

The return of the Jedi in entrepreneurship?!

Developing a validated competence framework for
sustainable entrepreneurship and exploring the
specific role of moral competencies in the sustainable
entrepreneurial process

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The title of this dissertation states: “The return of the Jedi in entrepreneurship?!”. One who is familiar with the Star Wars phenomenon is likely to associate the Jedi with the good trying to overcome the bad. Here the return of the Jedi refers to the promise that entrepreneurship holds for a transformation towards a (more) sustainable economy. Sustainable entrepreneurs act as change agents that, through their entrepreneurial behavior, try to transform existing (unsustainable) products and processes into more sustainable ones. Nevertheless, it is not clear what enables these sustainable entrepreneurs to bring about this change. Therefore, unravelling what enables these sustainable entrepreneurs is a central aspect of this dissertation. It is expected that competencies for sustainable entrepreneurship are important enablers for sustainable entrepreneurs. As a result, this dissertation reports on the importance and enactment of competencies for sustainable entrepreneurship in sustainable entrepreneurial processes. This is done in three ways. First, by providing clarity on which competencies constitute the heart of sustainable entrepreneurship. Secondly, by investigating the enactment of the competencies in the very first stage of the entrepreneurial process, namely opportunity recognition for sustainable development. Thirdly, by analysing the enactment of the competencies for sustainable development in relation to six critical moments in the entrepreneurial decision making process. The overarching aim of this dissertation is therefore to provide insights in the enactment of competencies for sustainable entrepreneurship in sustainable entrepreneurial processes and unravel the so called ‘black box’ that surrounds the concept of sustainable entrepreneurship. Related to the aim of this thesis, the following central research question is addressed in this dissertation: *What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes?*.

This thesis begins with an introduction to the competence framework for sustainable entrepreneurship. The competence framework for sustainable entrepreneurship is the focal point of departure in this dissertation and therefore there needs to be consensus on which competencies should be included in a framework of competencies for sustainable entrepreneurship, and what the validity of such a framework is. Once this is established, there is room to zoom in on specific competencies that are distinctive for sustainable entrepreneurship. As sustainable entrepreneurship is a value oriented and normative concept, moral competencies seem to be of particular importance in the process of recognizing opportunities for sustainable development, and are therefore focused upon. Finally, this thesis will end with an analysis of how the competencies for sustainable entrepreneurship are enacted within critical moments of the decision making process of sustainable entrepreneurs.

This first chapter will provide an overview of the main concepts, the problem statement, sub-research questions, sample and detailed outline of the dissertation. The main theoretical concepts that

are central to this dissertation are sustainable entrepreneurship, competencies for sustainable entrepreneurship and opportunity recognition for sustainable development. The next sections provide an overview of the literature and positions this dissertation within the current debates that are present in the discussion of each of these concepts.

1.2 Sustainable entrepreneurship

1.2.1 Theories on sustainable entrepreneurship

Global climate change and the accelerating depletion of natural resources are just two of several phenomena indicating that the world is not well aligned with the concept of sustainable development (Brundtland, 1987). The severity of global sustainability challenges has led to an increasing awareness that incremental solutions will not be enough to maintain critical levels of natural and social capital (Russo, 2003) and hence there is an increased interest in sustainable entrepreneurship as a phenomenon and a research topic (Cohen & Winn, 2007; Dean & McMullen, 2007). The relationship between entrepreneurship and sustainable development has been addressed by various streams of thought and literature such as eco-preneurship, social entrepreneurship, institutional entrepreneurship and sustainable entrepreneurship (Schaltegger & Wagner, 2011). This dissertation is centred around the concept of sustainable entrepreneurship. Early conceptions of this link between entrepreneurship and sustainable development stem from theories based on an economics or market failure perspective. Traditional theories from environmental and welfare economics largely concluded that market failures within the economic system not only prevent entrepreneurial action from resolving environmental problems but actually motivate environmentally degrading entrepreneurial behaviours (Pigou, 1932; Cropper & Oates, 1992). More specifically, this stream of literature states that, because of the unique characteristics of many environmental resources, certain obstructions to their efficient allocation in the market system exist, and, as a result, entrepreneurial action will not protect and preserve valuable environmental resources (Pigou, 1932; Dorfman, 1983). From a practical perspective, this argument has led to policy and research that focuses on regulatory intervention as the primary solution to environmentally relevant market failures and has created a general lack of knowledge about the means by which entrepreneurs can help solve environmental challenges (Pigou, 1932; Dorfman, 1983). This has however not held back recent developments in the field that focus less on the market system, but more on the individual processes and characteristics of these sustainable entrepreneurs.

As a result, nowadays entrepreneurship is increasingly identified as a catalyst for solutions to sustainability problems (York & Venkataraman, 2010; Dean & McMullen, 2007). Whereas conventional entrepreneurship is more associated with counteracting sustainable development, as almost everything

is subordinate to the bottom line, sustainable entrepreneurial action is seen as a promising way to preserve ecosystems, counteract climate change, reduce environmental degradation, improve agricultural practices, and maintain biodiversity (Cohen & Winn, 2007; Dean & McMullen, 2007; Patzelt & Shepherd, 2011). The central idea behind the development of sustainable ventures is that the activities performed by entrepreneurs in the pursuit of gains must not undermine the ecological and social environments in which they operate; and when necessary, they must restore or nurture such environments towards recovering the balance between the environment, society and economic activity and is referred to as the triple bottom line (Parrish, 2010; Patzelt & Shepherd, 2010; Schaltegger & Wagner, 2011). This and other definitions of sustainable entrepreneurship (e.g. Dean & McMullen, 2007; Hockerts & Wüstenhagen, 2010; Pacheco et al., 2010) resonate with mainstream sustainability ideas. Ultimately, its overarching aim is to balance the competing demands for environmental protection and economic development, emphasizing economic, ecological and social goals in equal degrees (Patzelt & Shepherd, 2010).

1.2.1 Sustainable entrepreneurs

In the work of Young and Tilley (2006) sustainable entrepreneurship is embodied by someone “who holistically integrates the goals of economic, social and environmental entrepreneurship into an organization that is sustainable in its goal and sustainable in its form of wealth generation” (p. 88). Sustainable entrepreneurs balance the triple bottom line, by balancing economic health, social equity and environmental resilience through their entrepreneurial behaviour (Kuckertz & Wagner, 2010). Sustainable entrepreneurs are often referred to as change agents for sustainability. According to Svanström et al. (2008) a successful change agent for sustainability must have knowledge of environmental-, of economic- and of social issues related to sustainability. Furthermore, the change agent must have a value system to support their actions. This value system is a necessary condition that separates conventional entrepreneurs from sustainable entrepreneurs. Addressing sustainability problems and recognizing sustainable business opportunities requires to go beyond descriptive questions of how complex social-ecological systems have evolved, how they are currently functioning, and how they might further develop (Swart et al. 2004; Rockström et al., 2009; Wiek et al., 2011). It deals with how social-ecological systems *ought* to be developed in order to achieve a balance between economic, social and environmental aspects in business practices. Therefore, the concept of sustainability can be characterized by its value oriented and also normative character. Individuals who are involved in sustainable development do not only feel responsible, they also take responsibility and act upon their values and norms. In addition, the sustainable entrepreneur must have the ability to perform sustainability tasks. Therefore, the difference between conventional entrepreneurs and

sustainable entrepreneurs is not just about the difference in the nature of the opportunity to be exploited, but also has to do with the value oriented character of the decisions made which entails making the trade-off between economic, social and environmental values without, a priori, choosing one over another – even if this entails tensions and conflicts (Hahn et al., 2014). Therefore, it is not just the sustainable entrepreneurial object (i.e. product, service, method of production, etc.) that serves a different goal than that of conventional entrepreneurs. Also the entrepreneurial process as such seems to imply that sustainable entrepreneurs require different skills, knowledge and values which enable them to achieve sustainability goals through their entrepreneurial actions.

Research on different types of skills and knowledge to deal with sustainability issues or challenges meanders across various contexts, varying from organisation level studies to individual level studies. For instance in the domains of environmental issue management and corporate social responsibility the level of analysis is commonly the company. Here, knowledge and skills to deal with sustainable development are usually described by organisational level competencies or dynamic capabilities (Ramachandran, 2001; Heugens, 2006; Nijhof et al., 2005). Even though the level of analysis in these studies is the company, it is acknowledged that these organisational level competencies or dynamic capabilities are a product of individual level competencies that are enacted by individual employees (Heugens, 2006). As a result, studies on individual level competencies are rising in most fields that deal with sustainable development in a business context. Especially in the field of entrepreneurship, where the individual has a much bigger impact on the performance of the venture (because of the small size of start-up companies), a focus on individual level skills, knowledge and attitudes is dominant. But also in the field of individual competencies different approaches exist. The next section addresses the concept of individual competence and introduces a competence framework for sustainable entrepreneurship.

1.3 Individual competencies for sustainable entrepreneurship

1.3.1 Approaches to individual competence

In the behavioral-functionalistic or work-oriented approach, individual competencies are derived from detailed job descriptions that are central for accomplishing specific work tasks and then translating those activities into personal attributes (Sandberg, 2000). A job analysis refers to an investigation of an occupation, in which the analysis is centered around a number of jobs. The jobs are further broken down into a series of activities, which in turn are broken down into duties, tasks and sub-tasks. One basic criticism of the behavioral-functionalistic approach is that a list of work activities does not sufficiently

capture the underlying knowledge, skills and attitudes required to accomplish those activities efficiently (Eraut, 1994).

As a reaction to these critiques, the generic or worker-oriented approach to the concept of competence emerged (Eraut 1994; Sandberg, 2000). The generic approach views competence as a set of attributes possessed by workers, typically represented as knowledge, skills, attitudes and personal traits required for effective work performance. Researchers in this approach focus on observing successful and effective job performers to determine how these individuals differ from less successful performers. One of the strengths of this approach to competence is that much effort has been put into testing it on a large scale with a wide variety of practitioners, using a wide range of psychometric techniques to measure the reliability and validity of the constructs (e.g. Bartram, 2005). However, the competence profiles resulting from this approach are often too general, thereby losing the context-specificity of the competencies and are therefore difficult to use in professional practice (Eraut, 1994; Osagie et al., 2015). Both the work-oriented and worker-oriented approach fall short in addressing the situated nature of professional practice (e.g. Brown et al., 1989); this is problematic since people and their world(s) are inextricably related: workers and their work blend together in the execution of activities, with workers experiencing them and making sense of them (Sandberg, 2000).

Over the last two decades there has been a continuous search for more comprehensive conceptualizations of competence in order to contrast them clearly with the disintegrative and reductionist models of competence described above. Comprehensive in this sense refers to the integrated and internalized capability conditional for accomplishing task performance, problem solving and functioning within a specific position and context (Mulder, 2017). From this comprehensive perspective competence is defined as “the generic, integrated and internalized capability to deliver durable effective performance in a certain professional domain, job, role, organizational context, and task situation” (Mulder, 2014, p. 111). Competency, or the plural competencies are the constituents of competence, which refers to coherent clusters of knowledge, skills and attitudes which can be utilized in real performance contexts. This comprehensive approach to competence will be followed in this dissertation. An important characteristic of competence is that it is a latent construct, meaning that not all competence is continuously present in performance. For instance, the mere fact that a person is able to act entrepreneurial with regards to sustainable development, does not mean this person is actually acting entrepreneurial all the time. Therefore, competence and its constituent competencies are latent constructs, meaning that assessing them always involves inference. Furthermore, competencies in the comprehensive approach are always context dependent, referring to them being constituted in relation to contextual factors (e.g. peers, networks, industry).

1.3.2 Competencies for sustainable entrepreneurship

Considerable, though mostly conceptual, efforts in describing competencies for sustainability professionals have been made over the last decade, mostly in an education for sustainable development context (Svanström et al., 2008; De Haan, 2006; Wiek et al., 2011; Rieckmann, 2012). Education for sustainable development (ESD) aims at enabling people to “not only acquire and generate knowledge, but also to reflect on further effects and the complexity of behavior and decisions in a future-oriented and global perspective of responsibility” (Rieckmann, 2012, p. 128). It is likely that these skills, attitudes and knowledge stem from individual competencies for sustainable development. Over the past few years, individual competencies for sustainable development have received much attention in the education for sustainability literature. (De Haan, 2006; Barth et al., 2007; Wiek et al., 2011; Rieckmann, 2012). Competencies such as foresighted or anticipatory thinking, systems thinking, interdisciplinary work and participation are considered as key competencies that warrant (additional) attention in higher education.

Critical questions can be raised regarding the conceptual nature of these studies as they lead to rather abstract academic descriptions of competencies (Delamare Le Deist & Winterton, 2005), which are more in line with the worker-oriented view on competence; focusing on generic descriptions and little attention for specific contexts. As a result, competence descriptions from the education for sustainability literature are usually decontextualized because competence lists are meant to be study program overarching, crossing various educational contexts and curricula. The reality, however, is that sustainability challenges and tasks often become meaningful in one’s specific work environment. Therefore, the work context is also an important factor to take into account in the field of sustainable development.

As a reaction to these critical remarks, several scholars have identified and studied competencies for sustainable development which are enacted in a specific work context and embrace a comprehensive approach to competence (Hesselbarth & Schaltegger, 2014; Osagie et al., 2015; Wesselink et al., 2015; Lans et al., 2014). In today’s society different types of work contexts for change agents in the field of sustainable development can be distinguished. For instance, CSR managers, sustainable intrapreneurs, sustainable development champions and sustainable entrepreneurs all play a key role in bringing about change to companies and society as a whole. Competencies identified in relation to specific change agent’s context are usually combinations of the key competencies for sustainable development mentioned above and key competencies identified in management and entrepreneurship literature (Hesselbarth & Schaltegger, 2014).

To bridge the gap between conceptual and empirical research on competencies for sustainable entrepreneurship, Lans et al. (2014) developed a competence framework for sustainable entrepreneurship. This framework specifically addresses competencies for sustainable entrepreneurship and consists of key competencies from entrepreneurship literature and key competencies from education for sustainable development literature. For building on previous literature in this field, the competence framework as proposed by Lans et al. (2014) includes 7 key competencies which are described as follows:

1. **Systems thinking competence:** the ability to identify and analyze all relevant (sub)systems across different domains (people, planet, profit) and disciplines, including their boundaries. (Wiek et al., 2011).
2. **Embracing diversity and interdisciplinary competence:** the ability to structure relationships, spot issues, and recognize the legitimacy of other viewpoints in business decision making processes; be it about environmental, social and/or economic issues. (De Haan, 2010; Ellis & Weekes, 2008).
3. **Foresighted thinking competence:** the ability to collectively analyze, evaluate, and craft “pictures” of the future in which the impact of local and/or short term decisions on environmental, social and economic issues is viewed on a global/cosmopolitan scale and in the long term (Wiek et al., 2011).
4. **Normative competence:** the ability to map, apply and reconcile sustainability values, principles and targets with internal and external stakeholders, without embracing any given norm but based on the good character of the one who is involved in sustainability issues (Wiek et al., 2011; Blok et al. 2016).
5. **Action competence:** the ability to actively involve oneself in responsible actions for the improvement of the sustainability of social-ecological systems (De Haan, 2010; Mogensen & Schnack, 2010).
6. **Interpersonal competence:** the ability to motivate, enable, and facilitate collaborative and participatory sustainability activities and research (Wiek et al., 2011; Schlange, 2009).
7. **Strategic management competence:** the ability to collectively design projects, implement interventions, transitions, and strategies for sustainable development practices (De Haan, 2010; Wiek et al., 2011).

An overview of the questionnaire that is used throughout this dissertation is added to the general Appendix (see Table A1).

Knowing which kind of competencies enable successful task performance is important, but knowing how these competencies are enacted within entrepreneurial processes is also important. The essence of entrepreneurship is action (McMullen & Shepherd, 2006). From a process perspective, an opportunity is recognized, a business concept is formulated, resources are identified and acquired, a venture is launched, adjustments are made, and the venture eventually emerges. These actions must be accomplished in a context that has been characterized as ambiguous, uncertain, stressful, intense, lonely, volatile, exhilarating, and frustrating, among other descriptors (e.g. Krueger & Dickson, 1994; Morris et al., 2012). Arguably, the ability to launch and grow a sustainable enterprise under such conditions demands that an entrepreneur develops certain competencies. In order to investigate the role of the identified competencies for sustainable entrepreneurship described above in the development of a sustainable venture, the venture creation process needs to be narrowed down. In this dissertation the focus will be primarily on the very first stage of the venture creation process, namely opportunity recognition.

1.4 Opportunity recognition

Opportunity recognition lies at the heart of the entrepreneurial process, as the entrepreneurial process always starts with the identification of a potential business idea that could be explored and further developed into a new product, service or process (Shane & Venkataraman, 2000). As a result, the concept of opportunity has become central in entrepreneurship research (McMullen & Shepherd 2006; Shane & Venkataraman, 2000; Davidsson, 2015).

1.4.1 Origins of opportunity recognition

What opportunities are, and how they come into being, is (still) a topic of lively discussion in the literature (e.g. DeTienne & Chandler, 2004; Renko et al., 2012; Vogel, 2016; Gaglio & Winter, 2017). Some scholars argue that opportunities exist in the economic environment, waiting to be discovered (Comanys & McMullen, 2007). Others argue that opportunities are subjective entities, socially constructed and created by individuals (Sarasvathy et al., 2010). The position scholars choose has an impact on how opportunities and the process underlying their identification are defined and investigated.

In general, three main ongoing debates about opportunity recognition can be distinguished within the literature. First of all, contemporary economic theories underpin that entrepreneurial opportunities are associated with market failures (Kirzner, 1997). Nevertheless, market failures should not be confused with opportunities themselves (Grégoire et al., 2010a). Opportunities are about the possibility to act, to

do something about market failure dynamics in the hope of individual, firm, and social betterment. This is consistent with the proposition of Venkataraman et al. (2012) that “an entrepreneurial opportunity consists of the opportunity to create future economic artefacts and as such, involves a demand side, a supply side, and the means to bring them together” (pp. 652). This conceptualization of opportunity recognition will be followed in this dissertation.

The second debate on opportunity recognition deals with the question whether opportunities are objectively (Kirzner, 1997) or subjectively (Davidsson, 2015) perceived. The aim of this dissertation is not to debate the ontological nature of opportunities as fundamentally objective or subjective. We rather follow the suggestion made by Grégoire and colleagues (2010a) who conclude that “opportunity recognition rests on the subjective perception and interpretation of objective realities (e.g., market dynamics, new information, etc.)” (Grégoire et al., 2010a, pp. 118).

The third debate is focussed on the distinction between two intertwined phases of entrepreneurial action (McMullen & Shepherd, 2006; Shepherd et al., 2008). The first phase concerns the formation of subjective beliefs that an opportunity exists for those with the relevant abilities and means to exploit it (third person opportunity). The second concerns the evaluation of the opportunity for oneself, that is, whether one has the means and motivations to act on the opportunity (first person opportunity). This dissertation focusses mainly on the first phase, namely on the third person opportunity belief.

Furthermore, the position of opportunity recognition within the entrepreneurial process should be clarified. Recently, Vogel (2016) published a conceptual article on the venture creation process; more specifically on how ideas evolve into opportunities over time. He argues that the majority of existing frameworks of opportunity recognition do not build on the logic that venture ideas and venture opportunities are distinct constructs and that opportunities are developed from an initial idea over time. Figure 1.1 shows the complete venture creation process, in which opportunity recognition plays an important role.

This dissertation can be positioned in the venture idea generation part of the process. According to Vogel (2016), there are three triggers that can start the idea generation process, namely resource push (e.g., customer need), market pull (e.g., commercialising resources), and desire to start (e.g., entrepreneurial ambitions). He defined three paths via which ideas can be generated. The first of these paths is intentional idea generation: an individual actively searches for an idea because of a desire to do so (e.g., for product improvement). The second path is accidental discovery: an individual does not have the intention of generating an idea, yet occasionally finds one when looking for something else, or even accidentally.

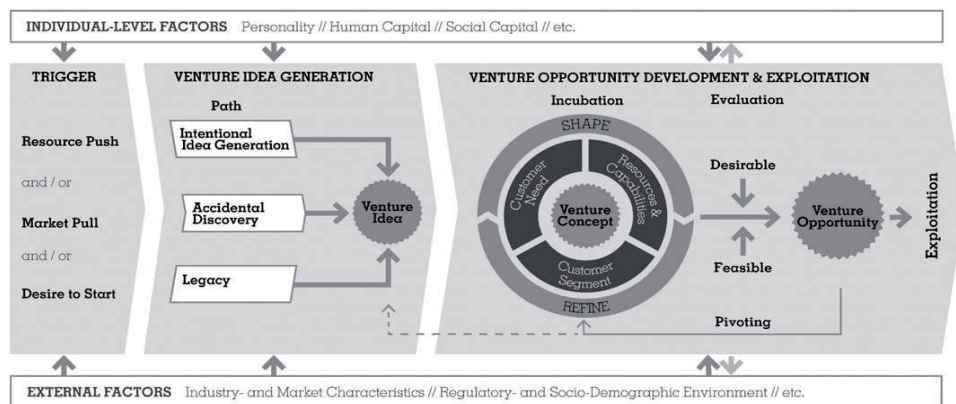


Figure 1.1. Overview of the process from venture idea to venture opportunity, as depicted by Vogel (2016).

The third path is legacy: an individual gets an idea from somebody else. In this dissertation the emphasis lies on the first path, as participants in the studies conducted in this thesis were asked to generate new ideas within the context of sustainability, leading to intentional generation of ideas. Thus idea generation, in this thesis, lays the foundation for opportunity recognition and is a measurable construct, whereas opportunity recognition as such is not easily measured. As the model also shows competencies for sustainable entrepreneurship are regarded as one of the individual level factors that influence the idea generation process.

Nevertheless, not all generated idea turn into actual venture opportunities. After a number of ideas are generated, the process continues and moves toward the incubation, evaluation and exploitation stages of the model. Together, incubation, evaluation and exploitation are sub-stages of “venture opportunity development and exploitation” in the model of Vogel (2016). What role the competencies for sustainable entrepreneurship play in these later stages of the opportunity recognition process is beyond the scope of this dissertation.

1.4.2 Opportunity recognition for sustainable development

In this dissertation the focus is on opportunity recognition for sustainable development. Sustainability can be conceptualized as a result of acting upon market failures, and market failures can be seen as sources of new entrepreneurial business opportunities. The competencies for sustainable entrepreneurship are seen as supporting the recognition of opportunities. As a result of acknowledging sustainability as a source of opportunities (Dean & McMullen, 2007), some efforts have been made in research to a) provide an overview of the opportunity recognition process specifically for sustainable

development and b) to indicate those key elements that make the difference between regular opportunity recognition and opportunity recognition for sustainable development (Dean & McMullen, 2007; Patzelt & Shepherd, 2011).

One of the most widely used models on opportunity recognition for sustainable development is developed by Patzelt & Shepherd (2011). Figure 1.2 provides an overview of this model. The model emphasizes the role of prior knowledge (of the natural and/or communal environment and of entrepreneurship) in combination with a sense of perceived threat to the environment and the level of altruism towards others, as facilitators for being able to recognize opportunities for sustainable development (Patzelt & Shepherd, 2011).

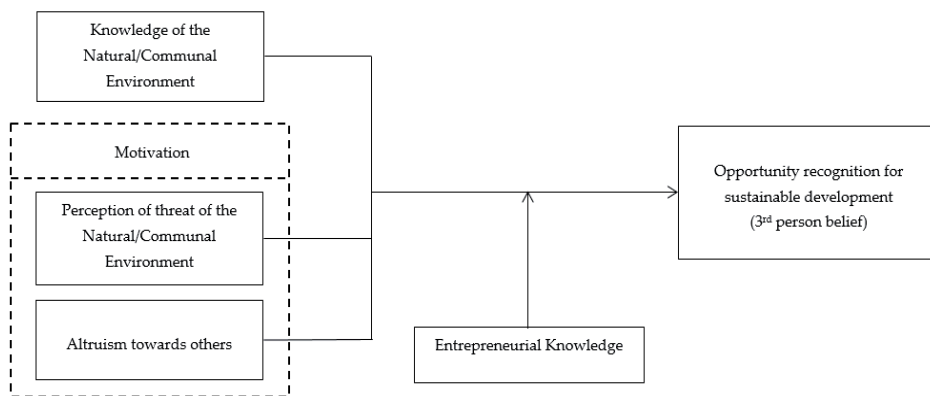


Figure 1.2. Overview of the model on opportunity recognition for sustainable development by Patzelt and Shepherd (2011)

In their conceptual model, Patzelt and Shepherd (2011) focus on the role of knowledge and motivation as explanatory factors of the opportunity recognition for sustainable development process. Within the motivational aspect of their model, Patzelt and Shepherd (2011) underpin the importance of altruism as a normative element in the model. Dealing with sustainability is not only about applying the right formulas and policies to help improve our current wealth, but also about taking responsibility of equally distributing well-being, sacrifice and risks between rich and poor, humans and non-humans and present and future generations (Blok et al., 2016). The concept of sustainable entrepreneurship can therefore be characterized by its normative character and individual ethical values and norms seem to be essential for sustainable entrepreneurship and can be seen as an important driver in recognizing opportunities for sustainable development (Lans et al., 2014; Blok et al., 2016). Sustainable entrepreneurs act as moral agents facing a moral entrepreneurial imperative every time sustainability problems are considered or

interpreted as venture opportunities (Muñoz & Dimov, 2015). The role of these normative values and norms is becoming more important in current models of sustainable entrepreneurship (Blok et al., 2016), but is still under researched. Therefore, this dissertation has a specific focus on these normative values and norms.

1.5 Problem statement

Sustainable entrepreneurs try to manage the triple bottom line, by balancing economic health, social equity and environmental resilience through their entrepreneurial behaviour (Kuckertz & Wagner, 2010). Sustainable entrepreneurship is thus associated with the promise of more traditional concepts of entrepreneurship such as gaining economic values, but also brings additional potential both for society and the environment. Even though it is often stated that the triple bottom line is managed by individuals, open ended problems like sustainability issues require difficult and complex decision making processes that are not easy to manage. In line with this, Gibbs (2009) refers to the concept of sustainable entrepreneurship as a 'black box', meaning that economic, social and environmental values and goals are combined in entrepreneurial processes regarding sustainability issues, but does not get at how (and even if) this is achieved. Focusing on competencies that can enable individuals to achieve this balance between people, profit and planet, helps in understanding this process.

As a result, several research issues can be pointed out. First, studies on which competencies could be considered as key competencies to achieve a balance between people, profit and planet are numerous. Interesting to see is that although many scholars warn for the production of endless laundry lists of competencies, the reality is that scholars continue to do so and that real consensus on which competencies constitute sustainable entrepreneurial competence is lacking. In addition, due to the conceptual nature of most of these studies, the lists of competencies are usually rather abstract academic descriptions of competencies (Delamare Le Deist & Winterton, 2005). There is a need for research that empirically addresses the validity of such lists of competencies. Second, the difference between conventional entrepreneurs and sustainable entrepreneurs seems to lie in the value oriented character that is dominant in sustainable entrepreneurship. Nevertheless, the role of moral competencies is under researched and should be more central in research on sustainable entrepreneurship. Third and final, moving from the 'which' question to the 'how' question remains problematic. There is a need for research that empirically addresses the actual enactment of these competencies by professionals in the field and relating the competencies with performance measures like opportunity recognition for sustainable development and with decision making processes. However, measuring opportunity recognition (for sustainable development) is challenging and still under debate. This dissertation will address these four main research issues in more detail.

1.6 Research aim and questions

The aim of this dissertation is therefore to provide insights in the enactment of the competencies for sustainable entrepreneurship in the sustainable entrepreneurial process and to contribute to unravelling the so called 'black box' that surrounds the concept of sustainable entrepreneurship. To unravel some of the underlying processes we will focus on validating a competence framework for sustainable entrepreneurship and exploring the role of moral competence within this framework and within opportunity recognition for sustainable development. Furthermore, the aim is to provide insights on the 'how' question by focusing on the actual enactment of competencies for sustainable entrepreneurship in decision making processes. The central research question: *What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes?*, addresses the aim of this dissertation.

In order to answer the central research question and to address the different aims of this dissertation, five sub-questions are formulated and are discussed in detail in the following chapters.

To start with, it needs to be clear which competencies are included in the competence framework for sustainable entrepreneurship and what the validity of such a framework is. Therefore the following sub-question is formulated: *"What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?"*. In relation to the validity question, a second sub-question is developed and is formulated as follows: *"How do key competencies for sustainable entrepreneurship relate to well-known antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?"*.

Secondly, to provide insights in whether ethical norms and values are distinctive for sustainable entrepreneurship, it needs to be examined whether and which moral norms and values are important in recognizing opportunities for sustainable development. This has led to the third sub-question: *"which individual moral antecedents play a role in the entrepreneurial process of opportunity recognition for sustainable development?"*.

After it has been identified which moral antecedents play a role in the entrepreneurial process, it can be further explored how moral competencies are enacted in the process of recognizing opportunities for sustainable development. This is translated in the fourth sub-question: *"How is moral competence enacted in the early stage of the sustainable entrepreneurial process?"*.

To bring everything together, the actual enactment of the competence framework for sustainable entrepreneurship in decision making processes of sustainable entrepreneurs should be researched. This has led to the fifth and final sub-question: *"How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?"*.

The relation between the sub-questions, research aims and chapters in this dissertation is explained in the next section.

1.7 Outline of this dissertation

This dissertation reports on the central research question and related sub-question stated above. The point of departure for all remaining chapters is the competence framework for sustainable entrepreneurship. Before taking any steps towards exploring relationships between the competence framework and output measures like opportunity recognition and decision making processes, the validity of the competence framework for sustainable entrepreneurship should be further analysed. Previous research made an first attempt in establishing the validity of the framework (e.g. Lans et al., 2014), but some steps still have to be made in order to establish the validity of the competence framework for sustainable entrepreneurship.

Therefore, the validity of the competence framework for sustainable entrepreneurs is assessed in Chapter 2. Sub-questions one and two are answered in this chapter. The chapter begins with an in-depth introduction to the variety of research that reports on competencies for sustainable development in a work-context. The choice for the competence framework as developed by Lans et al. (2014) is explained and the framework is discussed. The goal of this chapter is a first test to *assess the empirical robustness* of this framework by means of Confirmatory Factor Analysis. The construct validity of the competence framework for sustainable entrepreneurship was tested in higher education. The students that participated in the study (n=402) were enrolled in a specific entrepreneurship module, which enabled us to study these competencies in the earliest stages of entrepreneurship and label them as latent or would-be entrepreneurs. They have the intention to become entrepreneurs themselves, but the majority of them are not actual (sustainable) entrepreneurs yet. The results of this study help in moving away from developing more laundry lists of key competencies and provides a solid foundation for a six factor competence framework for sustainable entrepreneurship.

Chapter 2 assists in further strengthening the assessment of sustainable entrepreneurship competencies: it provides provisional insight into its nomological network (e.g. its relation with entrepreneurial self-efficacy and intentions). In Chapter 3 this is taken one step further. From literature it can be concluded that opportunity recognition for sustainable development is at least dependent on altruistic motivations (Patzelt & Shepherd, 2011). Chapter 3 dives into the model developed by Patzelt and Shepherd (2011) and introduces, next to competencies from the validated competence framework, other moral antecedents that could be related to opportunity recognition for sustainable development. Hence, the role of different moral antecedents in the opportunity recognition process is researched in Chapter 3. This relates to sub-question three. The aim of the chapter is to *explore* which moral

antecedents could be related to opportunity recognition for sustainable development. This study also enabled further testing of the nomological network of the competence framework, thus strengthening the validity of the competence framework. In this study in higher education, 96 would-be entrepreneurs were subjected to a case study in which they were guided through different assignments. These assignments entail for instance tests that measure the different moral antecedents, and assignments where respondents were subjected to an idea generation case. The results of this study help in re(de)fining the model on opportunity recognition for sustainable development by Patzelt and Shepherd (2011) and provide stepping stones for further research on the specific role of moral competencies.

The specific role and enactment of the two moral competencies in opportunity recognition for sustainable development is further *explored* in Chapter 4. In this chapter the fourth research question is central and the chapter starts zooms in on two moral competencies that are part of the competence framework for sustainable entrepreneurship. This chapter reports on two separate studies. In the first study the two moral competencies are quantitatively assessed in relation to opportunity recognition for sustainable development and in relation to the possible influence of entrepreneurial self-efficacy. The second study is a follow up on the results that have been presented in Chapter 3. In Chapter 3 it was concluded that normative competence and strategic action competence are related to idea generation for sustainable development. In this chapter it is explored how the two competencies are enacted in this process of idea generation for sustainable development, by qualitatively analysing whether elements of the two competencies are mentioned in the answers on idea generation by the respondents. The results provide insights in the 'how' question and contributes to understanding the specific and unique role of moral competencies for sustainable entrepreneurship.

All previously mentioned chapters are conducted in higher education, which has led to new and useful insights in 1) which competencies constitute a valid competence framework for sustainable entrepreneurship, 2) what role moral competencies have in recognizing opportunities for sustainable development and 3) how these moral competencies are enacted in recognizing these opportunities.

Chapter 5 ties everything together by *explaining* how sustainable entrepreneurs deal with sustainable development through their entrepreneurial behavior by researching the enactment of the competence framework for sustainable entrepreneurship in decision making processes in a sample of *actual* sustainable entrepreneurs who are in more advanced stages in the entrepreneurial process. The decision making process is characterized by six critical moments that have been identified in the literature (e.g. Maine et al., 2015). In total 33 sustainable entrepreneurs located in the Netherlands participated in this study. The competence framework which is validated and used in chapters 2, 3 and 4 is also queried among the participating sustainable entrepreneurs and additionally in-depth

interviews were held. The results of Chapter 5 contribute to our understanding of the sustainable entrepreneurial process and the role competencies have in this and support and enrich the findings of the studies in the higher education context. Furthermore, it provides insights in possible barriers in reaching the full potential of enacting the competencies for sustainable entrepreneurship throughout the entrepreneurial process, as the enactment of the competencies varies within the decision making process.

In Chapter 6, the final chapter, the mean research findings are briefly summarized and answers to the main research question and subsequent sub-questions are provided. The majority of the chapter deals with drawing up conclusions, integrating the results of the different studies and discussing the main results. Furthermore, the (methodological) limitations, implications and directions for future research are provided. Figure 1.3 provides an overview of the six chapters that are described above.

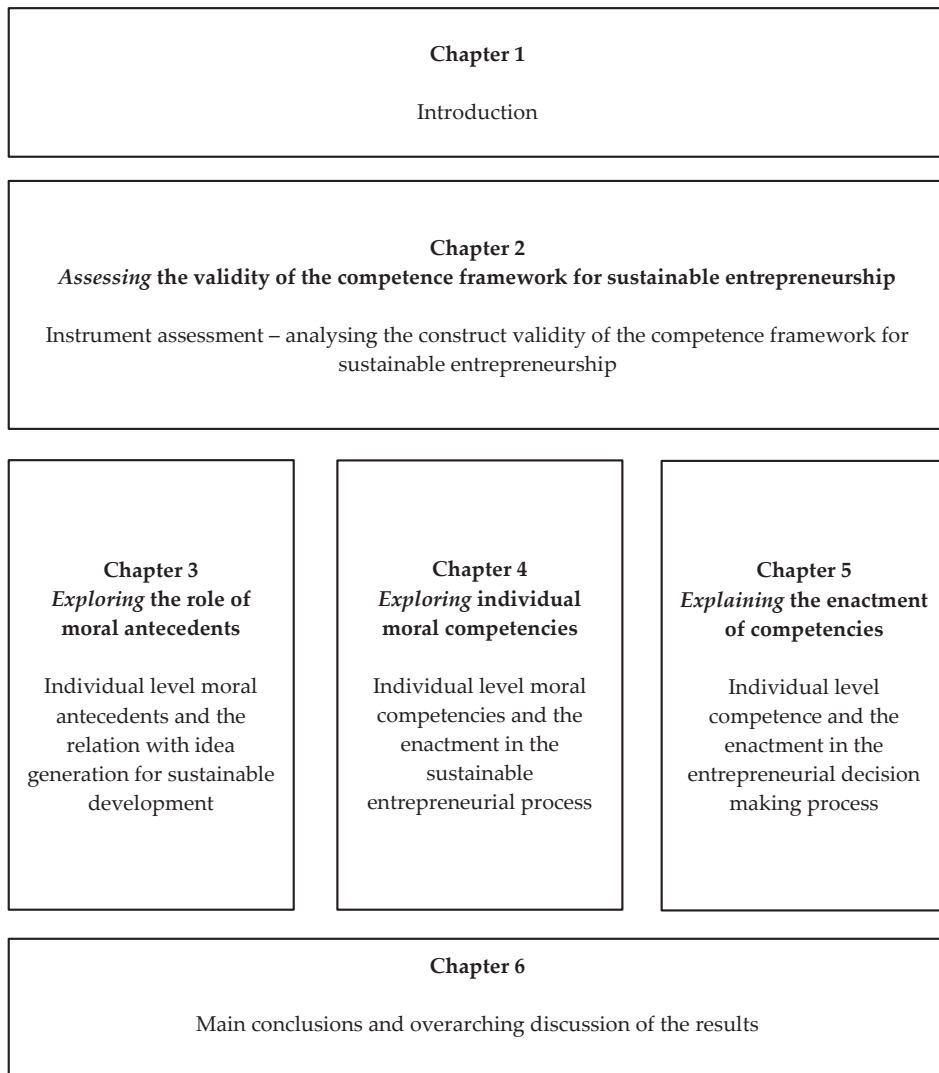


Figure 1.3. Representation of the chapters of this dissertation.

CHAPTER 2

TOWARD A VALIDATED COMPETENCE FRAMEWORK FOR SUSTAINABLE ENTREPRENEURSHIP¹

Knowledge, skills and attitudes to manage sustainable development have become significant components of different career paths. Previous research has explored which competencies are needed for future change agents in the field of sustainable development. Sustainable entrepreneurship can be seen as a promising work context in which these competencies are truly at the forefront and enacted. Several researchers have compiled frameworks of key competencies. However, their work is exploratory in nature and a more in depth analysis of these frameworks is called for. In this study an existing competence framework for sustainable entrepreneurship was tested in terms of construct validity, among 402 would-be entrepreneurs. The results suggest the inclusion of 6 competencies, which constitute a competence framework with a good model fit. Furthermore, a new combination of two existing competencies is proposed. This study has important implications for the debate on which competencies for sustainable entrepreneurship are essential on theoretical and empirical grounds.

¹ This chapter is based on:

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2017). *Toward a validated competence framework for sustainable entrepreneurship. Organization and Environment*. DOI: 10.1177/1086026617697039.

2.1 Introduction

The concept of sustainable development has gained global importance over the last 10 years (Schaltegger & Wagner, 2011). In response to this worldwide focus on sustainability, higher education institutions have engaged in incorporating and institutionalizing sustainability into their curricula, research, and operations in order to educate future sustainability professionals as change agents for sustainable development (Rieckmann, 2012; Wals & Jickling, 2002). These change agents develop sustainability as a factor of success in their working environment, integrate sustainability criteria into business processes and transfer the vision of sustainable development to society (Hesselbarth & Schaltegger, 2014).

In this line of thought, education for sustainable development (ESD) aims at enabling people to “not only acquire and generate knowledge, but also to reflect on further effects and the complexity of behavior and decisions in a future-oriented and global perspective of responsibility” (Rieckmann, 2012, p. 128). It is likely that these skills, attitudes and knowledge stem from individual competencies for sustainable development. In general, competencies are described as enabling successful task performance and problem solving with respect to real-world problems, challenges, and/or opportunities (Barth et al., 2007; Dale & Newman, 2005) on an individual level and consist of knowledge elements, skills, and attitudes (Wesselink et al., 2010; Mulder, 2014). Over the past few years, individual competencies for sustainable development have received much attention in the education for sustainability literature. Significant progress has been made in conceptualizing key competencies for sustainable development (De Haan, 2006; Barth et al., 2007; Wiek et al., 2011; Rieckmann, 2012). Competencies such as foresighted or anticipatory thinking, systems thinking, interdisciplinary work and participation are considered as key competencies that warrant (additional) attention in higher education.

Critical questions can be raised regarding the conceptual nature of these studies as they lead to rather abstract academic descriptions of competencies (Delamare Le Deist & Winterton, 2005). Furthermore, competence descriptions from the education for sustainability literature are usually decontextualized because competence lists are meant to be study program overarching, crossing various educational contexts and curricula. The reality, however, is that sustainability challenges and tasks often become meaningful in one’s specific work environment. Therefore, the work context is also an important factor to take into account in the field of sustainable development.

As a reaction to these critical remarks, several scholars have identified and studied competencies for sustainable development which are enacted in a specific work context (Hesselbarth & Schaltegger, 2014; Osagie et al., 2015; Wesselink et al., 2015; Lans et al., 2014). In today’s society different

types of work contexts for change agents in the field of sustainable development can be distinguished. For instance, CSR managers, sustainable intrapreneurs, sustainable development champions and sustainable entrepreneurs all play a key role in bringing about change to companies and society as a whole. Competencies identified in relation to specific change agent's context are usually combinations of the key competencies for sustainable development mentioned above and key competencies identified in management and entrepreneurship literature (Hesselbarth & Schaltegger, 2014). Nevertheless, the number of competence studies from a business perspective is much more limited, compared to competence studies from the educational context. To the best of our knowledge, only Hesselbarth & Schaltegger (2014), Osagie et al. (2015), Wesselink et al. (2015) and Lans et al. (2014) have made an effort in 'translating' more generic lists of competencies for SD into specific working contexts of change agents for sustainability. The former three focus more on the role of competencies in the work context of CSR managers and the latter focuses on would-be sustainable entrepreneurs.

Similar to the study of Lans et al. (2014) we focus on the work context of sustainable entrepreneurs. Nevertheless, studies in this field are still explorative in nature and offer little information about the various combinations of interrelated competencies for sustainable entrepreneurship that (start-up) businesses are in need of in order to address sustainability challenges. Furthermore, it is not clear how competencies relate to other predictors of entrepreneurial behavior which have been previously found in the literature such as gender, entrepreneurial self-efficacy, or entrepreneurial intentions. In addition, in order to establish a valid competence framework, the competencies should be tested against these other established measures. In this chapter we will address the following aspects: (1) validating and expanding existing key-competence frameworks for sustainable development in the specific context of sustainable entrepreneurship and: (2) examining the interrelatedness between key competencies for sustainable entrepreneurship and 3) examining the relation between key competencies for sustainable entrepreneurship and particular antecedents of entrepreneurial behavior. The following research questions are addressed: *What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?* and *How do key competencies for sustainable entrepreneurship relate to particular antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?*.

2.2 Individual competence – setting the stage

In general, competencies can be defined as enabling successful task performance and problem solving with respect to real-world problems, challenges, and opportunities on an individual level (Barth et al., 2007; Dale & Newman, 2005). Competence consists of knowledge, skills and attitudes, which enable this

successful task performance (Wesselink et al., 2010; Mulder, 2014). Three dominant approaches to the concept of competence can be distinguished (Delamare Le Deist & Winterton, 2005; Sandberg, 2000) and are discussed in more detail in section 1.3.2. This chapter the comprehensive approach to competence, or the multimethod-oriented approach (Sandberg, 2000) is followed. Following the comprehensive approach, competence in this research is defined as a person's integrated performance-oriented ability to reach specific achievements. 'Integrated' refers to a cohesive and complex set of knowledge, skills, attitudes and their embeddedness within the context in which successful performance has to take place (Mulder, 2014).

