

Wageningen University and Research Centre

Department of Social Sciences
Marketing and Consumer Behaviour Group

MSc Thesis

Influence of personal characteristics, attention and perception on entrepreneurial opportunity identification

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Study:	MME, Management, Economics and Consumer Studies
Specialisation:	Marketing and Consumer Behaviour
Course name:	MSc. Thesis Marketing and Consumer Behaviour
Thesis code:	MCB-80436
Credits:	36
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Abstract

Entrepreneurial opportunity identification is concerning the perception of market needs and searching for existing resources to create the fit between them. Identify and deliver new products or services that satisfy market needs is the main purpose of entrepreneurs. The cognitive processes that entrepreneurs apply during the entrepreneurial opportunity identification process have been examined. The gathering of the information about the entrepreneurial opportunities, which part of the information do entrepreneurs store more in their memory and how the information involves the identification. Four SWOT analyses have been presented as stimuli. The stimuli have been manipulated in their attributes configuration. The eye-tracking system has been used to track the respondents' eye movements during the collection of information to know what interests entrepreneurs more. The results have revealed that more or less entrepreneurial individuals do not differ during the process of information collection. The study captured and explored the respondents' two personal characteristics (entrepreneurial proclivity and need for achievement), memory and risk perception of presented stimuli. The higher the level of individual's entrepreneurial proclivity and need for achievement the more entrepreneurs store in their memory about the Opportunities. The perception of entrepreneurial opportunities and their risk perception have been determined as a significant condition for the entrepreneurial opportunity identification. Moreover, the study shows that biases that entrepreneurs are risk averse and see only the benefits of the projects they are exploiting are partly true. Entrepreneurs do perceive the Opportunities equal as Treats but they remember more about the Opportunities. The same apply on their risk perception. If they perceive the project as risky they are not going to identify it as feasible for further exploitation.

Key words: *entrepreneurial opportunity, identification process, eye-tracking, perception, entrepreneurial proclivity, need for achievement, memory*

Acknowledgement

I would like to express the greatest gratitude to all the people that have helped me and supported me throughout the whole study and thesis writing.

This thesis and whole studies would not have been possible without the instrumental supervision of Mr. Frans J.H.M. Verhees and Mrs. Erica H.W.I. van Herpen, the unending support of whole family, especially my lovely girlfriend that inspired me and encouraged me even towards the bad moods and occasions that appeared during the thesis writing. I also thank to all my friends that helped me directly or indirectly to accomplish the way.

I am obliged to thank to the Wageningen University and Research Centre in the Netherlands for the knowledge and experience I have gained during the studies and finally the Czech University of Life Sciences in Prague and their representatives for their financial support and the opportunity they provide me to study abroad.

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1. Introduction

The present entrepreneurial literature considers the entrepreneurial topic from many points of view. Nevertheless we can divide them into three main areas: 1) entrepreneurship and how is it delineated; 2) concept of entrepreneurial opportunities and their identification; and 3) entrepreneurial individuals, their characteristics and cognitive processes.

The literature delineates the concept of entrepreneurship (Shane and Venkataraman, 2000; Lumpkin and Dess, 1996; De Carolis and Saporito, 2006) that includes the concept of entrepreneurial opportunity and difference between its' types (Smith et al., 2009; Short et al., 2010) and the process of its identification (Ardichvili et al., 2003; Shane, 2000; Eckhardt and Shane, 2003; DeTienne et al., 2004; Baron and Ensley, 2004).

The literature also defines who is an entrepreneur (Gartner, 1989; Ardichvili *et al.*, 2003; Baron, 2004) and how his/her personal characteristics differ from others (Matsuno *et al.*, 2002; Tajeddini and Mueller, 2008; Zhang and Bruning, 2011).

The literature, concerning the cognitive processes of entrepreneurs, researches mainly the decision making process and how entrepreneurs make decision "under the risk" (Smidts, 1990; Woods and Williams, 2013). Risk perception and risk taking is another big topic due to researchers' assumption that entrepreneurs have higher risk taking propensity (Slovic, 1987; Brockhaus, 1992; Palich and Bagby, 1995; Gartner and Liao, 2012). Awareness of entrepreneurial opportunity (Gaglio and Katz, 2001; Tang et al., 2012) and its perception (Hills et al., 1997; Renko et al., 2012) are considered as important aspects for further exploitation of identified entrepreneurial opportunity.

Entrepreneurship, leading to innovation in new products and services, markets, technologies and processes (Shane and Venkataraman, 2000; Lumpkin and Dess, 1996), is the main domain of this study. This paper studies entrepreneurship from a cognitive perspective, how individuals identify - perceive, store and evaluate - entrepreneurial opportunities. The cognitive mechanisms are about receiving, processing, storing and exploiting external information (Baron, 2004).

