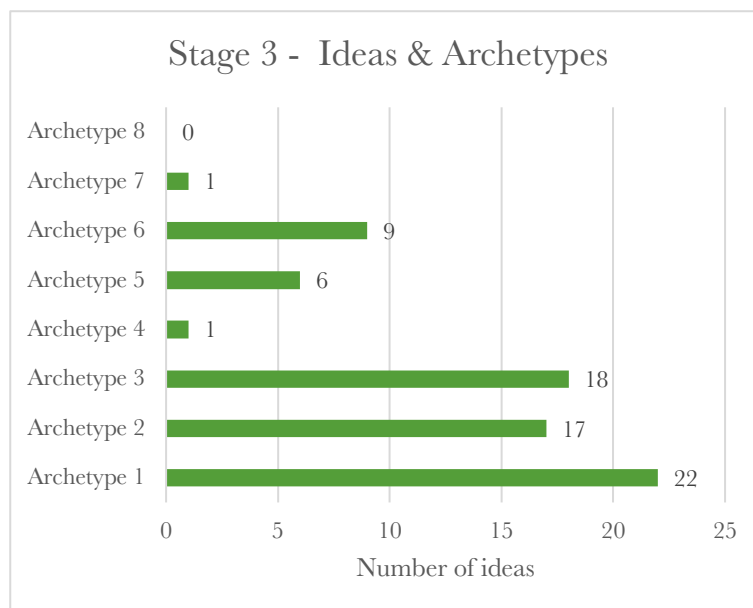
Graph 14: Stage 1 - Number of ideas / participants



Graph 15: Stage 1 – Ideas/ Archetypes



Graph 16: Stage 2 – Ideas/ Archetypes



Graph 17: Stage 3 – Ideas/ Archetypes

8.2. CODEBOOK: A LIST OF ALL QUESTIONS THAT WERE USED FROM THE OICAT QUESTIONNAIRE

Name	Sum	Category	Original Question
SQ1	Sustainable Development	Natural /communal environment	Hoeveel kennis had u over duurzaamheid voordat u meedeed aan dit onderzoek?
SQ2	Affordable and adequate food supply	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Betaalbare en adequate beschikbaarheid van voedsel
SQ3	Decent housing	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Fatsoenlijk onderdak
SQ4	Energy	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Energie
SQ5	Climate change	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Klimaatverandering
SQ6	Economic wealth	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Economische gezondheid
SQ7	Education	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Onderwijs
SQ8	Sustainable water supplies	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Duurzame waterlevering
SQ9	Personal health and safety	Natural /communal environment	Hoeveel kennis had u over de volgende duurzaamheidsthema's voordat u meedeed aan dit onderzoek? Persoonlijke gezondheid en veiligheid
EQ1	Involved in E venture in 12 months	Entrepreneurship	Hoe waarschijnlijk is het dat u betrokken zult zijn bij het starten van een onderneming... In de komende 12 maanden
EQ2	Involved in E venture in 5 years	Entrepreneurship	Hoe waarschijnlijk is het dat u betrokken zult zijn bij het starten van een onderneming... In de komende 5 jaar
EQ3	Involved in E venture in 10 years	Entrepreneurship	Hoe waarschijnlijk is het dat u betrokken zult zijn bij het starten van een onderneming... In de komende 10 jaar
EQ4	Involved in E venture sometime in your life	Entrepreneurship	Hoe waarschijnlijk is het dat u betrokken zult zijn bij het starten van een onderneming... Ooit in uw leven
EQ5	Involved in E venture now	Entrepreneurship	Bent u op dit moment eigenaar van een onderneming?
EQ6	Involved in E venture in the past	Entrepreneurship	Bent u in het verleden eigenaar geweest van een onderneming?
EQ7	Familiarity with BMC	Entrepreneurship	Was u al bekend met het Business Canvas Model voordat u meedeed aan dit onderzoek?
EQ8	Involvement in innovation activities at work	Entrepreneurship	In welke mate bent u in uw werk betrokken bij activiteiten gerelateerd aan innovatie?