2.2.1 Competencies for change agents in specific work contexts

According to Svanström et al. (2008) a successful change agent for sustainability must have knowledge of environmental-, of economic- and of social issues related to sustainability (i.e. knowledge element of competence). Furthermore, the change agent must have a value system to support their actions (i.e. attitude element of competence). In addition, the change agent must have the ability to perform sustainability tasks (i.e. skills element of competence). Considerable, though mostly conceptual, efforts in translating these abilities for change agents into competencies have been made over the last decade (Svanström et al., 2008; De Haan, 2006; Wiek et al., 2011; Rieckmann, 2012). Derived from research on competencies for sustainable development (SD) in higher education, various scholars have identified competencies for sustainable development in a work/business context (see Table 2.1). Most of these studies applied the comprehensive or multimethod-oriented approach to competence in applying these competencies in the business context. For example, the work of Hesselbarth and Schaltegger (2014) focusses on contextualizing competencies for SD in a work context. Based on experiences of MBA alumni, they propose five key competencies for change agents for sustainability. Osagie et al. (2015) combined results from a systematic literature review with results from 28 interviews with CSR managers to compile a set of eight CSR-related competencies. In the field of CSR, Wesselink et al. (2015) performed an empirical study to analyse individual competencies for managers engaged in corporate sustainable management practices and identified five competencies which highly correspond with core tasks performed by CSR managers. Finally, Lans et al. (2014) identified a framework of 7 competencies for sustainable entrepreneurship based on focus groups with teachers involved in entrepreneurship education and by performing an exploratory factor analysis on the survey in which the 7 competencies were queried. Table 2.1 provides an overview of the different competencies mentioned in the 4 different studies.

Table 2.1. Overview of competencies for sustainable development contextualized in the work-context, identified by key researchers

Authors	Key competencies included in research
Hesselbarth and Schaltegger (2014)	<ol style="list-style-type: none"> 1. Strategic competence 2. Systems-thinking competence 3. Anticipatory competence 4. Normative competence 5. Interpersonal competence
Osagie et al., 2015	<ol style="list-style-type: none"> 1. Anticipating CSR challenges 2. Understanding CSR-relevant systems and subsystems 3. Understanding CSR-relevant standards 4. CSR management competencies 5. Realizing CSR-supportive interpersonal processes 6. Employing CSR-supportive personal characteristics and attitudes 7. Personal value-driven competencies 8. Reflecting on personal CSR views and experiences
Wesselink et al., 2015	<ol style="list-style-type: none"> 1. Systems thinking competence 2. Embracing diversity and interdisciplinarity competence 3. Interpersonal competence 4. Action competence 5. Strategic management competence
Lans et al., 2014	<ol style="list-style-type: none"> 1. Systems-thinking competence 2. Embracing diversity and interdisciplinarity competence 3. Foresighted thinking competence 4. Normative competence 5. Action competence 6. Interpersonal competence 7. Strategic management competence

Despite the use of some of the same initial competencies, the inclusion of key competencies differs among the different studies. Three competencies are included in all four studies, namely: strategic (management) competence, systems thinking competence and interpersonal competence. Where Hesselbarth and Schaltegger (2014), Lans et al. (2014), and Osagie et al. (2015) underpin the importance of normative competence, the empirical study performed by Wesselink et al. (2015) did not point in this direction.

They argue that this could be a result of either normative competence already being internalized in the behavior of CSR managers, or the structural lack of normative behavior in this specific work/business context (Wesselink et al., 2015). Another competency which has been subject to debate is anticipatory/foresighted thinking competence (both words are used for more or less the same construct).

Rieckmann (2012) identifies this as one of the most important competencies and it is also empirically found in the work of Hesselbarth and Schaltegger (2014), Osagie et al. (2015) and Lans et al. (2014). However, Wesselink and colleagues (2015) did not include this competency as a key competency. The reason for not including this competency seems to be directly related to the specific CSR context in which they have researched the enactment of the competencies (Wesselink et al., 2015). They argue that in the more mature phases of the CSR implementation process, foresighted thinking is less important than in the starting phases. Their sample consisted of companies in the more mature phases, which could explain the absence of foresighted thinking competence.

Also, embracing diversity and interdisciplinarity competence is not supported by all four studies. Lans et al. (2014) and Wesselink et al. (2015) acknowledge the importance of this competence but it is not included in the studies by Hesselbarth and Schaltegger (2014) and Osagie et al. (2015). The fourth and last competence up for debate is action competence. In the literature this competence is widely considered as one of the most important competencies for sustainable development (de Haan, 2006; Ellis & Weekes, 2008; Blok et al., 2016), but in practice this does not always show. Even though Lans et al. (2014) tend to keep action competence included, the results of their exploratory analysis show significant overlap with strategic management competence. Also, Hesselbarth and Schaltegger (2014) and Osagie et al. (2015) encounter difficulties with the concept of action competence. The latter encourage a more practical interpretation of the concept and see it merely as “actively engaging oneself in the process of CSR implementation” (Osagie et al., 2015, p. 17). This calls for a more in depth and empirical analysis of the competencies at stake when dealing with sustainability challenges.

2.2.2 Sustainable entrepreneurs as change agents

An example of a promising work context in which competencies for sustainable development are truly at the forefront, enacted (and also contested), is the field of sustainable entrepreneurship (SE). The emerging stream of academic literature on sustainable entrepreneurship adds a new dimension to the promise of entrepreneurship being an attractive way of generating competitive advantage and resulting in economic gain. Entrepreneurship for sustainable development is supposed to result in more than economic success. Sustainable entrepreneurs try to manage the ‘triple bottom line’ (Patzelt & Shepherd, 2011); in other words, they balance economic health, social equity and environmental resilience through their entrepreneurial behavior. Sustainable entrepreneurship is thus associated with the promise of more traditional concepts of entrepreneurship, but also has additional potential both for society and the environment.

Sustainable entrepreneurs initiate those activities and processes that lead to identifying, evaluating and exploiting business opportunities to contribute to sustainability and profitability

(Schaltegger & Wagner, 2011; Patzelt & Shepherd, 2011. According to Hesselbarth and Schaltegger (2014) sustainable entrepreneurs act as change agents as they develop sustainability as a factor of success in their working environment, integrate sustainability criteria into business processes and transfer the vision of sustainable development to society. Nevertheless, becoming a successful sustainable entrepreneur does not happen overnight. The Global Entrepreneurship Monitor (GEM) defines four entrepreneurial stages: a) potential entrepreneurs who intend to start a business in the future; b) nascent entrepreneurs who are involved in setting up a business; c) new entrepreneurs who have just started a business; and d) established entrepreneurs who own and manage an established business (Kelley et al., 2011). The role of higher education in this process is widely recognized as education can play a significant role in stimulating and fostering phase 1 and 2. These individuals who have the intention to become a sustainable entrepreneur are labelled as would-be (sustainable) entrepreneurs (i.e. Baron & Ensley, 2006; Dimov, 2007). Furthermore, competence development usually is strongest in a context in which learning is central, which also emphasizes the role of higher education. In this research, we focus on these would-be sustainable entrepreneurs as they have an important role as future change agents and are in the stage of developing competencies and an entrepreneurial intention.

To bridge the gap between conceptual and empirical research on competencies for sustainable entrepreneurship, Lans et al. (2014) developed a competence framework. This framework is, to the best of our knowledge, the only framework that specifically addresses competencies for sustainable entrepreneurship. The competence framework consists of key competencies from entrepreneurship literature and key competencies from education for sustainable development literature. The competence framework as proposed by Lans et al. (2014) includes 7 key competencies which are identified as follows: systems thinking competence, diversity competence, foresighted thinking competence, interpersonal competence, strategic management competence, normative competence and action competence (see section 1.3.2 for a description of the competencies).

To sum up, several frameworks of competencies for sustainable development exist. A few of these frameworks have been tested and operationalized in a work context. Nevertheless, the descriptions of these frameworks are still too general and empirical work in this field is often exploratory. Therefore, we attempt to assess the validity one of those competence frameworks by using confirmatory factor analysis.

2.3 Methods

A cross-sectional study design was used to evaluate perceived levels of sustainable entrepreneurial competence and levels of entrepreneurial self-efficacy, intention and general background questions by would-be entrepreneurs.

2.3.1 Setting and sample

The data for the analysis of the competence framework of sustainable entrepreneurship was gathered at a university of applied sciences in the Netherlands (which can be compared internationally with Technical/vocational And Further Education institutions (TAFE)). This higher education institute is labelled as having a 'green' curriculum. All students participating in this research were enrolled in entrepreneurship courses for the duration of 6 months and show the intention to become an entrepreneur (N=438). The questionnaire was spread among the participants as an integrated part of their 6-month entrepreneurship program. The questionnaires were filled in during class after the students received a short introduction to the research and its intended learning outcomes for the respondents. The participants were asked to create a unique code to ensure the anonymity of the results.

2.3.2 Constructs and measures

The competence framework developed by Lans et al. (2014) and its accompanying questionnaire was used. They improved the initial framework by organizing focus group discussions with educators in the field before testing the framework among students. As a next step, items for all key competencies were developed. This led to a set of 42 items. Initial face-validity of these items was ensured through discussing all the items with three senior researchers and two master students involved and making changes in the phrasing when necessary. In the next step the items were pre-tested on understandability and interpretation during a pilot study with students. The data from a sample of 210 students was used to analyze scale development by means of reliability tests (Cronbach's alphas were all above the threshold of 0.7). Scale reduction and validation tests were constructed by means of an explorative factor analysis (EFA). The EFA led to the proposition of the final 7-factor competence framework for sustainable entrepreneurship. These considerations make the competency framework for sustainable entrepreneurship developed by Lans et al. (2014) most appropriate to use in this particular study.

The questions used to analyze the integrated competence framework for sustainable entrepreneurship can be labelled as a competence self-report. To measure their competencies, respondents were asked to rate themselves according to their opinion about their performance at that moment for an item, by rating the item on a scale of 1 to 10 (1 = low and 10 = high). Critique on using self-reports or self-assessments as a measurement tool is common and widely used to under-evaluate

this type of research (Braun et al., 2012). Nevertheless, research shows that certain conditions make it possible to measure different kinds of competencies by using self-reports (Braun et al., 2012). To do this, the self-report should first include multiple indicators per competency to address a competency's full complexity; second, context should be given for the competencies and instruments; and third, the indicators should describe concrete behavior (Braun et al., 2012). The seven competencies for sustainable entrepreneurship and their underlying items (27 in total) fulfil the three requirements mentioned above. The questionnaire is added to the general Appendix (see Table A1).

In order to further validate the competence framework for sustainable entrepreneurship, constructs from the field of entrepreneurship were used to analyze the relationship between the competencies for sustainable entrepreneurship and these commonly used antecedents of entrepreneurial behavior in general. These antecedents are described as entrepreneurial self-efficacy, entrepreneurial intentions, gender, work experience, and entrepreneurial parents. These constructs are not integrated in the competence framework as such, but could be strongly correlated to one or more competencies and therefore endanger the validity of the framework.

First, entrepreneurial self-efficacy (ESE) can be described as an antecedent of entrepreneurial behavior in general. Self-efficacy concerns an individual's belief in his one's own ability to perform well (Bandura, 1982). More specifically, entrepreneurial self-efficacy concerns an individual's belief in his or her own entrepreneurial competence to explore and exploit new business opportunities. Meta-analyses show that entrepreneurial self-efficacy is one of the strongest individual level predictors for entrepreneurial success (Rauch & Frese, 2007). ESE is measured through a 6 item measurement scale, based upon the validated scale developed by Liñán and Chen (2009).

Second, entrepreneurial intentions are taken into account as an important predictor of entrepreneurial behavior. Entrepreneurship is viewed as a process that occurs over time. In this sense, entrepreneurial intentions would be the first step in the evolving process of new venture creation. The intention to start a business is considered a necessary precursor to performing entrepreneurial behaviors. In addition, intention in general is considered to be the single best predictor of behavior (Ajzen, 2001). Entrepreneurial intention was measured on a 5 point Likert scale, with 5 underlying items.

Third, an important characteristic of entrepreneurial behavior is gender. Even though it is still heavily under discussion in the literature, some researchers argue that women are discriminated against men in various stages of the new venture creation process and face more barriers compared to men: women tend to have less educational, entrepreneurial and work experience which suggests women having lower human capital (Thébaud, 2010). However, evidence has also been found that females have more social capital in the business setting compared to males, as women base their beliefs, rules, and

behaviors on mutual trust which is supposed to increase information exchanging (Farr-Wharton & Brunetto, 2009).

Fourth, work experience is also an important factor to take into account. According to Gibb (2002), entrepreneurs of small companies learn from peers, learn by doing, learn from feedback, learn by copying, learn by experiment, learn by problem solving and learn from mistakes. Having experience positively influences the success of the next entrepreneurial endeavor.

Finally, another individual factor which could explain differences in entrepreneurial behavior is the family background of an individual. The family (business) environment has been associated with the tendency to start a new venture. Evidence has been found that individuals raised in an entrepreneurial family are more likely to be involved in entrepreneurial activities themselves (White et al., 2007).

2.3.3 Data analysis

Excluded cases

The initial dataset consisted of 438 responses (N=438). Based on a missing value analysis (MVA), 36 cases were excluded from the data analysis. Cases with more than 10% missing values were excluded; other missing values were replaced with the mean of the other variables. Replacing missing values with the expectation maximization technique is a common procedure to deal with random missing values. Little's Missing Completely At Random test (MCAR) showed that the missing values appear randomly and that there are no systematic missing values in the database ($\chi^2=570.365$, $df=619$, $p=0.919$). This allows for imputation techniques for the cases which have 10% or less missing values. In total 402 cases were used for the confirmatory factor analysis ($n=402$).

Confirmatory Factor Analysis (CFA)

In order to answer the first research question, the construct validity of the 27-item competence framework for sustainable entrepreneurship was tested through confirmatory factor analysis (CFA). CFA is a well-established method for model testing and scale development (Noar, 2003). We tested the 7-factor model and compared it to two competing models, namely with a 1-factor model and with a 6-factor model. The latter 6-factor model corresponds with the results from the exploratory study by Lans et al., 2014 and is hypothesized to outperform the 7-factor and 1-factor model. The data was analyzed by using IBM SPSS AMOS 23 in which CFA can be performed. We used the Maximum Likelihood (ML) robust extraction method as the estimator. This is recommended for non-normal distributed data. The following indices were used to assess model fit: Normed χ^2 (χ^2/df), Root Mean Square Error of Approximation RMSEA, Comparative Fit Index (CFI) & the Tucker-Lewis Index (TLI) and the Goodness

of Fit Index (GFI). To test the second research question, correlation coefficients between the constructs were calculated by using IBM SPSS Statistics 23.

2.4 Results

2.4.1 Descriptive statistics: sample

In total, 402 cases were included in the analysis. The male-female division within the dataset is 47.5% and 52.5% respectively. Most respondents are, at the moment of participation, enrolled in their second year of education at the participating higher education institute (88.3%). Only a few respondents mention they already own their own company (6.7%) versus the majority (93.7%) who mention they do not have their own company. Nevertheless, 66.6% of the respondents show that they have the intention to become an entrepreneur within the next 5 years (based on a score of 3 or higher, measured on a 5 point Likert scale). Regarding having prior working experience, 16.9% of the respondents mention they do not have any prior working experience; the rest have either prior experience as an employee (70.9%), as an owner of a company (4.5%), or both (4.7%). Furthermore, 43.3% indicate having entrepreneurial parents, compared to 54.0% who indicate not having entrepreneurial parents.

2.4.2 Assessment of the measurement model

The first step in confirmatory factor analysis is to test the goodness-of-fit indices, the reliability and the validity of the preferred measurement model. Based on theoretical grounds, three measurement models were tested in order to compare which model fitted the data best. Table 2.2 suggests that, based on the model fit indices, the 6-factor model best fits the data and is therefore chosen to continue the analysis with. This is also in line with the findings from the explorative analysis as performed by Lans et al., 2014.

Table 2.2. Model fit indices of the measurement models

Measurement model	χ^2/df	RMSEA	GFI	CFI	TLI
7 – factor model	3.19	0.074	0.749	0.813	0.798
1 – factor model	5.21	0.102	0.608	0.631	0.612
6 – factor model	2.69	0.065	0.871	0.912	0.899

Note. The 7-factor model is the original model, the 6-factor model is based on the discussion of the results of the exploratory factor analysis as presented in the work of Lans et al., 2014.

The preferred measurement model includes 27 items describing six latent constructs: Strategic management & action competence (Sm_AC), Diversity competence (DC), Systems thinking competence

(StC), Normative competence (NC), Foresighted thinking competence (FC) and Interpersonal competence (IC). Based on the modification indices, item Normative_c was moved from the latent construct 'Foresighted thinking competence' to the latent construct 'Normative competence' (which it also initially belonged to), which lowered the Chi-square to improve the model. After optimizing the model, the goodness-of-fit indicators suggest a reasonably good fit of the proposed 6-factor model.

The convergent and discriminant validities of the constructs can be assessed by referring to the measurement model. According to Fornell and Larcker (1981), convergent and discriminant validity is evaluated based on three criteria: (1) factor loadings; (2) the scale composite or construct reliability (CR); and (3) the average variance extracted (AVE). The findings showed that all loadings are more than 0.5 (a table with individual factor loadings is added to the Appendix of this chapter; see Table 2.5). Moreover, all constructs had a construct reliability (CR) value, ranging from 0.68 to 0.89, close to or higher than the recommended level of 0.70. With respect to the AVE estimate, the results revealed that the AVE estimate for all constructs is above or close to the recommended threshold of 0.50 (Table 2.3), except for interpersonal competence which is lower with 0.42.

Table 2.3. Reliability and convergent validity of the measures

Construct	# of items	CR	AVE
Strategic management competence and Action competence (Sm_AC)	8	0.89	0.54
Embracing diversity and interdisciplinary competence (DC)	4	0.82	0.60
Systems thinking competence (StC)	5	0.86	0.50
Normative competence (NC)	4	0.82	0.54
Foresighted thinking competence (FC)	3	0.80	0.57
Interpersonal competence (IC)	3	0.68	0.42

Discriminant validity establishes whether any latent construct (i.e. competence) is different from any other latent construct in the model and was assessed by comparing the inter-item correlations between the latent constructs. All latent constructs are assumed to correlate to a certain extent with each other and the maximum threshold of 0.85 is not exceeded. The Fornell-Larcker criterion for discriminant validity assesses whether the square root of AVE is greater than the correlation coefficient of the focal construct with any of the other constructs in the model. Table 2.4 shows that this is the case. Therefore, the constructs are distinct from each other and their discriminant validity is established. However, the factor interpersonal competence is only just meeting the criteria, which could lead to problems for the discriminant validity of this particular factor.

2.4.2 Criterion related variables

There is a positive relationship between the six competencies: they all correlate to a medium extent with each other (Table 2.4). The competencies which correlate the lowest are interpersonal competence and foresighted thinking competence ($r=0.353$, $p<0.01$). The highest correlation exists between the combined competence of strategic management and action and normative competence ($r=0.721$, $p<0.01$). Entrepreneurial self-efficacy (ESE) is positively correlated with all of the six competencies, of which 5 are at $p<0.01$ significance level and one is at $p<0.05$ significance level. Also, the correlation between ESE and intention is significant and relatively high. When looking at the correlations between the intention to become an entrepreneur and the competencies it becomes clear that only foresighted thinking competence and interpersonal competence do not show significant results. Furthermore, the results suggest that women score themselves significantly lower on all competencies compared to men. Males score themselves a bit higher on diversity competence and systems thinking, and those who already have some work experience as an employee tend to score themselves slightly higher on diversity competence, on the combined strategic management and action competence and on ESE as well. Students with parents who own a company only scored higher on entrepreneurial self-efficacy and have significantly more work experience.

2.5 Discussion and Conclusions

The six factor model structure identified in the EFA (Lans et al., 2014) was confirmed in the CFA with adequate model fit in a new sample of would-be entrepreneurs, thus providing additional evidence for the construct validity of the integrated competence framework for sustainable entrepreneurship. With this, the first research question, "What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?", is answered; the six competencies can be seen as supporting future change agents in their sustainable entrepreneurial endeavours.

When comparing these results with the work of other key authors in the field, this study underlines the empirical validity of four competencies which are recognized by all key researchers, namely systems thinking competence, foresighted thinking competence (or anticipatory competence), normative competence and interpersonal competence (de Haan, 2006; Wiek et al., 2011; Rieckmann, 2012; Hesselbarth & Schaltegger, 2014; Lans et al., 2014; Wesselink et al., 2015 and Osagie et al., 2015). However, when zooming in on interpersonal competence and applying a stricter threshold for discriminant validity, it does not seem to have sufficient discriminant validity in our sample.

Table 2.4. Discriminant validity and means and correlations between competencies and important entrepreneurial antecedents.

Construct	M	1	2	3	4	5	6	7	8	9	10
1. Sm_AC	5.33	0.734									
2. DC	5.70	0.627**	0.774								
3. StC	6.13	0.598**	0.550**	0.707							
4. NC	6.21	0.721**	0.484**	0.603**	0.734						
5. FC	6.30	0.547**	0.489**	0.666**	0.552**	0.754					
6. IC	6.49	0.485**	0.372**	0.392**	0.376**	0.353**	0.648				
7. ESE	3.02	0.299**	0.251**	0.250**	0.127*	0.151**	0.200**	--			
8. Intention	2.90	0.194**	0.154**	0.170**	0.164**	0.084	0.091	0.297**	--		
9. Gender	1.53	-0.153**	-0.302**	-0.217**	-0.172**	-0.107*	-0.117*	-0.128*	-0.152**	--	
10. Experience	1.97	0.219**	0.259**	0.177**	0.130*	0.198**	0.086	0.211**	0.051	-0.221**	--
11. Parents	1.55	-0.06	-0.076	-0.063	-0.045	-0.082	0.053	-0.143**	-0.235**	0.054	-0.200**

Note. In bold: the square root of AVE. M=mean, n=402, *p < .05, **p < .01.

Even though, based on theory, interpersonal competence is assumed to be discriminant from the other competencies, these results point in the direction that this is not completely the case. The exploratory analysis has led to a scale reduction from 6 items to 3 and one can wonder whether these three items which belong to the factor interpersonal competence are defining enough to be discriminant from the others. Another explanation for the weak discriminant validity of this factor could be that interpersonal competence is the only competence that is the least specific for sustainable entrepreneurship and operates on a more general level. Furthermore, the correlation structures between the six competencies reveal possible clusters among the competencies. First, the merge of strategic management competence and action competence is discussed. This is followed by an analysis of the underlying relations between the competencies and explore whether a distinction based on the clusters can be made.

To start, as Lans and colleagues (2014) state in their conclusion, “from a practical point of view this [e.g. the merge of both competencies] makes sense since both competencies represent the actual pursuit of a sustainability opportunity and the turning of it into a concrete project; both require active involvement of the individual” (p. 45). Nevertheless, Lans et al. (2014) were, based on their exploratory research, reluctant to merge these two competencies into one. As our 6 factor measurement model also shows a better model fit when both competencies are taken together, we propose to combine both competencies and in the future refer to them as one. This synthesis of one strategic action competence can further strengthen the debate on the importance of action competence and the additional role of strategic management.

Action competence has received increased attention in the domain of higher education for sustainable development (Jensen & Schnack, 2006; Ellis & Weekes, 2008; Mogensen & Schnack, 2010; Blok et al., 2016). Action competence has been defined as the ability to actively involve oneself in responsible actions to improve the sustainability of social-ecological systems in general and products, processes and procedures in particular (de Haan, 2006). Jensen and Schnack (2006) distinguish four components of action competence: knowledge and insight concerns knowledge about the problem of sustainable development and the ability to think critically about its possible solutions; commitment relates to the motivation and drive to engage oneself in the solution of sustainability problems; visions concerns the ability to conceptualize the future state of the world; and action experiences stresses the importance of actual involvement in concrete sustainable actions. Nevertheless, the initial operationalization of action competence in this study focusses primarily on the motivational aspects and ability to recognize opportunities, but does not address the knowledge and more strategic aspects of action competence as described by Jensen and Schnack (2006). However, within the initial strategic management competence the actual involvement in sustainable actions and critical thinking are at the forefront, which are also

important elements of action competence. In addition, when comparing the field of sustainable entrepreneurship to the general field of sustainable development, strategic thinking and planning and actively involving oneself in sustainable action might be even more prominent and more interwoven as entrepreneurship unmistakably is associated with turning ideas into actions. Therefore, the entrepreneurial context could be one of the reasons for the strong relation between strategic management and action competence. Whether this also holds for the field of sustainable development in general can be disputed. At least we can argue that when dealing with action competence in a work context like sustainable entrepreneurship, strategic management should be incorporated in the operationalization of action competence and should be referred to as strategic action competence.

Secondly, as all competencies correlate to a medium extent with each other in general and each competence seems to correlate high with at least one of the other competencies, it is likely that these high correlating competencies share some kind of overlapping orientation. Analysing these clusters of competencies and linking them to a general orientation of the competencies, could help in further analysing and understanding the underlying relations between the competencies. Based on the (inter-) correlations between the competencies, as well as the content of these competencies and their underlying items, a sub division between the competencies can be made.

Distinctions based on the orientation of competencies have been made by other researchers as well (e.g. Hesselbarth & Schaltegger, 2014; Wals, 2015). Hesselbarth and Schaltegger (2014) make a general distinction based on methodological competencies, social competencies and personal competencies. Wals (2015) refers to 4 dimensions of sustainability competence; namely a conceptual and systemic knowledge dimension, a critical thinking dimension, a change and innovation dimension, and an ethical dimension. These four dimensions are taken into account in analysing the relations between the competencies. Looking at the correlations between the competencies and taking into account the content of the competencies as well, it becomes clear that foresighted thinking and systems thinking competence seem to cluster together. These two competencies both deal with learning to know how to deal with sustainability, which could be referred to as the conceptual and systemic knowledge dimension. Also strategic action and normative competence correlate high with each other and could be clustered in an ethical dimension, as both competencies are value oriented, normative and deal with learning to be, learning to care. Another dimension could be constituted by clustering diversity competence and strategic action competence; both competencies deal with learning to critique. From the four dimensions by Wals (2015), this is best explained by the critical thinking dimension. Where the previous three dimensions are also empirically sound, the last cluster of competencies, consisting of interpersonal competence and diversity competence, is only based on overlapping content based on the interpretation

of the items belonging to the competencies. These two competencies share a mutual goal of learning to make change happen, which could be explained by the change and innovation dimension. It appears that the 4 dimensions of sustainability competence could be applied to the six competencies for sustainable entrepreneurship. In other words, these four, more general, dimensions support sustainable entrepreneurs as change agents for sustainable development.

In addition, to answer the second research question and further validate the framework, the relation between the competencies and general antecedents of entrepreneurial behavior (entrepreneurial self-efficacy, gender, experience and entrepreneurial parents) was analysed. Overall, the antecedents did not correlate too high or low with the competencies for sustainable entrepreneurship. However, there were some differences between the different antecedents and their relation to the competencies. In line with the expectations, ESE correlates positively with all competencies (Le Deist & Winterton, 2005). Future research should focus on the relation between ESE and the competencies for sustainable entrepreneurship as ESE could be an important influence on these competencies and could define the boundaries of the sustainable entrepreneurial spectrum. Also, the relation between the competencies and ESE with entrepreneurial outputs is an interesting field of future research as they can be seen as possible predictors of entrepreneurial success (Rauch & Frese, 2007).

As intention is perceived as one of the most influential antecedent of entrepreneurial behavior, one would expect that intention would have a significant correlation with all competencies. Nevertheless, it does not significantly correlate with foresighted thinking competence and interpersonal competence. It could be that these two competencies show less overlap with entrepreneurial characteristics and therefore do not relate with entrepreneurial intention. The relation between entrepreneurial intentions, competencies for sustainable entrepreneurship, and entrepreneurial behavior could be an interesting topic for future research.

Furthermore, gender is a broadly discussed concept in entrepreneurship literature; the results in this study are more in line with literature which states that women have lower human capital and therefore perceive themselves as less competent when it comes to entrepreneurial behavior (Thébaud, 2010). Female respondents score themselves significantly lower than male respondents on all competencies and also on ESE. Even on the competencies which are more related with social capital, such as interpersonal competence and normative competence, females score themselves lower than their male counterparts. This is somewhat unexpected, as literature states that women generally score higher on these type of constructs (Farr-Wharton & Brunetto, 2009). Whether these results also hold for actual sustainable entrepreneurial behavior is beyond the scope of this research, as we focused on self-perceived scores on the competence framework.

Next, having prior experience seems to have a positive influence on the scores on the

competencies, this is also in line with the expectations and therefore can positively influence the level of sustainable entrepreneurial competence of would-be entrepreneurs. Having entrepreneurial parents is positively associated with involvement in entrepreneurial activities (White et al., 2007; Lans et al., 2015), but in this sample the relation between the competencies and having entrepreneurial parents is not significant. Only with ESE and experience there is a positive relation with having entrepreneurial parents. Establishing relations between general entrepreneurial antecedents like gender, experience, and entrepreneurial parents and the six competencies for sustainable entrepreneurship remains difficult. This could be due to the fact that in this research the role of the sustainability part of sustainable entrepreneurship is emphasized and the antecedents more with the entrepreneurship part. Nevertheless, the relation with ESE and the competencies for sustainable entrepreneurship could be further analysed to better grasp the influence of ESE on these competencies.

Although the results of the study are promising, the data on the sustainable entrepreneurship framework was only collected among would-be entrepreneurs, i.e. students with the intention to become a (sustainable) entrepreneur and at only one higher education institute. Whether nascent or established sustainable entrepreneurs also recognize themselves in these competencies was beyond the scope of this research. Future research could focus on nascent or established sustainable entrepreneurs and test the framework in this context to examine whether the framework for sustainable entrepreneurship could also be supporting for these entrepreneurs. This would also create the possibility of exploring the boundaries of sustainable entrepreneurship (e.g. normative competence and ESE/action competence) more carefully and to address the predictive validity of the model. Although our model does seem to be robust enough to pass basic criteria for convergent and discriminant validity, the threshold values also suggest that these results have to be interpreted with care.

Another methodological limitation is related to the use of the Fornell-Larcker criterion for assessing the discriminant validity. The downsides of the measure are the overestimation of the indicator loadings and the indicator variance being included in the composite score (Henseler et al., 2014). Nevertheless, the Fornell-Larcker criterion and assessing the cross loadings are still the most dominant approaches for analysing discriminant validity (Henseler et al., 2014). Furthermore, in this study, antecedents of entrepreneurial behavior, such as ESE, were only measured by contextualizing them in an entrepreneurial context, not in a sustainable entrepreneurial context. Related to this, future research should focus on also including outcome variables. Combining the 6 factor competence framework with more tangible performance indicators, for instance related to the moral decision making process or entrepreneurial outcomes (i.e. success, opportunity recognition), could lead to useful information about how these competencies are used in practice and what are more or less important competencies in different phases of the entrepreneurial process.

The results of this study are relevant and important for practitioners in the field of higher education, but also for start-up companies or entrepreneurs which are involved in tackling the sustainability challenges that we currently face. In a world in which global climate disruption, ever-increasing population and massive extinctions of biodiversity is recognized and acknowledged, there is a need for individuals who are able to deal with these challenges. Competencies can be viewed as a catalyst for creating a more critical, innovative, and reflexive culture that frequently questions its own routines, assumptions and guiding principles. Knowing which kind of competencies enable future change agents to deal with these complex problems helps higher education institutes to adjust and reframe their education program accordingly.

To conclude, the results of the CFA confirm the convergent, discriminant and construct validity of the six factor competence framework for sustainable entrepreneurs. These competencies, which can be described by four dimensions, support future change agents in their sustainable entrepreneurial endeavours. Furthermore, action competence was redefined by including elements of strategic management and was renamed as strategic action competence. Altogether, at this point, the six factor competence framework provides researchers as well as teachers and practitioners with stepping stones for further enhancing sustainable entrepreneurship.

2.6 Shifting to the role of moral antecedents

On the one hand, sustainable entrepreneurship is seen as a way of generating competitive advantage by recognizing new sustainable business opportunities, resulting in new products, new methods of production, new markets or new ways of organizing business processes (Patzelt & Shepherd, 2011). On the other hand, sustainability is a value oriented and normative concept, since it addresses the question of how social-ecological systems ought to be developed in order to achieve a balance between economic, social and environmental aspects in business practices. When dealing with complex value-driven problems such as sustainable development, individuals need to have values and norms that go beyond the appropriation of tangible business outcomes for themselves. Therefore, in contrast to regular opportunity recognition, the process of opportunity recognition for SD is more dependent on individual moral antecedents such as ethical values and norms (Swart et al., 2004). The next chapter zooms in on the role of different moral antecedents in the process of recognizing opportunities for sustainable development.

Appendix

Table 2.5. Rotated component matrix with all items and individual factor loadings

	Item description	Original	Sm_ AC	NC	DC	StC	FC	IC
1	I am able to bring together economic, social and environmental conflicts of interest	DCa	0.16	0.02	0.68	0.17	0.21	0.15
2	I use the experiences, activities and values of various relevant stakeholders in addressing sustainability issues	DCb	0.20	0.23	0.78	0.10	0.20	-0.02
3	I am able to actively involve stakeholders and experts from other disciplines in addressing sustainability issues	DCc	0.29	0.14	0.84	0.09	0.13	-0.03
4	I am able to explain the importance of involving local stakeholders (e.g. in recruitment) for a company	DCd	0.19	0.05	0.75	0.16	0.21	0.10
5	I am able to construct and consider different directions for sustainability in the future	FCb	0.11	0.19	0.09	0.21	0.74	0.05
6	I am able to identify risks and opportunities inherent in present and future developments	FCc	0.17	0.04	0.23	0.22	0.77	0.03
7	In analyzing and evaluating scenario's for action, I take the impact on the short as well as the long term into consideration	FCd	0.16	0.16	0.27	0.19	0.67	0.03
8	In analyzing and evaluating scenario's for action, I take both the impact on the local and the global scale into consideration	FCe	0.20	0.12	0.17	0.06	0.67	0.14
9	I am able to identify key aspects of production chains and agricultural eco-systems	StCa	0.18	0.14	0.16	0.78	0.21	0.03
10	I am able to identify the key operations of a company that have a negative impact on the environment or society	StCb	0.19	0.24	0.13	0.69	0.28	0.07
11	I am able to analyse strengths and weaknesses of production chains and propose improvements to reduce the negative effects on the environment or society	StCd	0.25	0.14	0.14	0.77	0.17	0.15
12	I am able to integrate social, environmental and societal issues into future plans of a company	StCe	0.29	0.28	0.18	0.62	0.10	0.40
13	I am willing to take initiative to make improvements in my own practice based on norms, values, targets and principles of sustainability	NCc	0.07	0.75	0.09	0.18	0.20	0.15

14	I know what is seen as 'good sustainable practice' in my field of study	NCd	0.40	0.62	0.07	0.26	0.21	0.08
15	I am able to apply norms, values, targets and principles of sustainability to my own practice	NCe	0.37	0.65	0.05	0.31	0.15	0.23
16	I know how to explain the decisions a company has made concerning sustainability	NCf	0.49	0.40	0.17	0.32	0.26	0.17
17	I challenge not sustainable ways of working in a company	ACd	0.39	0.63	0.22	0.02	0.01	0.07
18	I am very good at identifying opportunities for sustainable development	ACe	0.43	0.62	0.13	0.20	0.21	0.21
19	I know how social, environmental or societal challenges can be turned into opportunities for an organization/company	ACg	0.60	0.21	0.14	0.26	0.18	0.19
20	I am able to motivate higher management in a company to invest in sustainability	ACh	0.64	0.19	0.24	0.16	0.14	0.25
21	When it comes to achieving particular goals in relation to sustainability I know whom to involve	SmCa	0.76	0.21	0.21	0.09	0.23	0.10
22	If I want to reach goals in relation to sustainability, I know which steps should be taken to be successful	SmCb	0.73	0.30	0.25	0.23	0.19	0.10
23	I am able to use a strategic way of working in sustainability related projects (designing, testing, implementing)	SmCd	0.68	0.35	0.18	0.24	0.15	0.02
24	I am able to monitor the sustainability performance of a company	SmCe	0.67	0.33	0.24	0.28	0.06	0.17
25	I let others know how much I appreciate cooperating with him or her in solving complex issues	ICd	0.18	0.13	0.08	0.10	0.12	0.82
26	I stand up for my rights if someone is overlooking (forgetting) one or more aspects of sustainability	ICe	0.20	0.32	- 0.02	0.17	0.01	0.79
27	I am able to feel to what extent stakeholders are willing to cooperate in a project	ICf	0.57	-0.06	0.24	0.08	0.19	0.52

Note. Orthogonal rotation. DC = diversity competence, FC = foresighted thinking competence, STC = systems thinking competence, NC = normative competence, AC = action competence, SMC = strategic management competence, IC = interpersonal competence and Sm_AC = strategic action competence. The indicators A, B, C, etc. are corresponding to the item description sequence belonging to the factor. The values in bold are the highest factor loadings (>0.40).

CHAPTER 3

EXPLORING THE RELATION BETWEEN INDIVIDUAL MORAL ANTECEDENTS AND ENTREPRENEURIAL OPPORTUNITY RECOGNITION FOR SUSTAINABLE DEVELOPMENT²

When dealing with complex value-driven problems such as sustainable development, individuals need to have values and norms that go beyond the appropriation of tangible business outcomes for themselves. This raises the question of the role played by individual moral antecedents in the entrepreneurial process of opportunity recognition for sustainable development. To answer this question, an exploratory empirical research design was used in which 96 would-be entrepreneurs were subjected to real-life decision-making processes in an online environment. The participants were guided through the process of opportunity recognition for sustainable development. Furthermore, they were subjected to several tests linked to individual moral antecedents. The mixed methods design used to analyse the results led to the conclusion that pro-environmental behavior values and moral competencies are important indicators of the ability to recognize opportunities for sustainable development. These results provide useful insights about relating moral antecedents to idea generation for sustainable development and can help researchers, higher education institutes, and sustainable entrepreneurs to further develop the concept of sustainable entrepreneurship and its underlying processes.

² This chapter is based on:

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2018). Exploring the relation between individual moral antecedents and entrepreneurial opportunity recognition for sustainable development. *Journal of Cleaner Production*, 172, 1582-1591. DOI: 10.1016/j.jclepro.2017.10.296

3.1 Introduction

Sustainable development is perhaps the most prominent challenge for businesses of our time. Climate change and the destruction of biodiversity demonstrate the negative and potentially deadly consequences these processes have for living species (United Nations, 2004). Entrepreneurial action is increasingly seen as a promising way to preserve ecosystems, counteract climate change, reduce environmental degradation, improve agricultural practices, and maintain biodiversity (Dean & McMullen, 2007; Patzelt & Shepherd, 2011). The sustainable entrepreneur initiates those activities and processes that lead to the identification, evaluation and exploitation of business opportunities in order to contribute to sustainable development through their entrepreneurial endeavours (Schaltegger & Wagner, 2011; Patzelt & Shepherd, 2011).

Opportunity recognition lies at the heart of entrepreneurship research, as the entrepreneurial process always starts with the identification of a potential business idea that could be explored and further developed into a new product, service, or process (Shane & Venkataraman, 2000). Therefore, the concept of opportunity has become central in entrepreneurship research (McMullen & Shepherd, 2006; Shane & Venkataraman, 2000; Davidsson, 2015). Nevertheless, on the conceptual front, there is still no consensus on what the concept of sustainable opportunity recognition entails. There has been considerable interest in studying the factors, processes, and dynamics that foster opportunity recognition (Baron & Ensley, 2006; Shane, 2000; Grégoire et al., 2010). However, there is a lack of empirical studies that examine these factors, processes, and dynamics, as most research is still conceptual in nature (Dimov, 2007; Davidsson, 2015). Consequently, there is a growing gap between theorizing about opportunity recognition and research practices for studying the phenomenon. Another gap in the literature concerns the question of what discriminates sustainable entrepreneurship from conventional entrepreneurship and what role opportunity recognition plays in this distinction. On the one hand, sustainable entrepreneurship is seen as a way of generating competitive advantage by recognizing new sustainable business opportunities, resulting in new products, new methods of production, new markets, or new ways of organizing business processes (Patzelt & Shepherd, 2011). On the other hand, sustainability is a value-oriented and normative concept, as it addresses the question of how social-ecological systems ought to be developed in order to make a trade-off between economic, social, and environmental aspects in business practices. Therefore, in contrast to regular opportunity recognition, the process of opportunity recognition for sustainable development includes individual moral antecedents such as ethical values and norms (Swart et al., 2004). The importance of moral values, such as altruism, in the sustainable entrepreneurial process was underpinned in the work of Patzelt and Shepherd (2011). Nevertheless, research on this relation has remained descriptive and conceptual ever since. In other fields related to sustainable entrepreneurship, for instance in the field of competencies

for sustainable entrepreneurship, other value-oriented constructs (i.e. moral competencies) are considered as distinctive for sustainable entrepreneurship. Patzelt and Shepherd's (2011) conceptual model serves as a starting point for analysing the relation between several different moral antecedents, as it is clear that sustainable entrepreneurship contains a value-oriented element. However, which elements play a role in the very first phase of the entrepreneurial process (i.e. idea generation) remains unclear. This raises the following research question: *Which individual moral antecedents play a role in the entrepreneurial process of opportunity recognition for sustainable development?*

The remainder of this chapter is structured as follows: in section 2 the concept of opportunity recognition is explained in more detail. Furthermore, literature in the field of moral antecedents is reviewed. The third section describes the qualitative and quantitative methods used in this study. Section 4 shows the main results and is followed by the final section in which the results are discussed and conclusions are drawn.

3.2 Opportunity recognition for sustainable development

In general, three main ongoing debates about opportunity recognition can be distinguished within the literature. In section 1.4.1 of this dissertation, these debates and views on opportunity recognition are discussed extensively. Here it suffices to state that "an entrepreneurial opportunity consists of the opportunity to create future economic artefacts and as such, involves a demand side, a supply side, and the means to bring them together" (Venkataraman et al., 2012, pp. 652). That "opportunity recognition rests on the subjective perception and interpretation of objective realities (e.g., market dynamics, new information, etc.)" (Grégoire et al., 2010a, pp. 118). And finally that idea generation lays the foundation for opportunity recognition (Vogel, 2016) and is a measurable construct. In this chapter, the process of recognizing opportunities by individuals by means of idea generation is central, as it forms an important foundation for the rest of the process.

3.2.1 Opportunity recognition for sustainable development

Sustainability can be conceptualized as resulting from acting on market failures, and market failures can be seen as sources of new entrepreneurial business opportunities. Because sustainability has been acknowledged as a source of opportunities (Dean & McMullen, 2007), some research efforts have been made to a) provide an overview of the opportunity recognition process specifically for sustainable development and b) indicate those key elements that make the difference between regular opportunity recognition and opportunity recognition for sustainable development (Dean & McMullen, 2007; Patzelt & Shepherd, 2011).

One of the most widely used models of opportunity recognition for sustainable development was developed by Patzelt and Shepherd (2011). Their model describes the role of prior knowledge (of the natural and/or communal environment and of entrepreneurship) in combination with a sense of perceived threat to the environment and the level of altruism toward others as facilitators for recognizing opportunities for sustainable development. In their conceptual model (see Figure 1.2 in Section 1.4.2 of this dissertation), they focus on the role of knowledge and motivation as explanatory factors of opportunity recognition for sustainable development process.

Within the motivational aspect, Patzelt and Shepherd (2011) underpin the importance of altruism as a normative element in the model, but it still remains a very broad and conceptual concept. A more specific and in-depth normative element is missing and should be added to the model, given that acting upon environmental and social problems inevitably imposes moral dilemmas and that sustainability problems constitute ethical issues (Muñoz & Dimov, 2015). Dealing with sustainability is not only about applying the right formulas and policies to help improve our current wealth, but also about taking responsibility for distributing well-being, sacrifice, and risks equally between rich and poor, humans and non-humans, and present and future generations (Blok et al., 2016). The concept of sustainable entrepreneurship can therefore be characterized by its normative character. Individual ethical values and norms seem to be essential for sustainable entrepreneurship and can therefore be seen as important drivers in recognizing opportunities for sustainable development (Lans et al., 2014; Blok et al., 2016). Sustainable entrepreneurs act as moral agents facing a moral entrepreneurial imperative every time sustainability problems are considered or interpreted as venture opportunities (Muñoz & Dimov, 2015). The role of these ethical values and norms is becoming more important in current models of sustainable entrepreneurship (Blok et al., 2016) and is also confirmed in empirical research on competencies for sustainable entrepreneurship (Ploum et al., 2017; this dissertation). However, research on the role of normative or moral values is still in its infancy, and their actual relation to opportunity recognition for sustainable development is unclear. Therefore, new explorative empirical research could provide valuable insights into two questions. The first deals with which key elements can make a difference between regular opportunity recognition and opportunity recognition for sustainable development, and the second with whether this normative character could be one of these key elements (Dean & McMullen, 2007; Patzelt & Shepherd, 2011; Muñoz & Dimov, 2015).