The essence of *entrepreneurship* is in identification, evaluation and exploitation of the most profitable entrepreneurial opportunities. This is considered as an action by individuals, small firms, strategic business units or large companies (Shane and Venkataraman, 2000; Lumpkin and Dess, 1996; De Carolis and Saporito, 2006).

Entrepreneurial opportunities are chances to meet market wants through innovations that deliver added value (Ardichvili *et al.*, 2003). This is based on identification, evaluation and

exploitation of new goods, services, raw materials, markets or organising methods. Additionally, entrepreneurial opportunity assumes that parallel to presence of lucrative (entrepreneurial) opportunities there is also a presence of enterprising individuals - entrepreneurs (Shane and Venkataraman, 2000).

Entrepreneurs are seen as individuals with distinct sets of personal characteristics, like need for achievement, internal locus of control, self-efficacy, tolerance for ambiguity, creativity, risk taking attitude and entrepreneurial alertness (Ardichvili *et al.*, 2003). This personal set of characteristics can be born as well as learned. Individuals' entrepreneurial characteristics do not have to occur just in private sector, e.g. by establishing a new venture, but also in public sector or in already existing companies (Shane and Venkataraman, 2000). Micro and small business firms are an extension of individuals who are in charge, e.g. owners or managers (Lumpkin and Dess, 1996).

The individuals' *opportunity identification* process is delineated into three steps: (1) perception of market needs and/or underemployed resources, (2) discovery of a fit between particular market needs and specific resources, and (3) creation of new fit between market needs and resources.

Perception plays an important role in the identification and decision making processes. Entrepreneurs have a chance to identify the opportunity and also perceive the risk of that opportunity when their senses notice the external stimulus or stimulus configuration (Baron, 2004). Entrepreneurs are not going to identify the opportunity if they do not perceive that there are some market needs that are not yet satisfied.

There is still a gap in the literature, concerning the cognitive perspective, how entrepreneurs look at the entrepreneurial opportunities, how they evaluate and store the external information within the entrepreneurial opportunity identification process. Aim of this research is to make a new contribution to the entrepreneurial literature that will lead to further discovering of the entrepreneurial phenomenon from a cognitive point of view.

This paper presents a model and hypothesis about the relationship of how entrepreneurs' characteristics influence the opportunity identification process and how they store and evaluate the gathered information. This relationship is empirically tested on the sample of international students of Wageningen University and Research Centre, in the Netherlands.

Results of this study can be beneficial for agencies or other entities that are interested in stimulation of entrepreneurship, e.g. banks, governmental agencies etc. The results describe how entrepreneurs identify the entrepreneurial opportunities and how they differ in that process based on their personal capabilities.

2. Literature review

2.1 Entrepreneurship

The concept of entrepreneurship is a way of delivering the innovation or new value creation on the market by identification, evaluation and exploitation of the most profitable entrepreneurial opportunities. Such innovation or new value creation can be delivered by entering already existing markets, or establishing a new one, with new or existing goods and services. This can be executed by start-up firms or by already existing firms (Burgelman, 1983; Gartner, 1989; Lumpkin and Dess, 1996).

Entrepreneurship includes the study of entrepreneurial opportunities. Each of the opportunities has different qualities. These qualities are evaluated differently by different individuals. Thus entrepreneurship occurs where there is a presence of profitable opportunities and enterprising individuals (Shane and Venkataraman, 2000). Entrepreneurship is about identification, evaluation and exploitation of entrepreneurial opportunities (De Carolis and Saparito, 2006) by enterprising individuals.

2.2 Personality characteristics related to entrepreneurship

Entrepreneurs, as enterprising individuals, are persons with particular type of personal capabilities that are leading to innovation and new venture creation. They deliver innovation through new goods or services, technologies, exploitation of new production sources, new markets or organising methods (Schumpeter, 1942). Thus entrepreneurs are perceived as persons that know how to combine the production factors to deliver an innovative added value to the market or to break the status quo.

In this study are entrepreneurs in the centre of analysis. Entrepreneurs' set of capabilities are the keys to explain the entrepreneurship phenomenon because entrepreneurs are the cause of entrepreneurship (Gartner, 1989). Neoclassical equilibrium theory proposes that entrepreneurs are individuals with a higher proclivity for uncertainty (Shane, 2000). In addition, the psychological theory perspective see entrepreneurs as individuals with personal characteristics such as a need for achievement, willingness to bear uncertainty, self-efficacy, internal locus of control, tolerance for ambiguity, creativity and risk taking propensity (Shane, 2000). Those personal characteristics that are highly correlated to entrepreneurship are described more in detail in next paragraphs.