8.3. DETAILED CORRELATION MATRIX TABLES

8.3.1. Individual- level correlation matrix

Variables	SQ1 - Sustainable Development	SQ2 - Affordable and adequate food supply	SQ3 - Decent housing	SQ4 - Energy	SQ5 - Climate change	SQ6 - Economic wealth	SQ7 - Education	SQ8 - Sustainable water supplies	SQ9 - Personal health and safety	SQ Composite	EQ1 - Involved in E venture in 12 months	EQ2 - Involved in E venture in 5 years	EQ3 - Involved in E venture in 10 years	EQ4 - Involved in E venture sometime in your life	EQ5 - Involved in E venture now	EQ6 - Involved in E venture in the past	EQ7 - Familiarity with BMC	EQ8 - Involvement in innovation activities at work	Number of ideas / Group	Individual's Composite Flexibility Score
SQ1 - Sustainable Development	1.00																			
SQ2 - Affordable and adequate food supply	0.47	1.00																		
SQ3 - Decent housing	0.39	0.46	1.00																	
SQ4 - Energy	0.62	0.33	0.37	1.00																
SQ5 - Climate change	0.55	0.36	0.36	0.69	1.00															
SQ6 - Economic wealth	0.32	0.34	0.24	0.39	0.41	1.00														
SQ7 - Education	0.38	0.29	0.32	0.32	0.37	0.51	1.00													
SQ8 - Sustainable water supplies	0.42	0.29	0.43	0.47	0.50	0.21	0.38	1.00												
SQ9 - Personal health and safety	0.37	0.45	0.41	0.47	0.49	0.28	0.35	0.35	1.00											
SQ Composite	0.75	0.65	0.65	0.73	0.76	0.63	0.65	0.64	0.59	1.00										
EQ1 - Involved in E venture in 12 months	-0.03	0.07	0.03	-0.02	-0.01	0.08	0.03	0.11	0.04	0.05	1.00									
EQ2 - Involved in E venture in 5 years	0.09	0.17	-0.01	0.10	0.06	0.24	0.11	0.13	0.02	0.16	0.74	1.00								
EQ3 - Involved in E venture in 10 years	0.22	0.19	0.01	0.17	0.12	0.12	0.14	0.08	0.09	0.05	0.18	0.54	0.82	1.00						
EQ4 - Involved in E venture sometime in your life	0.19	0.07	-0.02	0.12	0.09	0.13	0.08	0.05	0.03	0.12	0.48	0.69	0.83	1.00						
EQ5 - Involved in E venture now	0.04	0.02	-0.01	0.04	0.05	0.09	0.10	0.14	0.00	0.08	0.08	0.08	0.14	0.06	1.00					
EQ6 - Involved in E venture in the past	0.03	0.02	-0.02	-0.09	-0.08	0.02	-0.03	0.03	0.04	-0.01	0.11	0.11	0.12	0.11	0.19	1.00				
EQ7 - Familiarity with BMC	0.19	0.14	0.07	0.02	0.06	0.08	0.08	-0.05	0.09	0.11	0.19	0.23	0.20	0.28	0.02	-0.01	1.00			
EQ8 - Involvement in innovation activities at work	0.18	0.17	0.04	0.20	0.16	0.08	0.16	0.07	0.18	0.21	0.11	0.10	0.20	0.19	0.14	0.02	0.16	1.00		
Number of ideas / Individual	0.15	0.13	-0.03	0.13	0.15	0.06	0.07	-0.04	0.03	0.11	0.03	0.07	0.06	0.04	0.00	-0.01	-0.03	0.19	1.00	
Individual's Composite Flexibility Score	0.14	0.09	0.05	0.18	0.26	0.05	0.01	0.21	0.10	0.18	0.04	0.06	0.17	0.12	0.06	0.02	0.07	0.09	-0.05	1.00