Concluding, previous studies make important contributions to our understanding of the antecedents that enhance sustainable entrepreneurship and therefore also opportunity recognition for sustainable development in particular. This process is depicted in Figure 3.1 and serves as an overview of the existing literature on opportunity recognition for sustainable development. It also introduces the

concept of moral antecedents as an addition to the model. However, these process-level approaches do little to explain why certain individuals are more likely than others to recognize these opportunities for sustainable development and what characteristics could possibly explain these differences. Taking the individual as level of analysis, this study investigates what explains why some individuals are more likely to recognize these types of opportunities and explores the role of moral antecedents in this process. In section 3.3, these moral antecedents are introduced and further explored.

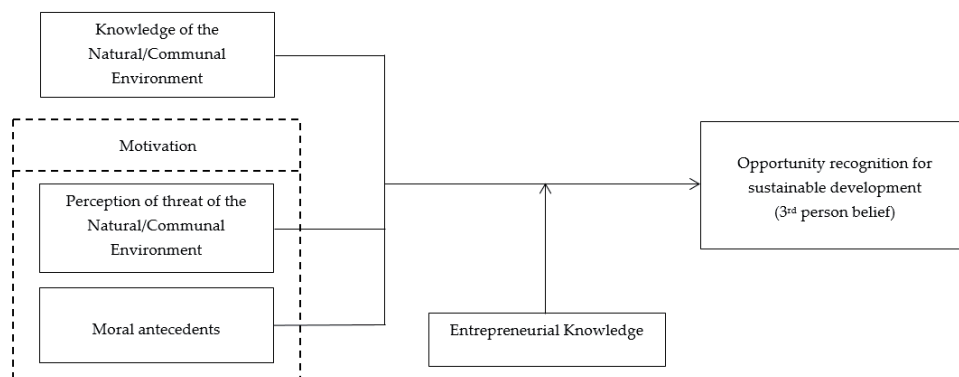


Figure 3.1. Conceptual model based on Patzelt and Shepherd (2011), in which altruism towards others is replaced by the variable moral antecedents.

3.3 Introducing individual moral antecedents

Building on Patzelt and Shepherd's (2011) model, but focusing on the important role of moral norms and values in the process of recognizing opportunities for sustainable development, this study introduces three individual moral antecedents that form the focal point of this research. The three antecedents are self-transcendence values (Schwartz, 1994), pro-environmental behavior values (Dunlap et al., 2000; Shepherd et al., 2013), and moral competencies (Blok et al., 2016; Ploum et al., 2017; this dissertation).

Values are guides and determinants of social attitudes, ideologies, and social behavior. They are "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973: 5). Thus, they represent guiding principles for decision making and subsequent action (Ajzen, 1991). Values are different from attitudes in that values are universal beliefs that underlie attitudinal processes (Ng & Burke, 2010). In addition, a major reason to focus on moral values is the pervasive and important influence of values on an individual's interpersonal, decision-making, and ethical behavior (Shepherd,

et al., 2013; Pohling et al., 2016). Furthermore, values can be considered as relatively stable during assessments as they are acquired by individuals through processes of socialization extending over many years (Grusec, 2011).

Patzelt and Shepherd (2011) underpinned the importance of altruism toward others as an important value or motivational aspect in the sustainable entrepreneurial process; the current study adds also the importance of altruism toward the environment in the combined factor called self-transcendence (Schwartz, 1994). Altruism is explained as the individual motivation to improve the welfare of another person (Penner et al., 2005: 368). Many explanations of altruism imply that individuals (consciously or non-consciously) act altruistically because it is in their self-interest in contrast to developing purely personal gain, but altruistic action always includes some sacrifice to oneself and an intention to develop benefits for others (Penner et al., 2005). Schwartz extends this conception of feeling empathy and sympathy for others to the environment in his universal personal values theory. Here, self-transcendence is a combined factor of 'benevolence' and 'universalism'. Benevolence addresses serving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group'), and universalism is about understanding, appreciation, tolerance, and protection for the welfare of all people and for nature (Schwartz, 1994). The latter is in line with what is usually referred to as altruism toward others. Building on Rokeach's (1973) work on the structure of values, Schwartz (1994) developed an instrument to measure dimensions of values that are considered to be universal across all people. This study focuses only on self-transcendence values as they are a promising antecedent of sustainable opportunity recognition.

Whereas altruism and self-transcendence cover the more universal values and can be interpreted very broadly, the concept of opportunity recognition for sustainable development is rather context specific. A value-driven construct that is used more often in different kinds of sustainability-related studies is pro-environmental behavior. Pro-environmental behavior (PEB) values are considered as important predictors of sustainable opportunity recognition (Shepherd et al., 2013). Whereas Shepherd and colleagues (2013) focus mostly on the role of these values in moral disengagement, they underpin the importance of these values for opportunity recognition. Although PEB values are discussed in general in the literature, they are rarely specified. An exception to this is the United Nations Millennium Declaration (United Nations General Assembly, 2000), which identified the precepts of sustainable development as respect for nature, shared responsibility, freedom, equality, solidarity, and tolerance. Perceiving an opportunity that benefits the natural environment as highly attractive is likely to be consistent with these general principles. An entrepreneur with higher pro-environmental values is more

likely than an entrepreneur with weaker pro-environmental values to perceive an opportunity that influences the natural environment positively.

In the field of competencies for sustainable entrepreneurship, another value-oriented construct has been distinguished as being distinctive for sustainable entrepreneurship. In this field of research, moral competencies are identified as important influencers in the sustainable entrepreneurial process. In general, competencies are described as enabling successful task performance and problem solving with respect to real-world problems, challenges, and/or opportunities on an individual level and consist of knowledge elements, skills, and attitudes (Mulder, 2014). Over the last two decades, there has been a continuous search for more comprehensive conceptualizations of competence. Comprehensive in this sense refers to the integrated and internalized capability conditional for accomplishing task performance, problem solving, and functioning within a specific position and context (Mulder, 2017). From this comprehensive perspective, competence is defined as “the generic, integrated and internalized capability to deliver durable effective performance in a certain professional domain, job, role, organizational context, and task situation” (Mulder, 2014: 111). Moral competence, in the literature used interchangeably with ethical competence, is covered mostly in the business ethics literature. In general, moral competence is described as “the sensitivity of managers and professionals to moral issues in their organizational structures followed by moral judgment and actions” (Pohling et al., 2016: 2). It can be considered as the transformation of intentional behavior to actionable behavior (Blok et al., 2016). Nevertheless, whereas Pohling et al. (2016) and Morales-Sánchez and Cabello-Medina (2013) focus primarily on the ethical decision-making process and the moral competencies needed to manage this process, this research focuses on the business context of sustainable entrepreneurs and the moral competencies needed to manage this particular process. Two moral competencies contextualized within the sustainable entrepreneurial context and proven to be empirically sound are normative competence and strategic action competence (Lans et al., 2014; Ploum et al., 2017; this dissertation). Normative competence is described as an attribute whereby change agents are enabled to collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets (Wiek et al., 2011). Sustainable development cannot be achieved merely through state intervention, legislation, new technologies, and efficient economies, but requires passive and active support from individuals (Blok et al., 2016). In line with this, strategic action competence is described as the ability to actively involve oneself in responsible actions to improve the sustainability of social-ecological systems (Mogensen & Schnack, 2010). They both concern norms, values, and beliefs that define what is right and wrong concerning sustainability, and enable professionals to take the right decisions and behave in a responsible way (Blok et al., 2016). Furthermore, they are assumed to enable individuals to recognize

those opportunities that are related to sustainable development and can be seen as discriminating factors in this process. Therefore, both competencies are taken into account as possible additional moral antecedents in the process of recognizing opportunities for sustainable development.

In conclusion, Figure 3.2 depicts the model used to analyze the relationship between individual moral antecedents and opportunity recognition for sustainable development. This model is an in-depth representation of the block ‘Moral antecedents’ from Figure 3.1.

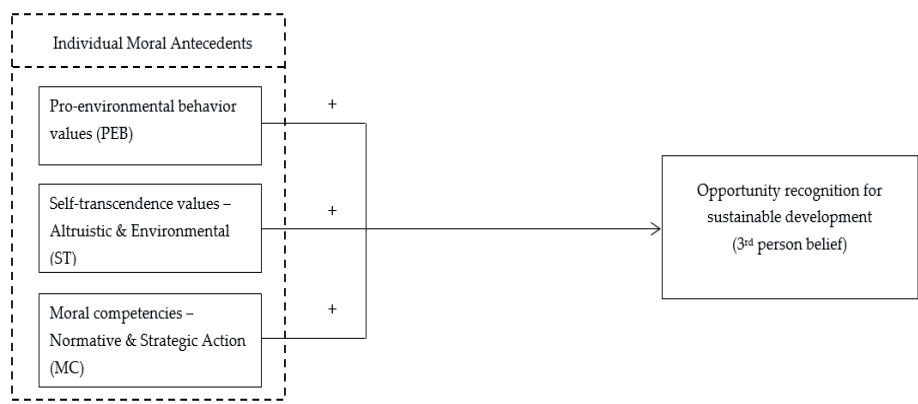


Figure 3.2. Zooming in on the moral antecedents as depicted in Figure 1 and their relation to opportunity recognition for SD

3.4 Methods

Research on opportunity recognition faces a number of methodological challenges. For instance, several studies have relied on observations that are prone to retrospective and recall biases (e.g., asking respondents about opportunities they recognized in the past), self-reporting and censored data and selection biases (e.g., studies that only include cases of successful opportunities). Grégoire and colleagues (2010a) have formulated some guidelines which could help in developing better ways to analyse opportunity recognition empirically. Features of their approach include for example: the use of research tasks and hypothetical exercises that showcase ‘real-time’ efforts of individuals to recognize opportunities, a focus on opportunity beliefs, the modelling of research tasks and material on “real-life” events/ ‘day-to-day’ experiences of entrepreneurs in particular contexts, and mobilizing and integration of different forms of data, data collection methods, and analytical techniques. These guidelines are used as an inspiration for the development of the methods used in this study. In line with these guidelines, a digitally scripted learning tool was developed to actively engage would-be entrepreneurs in ‘real-life’

decision making processes in the field of sustainable entrepreneurship. The learning tool exists of several tests and assignments which will be discussed below.

3.4.1 Setting and Sample

The participants in this exploratory study were N=105 international BSc students of a life sciences university in the Netherlands, who were following the principles of entrepreneurship course in May 2015 (n=50) and in September 2015 (n=55) as a free choice module in their educational program. In total, there were n=96 valid cases; nine cases were excluded because of missing data. The questionnaires and case study assignment were administrated throughout the six weeks of class. After a short introduction in the first week of the course, in which the anonymity and confidentiality of the data were stressed and the procedure explained, the participants signed a declaration of consent.

3.4.2 Constructs and measures

A digitally scripted learning tool (Noroozi et al., 2012) was designed to actively engage would-be entrepreneurs in an online environment to critically engage in 'real-life' decision-making processes in the field of sustainable entrepreneurship. In this way, participants experienced how difficult it can be to balance social, environmental, and economic goals and values in a business context. The core task consisted of an opportunity recognition assignment centred on a case description of an existing company. In the learning tool, the original business model of the existing company, Interface, (before it adopted a sustainability strategy) was used as a case description, and the description was anonymized. Using the Business Model Canvas (BMC) (Osterwalder & Pigneur, 2009), participants analysed the company's case description. Participants were asked to come up with new ideas to improve the business model accordingly. These ideas were used as the main source of input for analysis. In addition to this core task, the individual moral antecedents were queried as subtasks of the digitally scripted learning tool in the first week of the course.

Independent variables

Schwartz (1994) developed an instrument to measure dimensions of values that are considered to be universal across all people. The instrument is composed of 52 value items that represent 10 value types. Respondents are asked to rate the importance of each value item on a 5-point Likert scale. The second measure used in this study is the revised version of the New Environmental Paradigm (NEP) scale (Dunlap et al., 2000; Cordano et al., 2010) to measure PEB values. The revised NEP scale contains 15 items rated on a 5-point Likert scale. Thirdly, normative competence and strategic action competence are measured by means of a competence self-report (Lans et al., 2014; Ploum et al., 2017; this

dissertation). To measure their competencies, respondents were asked to rate themselves, on a scale of 1 to 10 (1 = low and 10 = high), on their perceived performance at that moment in time for an item/statement belonging to the competencies. The questionnaire can be found in the general Appendix of this dissertation (see Table A1).

Dependent variable

Opportunity recognition is measured by the number of identified ideas and by analysing the content of these ideas. In line with other studies, it is argued here that an essential part of the opportunity recognition process is the generation of opportunity ideas: initial ideas or envisioned futures in the mind of an individual (Lumpkin & Lichtenstein, 2005; Vogel, 2016). Respondents were completely free to choose sustainable or unsustainable opportunities.

First the frequency of the identified ideas was measured. As the number of problems identified and the number of ideas proposed can say something about a person's ability to identify opportunities, these two aspects were counted for each would-be entrepreneur. In order to identify whether a problem or idea could be considered a sustainable one – and therefore had a clear focus on the triple bottom line – the eight sustainable archetypes identified by Bocken et al. (2014) were used as indicators. The archetypes are described as follows: maximize 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, and develop scaled-up solutions (Bocken et al., 2014). If an idea could be categorized within at least one of the sustainable archetypes, the idea was considered an idea related to sustainable development. Also, choosing to innovate within the environmental/societal impact block of the BMC or the value proposition block can be seen as inclining more toward an opportunity for sustainable development and was therefore taken into account (0 = not used/chosen, 1 = used as first block, 2 = used as second block, 3 = used as third block). In line with this, a score was kept of whether sustainability was mentioned in the value proposition (0 = no, 1 = yes) and whether sustainability was mentioned in the other blocks of the BMC (0 = not mentioned, 1 = mentioned).

Secondly, the content of the identified ideas was analysed. Idea generation is recognized as being a domain-specific form of creativity. Creativity helps a person to come up with a new opportunity, without being stopped too much by cognition or other (rational) barriers (Corbett, 2007). Therefore, the ideas were scored on the basis of Guilford's (1967) classification and later adjusted by Baggen et al. (2016), who formulated three factors to score ideas on creativeness: fluency, elaboration, and flexibility. However, whereas Baggen et al. (2016) scored the ideas on a dichotomous (yes and no) scale, the current

study used a 5-point Likert scale, because the former classification led to all ideas being comprehensible and concrete.

In line with Guilford's (1967) guidelines, the ideas were scored on *comprehensibility* (1 = totally incomprehensible, 5 = totally comprehensible). Incomprehensible ideas were excluded from further analysis. For instance, 'offer products' was too vague to interpret in the context of sustainable development. Furthermore, the ideas were scored on *concreteness*: the degree to which it was possible to visualize or apply the idea (1 = not concrete, 5 = concrete). For instance, 'carpooling' makes more sense than 'rearrange the whole supply chain', although the second idea contains more details. Average scores on comprehensibility and concreteness were calculated. *Flexibility* indicates the degree to which the participants generated ideas in different categories. Bocken et al.'s (2014) eight sustainable archetypes were used to categorize the ideas. For instance, 'use solar energy' and 'use energy from windmills' are both related to the category 'maximizing material and energy efficiency'. The ideas 'substitute yarn with eco-friendly alternative', and 'diversify assortment' relate to different categories, indicating a higher flexibility score. Each idea per person was scored in one or more categories.

3.4.3 Data analysis

The 96 reports in which participants identified new ideas were coded in Atlas.ti. Before the whole set of 96 reports was coded, a trial session based on 12 reports (12.5% of the total set) was held in order to finalize the codebook. Two researchers were involved in the trial session and scored all the ideas, resulting in 80% agreement on core constructs. After intense discussion, the final codebook was developed and used for the analysis of the 96 reports.

Given the explorative nature of this study, simple statistics were used to discover potential relations between the predictor (moral antecedents) and outcome (opportunities) variables. On the basis of the analysis of the coded reports, the quantified data as well as the test data were entered and analysed in IBM SPSS Statistics 23.

3.5 Results

3.5.1 Descriptive statistics: sample

In total, 96 cases were included in the analysis. The male–female division within the dataset was 46.9% and 53.1%, respectively. Most respondents were, at the time of participation, enrolled in their third year of education at the participating higher education institute (89.9%). Of these respondents, 52.1% were following a more beta-oriented study program (natural and technical science) and 47.9% a more

gamma-oriented study program (social science). Only a few respondents indicated that they already had their own company (10.6%) versus the majority (89.4%) who stated that they did not have their own company. Nevertheless, all respondents had the intention of becoming an entrepreneur in the future, with 76.3% of them having a score of 3 or higher, measured on a 5-point Likert scale. Also, their attitude toward entrepreneurship was positive overall, with 87.5% of the respondents scoring a 3 or higher on average. Furthermore, 36.5% indicated that they had entrepreneurial parents, compared to 63.5% who indicated that they did not have entrepreneurial parents

3.5.2 Descriptive statistics: explanatory variables – moral antecedents

Mean scores and Spearman correlation coefficients between the moral antecedents were calculated (Table 3.1) to check whether the constructs could be considered as discriminant constructs. As expected, altruism toward others and altruism toward the environment correlated highly with the combined variable self-transcendence ($r=0.812$ and $r=0.902$, both $p<0.01$) and correlated moderately with each other ($r=0.484$, $p<0.01$), indicating that they measure two different aspects. This also holds for the combined variable moral competence, which is composed of normative competence and strategic action competence ($r=0.861$ and $r=0.952$, $p<0.01$), with a correlation between the constructs of $r=0.668$, $p<0.01$. All moral antecedents correlated moderately with one another ($p<0.01$). The correlations did not exceed the threshold of $r=0.7$ and therefore did not overlap too much. The only moral antecedent that did not correlate significantly with most of the other antecedents was cognitive moral development; it correlated significantly only with self-transcendence ($r=0.16$, $p<0.01$) and altruism toward others ($r=0.277$, $p<0.01$).

3.5.3 Descriptive statistics: dependent variable – idea generation

As explained, opportunity identification was measured through an idea generation assignment. In total, 249 problems were identified, of which 123 related to sustainable development (49.4%). On average, respondents were able to identify 2.6 problems in general, and 1.3 problems related to sustainable development (50%). In total, 29 respondents (30.2%) did not identify any problems related to sustainable development. The other 67 respondents (69.8%) did identify problems in the business model that could relate to sustainable development, ranging from one identified problem to seven problems in total. Regarding the number of identified ideas, in total 427 ideas were generated, of which 200 related to sustainable development (46.8%). On average, respondents identified 4.5 ideas in general and 2.1 ideas specifically related to sustainable development (46.6%). Sixteen of the respondents (16.7%) did not generate any ideas related to sustainable development; the other 80 respondents (83.3%) did identify

Table 3.1. Descriptive statistics: mean scores and correlation coefficients between moral antecedents

	M	SD	1	1a	1b	2	3	3a	3b
Spearman correlation coefficients									
1. Self-transcendence	3.60	0.64	-						
1a. Altruism others	3.71	0.73	0.812**	-					
1b. Altruism environment	3.45	0.75	0.902**	0.484**	-				
2. Pro-environmental behavior	3.67	0.55	0.600**	0.516**	0.524**	-			
3. Moral competence	6.93	0.88	0.494**	0.347**	0.487**	0.577**	-		
3a. Normative	7.32	1.04	0.442**	0.313**	0.430**	0.462**	0.861**	-	
3b. Strategic action	6.75	0.91	0.465**	0.324**	0.462**	0.582**	0.952**	0.668**	-

Note. M = mean, SD = Standard deviation, N = 96, ST = Self-transcendence values (scale: 1–5), PEB = Pro-environmental behavior (scale: 1–5), MC = Moral competence (scale: 1–10), **p < .01

new ideas ranging from one idea to nine different ideas per respondent. The results of the correlation analysis indicate that the number of identified problems related to sustainable development correlated strongly to the number of identified ideas for sustainable development ($r(94)=0.451$, $p<0.05$).

Besides the number of identified problems and ideas, choosing to innovate within the environmental impact block of the BMC and within the value proposition block, and mentioning sustainability in the latter and throughout the BMC, were coded and scored for analysis. Table 3.2 provides an overview of the scores on these elements. Choosing to innovate in the value proposition block does not show a significant relation with the number of identified ideas for sustainable development. However, choosing to innovate within the environmental impact block does show a strong correlation with the number of identified ideas for sustainable development ($r(94)=0.523$, $p<0.05$). Not all business model innovations (i.e. new ideas) within the value proposition are related to sustainability, whereas the ideas within the environmental/societal impact block are. Only 10 respondents chose to mention sustainability in the value proposition block; this could explain these results.

Table 3.2. Descriptive statistics: frequencies of indicators of Business Model Canvas (BMC)

Variable	Category	Frequency	Percent
Priority environmental impact block	Not chosen	31	32.3
	Used as first block	25	26.0
	Used as second block	19	19.8
	Used as third block	21	21.9
Priority value proposition	Not chosen	69	71.9
	Used as first block	16	16.7
	Used as second block	5	5.2
	Used as third block	6	6.3
Sustainability used in value proposition	No	86	89.6
	Yes	10	10.4
Sustainability mentioned throughout BMC	No	85	88.5
	Yes	11	11.5

3.5.4 Descriptive statistics: dependent variable – content of ideas

Examination of the generated ideas related to sustainable development and the scores on the content of those ideas reveals that all ideas are scored as comprehensible and concrete, with average scores of 3.50 and 2.05, respectively (Table 3.3). This means that on average the respondents scored just above the mid-point for comprehensibility and provided only some details, but mostly just mentioned the idea. On average, the flexibility score was 0.21, with 0.13 being the lowest score and 0.50 the highest. Nevertheless, the range of the scores on the content of the ideas varied extremely between the ideas. To

illustrate this: the three highest scoring ideas on flexibility (number of categories), comprehensibility, and concreteness were ‘use elephant grass as material for carpets’ (scores of 3, 5, and 5), ‘replace yarn with Sorona Fibres’ (scores of 2, 4, and 5) and ‘store energy with compressed air energy storage’ (scores of 2, 4, and 4). The three lowest scoring ideas were: ‘use organic materials’ (scores of 1, 2, and 1), ‘research glue’ (scores of 1, 2, and 1) and ‘use less nylon’ (scores of 1, 2, and 1). However, this classification of highest and lowest scoring ideas does not say anything about the feasibility or innovativeness of the ideas.

Table 3.3. Descriptive statistics: average scores of content measures

	Range	Average score	SD
Flexibility score (with maximum score of 1)	0.13 – 0.50	0.21	0.08
Comprehensibility (with maximum score of 5)	1.67 – 4.00	3.05	0.41
Concreteness (with maximum score of 5)	1.00 – 5.00	2.05	0.78

3.5.4 Testing: the relation between moral antecedents and opportunity recognition for sustainable development

First, when the relation between the number of identified ideas for sustainable development and the four moral antecedents was tested, significant results for PEB scores ($r(94)=0.213$, $p<0.05$) and moral competence as a composite construct ($r(94)=0.225$, $p<0.05$) were found. Normative competence ($r(94)=0.215$, $p<0.05$) and strategic action competence ($r(94)=0.200$, $p<0.05$) as separate antecedents also had a significant correlation with the number of identified ideas for sustainable development. In other words, the higher the score on PEB values or on moral competencies, the more ideas for sustainable development were identified. No significant correlations were found between number of ideas and the moral antecedent self-transcendence. Also, when the separate elements of self-transcendence – consisting of altruism toward others and altruism toward the environment – were examined, no significant correlations were found.

Second, when the relation between the moral antecedents and the content of the ideas for sustainable development were examined, the correlation analysis showed no significant results either. There were no significant correlations between the scores on the three individual moral antecedents and the content of the ideas as measured by flexibility, comprehensibility, and concreteness. In the process of looking for explanations for these results, scatterplots of the correlations were analysed. These scatterplots showed a large concentration in the middle, with on both ends of the line some big differences in the scores on the moral antecedents between high and low scoring ideas on the content

measures. When these extremes (in this case the highest and lowest scoring ideas for sustainable development) were further examined, an indication for differences on the scores on the moral antecedents was found (see Table 3.4). It appears that, for the *highest* scoring ideas on the three content measures, the corresponding respondents scored *higher* on average on the moral antecedents than the average of the whole sample. Similarly, for the respondents with the *lowest* scoring ideas on the three content measures, the scores on the four moral antecedents were *lower* on average than the average of the whole sample. Comparable results were found on examination of the high scoring individuals on the moral antecedents: top scoring individuals on the moral antecedents scored higher on the content measures. To test whether these extreme cases were not merely outliers and therefore should be excluded from the analysis, the outlier labelling rule and one sample t-tests were performed on the content measures as well as on the moral antecedents. The tests under the Tukey outlier labelling rule resulted in finding no significant outliers within the data. The one sample t-tests were not significant either; this in general means that there was no specific mean for the whole population. Specifically, these results indicate that the extreme cases were significantly different from the group average and should therefore be considered as valid data points and not as outliers.

Table 3.4. Scores on moral antecedents of the three highest and the three lowest scoring ideas on the three content measures

	Respondent-ID /corresponding idea	Self- transcendence	Pro- environmental behavior values	Moral competence
Group average		3.6	3.7	6.9
High score	12 - Elephant	4.7	4.5	8.7
on content	29 - CAES	4.0	3.7	7.3
measures	35 - Sorona	4.3	4.0	8.3
Low score	20 - Organic	3.4	3.5	6.8
on content	27 – Glue	3.0	3.5	6.2
measures	65 - Nylon	2.6	2.9	6.0

Note. The three content measures are comprehensibility, concreteness and flexibility. The ideas are described in detail in section 3.3.4.

To sum up, although not statistically significant, there are reasons for assuming that there is a relation between the moral antecedents and the content of the identified ideas for sustainable development. The analysis of the extreme cases clearly suggests that there is some kind of threshold value that can be considered as a tipping point for the influence of the moral antecedents on the content of the identified ideas.

3.6 Discussion and Conclusions

This research tries to unravel the initial phase in sustainable entrepreneurship by analysing the relation between moral antecedents and opportunity recognition for sustainable development. In this study, opportunity recognition is measured by identifying (business) ideas for sustainable development. The analysis showed that two of the three moral antecedents have a positive and significant relation with the number of identified ideas for sustainable development. These two moral antecedents are pro-environmental behavior values and moral competencies. The other moral antecedent, labelled as self-transcendence, did not relate significantly with the number of identified ideas for sustainable development. This answers the main research question: *Which individual moral antecedents play a role in the entrepreneurial process of opportunity recognition for sustainable development?*

Pro-environmental behavior values and moral competencies can be seen as important moral antecedents in the process of recognizing opportunities for sustainable development. In addition, the results show that the number of identified problems for sustainable development is a significantly good predictor of the number of identified ideas for sustainable development. Another positive result of this study is the relation between choosing to innovate within the environmental/societal impact block of the BMC and the number of ideas for sustainable development identified. The original BMC does not include this block, but assumes that sustainability-related topics can be integrated in the other blocks. Nevertheless, more and more research on sustainable business models is being conducted, as sustainability is becoming a more important factor for businesses (Abdelkafi & Täuscher, 2016; Joyce & Paquin, 2016). Research varies from a completely new system dynamics approach (Abdelkafi & Täuscher, 2016) to 'simply' adding new elements to existing models (Joyce & Paquin, 2016). Because of the wide variety of orientations, there is still no consensus on how sustainability should be incorporated in existing business model tools. Providing concrete answers to this discussion is beyond the scope of this research. However, the results do suggest that making the environmental/societal impact of the business model visible within the BMC in the form of an additional block leads to the identification of more ideas for sustainable development.

Finally, the results of this study have led to a re-evaluation of the conceptual model depicted in Figure 3.1. The redefined model of opportunity recognition for sustainable development is presented in Figure 3.3.

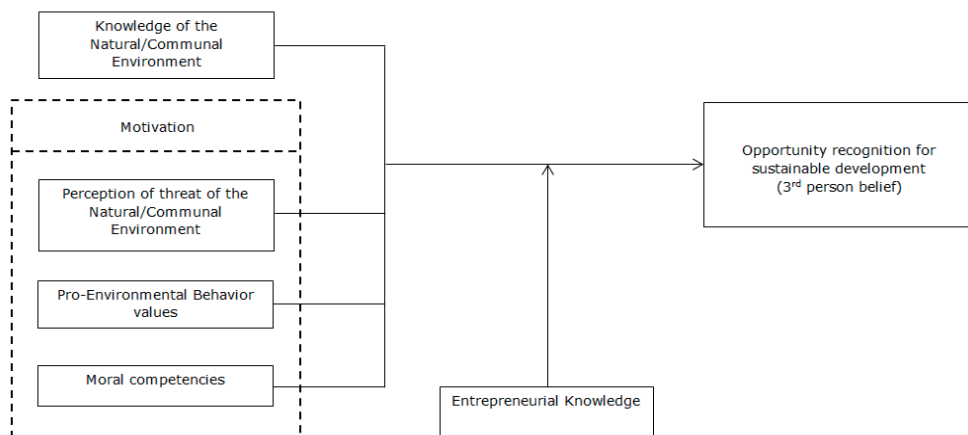


Figure 3.3. Redefined conceptual model of opportunity recognition for sustainable development

The relation between self-transcendence (i.e. altruism toward others) and opportunity recognition for sustainable development was not confirmed in this study. Most of the literature on sustainable or social entrepreneurship emphasizes the importance of altruism in the entrepreneurial process (Patzelt & Shepherd, 2011). However, these studies are usually conceptual in nature, whereby altruism is often seen as an intrinsic motivation to do good and help others. In studies of sustainable entrepreneurship, altruism is usually explained by empathy and sympathy toward others (Patzelt & Shepherd, 2011). As appears from the results, a general moral orientation or sensitivity toward environmental issues, operationalized in this study by altruistic values, is not correlated with the recognition of sustainable entrepreneurial opportunities. A possible explanation for this could be that these altruistic values cover mostly the human aspects of morality, like empathy and sympathy toward others, whereas recognizing opportunities for sustainable development deals mostly with the more environmental aspects of morality. This is also in line with research on distal and proximal constructs, which are common in the psychology domain (Rauch & Frese, 2007). It could be that altruism can be considered as a more general or distal construct that influences a more specific or proximal construct (for instance moral competencies), which in turn relates to an outcome variable. The relation of self-transcendence with recognizing opportunities could therefore possibly be considered as indirect, but more research is needed to assess whether this is actually the case.

Another important element of this study relates to the content of the ideas. It is not only the ability to identify ideas for sustainable development that is an important indication of opportunity recognition; the content of the ideas can also say something about whether an idea has more or less potential to become a first person opportunity. Nevertheless, the results found in this study do not provide sufficient

significant backup for a possible relation between the moral antecedents and the content of the ideas for sustainable development. This could have to do with the majority of the sample scoring an average score of 3 on the comprehensibility and concreteness measures, as it remains hard to classify the ideas. Furthermore, the classification based on the work of Guilford (1967) and Baggen et al. (2016) needs to be further strengthened and validated in the field of opportunity recognition, as it is based on creativity measures. As a result of the clustering of scores in the middle, the cases on the far ends of the spectrum were analysed in more detail. Examination of these extremely high and low scores on the content measures reveals that those respondents also score higher or lower on average on the moral antecedents. Also, examination of the extreme scores on the moral antecedents reveals that those respondents who score high on the moral antecedents also score better on average on the content measures than the respondents who score lower on the moral antecedents. In other words, although not statistically significant, there are reasons for assuming that there is a relation between the moral antecedents and the content of the identified ideas for sustainable development. There seems to be a threshold, given the extreme scores of the moral antecedents and their relation to the content of the identified ideas. Identifying the exact threshold is beyond the scope of this study but has led to a proposition for future research: the higher the scores on the moral antecedents, the better the content of the ideas.

Although the results of this study are promising, some limitations have to be mentioned. First, the data were collected among would-be entrepreneurs, (i.e. students with the intention of becoming a [sustainable] entrepreneur), and at only one higher education institute. Future research could for instance focus on conducting focus groups with nascent and established sustainable entrepreneurs or on testing the model with these two groups to examine whether the moral antecedents could also be supportive in the entrepreneurial process. Second, the study focuses on the recognition of sustainable development opportunities for someone (third person opportunities), but it does not investigate individuals' assessments of whether these opportunities represent opportunities for themselves (and thus, their intentions and decisions to exploit those opportunities [first-person opportunities]). These are distinct and subsequent steps in models of entrepreneurial action (Shepherd, McMullan, & Jennings, 2008). Third, it is acknowledged that many factors beyond the moral antecedents – such as knowledge (Patzelt & Shepherd, 2011), the individuals' networks (Ozgen & Baron, 2007), and cognitive structures (Baron & Ensley, 2006) – may influence individuals' recognition of sustainable development opportunities. Investigating all these factors is beyond the scope of this study but could be addressed in future empirical research on opportunity recognition for sustainable development. Testing the complete model, with all subsequent blocks and underlying interactions, is the next step that needs to be taken.

Concluding, in a world in which global climate disruption, ever-increasing populations, and massive extinctions of biodiversity are recognized and acknowledged, there is a need for individuals who are able to deal with these challenges through their entrepreneurial behavior. This study has shown that pro-environmental behavior values and moral competencies are important elements in the very early stage of recognizing opportunities for sustainable development.

Knowing what kind of moral antecedents enable future change agents to deal with these complex problems and being able to identify opportunities for these problems, helps higher education institutes to adjust and reframe their education program accordingly. Recent approaches highlight the importance of entrepreneurship education to inspire and build awareness of the opportunities inherent in the sustainability arena for self-interest and to benefit diverse stakeholders (Kuckertz & Wagner, 2010). However, there are only a few studies that investigate the learning processes, learning inputs and outputs of nascent sustainable entrepreneurs in specific educational interventions. In this process it is important to keep track of the moral competencies that are important for sustainable entrepreneurship and to foster them within the teaching cases. Lackéus (2015) provides stepping stones for teaching cases that enable learning by doing and the possibility to integrate moral obligations into entrepreneurial practices. Examples are the Business Model Canvas and the Lean start-up (e.g. Lackéus, 2015). Sustainability is therefore not just an add-on to the entrepreneurship programs that already exist. It has to be implemented at the core of entrepreneurship education, focusing on the development of moral competencies and teaching methods that enable students to move away from a sole focus on profit maximization but leaves room for the triple bottom line. This study provides stepping stones for future research on the implementation of moral antecedents in entrepreneurship education by using the Business Model Canvas.

Furthermore, the results of this study support starting sustainable entrepreneurs in their entrepreneurial processes by focusing on the development of moral antecedents during this very early stage of the entrepreneurial process. More attention should be paid to the development of moral competencies within business acceleration programs, business incubators, and professional education programs. Altogether, at this point, the redefined framework for recognizing opportunities for sustainable development (Figure 3) provides researchers as well as teachers and sustainable entrepreneurs with stepping stones to further enhance sustainable entrepreneurship.

3.7 The specific role of moral competencies

The relation between the moral competencies and recognizing opportunities for sustainable development has been established in this chapter. Nevertheless, it remains unclear how exactly the two moral competencies are related to opportunity recognition for sustainable development. In addition,

the relation between the two moral competencies (i.e. normative competence and strategic action competence) deserves more attention. It seems that the concept of sustainable entrepreneurship inherently addresses a paradox. On the one hand an individual needs to be self-oriented in order to deliver on the entrepreneurship front. At the same time, this individual needs to be others-oriented in order to address the sustainability aspects. The next chapter explores the role that the two moral competencies have in bridging these two seemingly opposite ends of the spectrum.

CHAPTER 4

SELF-INTEREST VERSUS SELF-TRANSCENDENCE. AN EMPIRICAL APPROACH TO INVESTIGATE THE ROLE OF MORAL COMPETENCIES IN ENTREPRENEURSHIP EDUCATION³

Entrepreneurship education for sustainable development primarily teaches students to develop a profit-driven mentality. However, sustainability is a value oriented and normative concept. As a result, the role of individual ethical norms and values in entrepreneurial processes has received increased attention. Therefore, this study addresses the question what role moral competence has in the process of idea generation for sustainable development. A mixed method design was developed in which would-be entrepreneurs were subjected to a questionnaire (n=402) and to real-life decision making processes in a case assignment (n=96). The results provide stepping stones for implementing (moral) competencies in sustainable entrepreneurship education as a possible avenue to move away from a focus on the profit-driven mentality.

³ This chapter is based on:

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (submitted). *Self-interest versus self-transcendence. An empirical approach to investigate the role of moral competencies in idea generation for sustainable development in higher education. Business Ethics: a European review.*

4.1 Introduction

Sustainable development has become one of the most prominent challenges of our time, and entrepreneurial action is increasingly seen as a promising way to preserve ecosystems, counteract climate change, reduce environmental degradation and maintain biodiversity (Dean & McMullen, 2007; Patzelt & Shepherd, 2011). The term 'sustainable entrepreneurship' can be seen as an overarching way of looking at the contribution of entrepreneurship to social, ecological and economic issues and has gained importance over the years (Schaltegger & Wagner, 2011). As a response to criticism of the 'profit-first' mentality of business schools and increased attention to sustainable entrepreneurs as the change agents of our time, more and business schools, universities and colleges are introducing sustainable entrepreneurship programs in their curricula (Lackéus, 2015; Lourenço et al., 2013). The underlying idea of such programs is that entrepreneurship educators can promote principles of sustainability to those individuals who identify (sustainable) business opportunities, take initiative and are willing to take risk.

Whereas the focus on 'traditional' entrepreneurship education and learning is on the development of entrepreneurial intentions, competence, behavior and culture sustainable entrepreneurship seems to go further by also taking further effects and the complexity of behavior and decisions in a future-oriented and global perspective of responsibility into consideration (Rieckmann, 2012). But what exactly makes competencies for sustainable entrepreneurship – i.e. the integration of knowledge, skills and attitudes that form the building blocks of modern curricula – different from those competencies related to more traditional entrepreneurship? In contrast to the notion of conventional entrepreneurship, the concept of sustainable entrepreneurship is value oriented and normative, since it addresses the question of how social-ecological systems ought to be developed in order to achieve a balance between economic, social and environmental aspects in business practices (Swart et al., 2004; Rockström et al., 2009). Individual (ethical) values and norms related to others (either socially or environmentally oriented) are therefore considered as essential for sustainable entrepreneurship competencies and could even be seen as distinctive for sustainable entrepreneurs. This differs from entrepreneurship competencies in general, as they are mostly associated with economic driven motivations, a 'profit-first mentality' and egocentric or self-interested value frames (Bakan, 2004). There seems to be an inherent paradox when it comes to sustainable entrepreneurship. On the one hand sustainable entrepreneurship requires individuals to be focused on gains that are oriented towards others (i.e. self-transcendence), while also being oriented to gains for themselves (i.e. self-interest) (Blok, 2017; Lourenço et al., 2013). Although recent studies suggest that it is worthwhile to introduce sustainable development related-content in entrepreneurship education programs (Hall et al., 2010; Kuckertz & Wagner, 2010), it is not clear how entrepreneurial learners (e.g. students) manage both interests related to sustainability and entrepreneurship (Gibb,

2002). Better insight in this process is necessary as it provides teachers evidence-informed stepping stones for how to teach and facilitate the development of sustainable entrepreneurship competencies among latent, early stage and nascent sustainable entrepreneurs.

In order to shed light on the tension between self-transcendence and self-interest in the early stages of the entrepreneurial processes, we investigated the role of moral competence in the process of idea generation for sustainable development. The main research question of this article is therefore as follows: *'What role does moral competence play in the process of idea generation for sustainable development?'*.

To answer the main research question, two different empirical studies at two different higher education institutions with a green curriculum in the Netherlands were conducted. Participants in both studies were enrolled in an entrepreneurship minor, indicating a positive attitude towards entrepreneurship and ensuring basic knowledge on entrepreneurship theories. The first study addresses moral competence by means of a survey and the second study addresses the role of moral competence in the process of idea generation for sustainable development by means of a problem based case assignment.

4.2 Entrepreneurship Education for sustainable development

Entrepreneurship Education for sustainable development seems to source and combine insights of the applied fields of Entrepreneurship Education (EE) and Education for Sustainable Development (ESD). Starting with the former, although entrepreneurship education is already there for a long time, according to some its intellectual underpinnings are more than 100 years old, the research field is very young. What is clear is that the offerings of EE worldwide have increased enormously over the last decades (in the USA there were approximately 250 entrepreneurship programs in 1985, in 2008 there were over 5.000 programs, with the numbers still increasing each year (Morelix, 2015)). According to a recent study carried out by Lackéus for the OECD on the status of Entrepreneurship Education (Lackéus, 2015), EE has elements of problem-based learning, project-based learning and service learning. EE pedagogies include also elements of opportunity-based learning (rather than problem-based) (Rae, 2010), interaction with the outside world, active experimentation and iteration (Sarasvathy, 2001) although not all of these learning forms are always explicitly anchored in entrepreneurship education. In terms of outcomes of EE, practitioners and policy makers focus merely on the benefits of EE (European Commission, 2015). Nonetheless, scientific studies on EE show less consensus about the true benefits of EE. Recent meta-analyses suggest overall small but positive effects of EE on the development of entrepreneurial intentions (Bae et al., 2014; Martin et al., 2013). However, these meta-analyses also highlight methodological weaknesses and warn that results have to be interpreted with

care. Another criticism of entrepreneurship education is that it primarily teaches students to develop a profit-driven mentality, which has no regard for moral considerations or social responsibilities (Slater & Dixon-Fowler, 2010). On the other hand, education for sustainable development does embrace the perspective of integrating sustainability as an opportunity in a way that is positive and driven by self-interest while also considering the benefits for multiple stakeholders (Lourenço, 2013).

Contrary to EE, the field of Education of Sustainable Development (ESD) is spiced with debates on desired outcomes of ESD and the type of learning that should be stimulated to foster these outcomes. Generally speaking what is clear is that ideas about learning for ESD have shifted from a transmissive and instruction oriented notion of learning towards embracing social constructivist notion of learning. More concretely Wals (2012) identifies in his influential report on the UN decade of Education for Sustainable Development more what this shift towards more social constructivist pedagogies of learning for sustainable development entails. From a survey among 102 countries, the author concludes that the most important or exemplary forms of learning in ESD are discovery, systems-thinking, critical-thinking, interdisciplinary, problem-based and participatory learning. What is interesting to note is that in some universities the introduction of ESD opened up the door for transforming education and learning in a broader sense, thus functioning as a catalyst for educational change. In other situations ESD co-evolved with the more general need for introducing newer and more active styles of learning. In terms of desired learning outcomes the field of ESD highlights the importance of systems thinking, empathic thinking, the ability to switch perspective temporally, spatially and culturally emotions, values and ethics, next to more traditional content-knowledge and skills (UNECE, 2011). Nevertheless, much of the suggested impact of these (new) learning practices seems to be anecdotal and the supposed relationship(s) between the sustainability content, pedagogy and its intended outcomes (e.g. more systems thinking) still seems to be an area where research is highly needed.