2.2.1 Need for achievement

One of the most distinguishable qualities of entrepreneurs is a need for achievement. This personal characteristic is an entrepreneurs' internal motivation. It refers to a stable, learned characteristic that delivers satisfaction by striving and achieving higher levels of excellence. Need for achievement is an effective instrument how to differentiate between individuals that have or do not have the entrepreneurial predispositions. Individuals who have higher level in need for achievement are searching for situations where they have a high degree of responsibility for outcomes. Such activities or tasks that require individual skills and effort and have moderate degree of risk. Situations where such individuals have a direct control over the overall results or they can see how their work affects the overall outcome. Need for achievement is significantly related to founding new companies (Shane *et al.*, 2003) thus higher level in need for achievement can be usually identified by new venture founders. Entrepreneurs with higher level in need for achievement are also more likely to be proactive in their success leading strategies (Shane *et al.*, 2003; Zhang and Bruning, 2011).

2.2.2 Self-efficacy

"Self-efficacy is the belief in one's ability to muster and implement the necessary personal resources, skills, and competencies to attain a certain level of achievement on a given task" (Shane *et al.*, 2003, p. 267) at a specific level of expertise. Self-efficacy can be also explained as individuals' capability that "mobilises the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives" (Chen *et al.*, 1998, p. 296). Self-efficacy is a good tool to predict individuals' performance in a task and also explain why different individuals with equal abilities can perform differently. Individuals with higher self-efficacy are more internally motivated to perform the tasks more effectively. They are more willing to increase their effort, for a longer time, and persist to challenges or setbacks. They are also willing to set higher goals and develop better plans and strategies for the tasks. The role of self-efficacy is shown as a key antecedent of establishing a new venture or starting own business. It can be also use as a predictor of entrepreneurial behaviour (Chen *et al.*, 1998; Shane *et al.*, 2003).

Some studies have reported that the unobserved self-efficacy beliefs can be substituted with the effect of internal locus of control (Shane *et al.*, 2003). The main differences between those two domains are that self-efficacy can be affected by individuals' performance and internal locus of control can be affected by prior knowledge and experiences (Chen *et al.*, 1998).

Individuals with higher self-efficacy are more likely to seek ways to exploit opportunities (Shane *et al.*, 2003). In addition self-efficacy is positively associated with opportunity perceptions (Krueger *et al.*, 2000).

2.2.3 Internal locus of control

One of the most researched entrepreneurs' personal characteristic is locus of control. Locus of control is conceptualised as individuals' believes in internal or external forces that affect events or outcomes of their work (Chen *et al.*, 1998; Shane *et al.*, 2003). Individuals with internal locus of control perceive themselves as a main cause of success or failure of their business. They believe that their fate and fortune is directly affected through their own actions and personal abilities, effort, or skills. In contrast, individuals with external locus of control belief that events or outcomes of their work are affected by external forces such as destiny or luck (Mueller and Thomas, 2001; Zhang and Bruning, 2011).

Entrepreneurs with internal locus of control are willing to seek entrepreneurial actions where they can use their own ability and have a direct impact on their business outcomes (Mueller and Thomas, 2001; Shane *et al.*, 2003). Entrepreneurs with higher level of internal locus of control are willing to take an action to be successful that is internally driven by their innovativeness and creative ideas (Zhang and Bruning, 2011).

2.2.4 Tolerance for ambiguity

Ambiguity appears in situations where there is a lack of information that individuals need to easily categorise or structure such situations. It can be caused by novelty, complexity or insolubility. Tolerance for ambiguity is defined as capability to react positively to ambiguous situations (Teoh and Foo, 1997) or tendency to perceive situations more attractive than threatening without previous clear outcomes (Shane *et al.*, 2003). This is why tolerance for ambiguity is an important entrepreneurial characteristic because dealing with challenges or potential success joined with new venture creation is by nature unpredictable. Individuals with higher level of tolerance for ambiguity can be convinced that they will succeed in ambiguous environments even without any additional search for information. The level of tolerance for ambiguity is also a solid distinguishing psychological characteristic between new venture founders and managers, specified as non-founders working in a business. Individuals with higher level of tolerance for ambiguity are more likely trying to find a new and creative way of doing things (Teoh and Foo, 1997; Shane *et al.*, 2003).