8.3.2. Group-level correlation matrix

Variables	SQ1 - Sustainable Development t	SQ2 - Affordable and adequate food supply	SQ3 - Decent housing	SQ4 - Energy	SQ5 - Climate change	SQ6 - Economic wealth	SQ7 - Education	SQ8 - Sustainable water supplies	SQ9 - Personal health and safety	SQ Composite	EQ1 - Involved in E venture in 12 months	EQ2 - Involved in E venture in 5 years	EQ3 - Involved in E venture in 10 years	EQ4 - Involved in E venture sometime in your life	EQ5 - Involved in E venture now	EQ6 - Involved in E venture in the past	EQ7 - Familiarity with BMC	EQ8 - Involvement in innovation activities at work	Number of Ideas / Group	Group's Composite Flexibility Score
SQ1 - Sustainable Development	1.00																			
SQ2 - Affordable and adequate food supply	0.33	1.00																		
SQ3 - Decent housing	0.22	0.51	1.00																	
SQ4 - Energy	0.46	0.28	0.34	1.00																
SQ5 - Climate change	0.61	0.39	0.43	0.68	1.00															
SQ6 - Economic wealth	0.29	0.33	0.26	0.38	0.37	1.00														
SQ7 - Education	0.52	0.30	0.31	0.37	0.47	0.54	1.00													
SQ8 - Sustainable water supplies	0.40	0.37	0.53	0.55	0.53	0.14	0.27	1.00												
SQ9 - Personal health and safety	0.45	0.21	0.13	0.20	0.40	0.13	0.35	0.16	1.00											
SQ Composite	0.71	0.65	0.69	0.69	0.81	0.57	0.69	0.69	0.50	1.00										
EQ1 - Involved in E venture in 12 months	0.04	-0.05	-0.04	-0.11	0.00	0.07	-0.10	0.04	-0.02	-0.03	1.00									
EQ2 - Involved in E venture in 5 years	0.04	0.04	-0.12	-0.03	-0.11	0.09	-0.07	-0.04	-0.10	-0.05	0.82	1.00								
EQ3 - Involved in E venture in 10 years	0.06	-0.02	-0.20	0.00	-0.08	-0.10	-0.19	-0.13	0.06	-0.11	0.70	0.86	1.00							
EQ4 - Involved in E venture sometime in your life	0.14	-0.08	-0.08	0.04	0.02	-0.04	-0.13	-0.09	0.07	-0.04	0.66	0.78	0.90	1.00						
EQ5 - Involved in E venture now	0.10	-0.01	0.18	0.19	0.10	0.07	0.24	0.30	-0.03	0.19	0.25	0.29	0.16	0.08	1.00					
EQ6 - Involved in E venture in the past	0.01	-0.11	-0.30	-0.21	-0.24	-0.04	-0.02	-0.21	-0.08	-0.21	0.35	0.37	0.32	0.24	0.21	1.00				
EQ7 - Familiarity with BMC	0.05	0.06	0.13	-0.20	-0.09	-0.02	-0.04	-0.16	0.13	-0.03	0.41	0.35	0.45	0.39	0.11	0.25	1.00			
EQ8 - Involvement in innovation activities at work	0.30	-0.02	0.00	0.29	0.27	-0.15	0.09	0.11	0.34	0.19	0.07	0.04	0.22	0.33	0.02	-0.02	0.01	1.00		
Number of Ideas / Group	0.01	0.25	0.06	0.03	0.03	-0.13	0.05	0.02	-0.03	0.05	0.02	0.02	-0.01	-0.04	-0.13	-0.05	-0.21	0.14	1.00	
Group's Composite Flexibility Score	0.14	-0.03	0.22	0.29	0.34	-0.15	0.00	0.34	0.24	0.23	0.14	-0.07	0.08	0.22	0.44	-0.08	0.12	0.49	-0.08	1.00