Both fields are thus very much in development and are conducting more and more systematic educational research in their (separate) fields. One area in which much progression has been made, both practical as well as theoretical is that of the development of more detailed, evidence-informed competence-frameworks (e.g. Wiek et al, 2011; de Haan, 2011; Lans et al., 2014). Developing competencies can help (future) sustainable entrepreneurs in dealing with complexity and uncertainty (Gibb, 2002). In addition, according to Wiek et al. (2011) key competencies provide an “explicit and commonly shared framework for developing distinct and recognizable profiles of the academic field, the schools, the graduates, the professions, and so forth. Moreover, key competencies provide the reference scheme for transparently evaluating student learning and teaching effectiveness” (p. 204). In

the last five years there has been considerable effort to combine insights from competence research in the fields of EE (Man et al. 2001; Mitchelmore & Rowley, 2010) and ESD (De Haan, 2006; Wiek et al., 2011, Rieckmann, 2012) in order to develop competence frameworks for specific fields like CSR (Osagie et al., 2015) and sustainable entrepreneurship (Lans et al., 2014; Ploum et al., 2017; this dissertation). What is important to note is that these competence-framework stem from modern, comprehensive approaches to competence. Contrary to the more reductionist notions of competence popular in the previous century these modern notions of competence consists of the integration of knowledge elements, skills and attitudes, which enable successful task performance and problem solving with respect to real-world problems, challenges, and opportunities on an individual level (Delamare Le Deist & Winterton, 2005; Mulder, 2014). ‘Integrated’ refers to a cohesive and complex set of knowledge, skills, attitudes and their embeddedness within the context in which successful performance has to take place (Mulder, 2014). Within these modern competence frameworks for sustainable entrepreneurship there is next to the cognitive competence domain (i.e. getting ahead) and the social competence domain (i.e. getting along), more and more interest in competencies that could be labelled as meta-oriented (Delamare Le Deist & Winterton, 2005), as they emphasize reflection or tap into value systems (i.e. getting it right). These ethical values and norms are commonly described in what is called moral or ethical competence.

4.3 The concept of moral competence

Moral competence, used interchangeably in the literature with ethical competence, is mostly covered in the business ethics literature (cf. Jones, 1991; O’Fallon & Butterfield, 2005). From this perspective, moral competence is described as “the sensitivity of managers and professionals to moral issues in their organizational structures followed by moral judgment and actions” (Pohling et al., 2015, p. 2). Specifically, it means the ability to consistently behave according to accepted ethical principles (Kim & Kim, 2013). Moral competence can help leaders gain competitive advantage by motivating employees (Lennick & Kiel, 2005), because it enhances employees’ justice perceptions (Folger, 1998). Pohling and colleagues explain moral competence in more detail based on 6 aspects: “Moral competence is about (1) conscious decisions and action within a given (2) responsibility situation. It implies (3) to feel obliged to one’s own moral principles and (4) to act responsibly taking into account legal standards as well as economical, ecological, and social consequences. Moral competence (5) requires normative knowledge and (6) the ability to defend derived behavioural options against occurring resistance” (Pohling et al., 2015, p. 2). Nevertheless, moral competence in business ethics literature is often referred to as a broader competence domain, like social competence, cognitive competence or emotional competence (Kim & Kim, 2013) and not as a very concrete tangible performance based construct. In line with this, moral

competence is often described as a multi-dimensional construct containing concepts like integrity, responsibility, compassion and forgiveness (Lennick & Kiel, 2005; Kim & Kim, 2013). These descriptions usually do not comply with the comprehensive approach to competence developed in education and competence research, as they are decontextualized and often too broad. Therefore, the applicability of moral competence as described in business ethics literature can be questioned when considering applying it in empirical research in the context of (learning for) sustainable entrepreneurship. Furthermore, where Pohling et al. (2015) and Morales-Sánchez & Cabello-Medina (2013) focus primarily on the ethical decision making process and the moral competencies needed to manage this process, this research focusses on the entrepreneurial process and the moral competencies needed to manage this particular process. This particular focus requires a different interpretation of the concept of moral competence, as the entrepreneurial decision making process differs significantly from the moral decision making process.

4.3.1 Disentangling moral competence from a sustainable entrepreneurship perspective

There are researchers who have integrated moral competencies into more context specific business domains that deal with sustainable development, for instance in the field of Corporate Social Responsibility (CSR) (Osagie et al., 2016; Wesseling et al., 2015) and the field of sustainable entrepreneurship (Lans et al., 2014; Ploum et al., 2017; this dissertation).

Within these fields usually two moral competencies are described: normative competence and (strategic) action competence. Normative competence is about the ability to assess and improve the sustainability of social-ecological systems, on the basis of a set of values and principles (Gibson, 2006; Wiek et al., 2011). Strategic action competence, on the other hand, is about the ability to actively involve oneself in responsible actions to improve sustainable business practices (Schnack, 2003; de Haan, 2006). They both concern norms, values and beliefs which define what is right and wrong concerning sustainability and enable professionals to take the right decisions and behave in a responsible way (Blok et al., 2016). Furthermore they are assumed to enable individuals to recognize those opportunities that are related to sustainability and can be seen as discriminating factors in this process (Ploum et al., 2017; this dissertation). In addition, Blok and colleagues (2016) underpin that moral competence in the context of sustainable entrepreneurship consists of an element of sensitivity for moral issues (i.e. normative competence) and an element of the transformation of intentional behavior to actionable behavior (i.e. strategic action competence). They argue that normative competence has to be understood as the application of values, principles and targets in order to establish sustainable practices, while strategic action competence is the internalization of this ability to develop and apply values and principles (Blok

et al., 2016).

These elements of moral competence can more or less also be found in the general description of moral competence in the business ethics literature. The first two aspects of moral competence as described by Pohling and colleagues (2015), (1) conscious decisions and actions within a given (2) responsibility situation, are applicable for both sensitivity for moral issues and the transformation of intentional behavior to actionable behavior as they form the basic pre-condition for moral competence. The other four relate specifically to either the sensitivity part (i.e. normative competence) or the transformational part (i.e. strategic action competence). On the one hand, sensitivity for moral issues can be found in the aspects: (3) to feel obliged to one's own moral principles, (5) requiring normative knowledge and (6) the ability to defend derived behavioural options against occurring resistance. On the other hand, the transformation to actionable behavior shows similarities with aspect (4) to act responsibly taking into account legal standards as well as economical, ecological, and social consequences. Nonetheless this overlap, between the description of moral competence by Pohling et al. (2015) and normative competence and strategic action competence as described by Blok et al. (2016), there also seem to be some differences. The distinction between norms and values and actionable behavior is not really defined in the conceptualization of moral competence by Pohling et al. (2015), while this is an important element in the conceptualization by Blok et al. (2016). In addition, in following the comprehensive approach to competence, the two moral competencies defined in the literature on CSR and sustainable entrepreneurship are more context dependent and performance oriented compared to moral competence described in the business ethics literature. Therefore, normative competence and (strategic) action competence are used in this study.

Normative competence

Normative competence is widely recognized as one of the key competencies for sustainable development. Table 4.1 provides an overview of the use of normative competence in leading literature on competencies for sustainable development and related fields of study. Normative competence comprises the knowledge, skills and attitudes that enables individuals to recognize moral issues related to sustainability and to make a moral judgment about the right thing to do based on ethical norms and principles. Blok and colleagues (2016) emphasize in addition that normative competence concerns the ability to apply, negotiate and reconcile norms and principles based on the judgements of multiple stakeholders. Normative competence doesn't consist then primarily in the application of pre-given norms but in the ability to identify and generate norms that solve ethical conflicts and are acceptable to multiple stakeholders" (Blok et al., 2016, p. 15). This process of development, negotiation and reconciliation of norms is unique in every situation. The norms and interests of multiple stakeholders

Table 4.1. Overview of research that addresses normative competence

Authors	Year	Nature	Field	Label	Description of competence
De Haan	2006	Theoretical/ Conceptual	Higher education for sustainable development	Capacity for empathy and solidarity	Acting and communicating in the spirit of international solidarity. It motivates and enables people to work together to find future-compliant solutions to shared problems and to find responsible ways to achieve more justice.
Wiek et al.	2011	Theoretical/ Conceptual	Higher education for sustainable development	Normative competence	Ability to collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets. This capacity enables, first, to collectively assess the (un-) sustainability of current and/or future states of social-ecological systems and, second, to collectively create and craft sustainability visions.
Rieckmann	2012	Empirical/ Conceptual	Higher education for sustainable development	Competency for empathy and change of perspective	See de Haan (2006)
Hesselbarth and Schaltegger	2014	Empirical/ Conceptual	Higher education for sustainable development	Normative competence	See Wiek et al. (2011)
Lans et al.	2014	Empirical/ Testing	Sustainable entrepreneurship	Normative competence	See Wiek et al. (2011)
Osagie et al.	2016	Empirical/ Conceptual	Corporate Social Responsibility	Ethical normative competence	The CSR professional is convinced of the urgency of CSR challenges and is intrinsically driven (i.e., intrinsic motivated) to address these challenges. This competence involves the ability to apply one's personal ethical standards and values while assessing CSR-related issues.
Blok et al.	2016	Theoretical/ Conceptual	Sustainable development as a wicked problem	Virtuous competence	The ability to apply, negotiate and reconcile norms and principles based on the judgements of multiple stakeholders. Normative competence doesn't consist primarily in the application of norms but in the ability to identify and generate norms that solve ethical conflicts and are acceptable to multiple stakeholders.
Ploum et al.	2017	Empirical/ Testing	Sustainable entrepreneurship	Normative competence	See Wiek et al. (2011) and Lans et al. (2014)

have to be weighed and revised over and over again and the role of the professional involved in sustainable entrepreneurship is to decide which norms to work with within a given situation.

Whereas the previously discussed studies address the concept of normative competence from a theoretical/conceptual perspective, other scholars in the field of sustainable entrepreneurship or corporate social responsibility have addressed it from an empirical point of view as well (Rieckmann, 2011; Hesselbarth & Schaltegger, 2014; Lans et al., 2014; Osagie et al., 2016, 2017; Ploum et al., 2017a). In addition, these empirical studies also take the specific work context into account.. Interestingly, not all of these work context studies result in the recognition of normative competence as being a key competence. Even though normative competence is taken into account in the studies by Rieckmann (2011) and Osagie et al. (2016) and are considered important from a theoretical point of view, they cannot underpin the importance of normative competence from the empirical results of their studies. Rieckmann (2011) does in fact acknowledge the importance of the competency for empathy and change of perspective, however, it is not considered as a key competence because of the lower ranking by experts in the field of sustainable development in his Delphi study. Also the Corporate Social Responsibility (CSR) experts in the study of Osagie et al. (2016) did not indicate the importance of the ethical normative competence, when looking at their job roles in the adaptation process of CSR. There seems to be a discrepancy between the apparent importance of normative competence from a theoretical and conceptual point of view and the perceived importance in CSR related practices. Nevertheless, Hesselbarth and Schaltegger (2014) did find positive reinforcement from their alumni of the MBA Sustainability Management program with regard to the importance of normative competence in their work-life. In addition, in the field of sustainable entrepreneurship, the importance of normative competence is also underpinned (Lans et al., 2014, Ploum et al., 2017; this dissertation).

However, these conceptualizations of normative competence do not necessarily say anything about moral action and behavior of the individual. Another competence is needed in order to prevent the degeneration of normative competence to a purely instrumental conceptualization as the ability to develop, negotiate, reconcile and apply norms and principles together with multiple stakeholders (Blok et al., 2016). The moral competence that is related to the actionable phase of the decision making process is described as 'action competence' in education for sustainable development literature and 'strategic action competence' in literature on sustainable entrepreneurship.

In addition, the two moral competencies are founded in two different competence domains. As normative competence concerns the ability to generate norms that solve ethical conflicts and are acceptable for multiple stakeholders (character of the decisions made), this competence can be assigned

to the cognition-oriented competence domain (for an explanation on the different competence domains see Delamar LeDeist & Winterton (2005)). Strategic action competence on the other hand, concerns the personal engagement of the professional involved in corporate sustainability (character of the decision-maker) and therefore belongs to the functional-oriented competence domain. These two domains are complementary to each other (together with the social-oriented and meta-oriented domains) and must be activated simultaneously in order for an individual to be competent, but the domains can be separated conceptually.

Strategic action competence

Strategic action competence refers to the moral transformation from a passive attitude with respect to sustainability issues into an active and engaged attitude (Lans et al. 2014; Blok et al., 2016). Table 4.2 provides an overview of leading literature on the concept of action competence.

Sustainable development cannot be achieved merely through state intervention, legislation, new technologies and efficient economies, but requires passive and active support from the population (De Haan, 2006). Action competence is the ability to actively involve oneself in responsible actions to improve the sustainability of social-ecological systems (Mogensen & Schnack, 2010). Jensen and Schnack (2006) distinguish four components of action competence: 'knowledge and insight' concerns knowledge about the problem of sustainable development and the ability to think critically about its possible solution; 'commitment' relates to the motivation and drive to engage oneself in the solution of sustainability problems; 'visions' concern the ability to conceptualize the future state of the world or the good life one wants to pursue; and 'action experiences' finally stresses the importance of actual involvement in concrete sustainable actions.

The advantage of action competence is that it doesn't refer to absolutist principles and norms and stresses the importance of critical thinking and the reality of incomplete knowledge. Its point of departure is often found in conflicting interests and value frames regarding sustainable development (Jensen & Schnack, 2006). This conceptualization of action competence fosters a more open ended approach of sustainable entrepreneurship in which the complexity, un-stability and context dependence of ethical judgments is taken into account (Almers, 2013; Blok et al., 2016). Also when considering the more empirical oriented studies, strategic action competence is indicated as one of the key competencies, alongside normative competence as one of the moral competencies (Lans et al., 2014, Ploum et al., 2017a). Even though the studies by Lans et al. (2014) and Ploum and colleagues (this dissertation) include both normative competence and strategic action competence as two separate

Table 4.2. Overview of research that addresses strategic action competence

Authors	Year	Nature	Field	Label	Description of competence
de Haan	2006	Theoretical/ Conceptual	Higher education for sustainable development	Learning participatory skills	Sustainable development cannot just be achieved through state intervention, legislation, new technologies and efficient economies, but requires passive and active support from the population.
Jensen and Schnack	2006	Theoretical/ Conceptual	Environmental Education	Action competence	Besides skills at a more general level, such as the ability to cooperate, read and make oneself clear, elements of action competence are: knowledge/insight; commitment; visions and action experiences.
Mogenson and Schnack	2010	Theoretical/ Conceptual	Higher education for sustainable development	The action competence approach	Action competence' refers to an educational ideal. As such it is not a goal that can be reached, and even if it is a competence, it is not a specific competence among many others. As an educational ideal it is situated in a non-place, a utopia, where it maintains good company with such concepts as liberal education, democracy, human rights, sustainable development and equal communication.
Almers	2013	Theoretical/ Conceptual	Environmentally responsible action	Action competence for sustainability	Defined as a willingness and capability to influence living conditions and lifestyles, in a way that involves inter-generational and global responsibility. It includes to act from a knowledge base that is always incomplete, and to be prepared to change decisions and actions related to new knowledge or insights.
Lans et al.	2014	Empirical/ Testing	Sustainable Entrepreneurship	Action competence	The ability to actively involve oneself in responsible actions to improve the sustainability of social-ecological systems.
Osagie et al.	2016	Empirical/ Conceptual	Corporate Social Responsibility	Behavior and Active Involvement	The ability to apply one's personal ethical standards and values. Feeling of personal responsibility. Active involvement in the implementation of CSR by being action-oriented and decisive.
Blok et al.	2016	Theoretical/ Conceptual	Sustainable development as a wicked problem	Virtuous competence	Concerns the ability to put virtues into practice by the personal engagement of the professional in the application of these virtues according to his or her practical wisdom, together with multiple stakeholders.
Ploum et al.	2017	Empirical/ Testing	Sustainable Entrepreneurship	Strategic Action competence	Strategic action competence is the ability to actively involve oneself in responsible actions and concerns the ability to implement interventions, transitions, and strategies towards sustainable development practices.

competencies, not all studies take into account both moral competencies. Some scholars stress the importance of normative competence, whereas others only focus on (strategic) action competence. Nevertheless, we would like to stress that there is a clear (conceptual) distinction between the two, but that the two moral competencies are also closely related. They could even be considered as two sides of the same coin (Blok et al., 2016). Normative competence is about the ability to assess and improve the sustainability of social-ecological systems, on the basis of a set of values and principles (Gibson, 2006; Wiek et al., 2011). Strategic action competence, on the other hand, is about the ability to actively involve oneself in responsible actions to improve sustainable business practices (Schnack, 2003; de Haan, 2006).

In other words, the difference between the two moral competencies can be described as: “based on normative competence, actors can be held responsible for sustainability, while based on strategic action competence, actors can take responsibility for sustainability” (Blok et al., 2016, p. 2). Without normative competence there is no reference to norms which should be act upon.

4.3.2 The complexity of enacting moral competence in the context of the entrepreneurial process

Sustainable entrepreneurship deals with an inherent paradox that lies in the self-interested character of the entrepreneurship part and the self-transcendence character of the sustainable part. To understand the complexity and underpin the importance of moral competencies in the sustainable entrepreneurial process, it is important to understand the entrepreneurial process and its underlying aspects.

Opportunity recognition lies at the heart of the entrepreneurial process: without opportunities there is no entrepreneurship. The entrepreneurial process always starts with the identification of a potential new business idea, an imagined future reality, that could be explored and further developed into a new product, service, or process (Shane & Venkataraman, 2000). Although conceptually business ideas and entrepreneurial opportunities are distinct constructs: most scholars agree that opportunities are developed from an initial idea over time (Vogel, 2016). Not surprisingly, idea generation activity (either intentional or accidentally), is at the heart of many entrepreneurship education programs: it lies the foundation for further opportunity pursuit, it is a measurable construct, and a learning activity that can be effectively manipulated (DeTienne & Chandler, 2004, Karimi et al., 2016). Based on recent conceptual work on enablers of sustainable opportunity recognition (Patzelt & Shepherd, 2011) we expect that moral competence plays a direct role in idea generation. In their conceptual model, altruism towards others is mentioned as a motivational element that can be decisive in opportunity recognition for sustainable development and is also considered as a moral construct. The previous study in this dissertation (chapter 3) has empirically shown that altruism towards others does not significantly relate

to idea generation for sustainable development, but the two moral competencies do. Therefore in this chapter this relation is further explored.

A construct that has been widely accepted as an important element of the opportunity identification process and can help in further exploring the role of the two moral competencies in this process, is (entrepreneurial) self-efficacy. Several studies have shown that an individual's propensity to identify entrepreneurial opportunities is influenced by the confidence in their entrepreneurial skills (Davidsson & Honig, 2003; Ucbasaran et al., 2008). These studies depart from the notion that those with high self-efficacy for a specific task are more likely to pursue and then persist in that task than those who have low self-efficacy beliefs (Bandura, 1982). Self-efficacy concerns an individual's belief in his own ability to perform well (Bandura, 1982). More specifically, entrepreneurial self-efficacy concerns an individual's belief in his or her own entrepreneurial competence to explore and exploit new business opportunities and could be seen as a more motivational aspect. Furthermore, meta-analyses show that ESE is one of the strongest individual level predictors for entrepreneurial success in terms of start-up intentions as well as financial success (Rauch & Frese, 2007).

When looking at the descriptions of normative competence and action competence, it becomes clear that the concept of self-efficacy shows some overlap with the more transformational elements of strategic action competence. Some elements of strategic action competence as described above have a strong connection with entrepreneurial self-efficacy and one could wonder whether (strategic) action competence is not just merely a derivative of entrepreneurial self-efficacy with regard to sustainability. When it comes to self-efficacy, the relation with action competence has been highlighted in the work of Blok (2017) and Almers (2013). They state that feeling competent and confident with what one can contribute is considered as an important motivational element of action competence. One can argue that when self-efficacy is seen as an important motivational factor for action competence, entrepreneurial self-efficacy is an even more important factor for strategic action competence in a sustainable entrepreneurial context, as it also deals with turning intentions into actions. Furthermore, when looking at the relation between entrepreneurial self-efficacy and the two moral competencies, the explorative study by Lans et al. (2014) shows that entrepreneurial self-efficacy correlates significantly with action competence (positive), but not with normative competence (positive, but not significant).

These findings could indicate that normative competence deals with the more self-transcendence part and therefore the sustainable aspect of sustainable entrepreneurship and strategic action competence with the more self-efficacy part and therefore the entrepreneurship aspect of sustainable entrepreneurship. It could be that in sustainable entrepreneurship, strategic action competence fulfils

the role that entrepreneurial self-efficacy does in the regular idea generation process, and can be seen as entrepreneurial self-efficacy for sustainable development.

To sum up, two moral competencies for sustainable entrepreneurship are identified in the literature, namely normative competence and strategic action competence. Their role in identifying new ideas for sustainable development in an entrepreneurial context remains unclear and there seems to be an inherent paradox within the concept of sustainable entrepreneurship. One the one hand sustainable entrepreneurship requires individuals to be focused on gains that are oriented towards others (i.e. sustainability), while also being oriented to gains for themselves (i.e. entrepreneurship) (Blok, 2017). The moral competencies could possibly form a bridge between these two seemingly opposite ends of the sustainable entrepreneurial spectrum. Figure 4.1 proposes a conceptual framework which elaborates on the underlying relationships and addresses the paradox. The methods to research the above presented relations are discussed below.

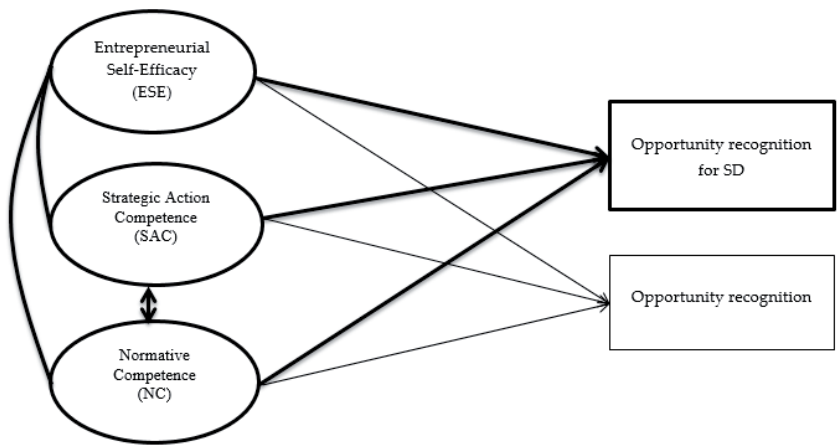


Figure 4.1. Conceptual framework including underlying relationships. In bold: zooming in on the process of recognizing opportunities for sustainable development, which is the main focus of this study

4.4 Methods

Two different studies were developed to examine the how the moral competencies play a role in idea generation for sustainable development of latent and early-stage student entrepreneurs. The first study is more quantitative and aims at studying the relation between normative competence, strategic action competence and entrepreneurial self-efficacy. The second study has a more qualitative nature, aiming

at zooming in on the relation between the two moral competencies, entrepreneurial self-efficacy and idea generation for sustainable development. Both studies take place in entrepreneurship education. The mixed method study design is discussed below.

4.4.1 Setting and Sample

Both studies were carried out at higher education institutes with a 'green curriculum'. A green curriculum means that they offer programmes which focus on nature, environment, human and animal health, nutrition and food production. The first study took place in a university of applied sciences in the Netherlands. Entrepreneurship education arrived here around 2005 and nowadays all bachelor programmes have a compulsory part in entrepreneurship education with increasing attention on sustainability. The participating students in study 1 did not specifically choose an entrepreneurship programme, but follow the entrepreneurship minor that is included as a standard component of their program. The second study was carried out at a life sciences university in the Netherlands. Entrepreneurship education here consists of an elective minor module, in which students can follow an entrepreneurship course in their free choice module in their educational program.

4.4.2 Constructs and measures

Study 1: large scale questionnaire

All students participating in study 1 were enrolled in entrepreneurship courses for the duration of 6 months (N=438). The questionnaire was spread among the participants as an integrated part of their 6-month entrepreneurship program. The questionnaires were filled in during class after the students received a short introduction to the research and its intended learning outcomes for the respondents. The participants were asked to create a unique code to ensure the anonymity of the results.

To analyse the relation between the two moral competencies, the six factor competence framework initially developed by Lans et al. (2014) and its accompanying items were used as the foundation for the large scale questionnaire. This dissertation already reported on the redefined framework by testing its validity by means of a Confirmatory Factor Analysis (Chapter 1). To measure their competencies, respondents were asked to rate themselves according to their opinion about their performance at that moment for an item, by rating the item on a scale of 1 to 10 (1 = low and 10 = high). If some of the criteria had not been practiced in a study program yet or learned in any other situation in the students' life (e.g. internship, work at home, holiday job), students were asked to show this by giving a low score for these criteria. An overview of the questionnaire can be found in the general Appendix of this dissertation (see Table A1).

Furthermore, to analyse the relation between the moral competencies and the construct of entrepreneurial self-efficacy, a measure to capture entrepreneurial self-efficacy was added. The underlying questions for entrepreneurial self-efficacy are well described in entrepreneurship education literature and were adopted from an existing 5 point Likert scale (Liñán & Chen, 2009).

The initial dataset consisted of 438 responses (N=438). Based on a missing value analysis, 36 cases were excluded from the data analysis, which has led to n=402 valid cases. The data gathered from the large scale questionnaire was analysed by making use of descriptive statistical analyses and correlation coefficients between the constructs by using IBM SPSS Statistics 23.

Study 2: case study

To further analyse the role of the two moral competencies and entrepreneurial self-efficacy in the opportunity recognition for SD process, a qualitative instrument was developed. Subjects for this second study followed a course called principles of entrepreneurship in May 2015 (n=50) and in September 2015 (n=55) as a free choice module in their educational program. In total there were n=96 valid cases, as 9 cases were excluded because of missing data. Furthermore, there were no differences in average scores between the first group in May and the second group in September (based on independent samples t-tests).

Research on opportunity recognition for sustainable development as a complex problem faces a number of methodological challenges which are in line with the challenges of entrepreneurship education in general. For instance, several studies have relied on observations that are prone to retrospective and recall biases, self-reporting and censored data and selection biases. Grégoire et al. (2010) have formulated some guidelines which could help in developing better ways to analyze opportunity recognition empirically and as such develop entrepreneurship education that is focused on problem solving. Features of their approach include for example: the use of research tasks and hypothetical exercises that showcase 'real-time' efforts of individuals to recognize opportunities, a focus on opportunity beliefs, the modelling of research tasks and material on 'real-life' events/ 'day-to-day' experiences of entrepreneurs in particular contexts, and mobilizing and integration of different forms of data, data collection methods, and analytical techniques. In line with these guidelines, a digitally scripted learning tool (Noroozi et al., 2010) was designed to actively engage the students in an online environment (over a course of 5 weeks) to critically engage in 'real -life' decision making processes in the field of sustainable entrepreneurship. In this way, participants experienced how difficult it can be to balance social, environmental and economic goals and values in a business context. The core task

consisted of a case description of an existing company with accompanying assignments centred around opportunity identification. Opportunity recognition was measured by identifying opportunity ideas. In line with other studies, it is argued that an essential part of the opportunity recognition process is the generation of opportunity ideas: initial ideas or envisioned futures in the mind of an individual (Wood & McKinley, 2010). Therefore, participants had to indicate new ideas for the company described in the case description. The case description was based on the carpet company Interface, which is one of the first companies to adopt a sustainable business model (Stubbs & Cocklin, 2008). In the learning tool, the original business model of Interface (before adopting a sustainability strategy) was used as a case description and the description was anonymized. The Business Model Canvas (BMC) is seen as a useful tool to engage students in learning by doing and is seen as an effective way to teach entrepreneurship and develop entrepreneurial competencies (Lackéus, 2015). The Business Model Canvas outlined by Osterwalder and Pigneur (2010) consists of nine basic building blocks needed when creating value to external stakeholders. This could be viewed as a simple checklist that students can use when planning their value creation attempts, asking them to provide answers to key value creation questions such as “Who do you help?”, “How do you help?”, “Who helps you?” and “What do you do?”. The language is business biased, but the principles are applicable to a wider context than venture creation. In fact, Osterwalder and Pigneur have written a book on how to apply these nine building blocks to personal development. For this specific case a 10th block was added to the BMC, which is related to environmental and societal impacts. By using the Business Model Canvas, participants analysed the case description of the company. Based on this analysis, they chose which blocks of the Business Model Canvas they believed could be improved by presenting new (innovative) ideas for the company. Based on valid argumentation and reasoning, the participants wrote a report on their business model innovations. Figure 4.2 shows an overview of the different tasks students needed to perform throughout the five weeks of participating in the course.

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>
<ul style="list-style-type: none"> - Introduction to the module - Pre-tests on entrepreneurial intentions, values and locus of control - DIT-2 test 	<ul style="list-style-type: none"> - Case description - Filling in Business Model Canvas - Writing new business model 	<ul style="list-style-type: none"> - Providing peer feedback on 2 other reports 	<ul style="list-style-type: none"> - Improving report based on peer feedback 	<ul style="list-style-type: none"> - Post-tests on competence levels, pro-environmental behavior. - Learning tool evaluation tests

Figure 4.2. Overview of the tasks of the digitally scripted learning tool

In this particular case the focus lies on those arguments that can possibly be related to- and could be supportive of- the two moral competencies in relation to identifying opportunities for SD. The output measure (i.e. idea generation for SD) was based on the number of ideas proposed that were related to SD. A distinction between those ideas related to sustainable development and those not, was made based on the eight archetypes of a sustainable business model (Bocken et al., 2014). If an idea could be assigned to one of the eight archetypes (maximize 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, and develop scale up solutions) the idea was considered to be an idea that was related to sustainable development. Furthermore, participants were queried on the competence framework and all other elements that were also queried in the large scale questionnaire.

In addition to some quantitative analyses that were performed in IBM SPSS Statistics 23 to analyse the relationship between the competencies and opportunity recognition, the data was analysed by means of a content analysis. The 96 reports with arguments for innovating in a particular direction were coded in Atlas.ti. Codes for the moral competencies were developed mostly top down, as they are based on the description and underlying items of normative competence and strategic action competence. Before the whole set of 96 reports was coded, a trial session based on 12 reports (12,5% of the total set) was held in order to finalize the codebook. Two independent researchers were involved in the trial session and scored all the reports, which resulted in 87% agreement on core constructs. After intense discussion the final codebook was developed and used for the analysis of the 96 reports (see the Appendix at the end of the chapter).

4.5 Results

4.5.1 Study 1: large scale questionnaire

In total, 402 cases were included in the analysis. The male-female division within the dataset is 47.5% and 52.5% respectively. Most respondents are, at the moment of participation, enrolled in their second year of education at the participating higher education institute (88.3%). Only a few respondents mention they already own their own company (6.7%) versus the majority (93.7%) who mention they do not have their own company. Nevertheless, the respondents show that they have the intention to become an entrepreneur within the next 5 years (based on a score of 3 or higher, measured on a 5 point Likert scale).

Descriptive statistics: normative competence, strategic action competence and entrepreneurial self-efficacy

The relation between the two moral competencies is assessed within the 6 factor competence framework for sustainable entrepreneurship as they are an integrated part of the framework. Table 4.3 provides an overview of the correlations between the competencies and the correlation with entrepreneurial self-efficacy. There is a positive relation between the six competencies: they all correlate to a medium or high extent with each other, as should be the case with an integrated competence framework. However, there are some differences between the correlation coefficients and the variances explained. The highest correlation exists between normative competence and strategic action competence ($r=0.720$, $p<0.01$). Also when looking at the variance explained (to measure the amount of variability in one variable that is shared by the other variable), it appears that 51,8% ($R^2=0.5184$) of the variance of strategic action competence is shared by the variability of normative competence. Compared to all the other competencies in the competence framework for sustainable entrepreneurship, normative competence and strategic action competence correlate the highest with each other.

Table 4.3. Descriptive statistics: mean scores and correlation coefficients between competencies for sustainable entrepreneurship, including the moral competencies

Measure	M	Sd	1	2	3	4	5	6	7
1. DC	5.71	1.58	-						
2. FC	6.31	1.11	0.515**	-					
3. SC	6.11	1.29	0.514**	0.613**	-				
4. IC	6.48	1.30	0.356**	0.367**	0.347**	-			
5. NC	6.20	1.29	0.479**	0.579**	0.571**	0.383**	-		
6. SAC	5.33	1.39	0.621**	0.553**	0.554**	0.478**	0.720**	-	
7. ESE	2.97	0.64	0.286**	0.230**	0.246**	0.195**	0.169*	0.317**	-

Note. DC = diversity competence, FC = foresighted thinking competence, SC = systems thinking competence, IC = interpersonal competence, NC = normative competence, SAC = strategic action competence, ESE = entrepreneurial self-efficacy, M = mean, Sd = standard deviation, N = 402, * $p < .05$, ** $p < .01$

When looking at the correlations between entrepreneurial self-efficacy and the competencies for sustainable entrepreneurship, it appears that strategic action competence correlates highest with ESE compared to the other 5 competencies for sustainable entrepreneurship ($r=0.317$, $p<0.01$). Yet, the correlation can be considered as a moderate association between the two variables as $r=0.317$ is not that

high. Normative competence correlates the lowest with ESE ($r=0.169$, $p<.05$). Also the significance level is different compared to the other 5 competencies ($p<.05$ compared to $p<.01$).

A partial correlation analysis was performed between normative competence and strategic action competence, while controlling for the effect of ESE, to assess whether the strong correlation between SAC and NC was caused by a third variable (ESE). The correlation coefficient between the two moral competencies, while controlling for ESE, turned out to be slightly lower than without controlling for ESE ($r=0.713$, $p<0.01$). However, the correlation coefficient has not diminished substantially (decline of 0.007). In other words, the high correlation between normative competence and strategic action competence is not caused by the entrepreneurial self-efficacy as a third variable.

4.5.2 Study 2: Online learning platform

In total, 96 cases were included in the analysis. The male-female division within the dataset is 46.9% and 53.1% respectively. Most respondents are, at the moment of participation, enrolled in their third year of education at the participating higher education institute (89.9%). Only a few respondents mention they already own their own company (10.6%) versus the majority (89.4%) who mention they do not have their own company. Nevertheless, 76.3 % of the respondents show the intention of becoming an entrepreneur in the future (a score of 3 or higher, measured on a 5 point Likert scale).

Descriptive statistics: opportunity recognition as dependent variable

Opportunity identification was measured through an idea generation assignment. As for the number of identified ideas, in total 427 ideas were generated, of which 200 were related to sustainable development (46.8%). On average, respondents identified 4.5 ideas in general and 2.1 ideas specifically related to SD. Sixteen of the respondents (16.7%) did not generate any ideas related to sustainable development, the other 80 respondents (83.3%) did identify new ideas ranging from 1 idea to 9 different ideas per respondent.

Descriptive statistics: the relation between NC, SAC, ESE and opportunity recognition for SD

The regression analysis shows a significant positive relation between the two moral competencies and the identification of new ideas for sustainable development. In predicting the number of ideas related to SD, normative competence seems to be a good predictor $F(1, 94)=4.560$, $p<0.05$ with $b(94)=0.317$, $p<0.05$. Also strategic action competence predicts the number of ideas related to SD well $F(1, 94)=3.904$, $p<0.05$ with $b(94)=0.335$, $p<0.05$. However, entrepreneurial self-efficacy does not show a significant relation with the number of identified ideas for SD. Entrepreneurial self-efficacy has no effect on

opportunity recognition for SD, whereas normative competence and strategic action competence do have a positive relation with the number of identified ideas for SD. When analysing the relation between the three latent variables (i.e. normative competence, strategic action competence and entrepreneurial self-efficacy) and 'regular' opportunity recognition in terms of identified ideas in general, no significant relations were found. There appears to be no relation between entrepreneurial self-efficacy and opportunity recognition for SD, but also not with opportunity recognition in general.

Qualitative analysis: moral competence on the surface in recognizing opportunities for SD

The coding scheme was used to identify elements of the two moral competencies within the cases. Within each case (1 report per respondent), respondents identified opportunities that could enhance the business model and were asked to provide arguments to support their proposed changes to the business model. In turn, the arguments provided by the respondents were used as a source for exploring how the two moral competencies surface and which elements of the two moral competencies surface more than others. When looking at the codes used, it appears that out of the 96 included reports, 14 reports did not include any references to the two moral competencies (14.6%). In absolute numbers, codes that belong to normative competence were used 141 times (4 different codes) and codes that belong to strategic action competence 276 times (8 different codes), see Table 4.4. Table 4.4 also shows an exemplary quote per code to show how the elements of both moral competencies surface in identifying new ideas for sustainable development. The code that was used the most is "identifying opportunities for SD", with the code being used 82 times, the second most used code is "identifying problems for SD" (61 times), both belong to strategic action competence. Note that the individual codes were only used once per report. The core of the assignment was centred around recognizing opportunities, which has led to these two codes being used the most by a large extent. Therefore this result has to be interpreted with caution. The code that was used the least in coding the reports, with the code being used 4 times is "monitor sustainability". Also the codes "strategic way of working" and "challenge not sustainable ways" (respectively used 8 and 14 times), belong to the least used codes. All three least used scores belong to strategic action competence, just like the most used codes. The codes that are used the least really deal with actual behavior, which can be difficult to surface within the hypothetical context of the assignment.

When zooming in on the use of the two moral competencies, it appears that for normative competence the most often used codes/items are "knowledge about sustainability" (45 times) and "apply norms and values to own practice" (42 times). These two underlying items of normative competence seem to surface the most in the process of recognizing opportunities for sustainable development.

Table 4.4. Overview of codes: frequencies and exemplary quotation

	Code	Frequencies	Exemplary quotation
Normative competence	1. Take initiative based on norms and values	36	"The current world population of 7.2 billion is projected to increase by 1 billion over the next 12 years and reach 9.6 billion by 2050. All these people demand resources of food, fuel, medicine, and energy. If we continue to demand and use more than the Earth can support, we will eventually use up available land and resources, especially drinking water. We should act upon this now." (R109)
	2. Knowledge about sustainability	45	"It's been shown that this is possible with the example of Green Floors Adhesives, which are 97% lower in emissions than current Carpet and Rug institute criteria. This should be applied within the company as well." (R112)
	3. Apply norms and values to own practice	42	"You wouldn't want your children to live in a planet that's depleted, full of smog and dying. Also because we are the market leader we can set an example of how it should be, if we show improvement others will follow and copy. (R32)
	4. Explaining impact of sustainability on BMC	18	"The introduction of a eco-carpet will affect not only key partnerships and the value proposition but will also affect the cost structure and revenue stream, by additional expenses for research and maybe new machines and employee training and create additional income by maintaining "old" customers that follow trends or by acquiring new customers which were not attracted by the "old" products. Additionally patents acquired through development of new glues or the usage of new materials (organic) can create additional income." (R39)
	Total	141	
Strategic action competence	5. Involving other parties	38	"For this they might look for laboratory workers from companies who are specialized in glue and cooperate with them to make a glue that is not harmful for the environment. This will result in a key partner and the company does not have everything in their own hands anymore. Maybe they could even look for universities over the world who have the possibility to conduct research on glue. With this initiative, you help students to do a research project and help yourself by getting a glue which is environmental friendly." (R95)
	6. Explanation of steps to be taken	22	"Year 1and2: Install solar panels and reach out to windmill manufacturers to see if making a deal with them is an option. Start market research to see if people are interested in new type of floor. Look at competitor's products and hire experts to assess and look for options to improve their products. Start building concrete and laminate floors through outside manufacturer, also assess if producing these type of floor yourself can be profitable. Become eco neutral at the end of year 2.

		<p>Year 3and4: Flood the market with your improved products and newly attained eco-friendly status. Take as much clients away from current competitors. Continue to focus on ways to improve product development</p> <p>Year 5: Enjoy your strong position and constantly strive to improve your products. Take the best researchers from your competitors and get to join your team. Profit." (R103)</p> <p>"Since there is a positive correlation between the material of the carpets and the need of glue to attach the carpets to the floor. By changing the material of the carpets it may reduce the need and use of glue or reduce the use of glue can affect the type of material the carpet can be made of. The result of reducing the need of glue enables recycling of used carpets and thereby increases the secondary value of used carpets. The company can also use materials that extend the durability of the flooring products. Which can improve the company's revenue streams as well as the cost structure." (R108)</p> <p>"Nowadays many companies have the need to hire external environmental services to measure the impact of its businesses have on the environment and as they can by modifying certain processes internal reduce this impact and achieve a greater sustainability as a company, at the same time provided technologies that although it has a high as the generation of energy cost benefits in the longer term and give unique characteristics to the companies that employ them." (R30)</p>
7. Strategic way of working	8	
8. Monitor sustainability	4	
9. Challenge not sustainable ways	14	<p>"We should minimize our negative environmental impact. The company made a start by implementing solar panels to reduce the natural gas use, but this is not enough. More interventions should be applied in the company." (R21)</p>
10. Identifying opportunities for SD	82	<p>"Elephant grass materials can be used for textile production which are biodegradable which means that the carpets could be recycled. The recycling of the carpet tiles made off elephant grass can be used for biofuel which has can make the company more energy efficient and reduce their fixed costs in the production." (R12)</p> <p>"Another weakness is the high energy requirement of factories, particularly needed for activities such as the production of glues and cleansers. Only 15% of the company's energy use is covered by renewable energy technologies including the application of solar panels. The remaining 85% consists of natural gas, brown electricity, propane, and steam. In addition to energy, also large amounts of raw materials are required for the production of yarn, chemicals, and backing material that make up the carpet tiles. When considering the entire life cycle of a carpet tile, the production of yarn has been determined to have the largest environmental impact, especially</p>
11. Problem identification for SD	61	

	contributing to global warming. This yarn mostly consists of nylon, although wool and polypropylene are sometimes also used." (R8)	
12. Motivation for investment in sustainability	insurance risk, the business will increase its financial savings. Moreover, a different reputation will be able to raise trustworthiness among customers, suppliers, investors, staff and, more importantly, the public community. Therefore, investing in sustainability will cost more in the beginning, but will be beneficial for the company in the long run. Also sustainability will become the norm, so it is better to invest now." (R3)	47
Total		276

Taking aside “recognizing opportunities for SD” and “recognizing problems for SD” for the reasons mentioned above, the items that surface the most for strategic action competence within the argumentation of respondents are “motivation for investment in sustainability” (47 times) and “Involving other parties” (38 times).

4.6 Discussion and Conclusions

In answering the main research question: ‘What role does moral competence play in the process of idea generation for sustainable development?’, three main conclusion can be drawn and will be discussed below.

First of all, the results show that conceptually seen both normative competence and strategic action competence share a mutual orientation towards what is described in business ethics as moral or ethical competence. Especially when comparing descriptions of normative competence and action competence with the description of moral competence by Pohling et al. (2015), clear overlap between the two different fields can be seen. One could even wonder whether the two are essentially the same. Nevertheless, a conceptualization of moral competence in the context of sustainable entrepreneurship does not suffice with a general description of moral competence as proposed by for instance Pohling and colleagues (2015). The transformation to actionable behavior seems to be an extremely important element of moral competence in the context of sustainable entrepreneurship and this is missing in the general description of moral competence in business ethics. In the context of sustainable entrepreneurship, moral competence should consist of normative competence and strategic action competence. From the results can be concluded that even though both competencies are two distinct competencies, they share a strong mutual orientation and correlate highly with each other. It could even be argued that without normative competence, strategic action competence would not be meaningful and vice versa within a sustainable entrepreneurial context. Nevertheless, they are not the same and both competencies serve a different goal. Normative competence really deals with the application of values, principles and targets and identifying what these values, principles and targets are in different contexts. It does not concern actually acting upon these values or principles, but merely enables an individual to map different perspectives on this matter. Strategic action competence on the other hand focuses more on how to transform these values, principles and targets into actions towards sustainable development. This confirms the theoretical findings proposed by Blok et al. (2016). As mentioned, entrepreneurship education that also teaches on sustainability is often still prone to the profit-first mentality (Slater & Dixon-Fowler, 2010; Lourenço et al., 2013). This leaves little room for the development of moral obligations or the development of feeling responsible. However, the results of

this study show that the two moral competencies do cover these aspects. Entrepreneurship education should focus more on the development of these moral competencies, by implementing modules and interventions that tap into these competencies. The case assignment as presented in this study is an example of an exercise that can help develop normative competence and strategic action competence as two distinct, yet closely related constructs.

Secondly, the relation between normative competence and strategic action competence was assessed within the 6 factor competence framework for sustainable entrepreneurship as developed by Lans et al. (2014) and Ploum et al. (this dissertation). The results of this study show that the two moral competencies, normative competence and strategic action competence, correlate the highest with each other, compared to the other competencies in the competence framework for sustainable entrepreneurship. They also both have a significant relation with identifying ideas for SD and do not show a significant relation with idea generation in general. They appear to be distinctive for the very first stages of the sustainable entrepreneurial process. Entrepreneurship education programs often focus only the value creation processes, referring to a narrow view on entrepreneurship education (Lackéus, 2015). Moreover, most EE programs teach students about entrepreneurship: students learn to understand entrepreneurship mainly from a theoretical point of view (Lackéus, 2015). In short, from the perspective of the narrow definition, students are supported to become an entrepreneur. From the perspective of the broad definition on EE, students are supported to act entrepreneurial and acquire entrepreneurial competencies, which they can use also in other working life contexts (Lackéus, 2015). In order to embrace the potential (sustainable) entrepreneurship education holds, a shift towards the broad definition is necessary. The results of this study show that developing competencies for sustainable entrepreneurship through an entrepreneurial case example leads to more identified ideas for sustainable development. In other words, there seems to be evidence that by focusing on the development of such competencies the entrepreneurial output (i.e. value creation) also results in better performances.

Furthermore, since strategic action competence is about taking responsibility for sustainability in an entrepreneurial context, the relation with entrepreneurial self-efficacy (ESE) was examined. Entrepreneurial self-efficacy has been proved to be one of the main predictors of entrepreneurial success and plays a role in transforming intentions into behavior (Rauch & Frese, 2007). Furthermore, several studies have shown that an individual's propensity to identify entrepreneurial opportunities is influenced by entrepreneurial self-efficacy (Davidsson & Honig, 2003). It appeared that entrepreneurial self-efficacy correlated the lowest with normative competence and the highest with strategic action

competence, compared to the relation of entrepreneurial self-efficacy with the other competencies for sustainable entrepreneurship. Even though the relation between entrepreneurial self-efficacy and strategic action competence is not extremely strong, it can be concluded that out of all competencies for sustainable entrepreneurship, strategic action competence has the strongest relation with entrepreneurial self-efficacy.

However, the results also show that entrepreneurial self-efficacy does not have a significant relation with idea generation for sustainable development (and also with idea generation in general). This is not in line with what was expected from the literature, but does substantiate the idea that strategic action competence fulfils more or less the role of entrepreneurial self-efficacy within a sustainable entrepreneurial context. Furthermore, this rather surprising result could also be caused by the fact that idea generation is one of the very first steps within the entrepreneurial process. A construct like entrepreneurial self-efficacy might have a bigger role in later stages of the entrepreneurial process. Another explanation can be found in the way opportunity identification was measured this study. In most studies, just like entrepreneurial self-efficacy, opportunity recognition is measured by self-perceived assessments. In this study, opportunity recognition was measured by a performance based assessment. It could be that entrepreneurial self-efficacy only relates to self-perceived opportunity identification (competence), but not to actual opportunity recognition.

Based on these results, it can be stated that normative competence serves mostly the sustainable part in sustainable entrepreneurship and strategic action competence serves mostly the entrepreneurship part in sustainable entrepreneurship. In addition, both moral competencies bridge the gap between the inherent paradox that comes with sustainable entrepreneurship. Where sustainable development is focused on self-transcendence values, entrepreneurship is focused on egocentric values. Within the framework of competencies for sustainable entrepreneurship the two moral competencies function as bridging this gap as they both concern bringing norms and values to the table and transforming them into new business opportunities.

Thirdly, the role of normative competence and strategic action competence within the entrepreneurial process of recognizing opportunities for sustainable development has been qualitatively analysed. As expected, it can be concluded that both competencies play an important role in identifying new ideas for sustainable development.

Considering normative competence, would-be sustainable entrepreneurs mostly apply norms and values and use knowledge on what is seen as a good sustainable practice in the field in the process of recognizing opportunities for sustainable development. In short, values and knowledge appear to be

the most important elements of normative competence in the very first phase of the entrepreneurial process, namely in identifying opportunities for SD. When looking at strategic action competence, it seems self-evident that the most important elements are problem identification and opportunity identification. The assignment was to identify new ideas for an existing business plan, so it is not strange that these two elements surface the most when looking at strategic action competence. Also the least used codes belong to strategic action competence. This has to do with the fact that a hypothetical case study like the one which was used in this research, leaves little room for ‘actual’ behavior. As strategic action competence is merely focused on this actionable aspect, it is not strange that also the least used codes are part of this competence. Nevertheless, when setting aside these more extreme outcomes, it seems like involving other parties or stakeholders and motivations for investing in sustainability surface the most within the process of recognizing opportunities for SD. In this early phase of the entrepreneurial process, individuals are focused on finding partners and on providing arguments to motivate to invest in sustainability when it comes to strategic action competence.

However, this does not mean that the other elements of the two moral competencies are not important, but in this very first phase of the entrepreneurial process (i.e. idea generation) these elements surface more than the other elements. This points in the direction of differences in use of the competence framework for sustainable entrepreneurship in different phases of the entrepreneurial process. Overall, the results support a revised, more specified conceptual model of the role of moral competence in the early entrepreneurial process (Figure 4.3). This model is not tested as such in this paper, more research is needed to test the overall model.

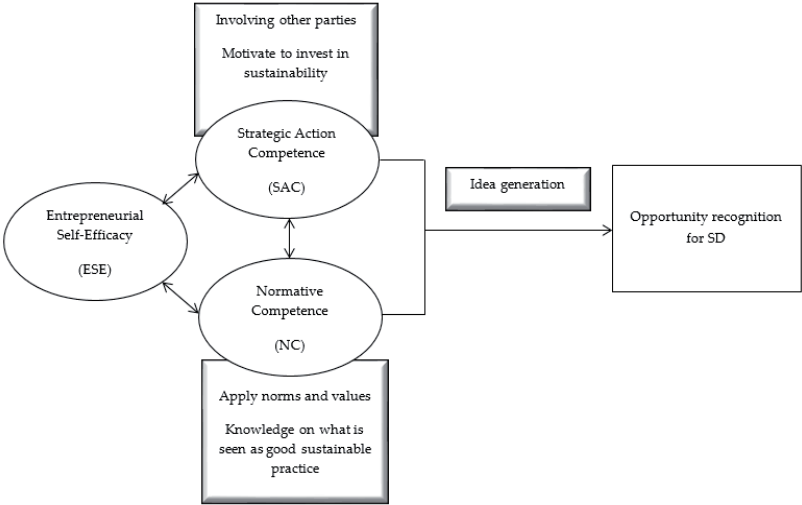


Figure 4.3. Adapted conceptual model with significant relations, including the elements of moral competence that surface the most in this early phase of the entrepreneurial process.

Concluding, the overall results show a strong relation between the two moral competencies. They share a mutual moral orientation, but serve a different goal. It can be concluded that they are two sides of the same coin. Furthermore, normative competence and strategic action competence are bridging competencies between the two worlds that sustainable entrepreneurship entails and are strengthened by the motivational construct of entrepreneurial self-efficacy. By taking into account normative values and norms (normative competence) and transforming them into sustainable actions (strategic action competence), the sustainable part within sustainable entrepreneurship is united with the entrepreneurship part of sustainable entrepreneurship. In addition, when looking at their role in the entrepreneurial process of recognizing opportunities for sustainable development, it appears that in the very first step of this process, namely idea generation, some elements of the moral competencies are more important than other elements. For normative competence these elements are applying norms and values to your own practice and knowing what is a good sustainable practice in the field. For strategic action competence these elements are involving other parties and motivating to invest in sustainability.

This study has several important scientific and practical contributions in the field of competencies for sustainable entrepreneurship and for developing entrepreneurship education as such. A first contribution entails contextualizing moral competence within the sustainable entrepreneurial context and positioning moral competence within this context. It could even be argued that the descriptions of moral competence in for instance business ethics literature also should incorporate the actionable character that strategic action competence entails. A second contribution can be found in the bridging character of the two moral competencies in the paradox between self-interest and self-transcendence in the context of sustainable entrepreneurship. A third contribution lies in the fact that up until now, competence research mostly focused on either conceptual contributions or on quantitative empirical work. By qualitatively showing how the two moral competencies are employed within the opportunity recognition process an unique insight into these competencies is revealed. Fourth and final, higher education institutes which stimulate entrepreneurship education, could focus more on developing these moral competencies. Higher education institutions and business schools prescribe mainly a profit-driven and materialistic worldview to students, which can compromise their ethical values and weaken their perceptions of social responsibility (Ghoshal, 2005; Mitroff, 2004). Critics such as Giacalone and Thompson (2006) argue that students are often encouraged to treat everything as subordinate to profit. Slater and Dixon-Fowler (2010) state that this 'profit-first' mentality has no regard for moral considerations or social responsibilities. Education institutions have a big role in the transition from this profit-first mentality as a logic, towards a new logic in which sustainability is not seen as a loss (the losing logic), but seen as a positive outcome. As such entrepreneurship education should incorporate

sustainable development as a basic requirement and focus on the development of the competencies for sustainable entrepreneurship. This can be done by implementing new pedagogies that focus on value creation that moves beyond profit maximization. In this process it is important to keep track of the competencies for sustainable entrepreneurship and to foster them within the teaching cases. Lackéus (2015) provides stepping stones for teaching cases that enable learning by doing and the possibility to integrate moral obligations into entrepreneurial practices. Examples are the Business Model Canvas and the Lean start-up (e.g. Lackéus, 2015). Sustainability is therefore not just an add-on to the entrepreneurship programs that already exist. It has to be implemented at the core of entrepreneurship education, focusing on the development of competencies for sustainable entrepreneurship and teaching methods that enable students to move away from a sole focus on profit maximization but leaves room for the triple bottom line.

Finally, some limitations and future research directions should be mentioned. First of all, the output measure in this research (i.e. opportunity recognition) was based on a hypothetical case description and only measured by the number of ideas. Ideally this output measure should be as closely related to actual behavior, as research in the field of competence could really benefit from empirical research that would address this. Future research should embrace new and innovative research methods to be able to monitor and measure actual opportunity recognition among students and sustainable entrepreneurs, in order to substantiate the conclusions of this study. In line with this, Future research should also focus on nascent and established sustainable entrepreneurs as this study only includes would-be entrepreneurs in an educational context.

4.7 Moving on to the enactment of competencies for sustainable entrepreneurship

The previous chapters all focused on the early stages in the entrepreneurial process, leaving the question that focuses on the enactment of the competencies throughout the whole entrepreneurial process unanswered. In addition, whereas the early stages of the entrepreneurial process can be assessed within an entrepreneurship education context, the enactment throughout the whole process requires a shift from would-be and nascent entrepreneurs to established and experienced entrepreneurs. Furthermore, the entrepreneurial process is not an one-dimensional or linear process (Venkataraman et al., 2012; Muñoz & Dimov, 2015). The entrepreneurial journey is full of critical incidents that require specific decisions to be made (Cope & Watts, 2000). The enactment of the competence framework for sustainable entrepreneurship within these critical incidents that occur throughout the lifespan of a sustainable venture is researched in the following chapter.

Appendix

Table 4.5. Overview of items, codes and signalling words related to the items belonging to the two moral competencies

	Original item	Item/Code	Signalling words
Normative competence	1	Take initiative based on norms and values	Importance, should do something, should take action, norms, values, feeling responsible
	2	Knowledge about sustainability	Facts and figures, sources, knowing
	3	Apply norms and values to own practice	Importance, feelings, moral standards, ethical value, responsibility, values, norms
	4	Explaining impact of sustainability on BMC	Integration BMC, impact on other blocks, impact on stakeholders
Strategic action competence	1	Involving other parties	Stakeholders, collaboration, working together
	2	Explanation of steps to be taken	Future plans, next steps
	3	Strategic way of working	Designing, testing, implementing, evaluating, integration BMC
	4	Monitor sustainability	Keep track, monitor, reflection
	5	Challenge not sustainable ways	Examples of behavior, personal experience,
	6	Identifying opportunities for SD	Opportunity, idea, chance
	7	Problem identification for SD	Problem, challenge, issue
	8	Motivation for investment in sustainability	Finance, influence on cost structure, framing SD in terms of money

CHAPTER 5

UNRAVELLING THE ROLE OF COMPETENCIES FOR SUSTAINABLE ENTREPRENEURSHIP WITHIN THE DECISION MAKING PROCESS OF SUSTAINABLE ENTREPRENEURS⁴

This paper addresses the enactment of competencies for sustainable entrepreneurship within decision making processes of sustainable entrepreneurs. A framework of six competencies was queried through a questionnaire and the enactment of this framework within six critical moments in the decision making process was queried through interviews with 33 sustainable entrepreneurs. Normative competence and diversity competence are enacted more in the early stages of the development of the sustainable venture, whereas foresighted thinking and systems thinking appear to be enacted more later on in the process. Sustainable entrepreneurs could focus more on the enactment of these competencies in the particular critical moments.

⁴ This chapter is based on:

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (submitted). *Unravelling the role of competencies for sustainable entrepreneurship within the decision making process of sustainable entrepreneurs*. *Business & Society*.

5.1 Introduction

Sustainable entrepreneurship is an approach to sustainable development that redefines how ventures and the environment interact. Sustainable entrepreneurs incorporate sustainability in the core of their venture, working towards social and ecological goals while generating economic benefits for the entrepreneur (Dean & McMullen, 2007; Hockerts & Wüstenhagen, 2009; Patzelt & Shepherd, 2011; Schaltegger & Wagner, 2011). Whereas traditionally entrepreneurs are perceived as egocentric, sacrificing sustainability for economic profit, sustainable entrepreneurs are contributing to solutions reducing the level of unsustainability and working towards sustainable development (York & Venkataraman, 2010).

On the one hand it is argued that sustainable entrepreneurship can be seen as a way of generating competitive advantage by recognizing new sustainable business opportunities, resulting in new products, new methods of production, new markets or new ways of organizing business processes (Dean & McMullen, 2007). But on the other hand, sustainable entrepreneurship is also a value oriented and normative concept, since it addresses the question of how social-ecological systems ought to be developed in order to achieve a balance between economic, social and environmental aspects in business practices (Swart et al., 2004; Patzelt & Shepherd, 2011). Therefore, sustainable entrepreneurs seem to extend the goal of market success to initiating societal change and changing market conditions and regulations (Schaltegger & Wagner, 2011). This implies that sustainable entrepreneurs engage in complex and difficult decision making processes and systemic thinking (Loorbach, 2010). These additional elements require individuals to have a strong sustainability orientation (Kuckertz & Wagner, 2010), to have knowledge of the environment (Patzelt & Shepherd, 2011) and to have incentives (i.e. norms and values) that go beyond the appropriation of tangible outcomes for themselves (Blok et al., 2016), with the list of driving factors still being explored and expanded in the literature. Therefore, it is not just the sustainable entrepreneurial object (i.e. product, service, method of production, etc.) that serves a different goal than that of conventional entrepreneurs. Also the entrepreneurial process as such seems to imply that sustainable entrepreneurs require different skills, knowledge and values which enable them to achieve sustainability goals through their entrepreneurial actions.

It is likely that the knowledge, skills and attitudes that are necessary for sustainable entrepreneurs stem from individual competencies. Individual competence refers to a complex set of performance-oriented knowledge elements, skills and attitudes needed to achieve specific goals (Mulder, 2014). Muñoz and Dimov (2015) state that there is a need for research that shows an integrated perspective on the drivers for sustainable entrepreneurship. Focusing on individual competencies for sustainable

entrepreneurship is a way to do so as a focus on competencies enables an integrated approach. Some efforts to identify key competencies for sustainable entrepreneurship have been made (Lans et al., 2014; Ploum et al., 2017; this dissertation), but these studies focus on the early stage of sustainable entrepreneurship (i.e. would-be or potential sustainable entrepreneurs), whereas the enactment of these competencies could be different in the stage where individuals are actually working as a sustainable entrepreneur (i.e. new or established entrepreneurs) (Kelley et al., 2011). Furthermore, the entrepreneurial process is not an one-dimensional or linear process (Venkataraman et al., 2012; Muñoz & Dimov, 2015). The entrepreneurial journey is full of critical incidents that require specific decisions to be made (Cope & Watts, 2000). The enactment of competencies throughout different stages of the entrepreneurial process and underlying decision making processes has, to the best of our knowledge, not been researched before. Accordingly, the research question that will be addressed is: *How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?*

In order to answer the research question, a qualitative study with 33 sustainable entrepreneurs was executed. A framework of six key competencies for sustainable entrepreneurship and corresponding survey was used in this study which has been empirically tested for its validity in previous studies (Lans et al., 2014; Ploum et al., 2017; this dissertation). In-depth interviews with these sustainable entrepreneurs around key decision making moments were held to analyse the role of individual competencies for sustainable entrepreneurship within the entrepreneurial process.

This study contributes to the literature as it is one of the first studies to empirically assess how individual competencies for sustainable entrepreneurship are enacted in subsequent stages of the entrepreneurial process. Given that SD challenges are complex and that thus decision making can be challenging in different stages, studying the enactment and potential supporting role of individual competencies for sustainable entrepreneurship is not only insightful from a research point of view, but also from a practical point of view.

5.2 Competencies for sustainable entrepreneurship

Individual competence is conceptualized as the combination of knowledge, skills and attitudes, which enable successful task performance (Wesselink et al., 2010; Mulder, 2014). Following the comprehensive approach to competence, competence is defined in this research as a person's integrated performance-oriented ability to reach specific achievements. 'Integrated' refers to a cohesive and complex set of knowledge, skills, attitudes and their embeddedness within the context in which successful

performance has to take place (Mulder, 2014). Section 1.3.1 elaborates more on the origins of competence.

Considerable, though mostly conceptual, efforts in describing competencies for sustainability professionals have been made over the last decade (Svanström et al., 2008; De Haan, 2006; Wiek et al., 2011; Rieckmann, 2012). Derived from research on competencies for sustainable development in higher education, various scholars have identified competencies for sustainable development in the business context (Hesselbarth & Schaltegger, 2014; Osagie et al., 2015; Wesselink et al., 2015). To bridge the gap between conceptual and empirical research on competencies for sustainable entrepreneurship, Lans et al. (2014) developed a competence framework, in which knowledge on entrepreneurial competence and competencies for sustainable development are combined. In this framework seven key competencies for sustainable entrepreneurship were identified: systems-thinking competence, diversity competence, foresighted thinking competence, normative competence, action competence, interpersonal competence, and strategic management competence. The study of Ploum et al. (2017, this dissertation) builds on the work of Lans et al. (2014) and finds more empirical evidence for the importance of the competence framework in supporting sustainable entrepreneurs. Furthermore, the study presented in Chapter 2 has led to the conclusion that action competence and strategic management competence are merged into strategic action competence, resulting in a six factor competence framework for sustainable entrepreneurship. The six identified competencies for sustainable entrepreneurship are described as follows:

1. **Diversity competence:** the ability to structure relations, spot issues and recognize the legitimacy of other viewpoints (i.e. stakeholders) in business decision-making processes, be it about environmental, social, and/or economic issues.
2. **Foresighted thinking competence:** the ability to collectively analyse, evaluate, and craft 'pictures' of the future in which the impact of local and/or short-term decisions on environmental, social, and economic issues is viewed on a global/cosmopolitan scale and in the long term.
3. **Systems-thinking competence:** the ability to identify and analyse all relevant (sub)systems across different domains (people, profit, planet) and disciplines, including their boundaries.
4. **Interpersonal competence:** the ability to motivate, enable, and facilitate collaborative and participatory sustainability activities and research.

5. **Normative competence:** the ability to map, apply, and reconcile sustainability values, principles, and targets with internal and external stakeholders, without embracing any given norm, but based on the good character of the one who is involved in sustainability issues.
6. **Strategic action competence:** the ability to collectively design projects, implement interventions, transitions, and strategies, and translate these strategies to responsible actions for the improvement of the sustainability of social-ecological systems.

5.3 Critical moments in the development process of a sustainable venture

5.3.1 The development process of a sustainable venture

Becoming and being a sustainable entrepreneur is a dynamic process where individuals and ventures go through different stages. In each of the stages the role of the entrepreneur and the role of the venture is different. A (sustainable) venture can be seen as the result of a developmental process that begins with an initial venture idea and is continuously shaped by action, social interaction, and learning (Dimov, 2007, Muñoz & Dimov, 2015). The developmental process is characterized by actions and interactions driven by some underlying, evolving purpose of the venture (Venkataraman et al., 2012). In the first stage, the entrepreneur only has a business idea and is planning on or thinking about starting a business (Grilo & Thurik, 2008). This stage is known as potential entrepreneurship (Kelley et al., 2011; Verheul et al., 2010) or pre-stage entrepreneurship (Wasdani & Mathew, 2014). In this stage the entrepreneur passes through phases of pre-contemplation and contemplation, where the idea of sustainable entrepreneurship is slowly settling in his or her mind (Klonek et al., 2015). In the second stage, the entrepreneur is turning the business idea into a business plan and is taking action to set up the venture, going through all the steps of starting up a venture (Grilo & Thurik, 2008). This stage is known as nascent entrepreneurship (Kelley et al., 2011) or gestation (DeTienne, 2010). In this stage the entrepreneur passes through phases of preparation, where the decision of becoming a sustainable entrepreneur has been made and the action plan of reaching that goal has been set out (Klonek et al., 2015). The third stage of the process of entrepreneurship is characterized by individuals who have recently set up a venture and are working towards finding their position on the market place. Here, most businesses are in the early stage of their existence where entrepreneurs are taking steps to reach the envisioned state (Klonek et al., 2015; Wasdani & Mathew, 2014). This stage is known as new or young entrepreneurship (Kelley et al., 2011; Verheul et al., 2010). The fourth and final stage is the stage where individuals become established entrepreneurs. These entrepreneurs have been around for a number of years and their ventures have a clear position in the market (Kelley et al., 2011; Wasdani & Mathew, 2014; Verheul et al., 2010). Klonek et al. (2015) identify that sustainable entrepreneurs have

reached their desired goal in this stage, but that it is key to maintain the business and to reflect on the behavior that got the business to this stage. Where previous research on individual competencies for sustainable entrepreneurship has focused primarily on the first two stages of entrepreneurship, this study will address the third and fourth stage of entrepreneurship, namely new and established entrepreneurship.

5.3.2 Critical moments in the development process of a sustainable venture

In order to understand and to study the development of the venture in a substantive sense, Muñoz and Dimov (2015) argue that ‘one needs to focus on its three observable markers, namely the venture ideas at its onset, the actions through which these ideas are expressed to set or keep the process in motion, and the interactions through which the ultimate exchange relationships are instituted’ (pp. 634). Or, in other words, it is not only important to describe what these observable stages or markers are, but to also put emphasis on how sustainable entrepreneurs define them, deal with them and how they deliberate them at each step of the way. A helpful theoretical lens to do so, are theories on critical moments or critical incidents in decision making processes. When looking at literature on decision making processes within the entrepreneurial process, several critical moments (or critical incidents) can be identified that can help to further unravel the sustainable entrepreneurial process. A focus on critical moments in an entrepreneurial context is a proven method for instance studying entrepreneurial learning of more established entrepreneurs (Cope & Watts, 2010; Lans et al., 2008). More specifically, Maine et al. (2015) identified 6 different critical moments within the decision making process of (sustainable) entrepreneurs: (1) selection of founding partners, (2) creation of the new venture, (3) finding successful funding, (4) technology-market matching, (5) breadth of portfolio and (6) adaptation of the business model.

The first three critical moments are common across entrepreneurship literature and are focused on the establishment and early resourcing of the venture and are therefore more prevalent in the stage of new entrepreneurship (e.g. Zhang et al., 2010; Hsu, 2007; Bhidé, 2000). Selecting a founding partner generally occurs only once and entrepreneurs tend to choose founding partners through people who the entrepreneurs already know, rather than finding founding partners externally (Maine et al., 2015). Since not all entrepreneurs have founding partners, in this research, the critical moment “founding partner selection” is broadened to “organize the entrepreneurial team”. This is also supported across entrepreneurship literature in which organizing a team is seen as a critical moment during the venture creation process (Maine et al., 2015; Timmons & Spinelli, 1999).

Actually creating the venture is the second critical moment in the development of the venture

that the entrepreneur needs to undertake (Maine et al., 2015). This critical moment deals with moving from the initial stage of idea generation to implementing the idea in practice. A business plan is written and the venture is listed at the chamber of commerce. This moment in the development of the sustainable venture occurs only once during the lifespan of the venture. Nevertheless, this moment entails many uncertainties and difficult decision making processes.

Another important critical moment is finding first funding and later acquiring additional funds. Funding is vital for starting and maintaining a business (Maine et al., 2015; Rasmussen, 2011). Especially for sustainable entrepreneurs it can be hard to acquire funding as their sustainable products or services come with risks and uncertainties. Finding the right investor not only implies making sure that a significant return on investment is assured, but also implies finding an investor that shares the sustainable vision of the venture.

Just like organizing the team and acquiring funding, the other three critical moments (technology-market match, portfolio and business model adaptation) may occur repetitively throughout the lifespan of the venture and do not fit neatly into a linear process model (Maine & Garnsey, 2006). Nevertheless, these three critical moments are more prevalent in later stages of the entrepreneurial process and therefore are more important in the stage of established entrepreneurship.

Technology-market matching and deciding on portfolio breadth/focus are most important for those sustainable ventures which have a wide range of potential market applications (Gambardella & McGahan, 2010; Maine & Garnsey, 2006). Technology-market matching is of great importance to create value for science-based firms that have a broad technology platform, which is commonly the case for sustainable ventures (Maine & Garnsey, 2006). When the technology does not match with the targeted market, the venture will not be able to develop into a high growth venture.

Furthermore, when it comes to developing a portfolio, entrepreneurs can choose between a narrow range, a broad range or a single market application (Maine & Garnsey, 2006; Maine et al., 2012). Entrepreneurs need to decide on the range of their product portfolio, which customers to target and what application their product will serve, which will also have an effect on the technology-market match (Maine et al., 2012).

The final critical moment, business model adaptation, is particularly important in commercialization over long time frames (Chesbrough, 2010). According to Chesbrough (2010), business model adaptation is important for commercialization in the long run, but it is also a difficult process as it requires reflection and anticipation of the entrepreneur on past developments and those developments yet to come. As venture creation is a dynamic process, reaching the stage of established entrepreneurship implies that the entrepreneur should be able to redirect the strategy of the venture

when and where necessary. Therefore business model adaptation is of high importance in the development process of a sustainable venture.

Figure 5.1 provides an overview of the key concepts of this study and how they are related to each other. It is important to keep in mind that the critical moments are not occurring linear throughout the entrepreneurial process, but can occur simultaneously or multiple times.

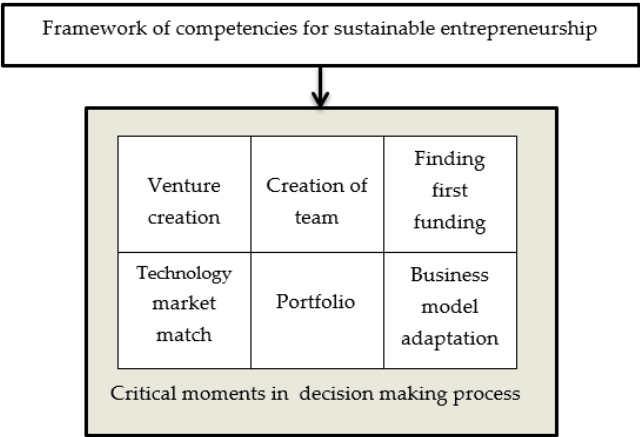


Figure 5.1. Conceptual model depicting the enactment of competencies for sustainable entrepreneurship in the entrepreneurial process.

5.4 Methods

Because little is known about the influence of competencies on the decision making process of actual sustainable entrepreneurs, an explorative semi-qualitative research design was chosen. In order to provide answers to the research question, interviews with 33 sustainable entrepreneurs (based in the Netherlands) were held.

5.4.1 Setting and Sample

Even though the Netherlands is a small country, it can be considered as one of the leading European countries when it comes to innovation and entrepreneurship (van der Zee et al., 2016). Therefore, next to practical reasons, the Netherlands was chosen as a context in which the sustainable ventures should be located. Nevertheless, it can be challenging to identify those ventures that can be considered ‘sustainable’. In order to identify whether a venture can be considered a sustainable one - and therefore has a clear focus on the triple bottom line - the eight sustainable archetypes identified by Bocken et al.

(2014) were used as indicators. The archetypes are described as follows: maximize 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 and develop scale up solutions (Bocken et al., 2014). If a venture could be categorized within at least one of the sustainable archetypes the venture was invited to participate in the study. In addition the following two criteria were taken into account as well: the sustainable ventures should exist for at least two years and the participant (i.e. sustainable entrepreneur) had to be one of the founders of the business. In total 50 sustainable ventures were invited to participate through this strategy of purposeful sampling. Thirty-three sustainable entrepreneurs accepted the invitation to participate, those who did not accepted the invitation mentioned time constraints and the wide range of invitations to participate in research to decline our invitation. An overview of the participants can be found in Table 5.1.

5.4.2 Constructs and measures

Before conducting the interviews, the participants received a short questionnaire which queried the closed-ended competencies for sustainable entrepreneurship and open background questions. The closed-ended questions were based on the questionnaire as used by Lans et al. (2014) and Ploum et al. (2017; this dissertation). Sustainable entrepreneurs were asked to rate themselves, on a scale of one to ten, on 27 items related to the six competencies for sustainable entrepreneurship. An overview of the questionnaire can be found in the general Appendix of this dissertation (see Table A1).

As the closed-ended questionnaire was pre-recorded, the open questions during the semi-structured interviews were aimed at clarifying and explaining the results from the questionnaire and relate the competencies with the decision making process of the sustainable entrepreneurs. Respondents were asked to provide examples of the competencies in general, in order to unravel how competencies are enacted in general. The competencies have been operationalized into themes, for instance the theme of stakeholders was used to analyse the general enactment of diversity competence. In addition, for each of the six critical moments questions were asked by the researcher to understand what the critical moment entails for the sustainable entrepreneur and to unravel what competencies were needed to overcome the critical moments. For example, respondents were asked to describe their initial motivation to start a sustainable venture to capture for instance the role and enactment of normative competence in this critical moment of venture creation. Another example of a question is related to the critical moment of organizing the team as respondents were asked to think back to a moment in which there were some tensions within the entrepreneurial team and describe how they overcame such issues. (operationalization of critical moments and competencies is available upon request).

Table 5.1. Overview of sustainable entrepreneurs included in the research (sorted by established to new entrepreneurship; account by year of product to market)

ID	Product to market	Industry/sector	Gender of founder	Age of founder	Archetype
RQ	1995	Energy	Male	56	1 & 3
RC	2008	IT	Male	61	2
RK	2008	Energy, construction	Male	53	1 & 3
RV	2009	Toys	Male	30	3
RAA	2009	Fashion	Female	51	2 & 6
RD	2010	Airspace	Male	42	3
RH	2010	Aviation, automotive	Male	42	3
RT	2010	Fashion	Male	54	3
RAB	2010	Food	Male	30	1, 2 & 3
RR	2011	Paper	Male	49	3
RX	2011	Upcycling	Female	30	2 & 3
RJ	2012	Transport pallets	Male	48	3
RU	2012	Transport pallets	Male	53	3
RY	2012	Food	Male	45	1, 2 & 3
RZ	2012	Energy	Male	63	3
RAF	2012	Construction, architecture	Male	32	2 & 3
RA	2013	Food	Male	58	3
RG	2013	Fashion	Male	60	3
RL	2013	IT	Male	56	4
RF	2014	Fashion	Male	25	2 & 6
RM	2014	Plastics	Male	58	2 & 3
RW	2014	Architecture, construction	Male	32	1 & 3
RAC	2014	Plastics	Male	38	1, 2 & 3
RB	2015	Architecture, construction	Male	23	2 & 3
RE	2015	Food	Male	24	6
RI	2015	IT	Female	39	4
RN	2015	Energy	Male	39	5
RP	2015	Paper	Female	21	3
RS	2015	Construction, architecture	Male	26	2 & 3
RAD	2015	Food	Male	24	1, 2 & 3
RAE	2015	Electronics	Male	28	1 & 2
RAG	2015	Tourism	Male	28	4
RO	2015	Food	Male	28	2

Note. Archetypes: 1=Maximize material and energy efficiency, 2=Create value from waste, 3=Substitute with renewables and natural processes, 4=Deliver functionality rather than ownership, 5=Adopt a stewardship role, 6=Encourage sufficiency, 7=Repurpose for society/environment and 8=Develop scale up solutions

5.4.3 Analysis

The scores on the closed-ended questionnaire were administered through IBM SPSS Statistics 23, in which simple statistics were performed. Because of the non-normal distributed data (Shapiro-Wilk test

was significant for all competencies), the Mann-Whitney U test was used to compare the results between independent groups within the sample (for example to check for possible differences between new and established ventures).

To minimize potential biases, the interviews were conducted by the corresponding author and in 75% of the cases a colleague joined the interview. One researcher made sure all questions were asked and the other researcher asked clarifying and in-depth questions. The interviews – which on average took about 100 minutes - were audio-recorded and transcribed which was followed by a content analysis of the interview transcripts. The interviews were anonymized, including passages that had clear references to the venture or competitors. The software program ATLAS.ti 7 was used to organize and analyse the transcripts.

First, to improve the rigor of the qualitative analysis, a sub set of 7 transcripts (20% of the total) was read by two researchers to identify meaningful passages in the interviewees' responses to the interview questions (Pope et al., 2000). The six competencies and critical moments were used as coding categories in order to group important elements. More than one code could be assigned to a single passage. Codes were independently assigned to these passages and afterwards the 7 transcripts and accompanying codes were thoroughly discussed by the two researchers to decide upon a final codebook. Second, the first author read all 33 interviews and assigned codes to meaningful passages, based on the codebook that was developed.

5.5 Results

5.5.1 Competence scores

Based on the scores of the self-perceived assessment all 33 sustainable entrepreneurs indicate that they familiarize themselves with the six competencies for sustainable entrepreneurship. On average normative competence has received the highest self-perceived scores, with an average score of 7,5 (on a scale from 1 to 10). Interpersonal competence has received the lowest average score, as respondents scored themselves a 6,7 on average. Table 5.2 provides an overview of the scores. All Cronbach's Alphas are above the threshold of 0.7, which means the constructs with underlying items are considered reliable.

To account for possible differences in scores between new and more established entrepreneurs (as time could be factor in terms of competence development) a Mann-Whitney U test was executed between ventures that exist for more than 5 years (n=16) compared to those that are younger (n=17): between 2-

5 years (after 5 years the ventures usually become established ventures). The Mann-Whitney U tests were not significant (for all separate competencies: $p > 0.05$). Also when taking all competencies together, the test is not significant $U = 114,5$, $p = 0.444$. Thus no significant differences between the scores on the competencies between new and established entrepreneurs were found. Even though this is not the main focus of this particular research, differences between the would-be sample (Ploum et al., 2017; this dissertation) and the new/established sample (this study) were also explored by means of Mann-Whitney U tests. Only interpersonal competence (with all underlying items) did not show differences in scores between the two samples. All other competencies and underlying items do show significant differences between the samples, with significant higher scores for the new/established entrepreneurs sample.

Table 5.2. Mean scores, reliability analysis and differences between new and established entrepreneurs

Competence	Mean	SD	Lowest	Highest	Cronbach's Alpha	Number of items	<i>U</i>	Sig.
							New versus established ventures	
Diversity	7.3	1.4	2.5	10.0	0.86	4	88.500	0.087
Foresighted	7.4	1.2	4.3	10.0	0.79	4	118.500	0.533
Systems	7.0	1.6	3.3	10.0	0.86	4	125.500	0.709
Interpersonal	6.7	0.9	5.0	8.0	0.73	3	141.000	0.873
Normative	7.5	1.3	4.0	10.0	0.78	4	112.00	0.402
Strategic Act.	7.0	1.0	4.8	9.0	0.85	8	97.500	0.168

Nevertheless, these quantitative results do not provide information on how the sustainable entrepreneurs enact the different competencies for sustainable entrepreneurship. The next sections will provide in-depth information on how the six competencies for sustainable entrepreneurship are enacted in general and how they are enacted differently in the critical moments of the decision making process.

5.5.2 Enactment of competencies of competencies for sustainable entrepreneurship

First, it was explored how often the six competencies for sustainable entrepreneurship were enacted in general. All six competencies for sustainable entrepreneurship were recognized in the answers of the respondents. Furthermore, beside systems thinking competence, all competencies surfaced at least one

time in each of the interviews. Nevertheless, some competencies surfaced more often than others. Table 5.3 shows that strategic action competence was identified most often with 245 times and interpersonal competence least often with 101 times in total.

Table 5.3. Frequencies of competencies

Competence	Number of times identified	Average per respondent
Diversity	196	5.9
Foresighted thinking	185	5.6
Systems thinking	110	3.3
Interpersonal	101	3.0
Normative	146	4.4
Strategic action	245	7.4

1. Diversity competence. All 33 sustainable entrepreneurs describe elements of diversity competence as being important which means they make use of diversity competence. In practice, it appears that diversity competence is often translated by the sustainable entrepreneurs in the context of stakeholder engagement and to stakeholder management related elements. Being able to identify relevant stakeholders and to involve them meaningfully in decision making processes is mentioned often by the sustainable entrepreneurs. Furthermore, as an example of diversity competence, respondents mention reaching out to others to gain knowledge that is not available in the venture is important. The government is mentioned often as a relevant stakeholder which plays an important role. However, in total 28 respondents mention that they would want more governmental support (either subsidies or more regulation when it comes to sustainable development) and are not satisfied with the role the government currently has and are not able to include the government as a stakeholder. Two quotes that support our understanding of diversity competence and provide an example of how diversity competence is enacted are described below:

“As we are developing a disruptive technology we are dependent on for example new developments in the market and on new knowledge that is gained from fundamental research. You need to know who to involve in order to include this into your business. We make use of a innovation agent who has a big network in our field of expertise. He [the innovation agent] helped us to get in touch with the right people and still serves as a bridge between our business, the market and for instance universities.” (RY)

“To fully implement our technology, working together entails going beyond normal forms of cooperation. If one of the stakeholders or clients wants to collaborate with us, it means that they also

have to make investments as the technology cannot be implemented in existing ways of producing. We call this co-cycling, without this commitment of stakeholders our technology will not endure.” (RA)

2. Foresighted thinking competence. All 33 sustainable entrepreneurs are able to identify at least short term goals and local impacts. The ability to translate these to global impacts and/or on a longer term is not always explicitly mentioned as being enacted in the responses of the sustainable entrepreneurs. In total 24 respondents indicate to think about longer term goals and only 10 respondents mention that they take into account global impacts of their business activities on a local scale. It is mentioned by respondents that their more short term and local oriented focus has to do with their relatively new position in the market. The uncertainties that come with this new position limits them to think globally and on the long term. Two exemplary quotes are provided below:

“In the beginning I only had a runway of 2 months. I gave myself two months to see where I would be after those two months and then gave myself another two months. This helped me to overcome uncertainties that are inherent to the first steps in the development of the venture. Now this does not work anymore. I have clients who depend on me and I need to set long term goals to reach certain sustainability goals. I also have a much better idea on what kind of consequences my actions or decisions have on future plans. I think this also has to do with experience.” (RW)

“The circular market is still relatively young, it can still go either way. For us it is important not to be fishing in the same pond as the competitors. We really try to anticipate and respond to changes in the market. We do this by reflecting regularly but also by making short term and long term plans. But always keeping in mind that we need to be flexible. I think that in the future our consultancy work will decrease as it will become more or less the status quo to implement circular economy within business models, but for now this is a nice way to earn some more money”. (RL)

3. Systems thinking competence. This competence was recognized in the answers of 31 respondents. Only two respondents did not mention abilities or processes that match with the description of systems thinking; both ventures were founded in the past three years. Similar to foresighted thinking, systems thinking seems to play a bigger role in later stages of the entrepreneurial process as respondents repeatedly mention that in the early stages of the development of the venture it is most important to focus on the primary goal of ‘keeping the business alive’. This entails a focus on micro management systems that are important in day to day practices and not on all relevant meso or macro management levels in considering a systems thinking approach. Several respondents mention that after scaling up or

after gaining some financial stability, systems thinking becomes more relevant as they are less focused on internal issues and therefore can widen their focus to their role and influence within the whole system. Some respondents also mention that their lack of employing systems thinking is related to their dependence on whether big players in the market adopt a sustainability orientation (n=11). As long as these big players do not want to invest in sustainable solutions, sustainable entrepreneurs are bound to local impacts instead of adopting a systems thinking approach. Examples of how systems thinking is enacted in general can be found below:

"A sustainable start-up is not only founded within the walls of the venture, but also outside of the venture. You are dependent on whether the market is ready for a disruptive technology like ours. What we constantly see is that big players in the field are really interested in our technology, but are also very conservative. They do not want to be the first to dive into the deep with something that could change the whole system. This unfortunately limits our own ability to have an impact on other sub-systems that are indirectly linked to our core business." (RM)

"With our product we want to offer a better alternative than using wood for paper, but we are not just focused on the development of just a product. Especially because our product cannot compete with regular paper yet, creating awareness is extremely important. We collaborate with local governments and schools to give presentations about sustainability and the disastrous impact cutting down trees has on the environment. I believe in a sharing economy in which each individual has his own competencies and background to bring to the table, on a local but also global level." (RR)

4. Interpersonal competence. Aspects of interpersonal competence were mentioned by all 33 sustainable entrepreneurs. Almost half of the respondents (n=15) mention that it is very hard to motivate stakeholders who do not have a sustainability orientation to collaboratively work together towards sustainable development goals. Respondents stress the importance of being part of the 'sustainability wave'. This becomes clear in the following quote:

"We see ourselves as the small boat that leads the bigger boats to the harbour. [...] We try to get as many seats on the big table as possible to talk with the most influential people or businesses in the field. It is not always the message they [red. other companies] want to hear, but more and more we see a shift in our abilities to motivate others to critically assess their own practice. That small boat can change the direction of the bigger boat and that's how we try to have an influence as well." (RI)

Therefore, in practice, interpersonal competence is mostly enacted when it comes to internal processes within the sustainable venture, with like-minded people, and not necessarily towards other external, not sustainable oriented stakeholders. As the following quote illustrates:

“Our team has grown exponentially over the past years, but for me our sustainability vision is still very important. And as the founder I try to transfer this to my employees. We have regular meetings with all employees, regardless of their position in the company, to discuss new ideas and to see whether they are still happy. Of course, I am responsible in the end for the decisions that are made, but I like to include as many employees as possible. I also stimulate them to be more sustainable at home and to have a healthy life style. (RQ)

5. Normative competence. All respondents mention normative competence to be important especially in the early stages of the entrepreneurial process. Whereas most respondents mention to have started their sustainable venture because of their sustainability values and principles, five of the respondents mentioned to have started their sustainable venture, ‘just because it was a good business opportunity’. However these respondents mentioned that later on sustainability values became more important and nowadays really include this in their business practices. Furthermore, 14 respondents mentioned that they have made decisions in the past that were against their sustainability values. In some cases this had to do with stakeholder norms and values that are not sustainability oriented and in other cases they had to make decisions that were not sustainability driven due to practical or financial reasons. In addition, normative competence is often used in relation to explaining the idea behind the venture to investors, in competitions and as a marketing tool. Two quotes that support this understanding of the enactment of normative competence are provided below:

“We are now in the phase from start-up to scale-up, because we’re getting bigger and are having more and more projects. In the beginning we really had the idea that ‘beggars can’t be choosers’, you cannot make decisions solely on your ethical principles because the system doesn’t work like that. So you have to make concessions in order to make it work. What we did do based on our ethical norms and values is to decide not to work together with some industries or companies. Examples are the oil-industry or the army, because we feel like it would be wrong to work with them as they are really not concerned with sustainability.” (RD)

“I was driven by experiences I had when I was in South-Africa. After sunset it is completely dark, most people do not have access to electricity but use kerosene instead. I was surprised as South-Africa is the

most developed compared to other African countries. It sank in for a while and after some months I decided that this really was not necessary as there is plenty of sunlight to use. It was not easy to develop a product that apparently was not wanted in the market, also because it was assumed to be more expensive. But we were convinced we could change their lives for the better.” (RZ)

6. Strategic action competence. Throughout all 33 interviews strategic action competence was mentioned more than other competencies. Working towards sustainable development requires to work step by step towards and to question the status quo. All respondents are aware of this and apply this to their business processes. An related element that surfaced frequently is that sustainable entrepreneurs are trying to challenge the ‘business as usual’ tendency by challenging not sustainable ways of working and by including the right people in their decision making processes. As mentioned before, this is not always successful, but the intention to change the business case logic is common across the respondents. Strategic action competence is mainly enacted by strategically making plans to for instance monitor sustainability or by constantly looking for new opportunities to improve the sustainability of the venture, internally as well as externally. Ten respondents explicitly mentioned to feel responsible for sustainable development and therefore try to act responsible on an individual level and a business level as well. Whereas 14 respondents mentioned to have made decisions that were against their sustainability values (see normative competence), the 10 respondents who explicitly mention to take responsibility do not want to make concessions on sustainability and stick to their goal of reaching sustainable development through their entrepreneurial behavior. Two examples of strategic action competence are presented below:

“It is kind of a strange world we live in. We live in a consumption society in which everything is centred around consuming more and more. I think that is the biggest underlying problem for many businesses in our field. Companies feel the need to grow and produce more, but that is something we do not want to do. You have to think about what is good for society and take responsibility for that. [...] Of course this entails making strategic plans in which you combine financial security with environmental impact. Step by step, because you cannot implement sustainability all at once on all levels of the organization.” (RV)

“We try to measure our impact, but it is a very hard task. What method do you choose and with what are you going to compare it? This also depends on how our company will develop in the coming years and on what project we will do. Especially with upcycling it is hard to measure where the positive impact is made. Therefore we try to stick to one product at the moment. We could also look at for

instance making tiles out of waste, but let's just start with the product we have at the moment. [...] We have made several plans in the past few years, and also had to revise them almost every time. However, knowing who to involve in which step of the way is really important as we are very dependent on the right kind of collaborations. Also in the stage we are in now, it is very important to reach your goals as we have to get the product to the client in time.” (RAF)

5.5.3 Enactment of competencies of competencies for sustainable entrepreneurship in relation to the critical moments in the entrepreneurial process

Second, we analysed in-depth which competencies were enacted more in which critical moment of the decision making process. Examples of the critical moment ‘venture creation’ were provided 42 times, of organising the team 40 examples were provided, of funding 52 examples, of technology-market matching 30 examples, of portfolio focus 16 and of business model adaptation 15 examples were provided. Especially the three critical moments that are relatively more important during the start-up phase are mentioned more than those critical moments that are more important during the scale-up phase of the venture. All sustainable ventures have dealt with for instance the actual creation of the venture, creating a team or selecting a founding partner and getting access to funding. However, not all have dealt with the critical moment of technology market matching, portfolio focus and business model adaptation. Table 5.4 provides an overview of the number of times a competency was mentioned when discussing a critical moment.

Table 5.4. Overview of the number of times the competencies were mentioned when discussing a critical moment

Competencies	Venture creation	Organise team	Funding	Technology-market	Portfolio focus	Business model adaptation
Diversity	4	22	24	12	3	5
Foresighted thinking	3	1	5	14	1	4
Systems thinking	2	0	1	9	2	5
Interpersonal	1	18	8	8	0	2
Normative	28	4	10	2	4	2
Strategic action	13	7	12	10	6	15

When looking at the critical moment of actually creating the venture (mentioned 42 times), the use of normative competence stands out, with normative competence being identified alongside venture creation 28 times in total. Incorporating sustainability norms and values is one of the core elements of sustainable entrepreneurs when starting their venture. It was mentioned regularly that if they would

do it for the money they would have chosen a different business model as they point out that a sustainable business model comes with many uncertainties. Not all respondents mention to have had a moral or normative objective with creating their venture. Nevertheless, those who did not have this at first mention to have developed a normative perspective during the development of the venture. Therefore, an intrinsic motivation that aligns with sustainability norms and values is deemed a necessary condition for the sustainable entrepreneurs in the sample. This also becomes clear in the example of the following entrepreneur:

"I have felt the need to make a difference ever since I was a child. And it has been a leading guideline throughout my life. I started working for a big consultancy firm as a sustainability consultant, focussing on sustainable investments, thinking that such a big company could really make an impact. Throughout the years I got more and more frustrated with the fact that they had this big potential to really make an impact, but in practice were not willing to live up to this potential. This had to do with sustainable development not being integrated as a necessary condition, but more as a nice add-on. I tried to work as an intrapreneur to challenge this perspective, but I noticed that they were not open for this. I made a list of what was really important to me and decided that I could not match this with the environment I was working in, so I decided to start a venture on my own. At first I built on my connections I had from my previous job and focused on consultancy projects, but steadily I developed the idea for our IT solution to make sustainable development more visible and transparent in large companies. Even though our impact is still small, because we are a small company, I feel like my own positive impact is much bigger now." (RI)

In the critical moment of selecting a founding partner and creating the team (mentioned 40 times in total), diversity competence (22 times) and interpersonal competence (18 times) surfaced the most. It appears that in selecting a founding partner or later in the process selecting team members, sustainable entrepreneurs make use of including different points of view on sustainable development to strengthen their team. It is important in this critical moment in the decision making process that those new people can bring complementary knowledge and new ideas to the table. They also focus on their own ability to bridge differences when making big decisions or to solve conflicts within the team when necessary. The following quote supports the use of diversity competence in selecting a founding partner as it centres around acquiring additional knowledge and including different perspectives in decision making processes as well:

"We are now with three co-founders, we were with two when we started, but now there is a third. He is a very seasoned person, very mature, had a couple of companies already. He is much more seasoned than the other two. Now we rely a lot on his experience and knowledge. Any decision for the company, any big decision, it's the three of us making the decision. It is not one or the other. I have my own thoughts about it, we discuss these, and the final decision is what we came up with the three of us. It's a consensual decision. Sometimes we also have a network of other people in the field from different areas, sometimes we give them a call to ask for advice. Probably not exactly on the topic, not exactly what we are trying to come up with. If it's a technical expert, because we have a lot of technical expertise in our company for example, we call him and ask him about a thing. We do not tell him directly what it is about, but we ask him for advice and make a decision based on that."
(respondent E)

Accessing funding is the third critical moment and was mentioned by the respondents 52 times in total. In relation to the six competencies for sustainable entrepreneurship and the enactment of these within the critical moment of funding, respondents mention to make use of diversity competence the most. Being able to identify different (relevant) stakeholders is an prerequisite for funding. Respondents mention different types of funding, examples are subsidies, private investors, own capital, angel investors and crowdfunding. Related to this, it is important to the respondents that their investors share their sustainability vision and prefer it if the investor can contribute to the venture in more than just financially. Almost half of the respondents mention that they are looking for an investor that can also be of added value in for instance widening their network, in providing necessary knowledge or in tackling more managerial challenges as most respondents mention to lack these managerial skills. This is explicitly mentioned in the following quote:

"Our first investor had just sold all his other companies, which were coincidentally also oriented towards the coffee industry. When we first met, he mentioned that he had spent so many years in the coffee industry, but never knew about the waste that was created and what potential coffee waste could have. For him and for us this was a perfect match and he really started to believe in our sustainable solution for the waste that is created. For us it was great that he had so much knowledge about the whole industry, from manufacturing to logistics. That he as a private investor was willing to share his knowledge really gave an impulse to our company. [...] In addition, and a very important one, our investors brought in seniority. As they were acting as a part of the team and adopted our sustainable business model, other investors were also more willing to step in. In the beginning we would step into a room with potential investors with the two of us, being young and ambitious, but could not really

deliver the message. When [name private investor] stepped in, those meetings changed and we became more successful in communicating the added value of our sustainable venture” (RE)

The fourth critical moment describes the process of matching the technology or product with the market. Not all respondents explicitly mention that they have had a focus on this critical moment in the past. As for the times it has been mentioned (in total 30 times), it seems like foresighted thinking and diversity thinking are most common to be enacted. The critical moment of technology-market matching requires being able to identify market needs and including the right stakeholders to get the technology to the market. Also dealing with uncertainties (i.e. foresighted thinking competence) seems to be important when dealing with this critical moment. The following respondent describes this like:

“One of the things that we are currently dealing with is how to get our product to the market. We have a technology that enables meat substitution for consumers, but we are bounded to all kinds of rules and regulations that hold us back from positioning us in the consumer market. If this does not change in the coming years, the technology will not be fully implemented in the market. [...] Dealing with these uncertainties has limited our perspective on the future of the company to only focus on the short term. Of course we have a sustainability vision for the long run, but that is largely dependent on how the system will change. We are now talking with other bigger companies to see whether we can make a statement together. If also other companies see the need for meat substitution, the EU will maybe change legislation accordingly to make it easier for small companies like ours to get the product to consumers as well.” (RA)

Portfolio focus as a critical moment was mentioned the least (16 times), in which strategic action competence co-occurred the most with 6 times. Most sustainable entrepreneurs in the sample focus on a single market application and want to succeed with their initial product first before applying it to different segments or markets. To achieve this they use a strategic way of working and try to challenge the status quo of unsustainable ways of doing business. Creating awareness for sustainable development is an additional element that was identified several times and can have an important influence on the portfolio focus. The following sustainable entrepreneur is not just concerned with his product as such, but also sees additional potential for creating awareness or the importance of sustainable development among people in general:

“We focus on three activities: suits, work clothes and recycling. It would be nice if within 5 years the suits have become an independent unit. I am currently looking for someone who is willing to focus on the suits. I need a team that can take care of marketing, communication and so on. For the other two

activities (work clothes and recycling) I have recently teamed up with another company to really implement this properly in different market segments as I am not able to reach this on my own. [...] I really want to make people aware of the potential of sustainable development as a business opportunity and now with this big company as a partner I can really create awareness. ” (RT)

The sixth and final critical moment deals with business model adaptation. For almost half of the sample (15 respondents) this has been addressed in the past. The other half has not dealt with this yet, as they are working towards the scale-up phase and are not concerned with adapting their business model as such. It stands out that strategic action competence was mentioned the most in relation to business model adaptation. In 15 unique cases strategic action competence was mentioned when the critical moment of business model adaptation was discussed by the respondent. Here especially a focus on measuring impact, reflecting and implementing new strategies are at the forefront. Business model adaptation requires entrepreneurs to be reflective and at the same time anticipate future changes. Respondents mention that working strategically and trying to look for new opportunities are important. According to some of the respondents these new opportunities arise when collaboratively working with other stakeholders. An example is provided below:

“After we had scaled-up our activities, we really felt that we were able to make some changes. We changed in the way we deal with new projects and have become much more actionable and strategic. This means we now try to develop small new ventures under our [brand name] umbrella. We separate the core activities from new projects, this also implies that we have made a change in the fact that first we were occupied with developing our own products, but now we are also doing projects with big companies who hire us as sustainability consultants. But also collaborations with other sustainable entrepreneurs have become much more frequent. We can allocate new funds to these projects, which gives us a much broader spectrum on which we can operate. You get inspired by working together with others and in our case this has led to a new venture” (RX)

5.6 Discussion and Conclusions

In this research, the role of competencies for sustainable entrepreneurship in the entrepreneurial process was analysed. To answer the research question: *How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?* first the enactment of these competencies in general was analysed and followed by an analysis of the competencies in relation to six critical moments.

5.6.1 Self-perceived competencies for sustainable entrepreneurship

Although the sample is too small to perform any dimension reduction tests to compare the results with the results from the Confirmatory Factor Analysis as reported in Chapter 2, the results of the reliability tests of the self-perceived scores on the competencies seem to be comparable with the results of previous studies that have included the same competencies (Lans et al., 2014; Ploum et al., 2017; this dissertation). The reliability analysis resulted in Cronbach's alpha above the threshold of 0.7 and the results show a wide range between lowest and highest scores on the items in the questionnaire. Therefore, also for a sample with actual sustainable entrepreneurs the self-perceived questionnaire to measure competencies for sustainable entrepreneurship seems to be valid.

In terms of actual scores on the test, it is interesting to note that the average scores on the competencies seem to be higher in this sample compared to earlier studies in which would-be entrepreneurs were sampled (e.g. this dissertation). Only interpersonal competence does not show significant differences between the two samples, which could be explained by interpersonal competence being the least context specific for sustainable entrepreneurship. Within this sample, however, there are no significant differences between the average scores of new and established entrepreneurs. The differences in average scores between would-be entrepreneurs and new or established entrepreneurs could be explained by the fact that competencies are context dependent and performance oriented. The 33 sustainable entrepreneurs in this sample are actually dealing with sustainable entrepreneurship and are beyond the initial phase of idea generation and are more performance oriented. However, in the transition from new to established entrepreneurs a difference was not noticeable. This could be due to the fact that the difference between would-be and actually doing is larger in terms of enacting (and being aware of) these competencies than the difference in (gradually) moving from new to more established entrepreneur.

5.6.2 Enactment of competencies for sustainable entrepreneurship

On average, all respondents see themselves as competent individuals with respect to the six competencies for sustainable entrepreneurship. In addition to the self-perceived scores, the respondents were asked to provide examples of concrete actions they have taken in the past that were related to the content of the competencies. All respondents were able to provide examples in which a clear enactment of the competencies was shown. Strategic action competence was referred to most frequently, followed by diversity competence, foresighted thinking competence and normative competence. Systems thinking competence and interpersonal competence were referred to the least by the respondents.

Nevertheless, the fact that a competence is referred less does not mean respondents are not competent with regard to these competencies, they just enact them less.

Business Case Logic

Even though sustainable development is important to all respondents and most mention to have started their business from a normative perspective, it appears to be difficult to maintain the initial idea behind the sustainable venture, which is to create not just economic value but also create value for others. The results show that concessions on sustainability have been made in order to please stakeholders. Also the feeling and the experience of respondents that the whole system as such is not ready yet to adopt a sustainable development vision has led to not reaching the full potential of many sustainable ventures. The apparent influence of the business case logic could provide some insights in why normative competence and systems thinking competence are not enacted consistently throughout the process. Hemingway (2005) has suggested that employees' personal beliefs about CSR may not be aligned with what they themselves do at work because a mismatch between employees' beliefs and that of their companies may lead to align their work behavior with what is acceptable within their companies. Also Osagie et al. (2016) confirm this in their work on competencies for CSR professionals and the implementation of these competencies in their job roles. Ethical competence is considered as important, but is not mentioned as important in relation to job roles. This could also apply for sustainable entrepreneurs as they are constantly interacting with stakeholders that might not share their vision. More positively, it also seems like sustainable entrepreneurs use the business case logic to engage stakeholders who might have a different vision (Osagie et al., 2016). By speaking the same language they can involve others better, which also came back in the interviews. Nevertheless, this comes with a cost as there is the risk of losing sight of the triple bottom line and downgrading the sustainability aspects of the venture by applying the business case logic instead of the more idealistic logic.

5.6.3 Enactment of competencies for sustainable entrepreneurship within the critical moments

Secondly, the enactment of the competencies within the six critical moments was analysed. In general, competencies were recognized mostly within the first three critical moments. This can be explained by the sample being divided between new and established entrepreneurs. The first three critical moments have been dealt with by both new and established entrepreneurs, whereas the latter three critical moments are mostly covered by the established entrepreneurs. This has to do with the development of the sustainable venture and the focus on different critical moments that comes with these different stages in the development process. Even though the scores self-perceived questionnaire did not differ statistically between new and established entrepreneurs, the actual enactment of those competencies

seems to be different between the stages of entrepreneurship. Strategic action competence and interpersonal competence are enacted throughout the process and within the stages. Normative competence and diversity competence seem to be enacted more in the early stages and the first three critical moments, whereas foresighted thinking competence and systems thinking competence are more frequently enacted later on in the development of the sustainable venture. Below these differences are discussed in more detail.

Pathways to develop sustainable ventures

One of the interesting outcomes can be found when zooming in on the critical moment of creating the sustainable venture. Within this critical moment the enactment of normative competence and also strategic action competence stands out. Whereas it could be expected that normative competence would be enacted by all respondents as sustainable entrepreneurship is considered as value driven, some of the respondents explicitly mentioned to not have started from a value oriented perspective. These respondents saw an opportunity for new business and acted upon this and later on developed a more value oriented focus. It could be that some sustainable entrepreneurs develop a normative focus by taking action, while others take action based on their normative focus. Blok et al. (2016) describe this in relation to the good character of the individual in which they state you can only become ethical by acting ethical. Here the good character can be the input for acting ethical or seen as an output based on actual performance. This also seems to be the case in this study; some start from a normative perspective and others develop it along the way. These results could possibly be explained by looking at different pathways that lead to the creation of a clear vision for sustainable ventures.

A study on pathways to develop a vision among CSR professionals show that there are two possible strategies which can be followed in creating a vision for social or sustainable ventures (Waddock & Steckler, 2014). One pathway is more *deliberative*, in which developing a vision proceeds taking action. This pathway is more in line with for a focus on strategic action competence. The other pathway is more *emergent*, and also value driven. Here action usually proceeds the development of a vision for the sustainable venture. In the emergent pathway, one would expect a focus on normative competence. In addition, building on Muñoz and Dimov (2015) one could also argue that *conformists* enact strategic action competence more in the early stages of the development of the sustainable venture, whereas *insurgents* build more on the enactment of normative competence. Even though these pathways and typologies were not studied as such within this research, it would be interesting for future research to analyse how the different competencies play a role in these kind of entrepreneurial processes that lie at the very beginning of the development of the venture.

Investor norms

When considering the enactment of diversity competence within the critical moment of attracting funding, the focus lies on dealing with investors. Most sustainable entrepreneurs mention to prefer an investor who shares their sustainability vision and quite a few managed to actually attract them. In literature on sustainable innovation the mismatch between sustainable ventures and investors is often described as one of the main challenges, as investors are profit maximizers, unwilling to compromise their return on investment (Pasewark & Riley, 2010; von Wallis & Klein, 2015). The sustainable entrepreneurs included in this research did not perceive this mismatch as such, as almost all were pleased with their financial status and did not perceive trouble with attracting investors who share their sustainability visions. This might be the result of emerging climate initiatives and incubators in the Netherlands that focus on sustainability (e.g. Climate-KIC, Biopartner, Oneplanetcrowd) and a relatively dense network due to geographical closeness that comes with operating in a small country like the Netherlands.

Social-ethical issues

Furthermore, throughout all critical moments, the enactment of foresighted thinking and systems thinking is limited. This could have serious consequences for future social-ethical issues that are common when dealing with sustainable or social innovations. Overall, respondents are not focused on long term thinking, taking into account global impacts and considering the systems approach in the beginning stages of the development of the sustainable venture. Reasons for not doing so are usually linked to several uncertainties, the financial position of the venture and/or a lack of necessary knowledge. However, one could argue that for a sustainable venture to thrive (at least those who are technology driven), it would be better to strategically and systematically address social-ethical issues from the beginning as by only doing so later on in the process could lead to being unable to address these issues due to the complexity of those sustainable technologies (Stilgoe et al., 2013). Furthermore, foresighted thinking competence is identified by Rieckmann (2012) as one of the key competencies, whereas in this study this is not considered as such. There seems to be a discrepancy between theorizing about key competencies for sustainable development and actual enactment of these competencies. Future research should focus on how to implement foresighted thinking and systems thinking early on in the entrepreneurial process to provide sustainable entrepreneurs with better guidelines to address social-ethical challenges that come with their innovations.

5.6.4 Limitations and directions for future research

A limitation of this study is that the relative importance of the enactment of the competencies for addressing the critical moments successfully was not measured in this study. In many cases it was clear that at least one of the competencies was enacted within a critical moment, but respondents were not asked to rank for instance the most important competencies within each critical moment. This can be considered as a potential threat to validity of the research. In future research respondents could for instance rank the importance of the six competencies for sustainable entrepreneurship within each critical moment. This would provide not only insights on how the competencies are enacted, but also on which competencies are more important according to sustainable entrepreneurs as differences between these can be expected. A study that shows a difference between the general perceived importance of CSR competencies and the importance of the same competencies when relating them to job roles is the study by Osagie et al. (2016). A similar study is needed for competencies for sustainable entrepreneurship. As this type of research is to some extent always prone to recall biases of respondents, future research should focus on developing new tools that enable researchers to monitor decision making over a longer period of time. Longitudinal research could be an interesting avenue for research on the entrepreneurial process. For instance Vogel (2016) suggests the use a communication technology as an assessment tool for monitoring the (sustainable) entrepreneurial process. Possible new technologies could be apps in which participants can easily record their daily activities, videotape their experiences or list their most important decisions.

5.6.5 Conclusion

This research has shed more light on the actual enactment of competencies for sustainable entrepreneurship within the entrepreneurial process. To analyse the entrepreneurial process, six critical moments were used to specify different key decision making moments in this process. All respondents considered themselves as competent sustainable entrepreneurs and provided useful examples of how they enacted the competencies. It appears that strategic action competence is enacted the most frequent throughout the whole process. Interpersonal competence was enacted the least frequent, but is also enacted throughout the process. Normative competence and diversity competence are enacted more in the early stages of the development of the sustainable venture, whereas foresighted thinking and systems thinking appear to be enacted more later on in the process. Especially the lack of enacting foresighted thinking and systems thinking could lead to challenges with respect to social-ethical issues that might not be able to overcome later on the process. Incubators and (would-be) sustainable entrepreneurs could learn from these results and focus more on the enactment of these competencies in the early stages of the entrepreneurial process as well.



CHAPTER 6

GENERAL DISCUSSION AND CONCLUSIONS

6.1 A recap of the research aim and research questions

Entrepreneurs are increasingly aware of their role in the transformation towards a more sustainable economy and as such, sustainable entrepreneurship has become a relevant and interesting field of study. This dissertation reports on the validity of a competence framework for sustainable entrepreneurship and on the role of these competencies in 1) opportunity recognition for sustainable development and 2) in dealing with critical moments throughout the development process of the sustainable venture.

As stated in Chapter 1, studies on which competencies could be considered as most important for sustainable development are numerous. Although many scholars warn for the production of endless laundry lists of competencies, the reality is that scholars remain to do so and real consensus on which competencies constitute sustainable entrepreneurship competence is lacking. Therefore, the first aim of this research was to empirically validate such lists of competencies. Furthermore, the difference between conventional entrepreneurs and sustainable entrepreneurs seems to lie in the value oriented character that is dominant in sustainable entrepreneurship. Nevertheless, the role of moral competencies is under researched and should be more central in research on sustainable entrepreneurship. The second aim of this study was therefore to analyse this role of moral competence in more detail. In addition, the third aim is related to the need of moving from the 'which' question to the 'how' question. There is a need for research that empirically addresses the actual enactment of these competencies by professionals in the field and relating the competencies with performance measures like opportunity recognition for sustainable development or with decision making processes. In order to contribute to a better understanding of what the competence framework for sustainable entrepreneurship should entail and how it is enacted, the central research question was developed as follows: *"What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes?"*.

In addition, five sub-research questions were formulated. Each of the sub-questions contributes to answering the main research question and lead to a better understanding of one or more research aims:

1. What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?
2. How do key competencies for sustainable entrepreneurship relate to well-known antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?
3. Which individual moral antecedents play a role in the entrepreneurial process of opportunity recognition for sustainable development?
4. How is moral competence enacted in the early stage of the sustainable entrepreneurial process?

5. How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?

This final chapter reports on the main findings retrieved from the different studies that have been covered in the previous chapters. Each of these studies addressed one or two sub-questions. Following the summary of the findings, a main conclusion is drawn. In this section, answering the main research question is central. Once the main research question is answered, the implications of the results are discussed. First, the theoretical implications are discussed, followed by a critical reflection of the limitations and possible future research avenues. Second, the more practice oriented implications that the results might have are discussed. Finally, this chapter is concluded with some final remarks.

6.2 Summary of the findings

In order to address the questions that zoom in on the role of the competence framework for sustainable entrepreneurship in the entrepreneurial process, the validity of the competence framework should be assessed first. Chapter 2 reports on the assessment of the competence framework for sustainable entrepreneurship. From a synthesis of existing literature on several competence frameworks in different work contexts, the framework designed by Lans and colleagues (2014) was chosen as the most suitable framework for studying competencies for sustainable entrepreneurship. The exploratory study by Lans et al. (2014) resulted in a seven factor competence framework, based on an Exploratory Factor Analysis. However, they also pointed out some issues with some of the results and indicated that more research was necessary to further validate this competence framework. The first research question “What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?” aligns with the need to investigate the competence framework in more detail. A new study to establish the validity of the competence framework was executed among 438 would-be entrepreneurs following an extensive entrepreneurship module at their higher education institute. In total 402 responses were deemed suitable to include in the analysis. The results of the Confirmatory Factor Analysis indicate that action competence and strategic management competence merge together into one combined competence that has been labelled strategic action competence. The six factor competence framework including the combined strategic action competence outperformed the original seven factor competence framework, based on an assessment of convergent and discriminant validity. The six factor competence framework exists then of the following competencies: diversity competence, foresighted thinking competence, systems thinking competence, interpersonal competence, normative competence and strategic action competence.

The second sub-question: “How do key competencies for sustainable entrepreneurship relate to well-known antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?”, refers more to the criterion related validity of the framework (i.e. its nomological network). The respondents were subjected to several questions that cover the different antecedents of entrepreneurial behavior. The analysis of the results led to the conclusion that all six competencies correlate with the antecedents as was expected. The correlations were not too high or too low, with some unexpected outcomes like no significant gender differences concerning the scores on the competencies. The overall conclusion that can be drawn from Chapter 2 is that the six factor competence framework for sustainable entrepreneurship is an empirically strong framework. This competence framework for sustainable entrepreneurship, with underlying competencies, can now be implemented in various settings to assess the role of the competence framework in for instance the entrepreneurial process.

Chapter 3 builds on the theory of sustainable entrepreneurship and emphasizes the value oriented and normative character of sustainable entrepreneurship. Here, the entrepreneurial process as such is operationalized by focussing only on the very first stage of this process, namely opportunity recognition for sustainable development. The model developed by Patzelt and Shepherd (2011) is used to shed light on the process of recognizing opportunities for sustainable development. In this model, altruism is considered as the main value oriented driver that enables individuals to recognize opportunities for sustainable development. Nevertheless, it can be expected that also other moral antecedents can play a role in this process. In this study self-transcendence values, pro-environmental behavior values and moral competencies are empirically studied next to each other. In order to answer the third sub-question: “What role do individual moral antecedents play in the entrepreneurial process of opportunity recognition for sustainable development?”, a case study assignment centred around opportunity recognition for sustainable development was developed in which these four moral constructs were queried. In total 106 would-be entrepreneurs participated in the study and the results of 96 students were included in the analysis. The main conclusion that can be drawn is that only pro-environmental behavior values and moral competencies show a significant relation with idea generation for sustainable development. Surprisingly, self-transcendence values (of which altruism is an element) is not significantly related. In addition, the two moral competencies correlate with the other moral antecedents (but not perfectly or too high), which supports the criterion validity of these two competencies from the larger framework even further. These results have led to an improvement of the model developed by Patzelt and Shepherd (2011).

The specific role of the moral competencies is further analysed in Chapter 4. From a theoretical point of view, the two moral competencies, described as normative competence and strategic action

competence, can be compared with what is described as moral competence in business ethics literature, and can be considered as two sides of the same coin. More specifically, to answer the fourth sub-question: “How is moral competence enacted in the early stage of the sustainable entrepreneurial process?”, two different studies were implemented. First, the specific relation between the two moral competencies is assessed, based on the responses from the questionnaire. From the analysis it can be concluded that normative competence serves the sustainable part of sustainable entrepreneurship and strategic action competence more the entrepreneurship part in sustainable entrepreneurship, but both deal with the value oriented character. The second study is designed to explore the enactment of the moral competencies in recognizing opportunities for sustainable development. Both normative competence and strategic action competence were recognized in the qualitative responses that were derived from the case study. Nevertheless, it seems that some elements of normative competence and strategic action competence are enacted more than other elements in the very early stage of the entrepreneurial process.

Tying things together, Chapter 5 focuses on more experienced sustainable entrepreneurs and on the perceived enactment of the competence framework throughout the development process of their sustainable venture. For this, a focus on six critical moments in entrepreneurial decision making processes, as developed by Maine et al. (2015), was chosen. In total 33 actual sustainable entrepreneurs participated in this study, in which they filled out the questionnaire that queried their perception of the competencies for sustainable entrepreneurship and were subjected to an in-depth semi-structured interview. All competencies were recognized in the responses of the participants, but clear differences in enactment within the different critical moments are recognized as well. With this, the fifth sub-question: “How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?”, is answered. These results say something about the dominant business logic rhetoric, the different paths to a sustainable venture, the importance of investor norms and the risk of social-ethical issues.

6.3 Main conclusion

All these sub-research questions mount up to answering the main research question: “What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes”. The results show that these competencies can be operationalised and measured in a reliable and valid way in a framework consisting of 6 distinct competencies which have largely consistent associations with constructs that are conceptually close (e.g. entrepreneurial self-efficacy, self-transcendence and pro-environmental behaviour). Furthermore, all competencies correlate moderately with each other, which shows the integrated character of the competence framework. An individual needs all six competencies

in the daily work as a sustainable entrepreneur. When it comes to the early stages of the entrepreneurial process, which has been described in this dissertation as the opportunity recognition process, it becomes clear that the competencies that tap into values are very important and could be seen as distinctive for sustainable entrepreneurs. Both normative competence and strategic action competence correlate high with idea generation for sustainable development. During the different critical moments in the decision making process, some competencies surface more than others, which show the dynamic and context dependent character of the competencies. It appears that normative competence is either enacted in the very early stages of the venture development process or in the more mature stages. Foresighted thinking competence and systems thinking competence are mostly enacted in the later stages in which decisions on portfolio focus, technology market matching and business model adaption need to be made. Strategic action competence, as well as diversity competence are enacted throughout the development process and interpersonal competence is enacted least throughout the process. These insights contribute to opening the so called black box of sustainable entrepreneurship.

6.4 Reflections on the theoretical implications of the results

In this section the theoretical implications of the results are discussed. Throughout this dissertation the main focus has been to contribute to the ‘what’ question (i.e. inclusion of competencies) and the ‘how’ question (i.e. enactment of competencies). With these two questions in mind, the theoretical contributions of this dissertation are discussed in relation to the research issues that have been presented in section 1.5 of this dissertation. First, the implications of the results for the competence framework for sustainable entrepreneurship are discussed. Second, the role that opportunity recognition for sustainable development plays in this dissertation is evaluated. Third, the theoretical implications of the results for research on (sustainable) entrepreneurship education are presented and discussed.

6.4.1 Framework of competencies for sustainable entrepreneurship

One of the main contributions of this dissertation to the theoretical advancement of competencies for sustainable entrepreneurship lies in the (empirical) measurement of these competencies. Up until recently, most work in the competence for sustainable development domain remained conceptual. This has resulted in a wide variety of competence lists, each slightly different from the other. There have been few attempts to empirically assess such competence lists and even fewer that have researched the relation between such competence lists and actual outcomes. This dissertation moves away from theorizing about competencies for sustainable entrepreneurship and focusses on actually operationalizing and measuring competence. Chapter 2 focused on validating the competence framework and led to the inclusion of six competencies that together can be considered as a reliable and valid backbone of sustainable entrepreneurship competence. Chapter 3, 4 and 5 further support this

view as they show the relation of the framework with similar constructs like entrepreneurial self-efficacy, self-transcendence and pro-environmental behavior values. As such, the initial results of the study by Lans et al. (2014) were further confirmed, and refined with the merge of strategic management competence with action competence. The six competencies that have been included in the competence framework are: diversity competence, foresighted thinking competence, systems thinking competence, interpersonal competence, normative competence and finally, strategic action competence. On a more general level, these six competencies align well with other well-known frameworks or competence-orientations in the field (e.g. De Haan, 2006; Wiek et al., 2011; Rieckmann, 2012; Hesselbarth & Schaltegger, 2014; Wesselink et al., 2015; Osagie et al., 2015). Hesselbarth and Schaltegger (2014) make a general distinction based on methodological competencies, social competencies and personal competencies. Wals (2015) refers to 4 dimensions of sustainability competence; namely a conceptual and systemic knowledge dimension, a critical thinking dimension, a change and innovation dimension, and an ethical dimension. Looking at the correlations between the competencies and taking into account the content of the competencies as well, it becomes clear that foresighted thinking and systems thinking competence seem to cluster together. These two competencies both deal with learning to know how to deal with sustainability, which could be referred to as the conceptual and systemic knowledge dimension. Also strategic action and normative competence correlate high with each other and could be clustered in an ethical dimension, as both competencies are value oriented, normative and deal with learning to care. Another dimension could be constituted by clustering diversity competence and strategic action competence; both competencies deal with learning to critique. From the four dimensions by Wals (2015), this is best explained by the critical thinking dimension. Where the previous three dimensions are also empirically sound, the last cluster of competencies, consisting of interpersonal competence and diversity competence, is only based on overlapping content based on the interpretation of the items belonging to the competencies. These two competencies share a mutual goal of learning to make change happen, which could be explained by the change and innovation dimension.

The study presented in Chapter 5 also provided insights in which competencies are mentioned together with other competencies. These results are not presented as such in the chapter, but have been analysed in the process of developing the chapter. In general, the same clusters that have been described above appear. The correlation analysis seems to overlap with the qualitative interpretation of the enactment of the competencies. The four dimensions can be seen as more general orientations that can help in further investigating the competencies for sustainable entrepreneurship. Thus, altogether these six competencies represent a coherent, theoretically sound backbone for future studies on sustainable entrepreneurship competence.

Furthermore, the results presented in this dissertation also provide a critical, detailed analysis on the specific role of some of the competencies, in particular of 1) the moral competencies 2) foresighted thinking competence and 3) interpersonal competence. Starting with the two moral competencies, the value oriented and normative character of sustainable entrepreneurship has led to a conceptualization that moral competencies, in this case normative competence and strategic action competence, can be considered as distinctive for sustainable entrepreneurs. The first question that needed to be answered was whether these two competencies actually could be considered as moral competencies. Chapter 3 shows that even though they are related with other moral antecedents, the two moral competencies are distinct constructs. In addition, Chapter 4 concludes that they indeed can be considered as moral competencies and that empirically they correlate high with each other. Also in the early stage of the entrepreneurial process it seems that the two moral competencies play an important role in generating ideas for sustainable development. Nevertheless, when focussing on the enactment of these two competencies in more advanced decision making processes of sustainable entrepreneurs, especially the role of normative competence stands out. The scores on the self-perceived assessment of the competencies for sustainable entrepreneurship are the highest on average for normative competence. However, when looking at qualitative results gained from the interviews, normative competence is mentioned much less than other competencies. One could argue that normative competence ought to be important by sustainable entrepreneurs, but in practice is not always used as such. A possible explanation for this can be found in the dominant rhetoric of the business case logic. Hemingway (2005) has suggested that employees' personal beliefs about Corporate Social Responsibility may not be aligned with what they themselves do at work because of a mismatch between employees' beliefs and that of their companies may lead to alignment of their work behavior with what is acceptable within their companies. Among others, Osagie et al. (2016) confirm this as well in their work on competencies for CSR professionals and the implementation of these competencies in their job roles. Ethical competence is considered as important in general, but it does not show up as important when discussing their job roles. This could also apply for sustainable entrepreneurs as they are constantly interacting with stakeholders that might not share their vision. More positively, it also seems that sustainable entrepreneurs use the business case logic to engage stakeholders who might have a different vision (Osagie et al., 2016). By speaking the same language they can involve others better, which also came back in the interviews. Nevertheless, this comes with a cost as there is the risk of losing sight of the triple bottom line and downgrading the sustainability aspects of the venture by applying the business case logic instead of the more normative logic. Sustainable entrepreneurs also mentioned during the interviews that along the way, their role as founder and vision developer shifts towards a more managerial role. Even though they at the same time point out that they do not feel comfortable in this

role and do not aspire to become a manager, a focus on managerial tasks could imply a lesser focus on the normative vision of the sustainable venture. This alleged mismatch between espoused theory (the importance of normativity in dealing with sustainable development) and theories in use (the lack of enactment of this normativity in practice) should be further researched.

Secondly, foresighted thinking competence is identified by Rieckmann (2012), who describes this as anticipatory thinking, as one of the key competencies. Nevertheless, in this dissertation, foresighted thinking is seemingly invisible when looking at the actual enactment of the competencies. This further underlines the apparent discrepancy between theorizing about key competencies for sustainable entrepreneurship and actual enactment of these competencies. The lack of enactment of foresighted thinking could lead to serious consequences for future social-ethical issues that are common when dealing with sustainable or social innovations. These social-ethical issues are usually a result of decisions or concessions that have been made early on in the innovation process. By not enacting foresighted thinking from the beginning, the consequences of these decisions might be overlooked. It therefore would be better to strategically and systematically address social-ethical issues from the beginning, as by only doing so later on in the process could lead to undesirable outcomes (Stilgoe et al., 2013). Research on how to implement foresighted thinking and also systems thinking early on in the process remains limited, but is necessary for further enhancing our understanding of these competencies.

Thirdly, another surprising result is that interpersonal competence, both quantitatively and qualitatively does not fully convince to be a distinctive competence for sustainable entrepreneurship. Even though, based on theory, interpersonal competence is assumed to be discriminant from the other competencies, the quantitative results point in the direction that this is not completely the case. The discriminant validity threshold is barely met. This could be a result of the exploratory analysis that has led to a scale reduction from 6 items to 3 and one can wonder whether these three items which belong to the factor interpersonal competence are defining enough to be discriminant from the others. Another explanation for the weak discriminant validity of this factor could be that interpersonal competence is the only competence that is the least specific for sustainable entrepreneurship and operates on a more general level. The latter also comes back in the more qualitative results. Interpersonal competence is mentioned the least by the sustainable entrepreneurs and barely comes back in decision making processes. One can wonder whether this more general competence should be part of the competence framework for sustainable entrepreneurship. Nevertheless, interpersonal competencies are mentioned by almost all other researchers in the field, and are usually considered as a key competence. Especially in the field of CSR this competence seems to be important (e.g. Wesselink et al., 2015; Osagie et al., 2015). Future research should focus on the specific role of interpersonal competence, as this dissertation cannot

provide clear answers on whether or not to include this competence in the framework for sustainable entrepreneurship.

Finally, the empirical strength of the framework is also supported when comparing the three different groups that have been tested over the chapters. Whereas Chapters 2, 3 and 4 report on would-be entrepreneurs, Chapter 5 reports on established and experienced sustainable entrepreneurs. When looking at the scores between established and experienced entrepreneurs, no significant differences on the competence scores could be found. The competence scores seem to be relatively stable once the step towards becoming an actual entrepreneur has been taken. However, when comparing the results of the would-be entrepreneurs with the results of the actual sustainable entrepreneurs, clear significant differences occur. Would-be entrepreneurs score themselves much lower on average. Even though these results are not surprising, they do support the idea that competencies are learnable latent variables that are context dependent.

6.4.2 Opportunity recognition for sustainable development

This dissertation specifically reports on the role of the competence framework for sustainable entrepreneurship in recognizing opportunities for sustainable development. In Chapters 3 and 4 the conceptual model by Patzelt and Shepherd (2011) on opportunity recognition for sustainable development was used as the main foundation of studying this process. Relating this to the model by Vogel (2016), the work by Patzelt and Shepherd (2011) can be positioned between the individual level factors and venture idea generation as they focus on the antecedents of opportunity recognition for sustainable development. Especially the role of the motivational aspect of their model was analysed in Chapters 3 and 4. In the model of Patzelt and Shepherd (2011) altruism towards others is, next to perception of threat to the natural environment, mentioned as being important for recognizing opportunities for sustainable development. Chapter 3 reports on a study in which altruism towards others as part of self-transcendence (based on the universal values developed by Schwartz, 1994) was measured and linked to idea generation for sustainable development. The results indicated, however, that altruism towards others did not show a significant relation with idea generation for sustainable development among aspiring sustainable entrepreneurs. A possible explanation for this could be that these altruistic values mostly cover the human aspects of morality, like empathy and sympathy towards others, whereas recognizing opportunities for SD mostly deals with the more environmental aspects of morality. This is also in line with research on distal and proximal constructs which are common in the psychology domain (Rauch & Frese, 2007). It could be that altruism can be considered as a more general or distal construct which influences a more specific or proximal construct (for instance the moral competencies), which in turn relates to an outcome variable. Or in other words it could be that constructs

like competencies mediate the relationship between altruism and opportunity recognition. The relation of self-transcendence with recognizing opportunities could therefore possibly be considered as indirect, but more research is needed to assess whether this is actually the case.

Nevertheless, pro-environmental behavior values (Dunlap et al., 2010; Shepherd et al., 2013) and moral competencies (Blok et al., 2016; Ploum et al., 2017; this dissertation) did turn out to be significant factors for recognizing opportunities for sustainable development. In addition the universal values (like altruism and self-transcendence) are deemed to be relatively stable during adult life (Schwartz, 1994). It is therefore assumed that also within a sample of actual entrepreneurs these results will be the same. This has led to the discussion whether the model by Patzelt and Shepherd (2011) should be revised and/or redefined. Building on the results from Chapter 3 and also from Chapter 4, it is proposed to replace altruism towards others by pro-environmental behavior values and moral competencies (i.e. normative competence and strategic action competence). Most of the literature on sustainable or social entrepreneurship underpins the importance of altruism in the entrepreneurial process (Patzelt & Shepherd, 2011). A shift towards more proximal constructs could benefit future empirical research on the antecedents of the opportunity recognition process. The framework for recognizing opportunities for sustainable development could look like the figure that is depicted in Figure 6.1, but needs additional back-up to be fully validated. Future research should focus on further analysing the role of these constructs in the opportunity recognition process.

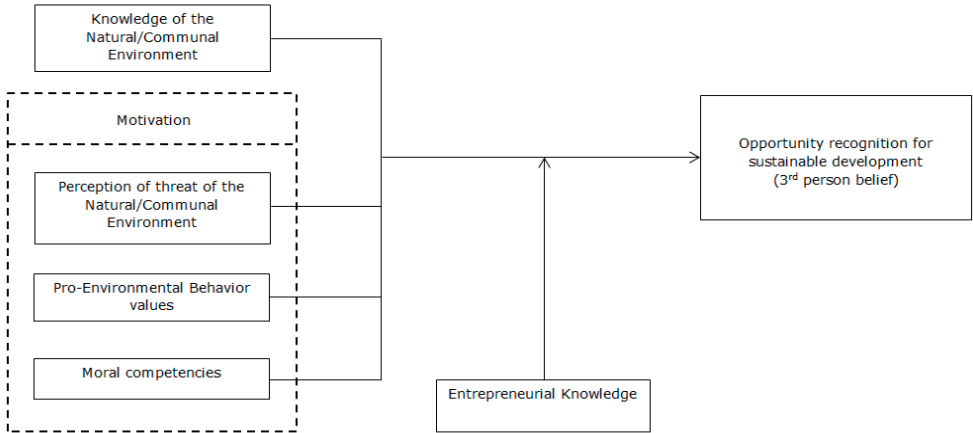


Figure 6.1. Redefined conceptual model of opportunity recognition for sustainable development

6.4.3 Entrepreneurship education for sustainable development

The third contribution is to the scholarly field of entrepreneurship education. Nowadays it is recognized that entrepreneurial education can help promote sustainable business practices and sustainable

entrepreneurship education has become a 'hot topic' in the field (Hall et al., 2010; Kuckertz & Wagner, 2010). Within the sustainable entrepreneurship education domain, sustainability is not seen as a burden or cost, but emphasizes the moral obligations facing business enterprises. In fact, this approach promotes social and environmental responsibilities as a means of developing future entrepreneurial potential (Cohen & Winn, 2007; Dean & McMullen, 2007; Hockerts & Wüstenhagen, 2010; Pacheco et al., 2010; York & Venkataraman, 2010). Consequently, business schools have an opportunity to teach sustainability in a way that is positive and driven by self-interest while also considering the benefits for multiple stakeholders. Approaches found in the literature on education for sustainable development seem to have followed Corporate Social Responsibility (CSR) trends (Lourenço et al., 2012). For example, early approaches tended to adopt normative and zero-sum perspectives such as awareness-building, critical thinking and introduction of tools to support environmental protection (Springett, 2005). The later wave adopts an instrumental perspective that highlights the value of sustainability and CSR initiatives to build competitive advantage (Kashyap et al., 2006). More recent approaches highlight the importance of entrepreneurship education to inspire and build awareness of the opportunities inherent in the sustainability arena for self-interest and to benefit diverse stakeholders (Kuckertz & Wagner, 2010). However, there are only a few studies that investigate the learning processes, learning inputs and outputs of nascent sustainable entrepreneurs in specific educational interventions. There is a lack of understanding of how for instance intentions, motivations and competencies related to sustainable development can be fostered and developed in (business) education. Hence, it is important to understand better the (cognitive) processes of nascent entrepreneurs engaged in business start-up programmes informed by opportunity-related views of sustainable entrepreneurship (e.g. Lourenço et al., 2012). Lourenço and colleagues (2012) examine the extent to which sustainability education informs the values of nascent entrepreneurs and therefore positively influences their intentions to engage in sustainable entrepreneurship learning. They conclude that nascent entrepreneurs with a profit-first mentality perceive fewer benefits and have fewer intentions to exploit learning related to sustainable entrepreneurship (Lourenço et al., 2012).

The results of Chapters 3 and 4 in this dissertation point in the same direction. Those who enact the moral competencies more, identify more opportunities for sustainable development in entrepreneurship education. These results fit with the argument proposed by Giacalone and Thompson (2006), who suggest that those with a profit-first mentality will be alert to the fact that socially responsible outcomes are subordinate to topics that focus on profit-maximisation (this also holds for the other way around; this dissertation). According to de Clercq and Voronov (2011), this situation can be explained by an institutional logic. This suggests that the dominant institutional logic (profit-first mentality) is acting as a constraint on the evaluation of sustainability (new or competing logic) by

nascent entrepreneurs. For this reason, the dominant logic acts as a barrier to their acceptance of sustainable entrepreneurship, and the losing logic (i.e. sustainability) is treated as subordinate but not eliminated (de Clercq & Voronov, 2011). The study by Lourenço et al., 2012 also showed that learning about sustainable entrepreneurship has a positive influence on the intention to also use knowledge about sustainable entrepreneurship in practice. By being subjected to sustainable entrepreneurship more, the profit-first mentality can be overthrown. This dissertation can be supportive of this statement as it introduces a case study that revolves around sustainable entrepreneurship. Implementing cases focused on sustainable development enables students to practice implementing sustainable development in their (future) entrepreneurial behavior. It can be argued that introducing sustainable entrepreneurship to would-be (e.g. aspiring, or nascent) entrepreneurs already in education can disrupt the equilibrium of their dominant institutional logic and values. According to de Clercq and Voronov (2011), the dynamic relationship between the two competing logics can lead to an acceptance that 'sustainable practices can benefit the field as a whole' (p. 336). For this reason, providing sustainability-related content in entrepreneurship education and business start-up programmes might be the way to move forward. However, research is needed to establish a common ground on what kind of interventions are most powerful for challenging and overthrowing the profit-first mentality.

6.5 Limitations and the future research agenda

The studies in this dissertation were conducted in different contexts (i.e. educational context and entrepreneurial context), among different participants (i.e. would-be entrepreneurs and established/experienced entrepreneurs), using mostly newly-developed self-developed instruments. This impairs limitations, but at the same time also opens new avenues for future research. This section discusses the main limitations of this dissertation and provides stepping stones for future research endeavours.

To start with, the limitations that come with studying a sample of students (would-be entrepreneurs) in an educational context are common across the field. Following the theory of planned behavior (Ajzen, 1991), it is argued that intentions lead to behavior. Studies focussing on the development of entrepreneurial intentions and assuming that this eventually leads to entrepreneurial behavior are numerous and also this study builds, to some extent, on this idea. Nevertheless, there is also criticism towards this assumption, as not all would-be entrepreneurs eventually become actual sustainable entrepreneurs. Studying entrepreneurial processes like opportunity recognition in a scholarly context therefore remains difficult when positioning this research in the entrepreneurial context. However, there are facts and figures that point out that entrepreneurship education helps in the development towards more entrepreneurial individuals, so positioning such research in the entrepreneurship

education context offers some solace. This gap between would-be or aspiring entrepreneurs and actual entrepreneurs also relates to the scores on the competence framework. Even though the sustainable entrepreneurs do confirm the framework, the results of this dissertation show significant differences between these two groups when analysing the scores on the competencies. Would-be entrepreneurs score themselves significantly lower than established and experienced entrepreneurs, which supports the idea that context is important for competence development. Especially the results of the studies presented in Chapter 3 and Chapter 4 should be interpreted with care. These studies revolve around would-be entrepreneurs in an educational context. And even though these studies intent to only explore possible relations between moral competencies (or antecedents) and opportunity recognition for sustainable development, this is not an one-on-one application of how this relation would manifest itself among actual sustainable entrepreneurs.

Secondly, it remains very difficult to implement real-life entrepreneurial cases into educational practices. In this dissertation a case study assignment was developed in which students were stimulated to actively identify new ideas for sustainable development. The Business Model Canvas (BMC) was used to evoke a critical assessment of the business model and to identify challenges and consequently new ideas to improve the business model. Even though the BMC is seen as an useful tool in entrepreneurship education (Lackéus, 2015), it does not capture all the nuances of a real-life setting. In addition, it was not possible to monitor the students closely during the five weeks that they worked on the case study on the online platform. Students worked on this at home. The exercises were time constrained, so each student had the same amount of time to work on the assignments. However, the conditions were not the same for each individual. Ideally, the researcher is presented to control for environmental changes and to keep the conditions between participants the same. This was not possible with this particular case as it was an integrated element of the 8 week course on principles of entrepreneurship.

Third, the methodological limitations of using a self-perceived questionnaire should be pointed out. As already mentioned throughout this dissertation, but especially in Chapter 1, using a self-perceived questionnaire brings along limitations. Critique on using self-reports or self-assessments as a measurement tool is common and widely used to under-evaluate this type of research (Braun et al., 2012). Critiques usually exists of a lack of validity of these type of competence assessments. Nevertheless, there are certain conditions that make it possible to measure different kinds of competencies by using self-reports (Braun et al., 2012). To do this, the self-report should first include multiple indicators per competency to address a competency's full complexity; second, context should be given for the competencies and instruments; and third, the indicators should describe concrete behavior (Braun et al., 2012). The six competencies for sustainable entrepreneurship and the underlying

items (27 in total) fulfil the three requirements mentioned above. Therefore, everything that could have been done to limit the possible pitfalls of using a self-report has been done. In addition, the assessment of the validity of the competence framework as reported in Chapter 2 is also positive. The competence framework for sustainable entrepreneurship seems to be a valid measurement tool. Nonetheless, no information on the importance of the competencies can be retrieved from the questionnaires (and interviews as well). It could be the case that certain competencies are scored relatively high and enacted frequently, but are not considered important in practice. This mismatch is revealed when looking for instance at the self-perceived scores on normative competence and the somewhat disappointing actual enactment of this competence within decision making processes. As a result, self-perceived scores do not necessarily align with actual performance for some of the competencies. Future research should take this into account and develop studies that address this gap.

A fourth limitation can be found when separating idea generation from idea evaluation. This is also in line with the work of Baron and Ensley (2006) who propose a twofold approach to measure opportunity recognition. The first step is described as business idea generation, which can be compared to what has been described in this dissertation. The second step, business idea evaluation, in which the generated ideas are evaluated by the individuals in more detail, has not been researched in this dissertation. This is an important step in the opportunity recognition process, and therefore should be taken into account in future research on opportunity recognition for sustainable development (Vogel, 2016).

A fifth and final limitation has to do with the fact that this dissertation mostly has a sole focus on the role of competencies for sustainable entrepreneurship. Although a range of different antecedents and conceptually related constructs in Chapters 2 and 3 are taken into account when exploring the relation between input (i.e. the competencies) and output (i.e. opportunity recognition), this thesis is not meant to be conclusive. Literature on entrepreneurship, sustainable development and also sustainable entrepreneurship has determined that for instance knowledge (Patzelt & Shepherd, 2011), the individuals' networks (Ozgen & Baron, 2007), and cognitive structures (Baron & Ensley, 2006) play an important role. Also Chapter 3 shows that pro-environmental behavior values are important. Studying all these factors at once was beyond the scope of this study, but the underlying relations between all these factors should be analysed in future research to be able to unravel the whole puzzle.

Besides these limitations there are also some avenues for future research. For instance, future research could focus on team level learning. Team level learning is something that receives more attention nowadays, as entrepreneurs usually work in teams in which they can share new ideas and evaluate these ideas with others, but also work on sustainability challenges together. Nevertheless, this

dissertation only reports on the individual level. It therefore remains an unanswered question to what extent an individual needs all competencies for sustainable entrepreneurship or whether they have to be present within the team, regardless of which individual embodies them. It also remains unclear how the team level affects opportunity recognition and evaluation. Second, future research should develop new methodologies to measure opportunity recognition more precisely. Research on sustainable entrepreneurial practices is often limited to (self-perceived) questionnaires or to interviews in which respondents are asked to look back in the past and explain what they did and how they did it. This was also the case in the interviews held with the sustainable entrepreneurs in this dissertation. However, decision making with regards to balancing the triple bottom line is not something that happens one moment in time. Usually, these processes develop over time and imply constant reflection and anticipation. Being able to capture these moments would be a true addition to the current scientific debates. Modern day technologies can enable researchers to dive into process level analyses and to monitor this over longer periods of time. For instance smartphones could be used to keep video diaries of meetings, or to write down thoughts on new ideas. It could also be possible to send exercises or questions to entrepreneurs. This means that there needs to be a strong commitment among participants, but it would gain so much more insights in actual decision making processes.

The research agenda consists then of focussing on studies that can bridge the gap between the entrepreneurial context and the educational context, on studies that include team learning, that take into account more than one input variable, studies that move towards actual real life case examples and studies that embrace new research methodologies.

6.6 Reflections on the practical implications of the results

In this section, the practical implications of the results of the current thesis are discussed on two levels: sustainable start-ups and higher education institutions.

6.6.1 Sustainable entrepreneurial start-ups

Sustainable entrepreneurs, or those who aspire to become a sustainable entrepreneur in the near future, can learn from this dissertation on several levels. First, knowing that the competence framework for sustainable entrepreneurship can help in developing a sustainable venture can be considered a first important contribution. A lot of sustainable entrepreneurs are involved in business accelerating programs, lean start-up boot camps, incubators and so on. They could use these learning platforms to develop their competencies and become more aware of the enactment of the right competencies during the stages of the entrepreneurial process. At the same time, these learning platforms should include a focus on the development of these competencies throughout their services.

Second, sustainable entrepreneurs tend to rely on their ability to enact normative competence mostly in the very beginning of the entrepreneurial process. Furthermore, there is a tendency that sustainable entrepreneurs use normative competence, or at least thrive on a value oriented perspective to 'sell the story' of the company to potential investors or other stakeholders. The actual enactment of these norms and values through normative competence and strategic action competence is often limited to 1) the very first stages (i.e. in opportunity recognition processes) and 2) the business model adaption stage where there is financial stability. The business logic remains a dominant perspective on doing business, even though the core values of sustainable ventures would suggest otherwise. In order to fully reach the potential that sustainable entrepreneurs have towards creating a more sustainable oriented economy and/or society, sustainable entrepreneurs should develop and enact both moral competencies throughout the whole development process of the sustainable venture.

Furthermore, throughout all critical moments, the enactment of foresighted thinking and systems thinking is limited. This could have serious consequences for future social-ethical issues that are common when dealing with sustainable or social innovations. It is argued that for a sustainable venture to thrive (at least those who are technology driven), it would be better to strategically and systematically address social-ethical issues from the beginning as by only doing so later on in the process could lead to being unable to address these issues due to the complexity of those sustainable technologies (Stilgoe et al., 2013). Sustainable entrepreneurs should become more aware of this and critically assess the social-ethical implications of their technologies early on in the entrepreneurial process, to avoid unresolvable problems later on.

Usually a sustainable start-up exists of more than one individual. It is likely that it is not a necessary condition to possess all competencies, rather the entrepreneurial team should balance out the different competencies for sustainable entrepreneurship. Even though more research is needed in this topic, it is safe to say that in practice this happens. Therefore, knowing which competencies are developed by individuals in the entrepreneurial team helps in identifying those competencies that need further development. Many sustainable entrepreneurs mentioned to have difficulties with finding the right people to join the team. This might lead to slowing down the development process and bringing along stress for the founder of the sustainable venture. Hiring people based on their competencies for sustainable entrepreneurship might help in filtering out those individuals that can really be of an added value for the sustainable venture. The competence framework for sustainable entrepreneurship could function as a guideline, besides professional qualifications, in the process of hiring employees within a sustainable start-up.

To summarize and conclude this section, sustainable start-ups should pay (more) attention to:

1. Monitoring the competencies for sustainable entrepreneurship by using the self-perceived assessment.
2. Challenge the business logic by relying more on moral competencies throughout the whole process.
3. Focus more on foresighted thinking and systems thinking during the first stages of the venture development process to avoid social ethical issues later on.
4. Use the competence framework to acquire the right individuals to reinforce the team.

6.6.2 Higher education institutions

Higher education institutions and business schools prescribe mainly a profit-driven and materialistic worldview to students, which can compromise their ethical values and weaken their perceptions of social responsibility (Ghoshal, 2005; Mitroff, 2004). Critics such as Giacalone and Thompson (2006) argue that students are often encouraged to treat everything as subordinate to profit. Slater and Dixon-Fowler (2010) call this the 'profit-first' mentality, which has no regard for moral considerations or social responsibilities. Education institutes have a big role in the transition from this profit-first mentality as a logic, towards a new logic in which sustainability is not seen as a loss, but seen as a positive outcome. As such entrepreneurship education should incorporate sustainable development as a basic requirement and focus on the development of the competencies for sustainable entrepreneurship. This can be done by implementing new pedagogies that focus on value creation that moves beyond profit maximization. In this process it is important to keep track of the competencies for sustainable entrepreneurship and to foster them within the teaching cases.

Lackéus (2015) proposed several entrepreneurship oriented tools to capture value creation processes within education. Even though these tools are specified within the entrepreneurship domain, they could also be useful for teaching on sustainable entrepreneurship. The tools that align most with the results of this dissertation are described as effectuation and the business model canvas. In addition, based on the findings of this dissertation, the competence framework for sustainable entrepreneurship as such is proposed as an additional tool.

The concept of effectuation represents a quite practical and hands-on approach to teaching "through" entrepreneurship. It has been developed by Sarasvathy and colleagues (see for example Sarasvathy, 2001, Sarasvathy & Dew, 2005, Sarasvathy & Venkataraman, 2011). Effectuation is described as an iterative process of decision making and active commitment seeking that results in creation of new value, where each iteration is started with questions such as "Who am I?", "What do I know?" and

“Whom do I know?”. The competence self-assessment developed in this dissertation could be used in answering those question, and could be of support for the effectuation approach. This effectuation approach offers a starting point for the development of the moral competencies as they are intended to build the good character (e.g. Blok et al., 2016). Questions like who am I and what do I know are central in the development of the good character within the virtue ethics approach. Sarasvathy and Venkataraman (2011) propose that entrepreneurship could be regarded as a generic method for creating potentially valuable change by unleashing human potential, and has contrasted this to the scientific method designed to harness mother nature. Viewing entrepreneurship as a generic method holds much promise for the field of entrepreneurial education, but requires emphasis on taking responsibility, value creation and using creativity tools (Neck & Greene, 2011).

The Business Model Canvas (BMC) outlined by Osterwalder and Pigneur (2010) consists of nine basic building blocks needed when creating value to external stakeholders. The BMC approach could be viewed as a simple checklist that students can use when planning their value creation attempts, asking them to provide answers to key value creation questions such as “Who do you help?”, “How do you help?”, “Who helps you?” and “What do you do?”. It is particularly useful when working in groups allowing for sketching and discussing around ideas outlined by the team. Here too the language is business oriented, but the principles are applicable to a wider context than venture creation. In fact, Osterwalder and his colleagues have written a book on how to apply these nine building blocks to personal development, which is well in line with a wide definition of entrepreneurship (Clark et al., 2012). This dissertation already reports on the use of the Business Model Canvas as a tool to foster (sustainable) entrepreneurial learning. From the evaluation of the tool it can be concluded that students enjoyed working with the BMC, that it provided them clear guidelines on how to analyse value creation processes and enabled them to come up with improvements. Nevertheless, the BMC does not explicitly include social or environmental impacts. In this dissertation a tenth block was added to the original BMC to foster this element. Recent research has also focused on including sustainable development as an integrated part of the business model. For instance the work by Joyce and Paquin (2016) on the triple layered business model canvas is an example of how to move forward. They have added an environmental layer based on a lifecycle perspective and a social layer based on a stakeholder perspective. The implementation of this triple layered business model canvas within sustainable entrepreneurship education might therefore be more suitable, as this version of the BMC specifically focuses on sustainable development.

In addition to providing insights on the use of the Business Model Canvas, this dissertation also provides a tool which measures self-perceived levels of competence. Implementing this as a high-stake formal test measure of competence is not what is suggested, but it could be used as a monitoring

instrument, keeping track of the development of the competencies (i.e. as a formative assessment instrument). The assessment of the competence framework could be used as a pre- and post-test measurement when implementing interventions (for instance case studies).

To summarize and conclude this section, higher education institutions should pay (more) attention to:

1. Moving away from the profit-first mentality in teaching methods.
2. Teaching *through* entrepreneurship by implementing tools like the Business Model Canvas and effectuation methods.
3. Dealing with sustainable development as an integrated part of entrepreneurship.

6.7 Concluding remarks

The title of this dissertation states: “The return of the Jedi in entrepreneurship?!”. The question mark was not placed there by accident. Despite the growing interest in sustainable development in all layers of society, it remains difficult to fully reach the potential sustainable entrepreneurs can have in the transformation towards a more sustainable society. The enactment of moral competencies seems to be important in this transition, but at the same time also seems to be the main challenge for sustainable entrepreneurs. Nevertheless, the exclamation mark was also not put there by accident. More and more entrepreneurial individuals see the added value and need for a business model that includes the triple bottom line. This dissertation provides stepping stones for further unravelling the role of competencies for sustainable entrepreneurship in managing this triple bottom line and indicates practical implications for sustainable entrepreneurs and higher education to develop these competencies for sustainable entrepreneurship.

General Appendix

Table A1. Overview of items in questionnaire

Competence	Items (scale 1-10)
Diversity	<p>a. I am able to bring together economic, social and environmental conflicts of interest</p> <p>b. I use the experiences, activities and values of various relevant stakeholders in addressing sustainability issues</p> <p>c. I am able to actively involve stakeholders and experts from other disciplines in addressing sustainability issues</p> <p>d. I am able to explain the importance of involving local stakeholders (e.g. in recruitment) for a company</p>
Foresighted thinking	<p>a. I am able to construct and consider different directions for sustainability in the future</p> <p>b. I am able to identify risks and opportunities inherent in present and future developments</p> <p>c. In analysing and evaluating scenario's for action, I take the impact on the short as well as the long term into consideration</p> <p>d. In analysing and evaluating scenario's for action, I take both the impact on the local and the global scale into consideration</p>
Systems thinking	<p>a. I am able to identify key aspects of production chains and agricultural eco-systems</p> <p>b. I am able to identify the key operations of a company that have a negative impact on the environment or society</p> <p>c. I am able to analyse strengths and weaknesses of production chains and propose improvements to reduce the negative effects on the environment or society</p> <p>d. I am able to integrate social, environmental and societal issues into future plans of a company</p>
Interpersonal	<p>a. I let others know how much I appreciate cooperating with him or her in solving complex issues</p> <p>b. I stand up for my rights if someone is overlooking (forgetting) one or more aspects of sustainability</p> <p>c. I am able to feel to what extent stakeholders are willing to cooperate in a project</p>

Normative	a. I am willing to take initiative to make improvements in my own practice based on norms, values, targets and principles of sustainability
	b. I know what is seen as 'good sustainable practice' in my field of study
	c. I am able to apply norms, values, targets and principles of sustainability to my own practice
	d. I know how to explain the decisions a company has made concerning sustainability
Strategic Action	a. I challenge not sustainable ways of working in a company
	b. I am very good at identifying opportunities for sustainable development
	c. I know how social, environmental or societal challenges can be turned into opportunities for an organization/company
	d. I am able to motivate higher management in a company to invest in sustainability
	e. When it comes to achieving particular goals in relation to sustainability I know whom to involve
	f. If I want to reach goals in relation to sustainability, I know which steps should be taken to be successful
	g. I am able to use a strategic way of working in sustainability related projects (designing, testing, implementing)
	h. I am able to monitor the sustainability performance of a company

References

- Abdelkafi, N. & Täuscher, K. (2016): Business Models for Sustainability From a System Dynamics Perspective. *Organization & Environment*, 29(1), 2016, 74–96.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Ajzen, I. (2001). Nature and operation of attitudes. *Annual review of psychology*, 52, 27-58.
- Almers, E. (2013). Pathways to action competence for sustainability—Six themes. *The Journal of Environmental Education*, 44(2), 116-127.
- Bae, T.J., Qian, S., Miao, C., & Fiet, J.O. (2014). The relationship between entrepreneurship education and entrepreneurial intentions: A meta-analytic review. *Entrepreneurship theory and practice*, 38(2), 217-254.
- Baggen, Y., Kampen, J., Naia, A., Biemans, H.J.A., Lans, T., & Mulder, M. (2016). Development and Application of the Opportunity Identification Competence Assessment Test (OICAT) in Higher Education. *Innovations in Education and Teaching International*, forthcoming.
- Bakan, J. (2004). *The corporation: The pathological pursuit of profit and power*. New York: Free Press.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-147.
- Baron, R.A., & Ensley, M.D. (2006). Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Management Science*, 52, 1331-1344.
- Barth, M., Godemann, J., Rieckman, M. & Stoltenberg, U. (2007). Developing key competences for sustainable development in higher education. *International Journal of Sustainability in Higher Education*, 8, 416-430.
- Bartram, D. (2005). The Great Eight competencies: a criterion-centric approach to validation. *Journal of Applied Psychology*, 90(6), 1185-1203.
- Bhide, A. (2000). *The Origin and Evolution of New Businesses*. Oxford University Press, New York, New York, USA
- Blok, V. (2017). Information Asymmetries and the Paradox of Sustainable Business Models: Toward an integrated theory of Sustainable Entrepreneurship. In: *Sustainable Business Models: Principles, Promise, and Practice*.
- Blok, V., Gremmen, B. & Wesselink, R. (2016). Dealing with the wicked problem of sustainable development: the necessity virtuous competence. *Business & Professional Ethics Journal*, 34(3), 297-327.

- Bocken, N.M.P., Short, S.W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of cleaner production*, 65, 42-56.
- Braun, E., Woodley, A., Richardson, J.T.E. & Leidner, B. (2012). Self-rated competences questionnaires from a design perspective. *Educational Research Review*, 7, 1-18.
- Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational researcher*, 18(1), 32-42.
- Brundtland, G.H. (1987). Our common future—Call for action. *Environmental Conservation*, 14(4), 291-294.
- Chesbrough, H. (2010). Business model innovation: opportunities and barriers. *Long range planning*, 43(2), 354-363.
- Cohen, B., & Winn, M.I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing*, 22(1), 29-49.
- Compans, Y.E., & McMullen, J.S. (2007). Strategic entrepreneurs at work: the nature, discovery, and exploitation of entrepreneurial opportunities. *Small Business Economics*, 28(4), 301-322.
- Cope, J., & Watts, G. (2000). Learning by doing—an exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behavior & Research*, 6(3), 104-124.
- Corbett, A.C. (2007). Learning asymmetries and the discovery of entrepreneurial opportunities. *Journal of Business Venturing*, 22 (1), 97-118.
- Cordano, M., Welcomer, S., Scherer, R., Pradenas, L., & Parada, V. (2010). Understanding cultural differences in the antecedents of pro-environmental behavior: A comparative analysis of business students in the United States and Chile. *The Journal of Environmental Education*, 41(4), 224-238.
- Cropper, M.L., & Oates, W.E. (1992). Environmental economics: a survey. *Journal of economic literature*, 30(2), 675-740.
- Dale, A. and Newman, L. (2005). Sustainable development, education and literacy. *International Journal of Sustainable Higher Education*, 6, 351-362.
- Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization. *Journal of Business Venturing*, 30, 674-695.
- Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of business venturing*, 18(3), 301-331.
- Dean, T.J., & McMullen, J.S. (2007). Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. *Journal of Business Venturing*, 22, 50-76.

- De Clercq, D., & Voronov, M. (2011). Sustainability in entrepreneurship: A tale of two logics. *International Small Business Journal*, 29(4), 322-344.
- De Haan, G. (2006). The BLK '21' programme in Germany: A 'Gestaltungskompetenz' based model for education for sustainable development. *Environmental Education Research*, 12, 19-32.
- Delamare Le Deist, F. & Winterton, J. (2005). What is competence? Human Resource Development International, 8, 27-46.
- DeTienne, D.R. (2010). Entrepreneurial exit as a critical component of the entrepreneurial process: Theoretical development. *Journal of Business Venturing*, 25(2), 203-215.
- DeTienne, D.R., & Chandler, G.N. (2004). Opportunity identification and its role in the entrepreneurial classroom: A pedagogical approach and empirical test. *Academy of management learning & education*, 3(3), 242-257.
- Dimov, D. (2007). Beyond the Single-Person, Single-Insight Attribution in Understanding Entrepreneurial Opportunities. *Entrepreneurship Theory and Practice*, 31, 713-731.
- Dorfman, N.S. (1983). Route 128: The development of a regional high technology economy. *Research Policy*, 12(6), 299-316.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of social issues*, 56(3), 425-442.
- Ellis, G. & Weekes, T. (2008). Making sustainability 'real': using group-enquiry to promote education for sustainable development. *Environmental Education Research*, 14, 482-500.
- European Commission (2015). User guide to the SME definition. Internal market, industry, entrepreneurship and SMEs. doi:10.2873/620234
- Eraut, M. (1994). *Developing professional knowledge and competence*. London: The Falmer Press.
- Farr-Wharton R. & Brunetto Y. (2009). Female entrepreneurs as managers: 'the role of social capital in facilitating a learning culture. *Gender in Management: an international journal*, 24(1), 14-31.
- Folger, R. (1998). Fairness as a moral virtue. Managerial ethics: Moral management of people and processes, 13-34.
- Fornell, C., & Larcker, D.F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 48, 39-50.
- Gaglio, C.M., & Winter, S. (2017). Entrepreneurial Alertness and Opportunity Identification: Where Are We Now?. In: Revisiting the Entrepreneurial Mind (pp. 339-358). *Springer International Publishing*.
- Gambardella, A., McGahan, A. (2010). Business-model innovation: general purpose technologies and their implications for industry structure. *Long Range Planning*, 43 (2/3), 262-271.

- Ghoshal, S. (2005). Bad management theories are destroying good management practices. *Academy of Management learning & education*, 4(1), 75-91.
- Giacalone, R.A., & Thompson, K.R. (2006). Business ethics and social responsibility education: Shifting the worldview. *Academy of Management Learning & Education*, 5(3), 266-277.
- Gibb, A. (2002). In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge. *International Journal of Management Reviews*, 4(3), 233-269.
- Gibbs, S. R. (2009). Exploring the influence of task-specific self-efficacy on opportunity recognition perceptions and behaviors. *Frontiers of entrepreneurship research*, 29(6), 1.
- Gibson, R. (2006). Sustainability assessment: basic components of a practical approach. *Impact Assessment and Project Appraisal*, 24, 170-182.
- Grégoire, D.A., Barr, P.S., & Shepherd, D.A. (2010a). Cognitive processes of opportunity recognition: The role of structural alignment. *Organization Science*, 21(2), 413-431.
- Grégoire, D.A., Shepherd, D.A., & Schurer Lambert, L. (2010b). Measuring opportunity recognition beliefs: illustrating and validating an experimental approach. *Organizational Research Methods*, 13(1), 114-145.
- Grilo, I., & Thurik, R. (2008). Determinants of entrepreneurial engagement levels in Europe and the US. *Industrial and Corporate Change*, 17(6), 1113-1145.
- Grusec, J.E. (2011). Socialization processes in the family: Social and emotional development. *Annual review of psychology*, 62, 243-269.
- Guilford, J.P. (1967). Potentiality for creativity. In J. C. Gowan, J. Khatena, & E. P. Torrance (Eds.), *Creativity: its educational implication*. Dubuque, IA: Kendall Hunt.
- Hahn, F., Jensen, S., & Tanev, S. (2014). Disruptive innovation vs disruptive technology: The disruptive potential of the value propositions of 3D printing technology startups. *Technology Innovation Management Review*, 4(12).
- Hall, J.K., Daneke, G.A., & Lenox, M.J. (2010). Sustainable development and entrepreneurship: Past contributions and future directions. *Journal of Business Venturing*, 25(5), 439-448.
- Henseler, J., Ringle, C.M. & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academic Marketing Science*, 43, 115-135.
- Hemingway, C.A. (2005). Personal values as a catalyst for corporate social entrepreneurship. *Journal of business ethics*, 60(3), 233-249.
- Hesselbarth, C. & Schaltegger, S. (2014). Education future change agents for sustainability - learnings from the first sustainability management master of business administration. *Journal of Cleaner Production*, 62, 24-36.

- Heugens, P.P. (2006). Environmental issue management: towards a multi-level theory of environmental management competence. *Business Strategy and the Environment*, 15(6), 363-376.
- Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids—Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing*, 25(5), 481-492.
- Hsu, D. (2007). Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Research Policy*, 36(5), 722-741.
- Jensen, B.B. & Schnack, K. (2006). The action competence approach in environmental education. *Environmental Education Research*, 12(3), 471-486.
- Jones, T.M. (1991). Ethical decision making by individuals in organizations: An issue-contingent model. *Academy of Management Review*, 16(2), 366-395.
- Joyce, A., & Paquin, R.L. (2016). The triple layered business model canvas: A tool to design more sustainable business models. *Journal of Cleaner Production*, 135, 1474-1486.
- Karimi, S., Biemans, H.J., Lans, T., Aazami, M., & Mulder, M. (2016). Fostering students' competence in identifying business opportunities in entrepreneurship education. *Innovations in Education and Teaching International*, 53(2), 215-229.
- Kashyap, R., Mir, R., & Iyer, E. (2006) Toward a responsive pedagogy: Linking social responsibility to firm performance issues in the classroom. *Academy of Management Learning & Education*, 5(3): 366-376.
- Kelley D.J., Bosma N. & Amoró's J.E. (2011). *Global entrepreneurship monitor; 2010 global report*. Global Entrepreneurship Research Association (GERA)
- Kim, T.Y., & Kim, M. (2013). Leaders' moral competence and employee outcomes: The effects of psychological empowerment and person-supervisor fit. *Journal of Business Ethics*, 112(1), 155-166.
- Kirzner, I.M. (1997). Entrepreneurial discovery and the competitive market process: an Austrian approach. *Journal of Economic Literature*, 35(1), 60- 85.
- Klonek, F.E., Isidor, R., & Kauffeld, S. (2015). Different stages of entrepreneurship: Lessons from the trans-theoretical model of change. *Journal of Change Management*, 15(1), 43-63.
- Krueger, N., & Dickson, P.R. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences*, 25(3), 385-400.
- Kuckertz, A., & Wagner, M. (2010). The influence of sustainability orientation on entrepreneurial intentions—Investigating the role of business experience. *Journal of Business Venturing*, 25(5), 524-539.

- Lackéus, M. (2015). Entrepreneurship in education: What why, when how. Entrepreneurship360 background paper. Retrieved from OECD website: http://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf
- Lans, T., Blok, V. & Gulikers, J. (2015). Show me your network and I'll tell you who you are: social competence and social capital of early stage entrepreneurs. *Entrepreneurship and Regional Development*, 27(7-8), 458-473.
- Lans, T., Blok, V. & Wesselink, R. (2014). Learning apart together: towards an integrated framework for sustainable entrepreneurship competence in higher education. *Journal of Cleaner Production*, 62, 37-47.
- Lans, T., Hulsink, W., Baert, H., & Mulder, M. (2008). Entrepreneurship education and training in a small business context: Insights from the competence-based approach. *Journal of enterprising culture*, 16(04), 363-383.
- Lennick, D., & Kiel, F. (2005). *Moral competence: Enhancing business performance and leadership success*. New Jersey: Wharton School Publishing.
- Liñán, F., & Chen, Y.W., (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33, 593-617.
- Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance*, 23(1), 161-183.
- Lourenço, F., Jones, O., & Jayawarna, D. (2013). Promoting sustainable development: The role of entrepreneurship education. *International Small Business Journal*, 31(8), 841-865.
- Lumpkin, G.T., & Lichtenstein, B.B. (2005). The role of organizational learning in the opportunity-recognition process. *Entrepreneurship theory and practice*, 29(4), 451-472.
- Maine, E., & Garnsey, E. (2006). Commercializing generic technology: The case of advanced materials ventures. *Research Policy*, 35(3), 375-393.
- Maine, E., Soh, P.H., & Dos Santos, N. (2015). The role of entrepreneurial decision-making in opportunity creation and recognition. *Technovation*, 39, 53-72.
- Maine, E., Soh, P.H., & Dos Santos, N. (2012). Decision-making processes in biotech commercialization: Constraints to effectuation. In: *Technology Management for Emerging Technologies (PICMET)*, 2012 Proceedings of PICMET'12: (pp. 611-616). IEEE.
- Man, T.W.Y., Lau, T., & Chan, K.F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, 17, 123-142.
- Martin, B.C., McNally, J.J., & Kay, M.J. (2013). Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *Journal of Business Venturing*, 28(2), 211-224.

- McMullen, J.S., & Shepherd, D.A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31, 132–152.
- Mitchelmore, S., & Rowley, J. (2010). Entrepreneurial competencies: A literature review and development agenda. *International Journal of Entrepreneurial Behaviour & Research*, 16, 92–111.
- Mitroff, I. (2004). An open letter to the deans and the faculties of American business schools. *Journal of Business Ethics*, 54(2), 185–189.
- Mogensen, F. & Schnack, K. (2010). The action competence approach and the ‘new’ discourses of education for sustainable development, competence and quality criteria. *Environmental Education Research*, 16, 59–74.
- Morales-Sánchez, R., & Cabello-Medina, C. (2013). The role of four universal moral competencies in ethical decision-making. *Journal of Business Ethics*, 116(4), 717–734.
- Morelix, A. (2015). The Evolution of Entrepreneurship on College Campuses. <http://www.kauffman.org/blogs/growthology/2015/10/the-evolution-of-entrepreneurship-on-college-campuses>. Retrieved on 10-07-2017.
- Morris, M.H., Webb, J.W., Fu, J., & Singhal, S. (2013). A Competency-Based Perspective on Entrepreneurship Education: Conceptual and Empirical Insights. *Journal of Small Business Management*, 51(3), 352–369.
- Mulder, M. (2014). Conceptions of Professional Competence. In S. Billett, C. Harteis, and H. Gruber (Eds), *International handbook on research into professional and practice-based learning*, 107–137. Dordrecht: Springer.
- Mulder, M. (2017). *Competence-based vocational and professional education. Bridging the worlds of work and education*. Cham: Springer International Publishing Switzerland.
- Muñoz, P., & Dimov, D. (2015). The call of the whole in understanding the development of sustainable ventures. *Journal of Business Venturing*, 30(4), 632–654.
- Neck, H.M., & Green, P. (2011). Entrepreneurship Education: Known Worlds and New Frontiers. *Journal of Small Business Management*, 49(1), 55–70.
- Ng, E.S., & Burke, R.J. (2010). Predictor of business students’ attitudes toward sustainable business practices. *Journal of Business Ethics*, 95(4), 603–615.
- Nijhof, W.J. (2005). Lifelong learning as a European skill formation policy. *Human Resource Development Review*, 4(4), 401–417.
- Noar S.M. (2003). The role of structural equation modeling in scale development. *Structural Equation Model*, 10, 622–647.
- Noroozi, O., Weinberger, A., Biemans, H.J., Mulder, M., & Chizari, M. (2012). Argumentation- based computer supported collaborative learning (ABCSCCL): A synthesis of 15 years of research. *Educational Research Review*, 7(2), 79–106.

- O'Fallon, M.J., & Butterfield, K.D. (2005). a review of the empirical ethical decision-making literature: 1996–2003. *Journal of Business Ethics*, 59(4), 375–413.
- Osagie, E.R., Wesselink, R., Blok, V., Lans, T. & Mulder, M. (2015). Individual competencies for corporate social responsibility: A literature and practice perspective. *Journal of Business Ethics*. DOI 10.1007/s10551-014-2469-0.
- Osagie, E.R., Wesselink, R., Blok, V., & Mulder, M. (2016). Contextualizing Individual Competencies for Managing the Corporate Social Responsibility Adaptation Process The Apparent Influence of the Business Case Logic. *Business & Society*, DOI: 0007650316676270.
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Creation*. Modderman Drukwerk: Amsterdam, The Netherlands.
- Ozgen, E., & Baron, R.A. (2007). Social sources of information in opportunity recognition: Effects of mentors, industry networks, and professional forums. *Journal of Business Venturing*, 22, 174–192.
- Pacheco, D.F., Dean, T.J., & Payne, D.S. (2010). Escaping the green prison: Entrepreneurship and the creation of opportunities for sustainable development. *Journal of Business Venturing*, 25(5), 464–480.
- Parrish, B.D. (2010). Sustainability-driven entrepreneurship: Principles of organization design. *Journal of Business Venturing*, 25(5), 510–523.
- Pasewark, W.R., & Riley, M.E. (2010). It's a matter of principle: The role of personal values in investment decisions. *Journal of Business Ethics*, 93, 237 - 253.
- Patzelt, H. & Shepherd, D.A. (2011). Recognizing opportunities for sustainable development. *Entrepreneurship Theory and Practice*, 35(4), 631–652.
- Penner, L.A., Dovidio, J.F., Piliavin, J.A., & Schroeder, D.A. (2005). Prosocial behavior: Multilevel perspectives. *Annual Review Psychology*, 56, 365–392.
- Pigou, A. C. (1932). *The economics of welfare*, 1920. *McMillan&Co., London*.
- Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2017). Toward a validated competence framework for sustainable entrepreneurship. *Organization and Environment*, DOI: 10.1177/ 1086026617697039.
- Pohling, R., Bzdok, D., Eigenstetter, M., Stumpf, S., & Strobel, A. (2016). What is Ethical Competence? The Role of Empathy, Personal Values, and the Five-Factor Model of Personality in Ethical Decision-Making. *Journal of Business Ethics*, 1–26.
- Pope, C., Ziebland, S., & Mays, N. (2000). Analysing qualitative data. *British medical journal*, 320(7227), 114.
- Rae, D. (2010). Universities and enterprise education: responding to the challenges of the new era. *Journal of Small Business and Enterprise Development*, 17(4), 591–606.

- Ramachandran, V. (2011). Strategic corporate social responsibility: a 'dynamic capabilities' perspective. *Corporate Social Responsibility and Environmental Management*, 18(5), 285-293.
- Rasmussen, E. (2011). Understanding academic entrepreneurship: Exploring the emergence of university spin-off ventures using process theories. *International Small Business Journal*, 29(5), 448-471.
- Rauch, A. & Frese, M. (2007). Born to be an entrepreneur? Revisiting the personality approach to entrepreneurship. In: Baum, J.R., Frese, M., Baron, R.A. (Eds.). *The Psychology of Entrepreneurship*, 41-65. Lawrence Erlbaum, New Jersey.
- Renko, M., Shrader, R.C., & Simon, M. (2012). Perception of entrepreneurial opportunity: a general framework. *Management Decision*, 50(7), 1233-1251.
- Rieckmann, M. (2012). Future-oriented higher education: Which key competencies should be fostered through university teaching and learning? *Futures*, 44, 127-135.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S., Lambin, E.F., ... & Nykvist, B. (2009). A safe operating space for humanity. *Nature*, 461(7263), 472-475.
- Rokeach, M. (1973). *The nature of human values*. New York: Free press.
- Russo, M.V. (2003). The emergence of sustainable industries: building on natural capital. *Strategic Management Journal*, 24(4), 317-331.
- Sandberg, J. (2000). Understanding human competence at work: an interpretative approach. *The Academy of Management Journal*, 43, 9-25.
- Sarasvathy, S.D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management review*, 26, 243-263.
- Sarasvathy, S.D., & Dew, N. (2005). New market creation through transformation. *Journal of Evolutionary Economics*, 15(5), 533-565.
- Sarasvathy, S.D., Dew, N., Velamuri, S.R., & Venkataraman, S. (2010). Three views of entrepreneurial opportunity. In: Handbook of entrepreneurship research (pp. 77-96). Springer New York.
- Sarasvathy, S.D., & Venkataraman, S. (2011). Entrepreneurship as method: Open questions for an entrepreneurial future. *Entrepreneurship theory and practice*, 35(1), 113-135.
- Schaltegger, S. & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business Strategy and the Environment*, 20, 222-237.
- Schlange, L.E. (2009). Stakeholder identification in sustainability entrepreneurship. *Greener Management International*, 55, 13-32.
- Schnack, K. 2003. Action competence as an educational ideal. In: *The internationalization of curriculum studies*, ed. D. Trueit, W.E. Doll, H. Wang, and W.F. Pinar, 271-91. New York: Peter Lang Publishing.

- Schwartz, S.H. (1994). Are there universal aspects in the structure and contents of human values?. *Journal of social issues*, 50(4), 19-45.
- Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11, 448-469.
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review*, 25, 217-226.
- Shepherd, D.A., McMullen, J.S., & Jennings, P.D. (2008). The formation of opportunity beliefs: Overcoming ignorance and reducing doubt. *Strategic Entrepreneurship Journal*, 1, 75-95.
- Shepherd, D.A., Patzelt, H., & Baron, R.A. (2013). "I care about nature, but...": Disengaging values in assessing opportunities that cause harm. *Academy of Management Journal*, 56(5), 1251-1273.
- Slater, D.J., & Dixon-Fowler, H.R. (2010). The future of the planer in the hands of MBAs: An examination of CEO MBA education and corporate environmental performance. *Academy of Management Learning & Education*, 9(3), 429-441.
- Springett, D. (2005). 'Education for sustainability' in the business studies curriculum: a call for a critical agenda. *Business Strategy and the Environment*, 14(3), 146-159.
- Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy*, 42, 1568-1580.
- Stubbs, W., & Cocklin, C. (2008). An ecological modernist interpretation of sustainability: the case of Interface Inc. *Business Strategy and the Environment*, 17(8), 512.
- Svanström, M., Lozano-García, F.J. & Rowe, D. (2008). Learning outcomes for sustainable development in higher education. *International Journal of Sustainability in Higher Education*, 9(3), 339-351.
- Swart, R. J., Raskin, P., & Robinson, J. (2004). The problem of the future: sustainability, science and scenario analysis. *Global environmental change*, 14(2), 137-146.
- Thébaud S. (2010). Gender and entrepreneurship as a career choice: do self-assessments of ability matter? *Social Psychology Quarterly*, 73(3), 288-304.
- Timmons, J.A., & Spinelli, S. (1999). *New venture creation: Entrepreneurship for the 21st century*.
- Ucbasaran, D., Westhead, P., & Wright, M. (2009). The extent and nature of opportunity identification by experienced entrepreneurs. *Journal of Business Venturing*, 24, 99-115.
- UNECE. (2011). Learning from each other: achievements, challenges and ways forward – Second evaluation report of the implementation of the UNECE ESD Strategy. Geneva, UNECE.http://www.unece.org/fileadmin/DAM/env/esd/6thMeetSC/Informal%20Documents/PhaseIIProgressReport_IP.8.pdf

- United Nations General Assembly. (2000). *United Nations millennium declaration*. <http://www.un.org/millennium/declaration/ares552e.htm>
- United Nations. (2004). *UNEP 2004 Annual Report*. Nairobi, Kenya: United Nations Environment Program. United Nations General Assembly. (2000). *United Nations millennium declaration*.
- Venkataraman, S., Sarasvathy, S. D., Dew, N., & Foster, W. R. (2012). Reflections on the 2010 AMR decade award: whither the promise? Moving forward with entrepreneurship as a science of the artificial. *Academy of Management Review*, 37, 21-33.
- Verheul, I., Thurik, R., Hessels, J., & van der Zwan, P. (2010). Factors influencing the entrepreneurial engagement of opportunity and necessity entrepreneurs. *EIM Research Reports*, 11, 1-24.
- Vogel, P. (2016). From Venture Idea to Venture Opportunity. *Entrepreneurship Theory and Practice*. DOI: 10.1111/etap.12234
- von Wallis, M., & Klein, C. (2015). Ethical requirement and financial interest: a literature review on socially responsible investing. *Business Research*, 8, 61-98.
- Waddock, S., & Steckler, E. (2016). Visionaries and Wayfinders: Deliberate and Emergent Pathways to Vision in Social Entrepreneurship. *Journal of Business Ethics*, 133(4), 719-734.
- Wals, A.E.J. (2012). Shaping the education of tomorrow: 2012 full-length report on the UN decade of education for sustainable development. Unesco.
- Wals, A.E.J. (2015). *Beyond unreasonable doubt: education and learning for socio-ecological sustainability in the Anthropocene*. Inaugural address held upon accepting the personal Chair of Transformative Learning for Socio-Ecological Sustainability at Wageningen University. <http://edepot.wur.nl/365312>
- Wals, A.E.J. & Jickling, B. (2002). "Sustainability" in higher education: from doublethink and newspeak to critical thinking and meaningful learning. *Higher Education Policy*, 15, 121-131.
- Wasdani, K.P., & Mathew, M. (2014). Potential for opportunity recognition along the stages of entrepreneurship. *Journal of Global Entrepreneurship Research*, 4(1), 7.
- Wesselink, R., Blok, V., van Leur, S., Lans, T. & Dentoni, D. (2015). Individual competencies for managers engaged in corporate sustainable management practices. *Journal of Cleaner Production*, 106, 497-506.
- Wesselink, R., De Jong, C., & Biemans, H.J.A. (2010). Aspects of competence-based education as footholds to improve the connectivity between learning in school and in the workplace. *Vocations and Learning*, 3(1), 19-38.
- Wiek, A., Withycombe, L. & Redman, C.L. (2011). Key competencies in sustainability: a reference framework for academic program development. *Sustainability Science*, 6, 203-218.

- White R.E., Thornhill S. & Hampson E. (2007). A biosocial model of entrepreneurship: the combined effects of nurture and nature. *Journal of Organizational Behavior*, 28, 451-466.
- Wood, M.S. & McKinley, W. (2010). The production of entrepreneurial opportunity: a constructivist perspective. *Strategic Entrepreneurship Journal*, 4, 66-84.
- York, J.G., & Venkataraman, S. (2010). The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. *Journal of Business Venturing*, 25(5), 449-463.
- Young, W., & Tilley, F. (2006). Can businesses move beyond efficiency? The shift toward effectiveness and equity in the corporate sustainability debate. *Business Strategy and the Environment*, 15(6), 402-415.
- Zee, F.A. van der, Goetheer, A, & Gijsbers, G. (2016). *De Staat van Nederland Innovatieland 2016. Publiek-Private Samenwerking in Onderzoek en Innovatie*. Delft: TNO
- Zhang, J., Soh, P.H., & Wong, P.K. (2010). Entrepreneurial resource acquisition through indirect ties: compensatory effects of prior knowledge. *Journal of Management*, 36(2), 511–536.

English summary

Competencies for sustainable entrepreneurship

Sustainable entrepreneurs try to manage the triple bottom line, by balancing economic health, social equity and environmental resilience through their entrepreneurial behaviour. Sustainable entrepreneurship is thus associated with the promise of more traditional concepts of entrepreneurship such as gaining economic values, but also brings additional potential both for society and the environment. Even though it is often stated that the triple bottom line is managed by individuals, open ended problems like sustainability issues require difficult and complex decision making processes that are not easy to manage. In line with this, the concept of sustainable entrepreneurship is often referred to as a 'black box', meaning that economic, social and environmental values and goals are combined in entrepreneurial processes regarding sustainability issues, but does not get at how (and even if) this is achieved. Focusing on competencies that can enable individuals to achieve this balance between people, profit and planet, helps in understanding this process and is receiving more and more attention in the literature.

This dissertation reports on a competence framework for sustainable entrepreneurship and the enactment thereof. The competence framework is assessed on its validity in an educational context, reporting on the self-perceived scores of 402 respondents. Furthermore, a performance based assessment was developed to study the relation between the competence framework and opportunity recognition in an educational context. Here, 96 respondents participated in an online platform that formed the foundation for the performance based assessment. Finally, also 33 sustainable entrepreneurs were interviewed to assess the enactment of the competencies in actual decision making processes.

Problem statement

Although the importance of competencies for sustainable entrepreneurship is recognized both from practical and theoretical point of view, the field of competencies for sustainable entrepreneurship is relatively young. The aim of this dissertation is therefore to contribute to the understanding of what competencies constitute a competence framework for sustainable entrepreneurship and how these competencies are enacted in decision making processes.

In line with this, several research issues can be pointed out. First, studies on which competencies could be considered as key competencies to achieve a balance between people, profit and planet are numerous. Interesting to see is that although many scholars warn for the production of endless laundry lists of competencies, the reality is that scholars continue to do so and that real consensus on which competencies constitute sustainable entrepreneurial competence is lacking. In addition, due to the

conceptual nature of most of these studies, the lists of competencies are usually rather abstract academic descriptions of competencies (Delamare Le Deist & Winterton, 2005). There is a need for research that empirically addresses the validity of such lists of competencies. Second, one of the research issues lies in the role that entrepreneurship education has in the development of these competencies for sustainable entrepreneurship. Most entrepreneurship education programs are focused on developing a profit-first mentality that does not align with the aims of sustainable development. Third, the difference between conventional entrepreneurs and sustainable entrepreneurs seems to lie in the value oriented character that is dominant in sustainable entrepreneurship. Nevertheless, the role of moral competencies is under researched and should be more central in research on sustainable entrepreneurship. Fourth and final, moving from the 'which' question to the 'how' question remains problematic. There is a need for research that empirically addresses the actual enactment of these competencies by professionals in the field and relating the competencies with performance measures like opportunity recognition for sustainable development and with decision making processes.

The aim of this dissertation is therefore to provide insights in the enactment of the competencies for sustainable entrepreneurship in the sustainable entrepreneurial process and to contribute to unravelling the so called 'black box' that surrounds the concept of sustainable entrepreneurship. The central research question: *What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes?*, addresses the aim and research issues of this dissertation. In addition, five sub-research questions were formulated:

1. What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?
2. How do key competencies for sustainable entrepreneurship relate to well-known antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?
3. Which individual moral antecedents play a role in the entrepreneurial process of opportunity recognition for sustainable development?
4. How is moral competence enacted in the early stage of the sustainable entrepreneurial process?
5. How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?

Content and main findings

In order to address the questions that zoom in on the role of the competence framework for sustainable entrepreneurship in the entrepreneurial process, the validity of the competence framework should be assessed first. Chapter 2 reports on the assessment of the competence framework for sustainable entrepreneurship. From a synthesis of existing literature on several competence frameworks in different work contexts, the framework designed by Lans and colleagues (2014) was chosen as the most suitable framework for studying competencies for sustainable entrepreneurship. The exploratory study by Lans et al. (2014) resulted in a seven factor competence framework, based on an Exploratory Factor Analysis. However, they also pointed out some issues with some of the results and indicated that more research is necessary to further validate this competence framework. The first research question “What is the empirical strength of the existing key competence frameworks for sustainable entrepreneurship?” aligns with the need to investigate the competence framework in more detail. A new study to establish the validity of the competence framework was executed among 438 would-be entrepreneurs following an extensive entrepreneurship module at their higher education institute. In total 402 responses were deemed suitable to include in the analysis. The results of the Confirmatory Factor Analysis indicate that action competence and strategic management competence merge together into one combined competence that has been labelled strategic action competence. The six factor competence framework including the combined strategic action competence outperformed the original seven factor competence framework, based on an assessment of convergent and discriminant validity. The six factor competence framework exists then of the following competencies: diversity competence, foresighted thinking competence, systems thinking competence, interpersonal competence, normative competence and strategic action competence. The second sub-question: “How do key competencies for sustainable entrepreneurship relate to well-known antecedents for entrepreneurial behavior (i.e. entrepreneurial self-efficacy, intentions, gender, experience and entrepreneurial parents)?”, refers more to the criterion related validity of the framework (i.e. its nomological network). The respondents were subjected to several questions that cover the different antecedents of entrepreneurial behavior. The analysis of the results led to the conclusion that all six competencies correlate with the antecedents as was expected. The correlations were not too high or too low, with some unexpected outcomes like no significant gender differences concerning the scores on the competencies. The overall conclusion that can be drawn from Chapter 2 is that the six factor competence framework for sustainable entrepreneurship is an empirically strong framework. This competence framework for sustainable entrepreneurship, with underlying competencies, can now be implemented in various settings to assess the role of the competence framework in for instance the entrepreneurial process.

Chapter 3 builds on the theory of sustainable entrepreneurship and emphasizes the value

oriented and normative character of sustainable entrepreneurship. Here, the entrepreneurial process as such is operationalized by focussing only on the very first stage of this process, namely opportunity recognition for sustainable development. The model developed by Patzelt and Shepherd (2011) is used to shed light on the process of recognizing opportunities for sustainable development. In this model, altruism is considered as the main value oriented driver that enables individuals to recognize opportunities for sustainable development. Nevertheless, it can be expected that also other moral antecedents can play a role in this process. In this study self-transcendence values, pro-environmental behavior values and moral competencies are empirically studied next to each other. In order to answer the third sub-question: "What role do individual moral antecedents play in the entrepreneurial process of opportunity recognition for sustainable development?", a case study assignment centred around opportunity recognition for sustainable development was developed in which these three moral constructs were queried. In total 106 would-be entrepreneurs participated in the study and the results of 96 students were included in the analysis. The main conclusion that can be drawn is that only pro-environmental behavior values and moral competencies show a significant relation with idea generation for sustainable development. Surprisingly, self-transcendence values (of which altruism is an element) is not significantly related. In addition, the two moral competencies correlate with the other moral antecedents (but not perfectly or too high), which supports the criterion validity even further. These results have led to a re-evaluation of the model developed by Patzelt and Shepherd (2011).

The specific role of the moral competencies is further analysed in Chapter 4. From a theoretical point of view, the two moral competencies, described as normative competence and strategic action competence can be compared with what is described as moral competence in business ethics literature, and can be considered as two sides of the same coin. More specifically, to answer the fourth sub-question: "How is moral competence enacted in the early stage of the sustainable entrepreneurial process?", two different studies were implemented. The first study entails the same study and accompanying responses that have been presented in Chapter 2. In Chapter 4, however, the specific relation between the two moral competencies is assessed. From the analysis it can be concluded that normative competence serves the sustainable part of sustainable entrepreneurship and strategic action competence more the entrepreneurship part in sustainable entrepreneurship, but both deal with the value oriented character. The second study is designed to explore the enactment of the moral competencies in recognizing opportunities for sustainable development. Both normative competence and strategic action competence were recognized in the qualitative responses that were derived from the case study that was also used in Chapter 3. Nevertheless, it seems that some elements of normative competence and strategic action competence are enacted more than other elements in the very early stage of the entrepreneurial process.

Tying things together, Chapter 5 focuses on more experienced sustainable entrepreneurs and on the perceived enactment of the competence framework throughout the development process of their sustainable venture. For this, a focus on six critical moments in entrepreneurial decision making processes, as developed by Maine et al. (2015) was chosen. In total 33 actual sustainable entrepreneurs participated in this study, in which they filled out the questionnaire that queried their perception of the competencies for sustainable entrepreneurship and were subjected to an in-depth semi-structured interview. All competencies were recognized in the responses of the participants, but clear differences in enactment within the different critical moments are recognized. With this, the fifth sub-question: "How are competencies for sustainable entrepreneurship enacted within the decision making process of sustainable entrepreneurs?", is answered. These results say something about the dominant business logic rhetoric, the different paths to a sustainable venture, the importance of investor norms and the risk of social-ethical issues.

Theoretical implications

Chapter 6 discusses the results of this dissertation and reflects on the research aim and research issues presented in Chapter 1 and in the proceeding sections of this summary. Three main domains are tackled, namely competencies for sustainable entrepreneurship, opportunity recognition for sustainable development and entrepreneurship education for sustainable development.

First, the theoretical implications of the results of this dissertation for the field of competencies for sustainable entrepreneurship is discussed. Addressing the research issue concerning the 'what' question, the results indicate that the competence framework for sustainable entrepreneurship consists of 6 key competencies. This is one of the first studies that empirically addresses the validity of such competence frameworks and therefore can be considered as an enrichment of the field. Combining these results with the results from the interviews with actual sustainable entrepreneurs has led to an in-depth perspective on what competencies are important and how they are enacted. Furthermore, the results presented in this dissertation also provide a critical, detailed analysis on the specific role of some of the competencies, in particular of 1) the moral competencies (i.e. normative competence and strategic action competence), 2) foresighted thinking competence and 3) interpersonal competence, as these three competencies stand out from the others concerning the implications these findings might have. Chapter 6 elaborates more on these implications.

Second, the results of this dissertation have implications for the field of opportunity recognition for sustainable development. In Chapters 3 and 4 the conceptual model by Patzelt and Shepherd (2011) on opportunity recognition for sustainable development was used as the main foundation of studying this process. The results of this dissertation have led to a re-evaluation of the model by Patzelt and

Shepherd (2011) as their motivational aspect of the model, captured by altruism towards others, did not come up as a significant. On the other hand, pro-environmental behavior values and the two moral competencies (i.e. normative competence and strategic action competence) did show a significant relation with the number of identified ideas for sustainable development. Therefore it is suggested that these two motivational constructs replace the construct of altruism towards others when discussing the very first stage of the process of opportunity recognition for sustainable development.

The third and final contribution of this dissertation is to the scholarly field of entrepreneurship education. Learning about sustainable entrepreneurship has a positive influence on the intention to also use knowledge about sustainable entrepreneurship in practice. By being subjected to sustainable entrepreneurship more, the profit-first mentality can be overthrown. This dissertation can be supportive of this statement as it introduces a case study that revolves around sustainable entrepreneurship, by implementing the Business Model Canvas. In addition, the results of this dissertation show that having higher pro-environmental behavior values and higher scores on the moral competencies leads to identifying more ideas that are related to sustainable development. Implementing cases focused on sustainable development enables students to practice implementing sustainable development in their (future) entrepreneurial behavior. It could even be argued that introducing sustainable entrepreneurship to would-be (e.g. aspiring, or nascent) entrepreneurs already throughout their educational program can disrupt the equilibrium of their dominant profit driven logic and values.

Practical implications

In Chapter 6 the main implications for practice are discussed in detail on two levels, namely those implications for sustainable ventures and those for higher education institutions. Below the main take-away messages are presented for both levels.

Sustainable start-ups should pay (more) attention to:

1. Monitoring the competencies for sustainable entrepreneurship by using the self-perceived assessment.
2. Challenge the business logic by relying more on moral competencies throughout the whole process.
3. Focus more on foresighted thinking and systems thinking during the first stages of the venture development process to avoid social ethical issues later on.
4. Use the competence framework to acquire the right individuals to reinforce the team.

Higher education institutions should pay (more) attention to:

1. Moving away from the profit-first mentality in teaching methods.
2. Teaching *through* entrepreneurship by implementing tools like the Business Model Canvas and effectuation methods.
3. Dealing with sustainable development as an integrated part of entrepreneurship.

Conclusion

All Chapters in this dissertation mount up to answering the main research question: “What role do competencies for sustainable entrepreneurship play in sustainable entrepreneurial processes?”. The results show that the competencies for sustainable entrepreneurship can be operationalised and measured in a reliable and valid way in a framework consisting of 6 distinct competencies which have largely consistent associations with constructs that are conceptually close (e.g. entrepreneurial self-efficacy, self-transcendence and pro-environmental behaviour). Furthermore, all competencies correlate moderately with each other, which shows the integrated character of the competence framework. An individual needs all six competencies in the daily work as a sustainable entrepreneur. When it comes to the early stages of the entrepreneurial process, which has been described in this dissertation as the opportunity recognition process, it becomes clear that the competencies that tap into values are very important and could be seen as distinctive for sustainable entrepreneurs. Both normative competence and strategic action competence correlate high with idea generation for sustainable development. During the different critical moments in the decision making process, some competencies surface more than others, which show the dynamic and context dependent character of the competencies. It appears that normative competence is either enacted in the very early stages of the venture development process or in the more mature stages. Foresighted thinking competence and systems thinking competence are mostly enacted in the later stages in which decisions on portfolio focus, technology market matching and business model adaption need to be made. Strategic action competence, as well as diversity competence are enacted throughout the development process and interpersonal competence is enacted least throughout the process. These insights contribute to opening the so called black box of sustainable entrepreneurship.

Nederlandse samenvatting

Competenties voor duurzaam ondernemerschap

Duurzame ondernemers proberen de driedubbele ondergrens te managen door het balanceren van economische gezondheid, sociale gelijkheid en veerkracht door behulp van hun ondernemende gedrag. Duurzaam ondernemerschap wordt daarom geassocieerd met de meer traditionele aspecten van ondernemerschap zoals het behalen van economische waarde, maar brengt ook additionele waarde voor zowel de maatschappij als het milieu. Ook al wordt het vaak gezegd dat de driedubbele ondergrens wordt gemanaged door individuen, problemen met een open einde zoals het probleem van duurzaamheid vereisen moeilijke en complexe besluitvormingsprocessen die over het algemeen niet makkelijk te managen zijn. In lijn met bovenstaande, naar concept van duurzaam ondernemerschap wordt vaak gerefereerd als een 'black box'. Hiermee wordt bedoeld dat economische, sociale en milieu gerelateerde normen en waarden worden gebalanceerd in ondernemerschap processen, maar vaak wordt niet aangegeven hoe (en zelfs of) deze balans wel wordt gemaakt. Een focus op competenties die individuen kunnen ondersteunen in het maken van een balans tussen winst, mensen en planeet helpt in het begrijpen van dit proces en krijgt steeds meer aandacht in de literatuur.

Deze dissertatie rapporteert over een competentie raamwerk voor duurzaam ondernemerschap en de bekrachtiging van deze competenties in de praktijk. De validiteit van het competentie raamwerk is getest in een onderwijs context, gebruikmakend van de zelfrapportage van 402 respondenten. Bovendien is er gebruik gemaakt van een prestatie gerichte evaluatie om zo de relatie tussen de competenties voor duurzaam ondernemerschap en kans herkenning voor duurzaamheid in een onderwijs context te onderzoeken. Om dit te kunnen doen hebben 96 respondenten deelgenomen in een online platform waarin de prestatie gerichte evaluatie centraal stond. Ten slotte hebben ook nog 33 duurzame ondernemers deelgenomen aan diepte interviews om zo het gebruik van competenties in de praktijk te kunnen analyseren.

Probleemstelling

Hoewel het belang van competenties voor duurzaam ondernemerschap zowel vanuit praktisch als theoretisch oogpunt wordt erkend, is het veld van competenties voor duurzaam ondernemerschap nog relatief jong. Het doel van dit proefschrift is dus om bij te dragen aan het begrijpen van welke competenties een competentie raamwerk voor duurzaam ondernemerschap vormen en hoe deze competenties in besluitvormingsprocessen worden ingezet.

Hierop volgend kunnen verschillende onderzoeksproblemen vastgesteld worden. Ten eerste zijn er meer dan genoeg studies die rapporteren over welke competenties als sleutelcompetenties

kunnen worden beschouwd in het balanceren tussen winst, mensen en planeet. Interessant om te zien is dat hoewel veel onderzoekers waarschuwen voor de productie van eindeloze waslijsten van competenties, de realiteit is dat onderzoekers dit blijven doen en dat echte consensus over welke competenties het raamwerk voor duurzaam ondernemerschap vormen, ontbreekt. Vanwege de conceptuele aard van de meeste van deze studies zijn de competenties ook meestal abstracte academische beschrijvingen van competenties (Delamare Le Deist & Winterton, 2005). Er is behoefte aan onderzoek dat empirisch de validiteit van dergelijke lijsten van competenties adresseert. Ten tweede ligt een van de onderzoeksproblemen in de rol die ondernemerschapsonderwijs heeft in de ontwikkeling van deze competenties voor duurzaam ondernemen. De meeste onderwijsprogramma's zijn gericht op het ontwikkelen van een winst-eerst mentaliteit die niet aansluit bij de doelstellingen van duurzaamheid. Ten derde lijkt het verschil tussen conventionele ondernemers en duurzame ondernemers in het waarde-gericht karakter dat dominant is in duurzaam ondernemerschap te liggen. Desalniettemin wordt de rol van morele competenties niet vaak onderzocht en zou het centraal moeten staan in onderzoek naar duurzaam ondernemerschap. Als vierde en laatste, het verplaatsen van de 'welke' vraag naar de 'hoe' vraag blijft vaak problematisch. Er is behoefte aan onderzoek dat empirisch de daadwerkelijke verwezenlijking van deze competenties door duurzame ondernemers adresseert door bijvoorbeeld prestatie gerichte evaluaties op het gebied van kans herkenning voor duurzame ontwikkeling en besluitvormingsprocessen te implementeren.

Het doel van dit proefschrift is dus om inzicht te geven in het inzetten en bekrachtigen van de competenties voor duurzaam ondernemerschap in het ondernemerschap proces en om bij te dragen tot het ontrafelen van de zogenaamde 'black box' die het concept van duurzaam ondernemerschap omringt. De centrale onderzoeksvraag is dan als volgt: *Welke rol spelen competenties voor duurzaam ondernemerschap in duurzame ondernemerschapsprocessen?*. Deze vraag adresseert de doelstellingen en onderzoek problemen van dit proefschrift. Daarnaast werden vijf sub-onderzoeksvragen geformuleerd:

1. Wat is de empirische kracht van bestaande kern competentie raamwerken voor duurzaam ondernemerschap?
2. Hoe hebben de competenties voor duurzaam ondernemen betrekking op bekende antecedenten voor ondernemend gedrag (d.w.z. geloof in eigen kunnen op het gebied van ondernemerschap, ondernemende intenties, geslacht, ervaring en ondernemende ouders)?
3. Welke individuele morele antecedenten spelen een rol in het ondernemerschap proces van kansen herkenning voor duurzame ontwikkeling?
4. Hoe worden morele competenties in het vroege stadium van het duurzame ondernemingsproces ingezet?
5. Hoe worden competenties voor duurzaam ondernemen in het besluitvormingsproces van duurzame ondernemers ingezet?

Inhoud en belangrijkste bevindingen

Om de vragen die betrekking hebben op de rol van het competentie raamwerk voor duurzaam ondernemerschap in het ondernemersproces aan te pakken, moet de validiteit van het competentie raamwerk eerst beoordeeld worden. Hoofdstuk 2 rapporteert over het testen van het competentie raamwerk voor duurzaam ondernemerschap. Uit een synthese van bestaande literatuur over verschillende competentie raamwerken in verschillende werkcontexten werd het door Lans en collega's ontworpen (2014) raamwerk gekozen als het meest geschikte raamwerk voor het bestuderen van competenties voor duurzaam ondernemen. De verkennende studie van Lans et al. (2014) resulteerde in een zeven-factor competentie raamwerk, gebaseerd op een Exploratory Factor Analysis. Zij hebben echter ook enkele problemen geconstateerd met sommige resultaten en aangegeven dat meer onderzoek nodig is om dit competentie kader verder te valideren. De eerste onderzoeksvraag "Wat is de empirische kracht van bestaande kern competentie raamwerken voor duurzaam ondernemerschap?" is in lijn met de noodzaak om het competentie raamwerk van Lans et al. (2014) nader te onderzoeken. Een nieuwe studie om de validiteit van het competentie raamwerk vast te stellen werd uitgevoerd onder 438 ondernemende studenten die een uitgebreide ondernemerschapsmodule bij hun hoger onderwijsinstituut volgen. In totaal werden 402 reacties geacht geschikt om in de analyse mee te nemen. De resultaten van de Confirmatory Factor Analysis geven aan dat actie competentie en strategisch management competentie samenvoegen in één gecombineerde competentie die is aangeduid als strategische actie competentie. Het zes-factor competentie raamwerk, inclusief de gecombineerde strategische actie competentie, presteert beter dan het oorspronkelijke zevenfactor kader, gebaseerd op een beoordeling van de convergente en discriminerende validiteit. Het zes-factor competentie raamwerk bestaat dan uit de volgende competenties: diversiteit competentie, vooruit denken competentie, systeem denken competentie, interpersoonlijke competentie, normatieve competentie en strategische actie competentie. De tweede sub-vraag: "Hoe hebben de competenties voor duurzaam ondernemen betrekking op bekende antecedenten voor ondernemend gedrag (d.w.z. geloof in eigen kunnen op het gebied van ondernemerschap, ondernemende intenties, geslacht, ervaring en ondernemende ouders)?", verwijst meer naar de criterium gerelateerde validiteit van het raamwerk (dat wil zeggen het nominale netwerk). De respondenten werden onderworpen aan verschillende vragen die betrekking hebben op de verschillende antecedenten van ondernemend gedrag. De analyse van de resultaten heeft tot de conclusie geleid dat alle zes competenties correleren met de antecedenten, zoals ook verwacht werd. De correlaties waren niet te hoog of te laag, met enkele onverwachte resultaten, zoals geen significante verschillen op basis van geslacht wat betreft de scores op de competenties. De algemene conclusie die uit hoofdstuk 2 kan worden getrokken is dat het zes-factor competentie raamwerk voor duurzaam ondernemerschap een empirisch sterk raamwerk is. Dit competentie raamwerk voor duurzaam ondernemerschap, met onderliggende competenties, kan nu in verschillende contexten worden geïmplementeerd om de rol van het competentie raamwerk in bijvoorbeeld het ondernemingsproces te beoordelen.

Hoofdstuk 3 bouwt voort op de theorie van duurzaam ondernemerschap en benadrukt het

waarde gericht en normatief karakter van duurzaam ondernemerschap. Hierbij wordt het ondernemersproces als zodanig geoperationaliseerd door alleen te concentreren op de eerste fase van dit proces, namelijk de herkenning van een kans of nieuw idee voor duurzame ontwikkeling. Het door Patzelt en Shepherd (2011) ontwikkelde model wordt gebruikt om het proces van kans herkenning voor duurzame ontwikkeling te onderzoeken. In dit model wordt altruïsme beschouwd als de belangrijkste waarde-georiënteerde drijver die individuen in staat stelt kansen voor duurzame ontwikkeling te herkennen. Niettemin kan men verwachten dat ook andere morele antecedenten in dit proces een rol kunnen spelen. In deze studie worden zelf-overstijgende waarden, pro-milieu gedragswaarden en morele competenties empirisch naast elkaar bestudeerd. Om de derde deelvraag te beantwoorden: "Welke individuele morele antecedenten spelen een rol in het ondernemerschap proces van kansen herkenning voor duurzame ontwikkeling?", werd een casestudieopdracht ontworpen rond kans herkenning voor duurzame ontwikkeling waarin de drie morele antecedenten werden uitgevraagd. In totaal hebben 106 ondernemers deelgenomen aan de studie en werden de resultaten van 96 studenten in de analyse opgenomen. De belangrijkste conclusie die kan worden getrokken is dat alleen waarden voor pro-milieu gedrag en de morele competenties een significante relatie hebben met idee generatie voor duurzame ontwikkeling. Verrassend genoeg zijn zelf-overstijgende waarden (waarvan altruïsme een element is) niet significant verwant. Bovendien correleren de twee morele competenties met de andere morele antecedenten (maar niet te laag of te hoog), die de criteriumvaliditeit nog verder ondersteunen. Deze resultaten hebben geleid tot een herbeoordeling van het model ontwikkeld door Patzelt en Shepherd (2011).

De specifieke rol van de morele competenties wordt verder geanalyseerd in hoofdstuk 4. Vanuit theoretisch oogpunt kunnen de twee morele competenties, omschreven als normatieve competentie en strategische actie competentie, worden vergeleken met wat wordt beschreven als morele competentie in bedrijfsethiek literatuur en kan worden beschouwd als twee kanten van dezelfde munt. Om de vierde sub-vraag te beantwoorden: "Hoe worden morele competenties in het vroege stadium van het duurzame ondernemingsproces ingezet?", werden twee verschillende studies uitgevoerd. De eerste studie houdt in dezelfde studie en respondenten in die in hoofdstuk 2 ook al zijn gepresenteerd. In hoofdstuk 4 wordt echter de specifieke relatie tussen de twee morele competenties geanalyseerd. Uit de analyse kan geconcludeerd worden dat normatieve competentie het duurzame deel van duurzaam ondernemerschap behelst en strategische actie competentie draagt meer bij aan het ondernemerschap deel van duurzaam ondernemerschap, waar beide wel het waarde gericht karakter dienen. De tweede studie is bedoeld om de bekrachtiging van de morele competenties in kans herkenning voor duurzame ontwikkeling te onderzoeken. Zowel normatieve competentie als strategische actie competentie werden herkend in de kwalitatieve reacties die afkomstig zijn uit de casestudy die ook in hoofdstuk 3 werd gebruikt. Niettemin lijkt het erop dat sommige elementen van normatieve competentie en strategische actie competentie meer dan andere elementen in dit zeer vroege stadium van het ondernemersproces naar voren komen.

Hoofdstuk 5 concentreert zich op meer ervaren duurzame ondernemers en op het inzetten van

het competentie raamwerk tijdens het ontwikkelingsproces van hun duurzame onderneming. Hiervoor is een focus op de zes kritieke momenten in besluitvormingsprocessen, ontwikkeld door Maine et al. (2015) gekozen. In totaal hebben 33 duurzame ondernemers deelgenomen aan deze studie, waarin zij de zelf gerapporteerde vragenlijst hebben ingevuld en hebben deelgenomen aan semigestructureerde interviews. Alle competenties werden herkend in de reacties van de deelnemers, maar duidelijke verschillen in het inzetten van de competenties binnen de verschillende kritieke momenten zijn vastgesteld. Hiermee wordt de vijfde sub-vraag: "Hoe worden competenties voor duurzaam ondernemen in het besluitvormingsproces van duurzame ondernemers ingezet?" beantwoord. De resultaten in dit hoofdstuk zeggen iets over de dominante winst eerst retoriek, de verschillende visies voor een duurzame onderneming, het belang van beleggersnormen en het risico op sociaal-ethische problemen.

Theoretische implicaties

Hoofdstuk 6 bespreekt de resultaten van dit proefschrift en reflecteert op het onderzoeksdoel en onderzoeksproblemen die in hoofdstuk 1 en in de voorgaande secties van deze samenvatting zijn gepresenteerd. Drie hoofddomeinen zullen hieronder worden aangestipt, namelijk competenties voor duurzaam ondernemen, kans herkenning voor duurzame ontwikkeling en ondernemerschap onderwijs voor duurzame ontwikkeling.

Ten eerste worden de theoretische implicaties van de resultaten van dit proefschrift voor het veld van competenties voor duurzaam ondernemerschap besproken. Als het gaat om het onderzoeksprobleem met betrekking tot de 'wat' vraag laat deze dissertatie zien dat het competentie raamwerk voor duurzaam ondernemerschap bestaat uit 6 kerncompetenties. Dit is een van de eerste studies die empirisch de validiteit van een dergelijke competentie raamwerk adresseert en kan daarom als een verrijking van het veld worden beschouwd. Het combineren van deze resultaten met de resultaten van de interviews met daadwerkelijke duurzame ondernemers heeft geleid tot een diepgaand perspectief op welke competenties belangrijk zijn en hoe ze worden ingezet. Bovendien geven de resultaten in dit proefschrift ook een kritische, gedetailleerde analyse van de specifieke rol van sommige competenties, in het bijzonder van 1) de morele competenties (d.w.z. normatieve competentie en strategische actie competentie), 2) vooruit denken competentie en 3) interpersoonlijke competentie, omdat deze drie competenties opvallen ten opzichte van de anderen met betrekking tot de implicaties die deze bevindingen zouden kunnen hebben. Hoofdstuk 6 gaat dieper in op deze implicaties.

Ten tweede, de uitkomsten van dit proefschrift hebben gevolgen voor het veld van kans herkenning voor duurzame ontwikkeling. In hoofdstukken 3 en 4 werd het conceptuele model van Patzelt and Shepherd (2011) op het gebied van kans herkenning voor duurzame ontwikkeling gebruikt als de basis voor het bestuderen van dit proces. De resultaten van dit proefschrift hebben geleid tot een herbeoordeling van het model door Patzelt en Shepherd (2011), omdat het motiverende aspect van het model, dat door altruïsme ten opzichte van anderen is aangeduid, niet als significant uit de test is gekomen. Aan de andere kant hebben de pro-milieu waarden en de twee morele competenties (d.w.z.

normatieve competentie en strategische actie competentie) wel een significante relatie met het aantal geïdentificeerde ideeën voor duurzame ontwikkeling. Daarom wordt voorgesteld dat deze twee motiverende constructen het construct van altruïsme ten opzichte van anderen vervangen als belangrijke antecedenten in de eerste fase van het proces van kans herkenning voor duurzame ontwikkeling.

De derde en laatste bijdrage van dit proefschrift betreft het vakgebied van ondernemerschap onderwijs. Het leren over duurzaam ondernemerschap heeft een positieve invloed op de intentie om ook kennis over duurzaam ondernemerschap in de praktijk te gebruiken. Door meer onderworpen te worden aan duurzaam ondernemerschap, kan de winst-eerst mentaliteit worden omgebogen. Dit proefschrift kan deze verklaring ondersteunen omdat het een casestudy introduceert die draait om duurzaam ondernemerschap, door het Business Model Canvas te implementeren. Daarnaast blijkt uit de resultaten van dit proefschrift dat het hebben van hogere waarden voor het pro-milieu waarden en hogere scores op de morele competenties leidt tot het identificeren van meer ideeën die verband houden met duurzame ontwikkeling. Het implementeren van cases die gericht zijn op duurzame ontwikkeling stellen studenten in staat om duurzaamheid te implementeren in hun (toekomstige) ondernemende gedrag. Het zou zelfs kunnen worden aangevoerd dat het introduceren van duurzaam ondernemerschap aan potentiële ondernemers (bv. aspirerend of beginnend) ten tijde van hun opleiding het evenwicht kan verstoren wat betreft hun dominante winst gedreven logica en waarden.

Praktische implicaties

In hoofdstuk 6 worden de belangrijkste implicaties voor de praktijk op twee niveaus gedetailleerd besproken, namelijk de implicaties voor duurzame ondernemingen en die voor instellingen voor hoger onderwijs. Hieronder staan de belangrijkste take-away boodschappen voor beide niveaus.

Duurzame ondernemers moeten (meer) aandacht besteden aan:

1. Monitoren van de competenties voor duurzaam ondernemerschap door gebruik te maken van de zelfrapportage tool.
2. Het uitdagen van de winst gedreven logica door meer te vertrouwen op de twee morele competenties door het hele proces.
3. Een grotere focus op vooruit denken competentie en systeem denken competentie tijdens de eerste stappen in het ontwikkel proces van de duurzame onderneming om later in het proces sociaal- ethische problemen te vermijden.
4. Gebruik maken het competentie raamwerk om de juiste personen te verwerven om het team te versterken.

Hoger onderwijsinstellingen moeten (meer) aandacht besteden aan:

1. Vermijden van de winst-eerst mentaliteit in onderwijsmethoden.

2. Lesgeven *door* ondernemerschap door het implementeren van tools zoals het Business Model Canvas en effectuerende methoden.
3. Omgaan met duurzame ontwikkeling als een geïntegreerd onderdeel van ondernemerschap.

Conclusie

Alle hoofdstukken in dit proefschrift volgen de hoofdvraag: "Welke rol spelen competenties voor duurzaam ondernemerschap in duurzame ondernemerschap processen?". Uit de resultaten blijkt dat de competenties voor duurzaam ondernemerschap kunnen worden geoperationaliseerd en gemeten op een betrouwbare en geldige manier in een raamwerk dat bestaat uit zes verschillende competenties. Deze zes competenties laten voor een groot deel consistente associaties zien met constructen die conceptueel dicht bij de competenties liggen, zonder daarbij extreme waarden te vertonen (bijv. geloof in eigen kunnen, zelf-overstijgend en pro-milieu gedrag). Bovendien correleren alle competenties tot een bepaald niveau met elkaar, wat het geïntegreerde karakter van het competentie raamwerk weergeeft. Een individu heeft alle zes competenties nodig in het dagelijkse werk als duurzaam ondernemer te kunnen presteren. Wat de vroege stadia van het ondernemerschap proces betreft, dat in dit proefschrift als kans herkenning voor duurzame ontwikkeling wordt beschreven, wordt duidelijk dat de competenties die ingaan op waarden zeer belangrijk zijn en kunnen worden gezien als onderscheidend vermogen voor duurzame ondernemers. Zowel normatieve competentie als strategische actie competentie correleren hoog met idee generatie voor duurzame ontwikkeling. Tijdens de verschillende kritieke momenten in het besluitvormingsproces vallen sommige competenties meer op dan anderen, wat het dynamische en contextafhankelijke karakter van de competenties toont. Het lijkt erop dat normatieve competentie vooral in de eerste fase van het ontwikkelingsproces van de onderneming wordt ingezet. Vooruit denken competentie en systeem denken competentie worden meestal in de latere fasen ingezet waarin beslissingen over de portfolio keuze, technologisch-markt match en aanpassing van het bedrijfsmodel moeten worden vastgesteld. Strategische actie competentie, evenals diversiteit competentie, worden in het gehele ontwikkelingsproces ingezet en de interpersoonlijke competentie wordt over het algemeen het minst in het proces ingezet. Deze inzichten dragen bij aan de opening van de zogenaamde 'black box' van duurzaam ondernemerschap.

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About the author

Lisa Ploum was born on November 29, 1988, in Venlo. After finishing fundamental education, Lisa obtained a bachelor's degree in management and consumer studies at Wageningen University. Thereafter, she obtained the Research Master Variant degree in management, economics and consumer studies at Wageningen University. In 2013, she started her PhD trajectory, which was part of the European funded Euregio Rhine-Waal research project (INTERREG IV), at Wageningen University & Research at the Management Studies group. Here, she worked simultaneously on the Euregio Rhine-Waal research project, which resulted in a practical toolbox for higher education institutions and on her PhD, which has resulted in this dissertation.

List of Peer reviewed publications

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2017). Toward a validated competence framework for sustainable entrepreneurship. *Organization and Environment*. DOI: 10.1177/1086026617697039.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2018). Exploring the relation between individual moral antecedents and entrepreneurial opportunity recognition for sustainable development. *Journal of Cleaner Production*, 172, 1582-1591. DOI: 10.1016/j.jclepro.2017.10.296

Manuscripts under review

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. Self-interest versus self-transcendence. An empirical approach to investigate the role of moral competencies in idea generation for sustainable development in higher education. Submitted to *Business Ethics: a European review*.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. Unravelling the role of competencies for sustainable entrepreneurship within the decision making process of sustainable entrepreneurs. Manuscript submitted to *Business & Society*.

Lans, T., Baggen, Y., & Ploum, L. Towards more synergy in entrepreneurial competence research in entrepreneurship education. Submitted for an edited book on entrepreneurship education by Alain Fayolle.

Professional publications

Ploum, L.J.L., Orhei, L., Schauburger, M., Blok, V., & Haanstra, A. (2015). Euregio Rhein-Waal toolbox: a toolbox for analysing entrepreneurship education in Higher Education Institutes.

Presented conference papers and workshops

Ploum, L. (2013-2017). Sustainable Entrepreneurship Scan. Workshop given at several occasions for Van Hall Larenstein, Platform VO-HO and G-BiB.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2014). *The role of competencies in managing the trade-offs in sustainable entrepreneurial practices*. Paper presented at the European Business Ethics Network (EBEN) conference, Lisbon.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2015). *The role of moral decision making in managing the triple bottom line in entrepreneurial practices*. Paper presented at the European Business Ethics Network (EBEN) conference, Copenhagen.

Ploum, L., Blok, V. (2015). *Hunting for opportunities and the role of competencies for sustainable entrepreneurship*. Workshop given at the International week at the University of Vechta, Germany.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2016). *Leren voor duurzame ontwikkeling: de rol van morele competenties in het herkennen van kansen voor duurzame ontwikkeling*. Key note speech at Studiedag, KU Leuven, Belgium.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2016). *Analysing the role of moral competencies in recognizing opportunities for sustainable development*. Paper presented at the Sustainability, Ethics and Entrepreneurship (SEE) conference, Denver.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2016). *Exploring the relationship between individual moral characteristics and opportunity recognition for sustainable development*. Paper presented at the Competence 2016 conference, Wageningen.

Ploum, L., Blok, V. (2017). *Sustainable entrepreneurship, opportunity recognition for sustainable development and competencies*. Series of lectures and assignments provided for the Global Responsibility Week, Nottingham Business School, England.

Ploum, L., Blok, V., Lans, T., & Omta, S.W.F. (2017). *Unravelling the role of competencies for sustainable entrepreneurship in decision making processes*. Paper presented at the International Association for Business and Society (IABS) conference, Amsterdam.

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
Writing research proposal	WUR	2013	6
Advanced Econometrics	WUR	2014	6
Competence theory, research and practice	ICO/WASS	2015	3
Ethical theory and moral practice	OZSW	2015	6
B) General research related competences			
Introduction course	WASS	2013	1
Scientific writing	WGS	2015	1.8
<i>'The role of competencies in managing the trade-offs in sustainable entrepreneurial practices'</i>	EBEN, Lisbon	2014	1
<i>'The role of moral decision making in managing the triple bottom line in entrepreneurial practices'</i>	EBEN, Copenhagen	2015	1
Workshop: 'Hunting for opportunities and the role of competencies for sustainable entrepreneurship'	International week, University of Vechta	2015	1
<i>'Leren voor duurzame ontwikkeling: de rol van morele competenties in het herkennen van kansen voor duurzame ontwikkeling'</i>	Keynote op Studiedag, KU Leuven	2016	1
Workshop: 'sustainable entrepreneurship scan'	a. Van Hall Larenstein b. Platform VO-HO c. G-BiB	a. 2013-2017 b. 2016 c. 2017	3
<i>'The role of moral decision making in recognizing opportunities for sustainable development'</i>	SEE, Denver and Competence 2016, Wageningen	2016	1
<i>'Analysing the role of moral competencies in managing the triple bottom line in sustainable entrepreneurial practices'</i>	IABS, Amsterdam	2017	1
C) Career related competences/personal development			
Project management Knowledge Alliance Rhine-Waal & development of toolbox	Euregio INTEREGG IV	2013-2015	2
Teaching Course: 'sustainable entrepreneurship, opportunity recognition for sustainable development and competencies'	Global Responsibility Week, Nottingham Business School	2017	1
Teaching MCB-11306, MST-54306	MST	2013-2016	1
Supervising BSc and MSc students	MST	2014-2017	2
Grant writing: Climate KIC education grant	ECS/MST	2014	1
Total			39.8

*One credit according to ECTS is on average equivalent to 28 hours of study load

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