2.2.5 Creativity

Creativity is another personal characteristic that is linked to entrepreneurship (Ardichvili *et al.*, 2003). “Creativity is best understood as an iterative process of divergent and convergent thinking to generate, evaluate, refine, and eventually come up with a creative idea” (Gielnik *et al.*, 2012, p. 560). Divergent thinking is defined as individuals’ ability to generate multiple, novel and original business ideas. “Divergent thinking can be understood as the end result of more specific cognitive processes underlying idea generation, such as application of knowledge, analogical reasoning, conceptual combination/reorganisation, or abstraction” (Gielnik *et al.*, 2012, p. 562). It is important basis for following stages of opportunity evaluation and exploitation. Next to divergent thinking, convergent thinking evaluates, improve and develop the applicable and useful business ideas or solutions. Thus creativity is very important for opportunity identification that is obtained by interaction of individuals’ capabilities and changes in external environment (Hills *et al.*, 1997; Nicolaou *et al.*, 2003; Gielnik *et al.*, 2012)

2.2.6 Entrepreneurial alertness

Entrepreneurial alertness, or sometimes also called entrepreneurial awareness, is an important factor for successful identification of opportunities. Entrepreneurial alertness is defined as “a propensity to notice and be sensitive to information about objects, incidents, and patterns of behaviour in the environment, with special sensitivity to maker and user problems, unmet needs and interests, and novel combinations of resources” (Ardichvili *et al.*, 2003).

Entrepreneurial alertness is affected by prior knowledge and experience about resources and market needs. As a set of cognitive perceptual processing skills it distinguishes between alert and non-alert individuals. Based on individuals’ perceptual processing skills they make different decisions. Non-alert individuals do not identify the entrepreneurial opportunity because they incorrectly identify the market needs and required behaviour to exploit it. They do not identify, or ignore, or discount the informational cues that reveal the market needs or underused resources. Entrepreneurial alertness directs attention towards the novel or unusual events and induces information processing towards the compilation of information cues to break the status-quo (Gaglio and Katz, 2001). Individuals with higher entrepreneurial alertness usually have a sense of looking for change. Thus, in a specific situation, alert individuals are more sensitive to early stimuli of market disequilibrium (Gaglio and Katz, 2001) because of ability to see a big picture or to think outside of the box (Baron, 2004) than non-alert individuals.

2.2.7 Entrepreneurial proclivity

Entrepreneurial proclivity is defined as an individual predisposition to accept entrepreneurial processes, practices, and decision making to promote the identification of new market opportunities. Entrepreneurial proclivity is represented by a three underlying entrepreneurs' personal characteristics: 1) proactiveness; 2) innovativeness; and 3) risk taking attitude (Matsuno *et al.*, 2002; Verhees *et al.*, 2012).

Proactiveness refers to a willingness to anticipate and act on future wants and needs of customers or changes in the market environment. Proactive entrepreneurs have the desire to be first identifying a new market opportunities. They want to be the pioneers on the new emerging market segments and be ahead of their competitors by creating a new venture or by introducing a new product (Brockhaus, 1980; Verhees *et al.*, 2012).

Innovativeness exhibits the entrepreneurs' willingness to implement new ideas, novelty, experimentation and creative processes and deviation from existing status-quo, e.g. in technologies or practices. Innovativeness supports the proactiveness and stimulates the opportunity identification process (Verhees *et al.*, 2012).

Risk taking propensity is the willingness to act in uncertain environment. It is the willingness to take a risk and try out a new or uncertain situations, where the perceived probability of obtaining gains associated with success are higher than the consequences associated with failure (Gartner and Lian, 2012; Verhees *et al.*, 2012). Risk taking propensity is the personal trait that distinguishes between founders and non-founders of new venture. Founders have a higher risk taking propensity than non-founders, even if they do not perceive their behaviour as risky (Shane *et al.*, 2003). Individuals considered as successful entrepreneurs have a tendency to take a moderate risk. It can also happen that individuals realised, when they become more aware of their business environment, that the peril of their action has been much higher than they initially perceived (Brockhaus, 1980). Individuals with higher risk taking propensity are willing to accept higher level of variability in the gains or losses of future opportunities and vice versa. The higher level of variability could be explained as acceptance of opportunity that has the same probability to earn one million as earning zero. The lower level of variability would be in this case earnings of six hundred thousand or four hundred thousand. Even if the average outcomes of both opportunities are same (five hundred thousand). The acceptance of higher level of variability is perceived as more risky, because the variation between gains and losses is greater (Gartner and Liao, 2012).

Entrepreneurs are perceived as individuals with higher proclivity to bear uncertainty and take a risk for the probability of future gains. The more income-oriented entrepreneurs are rather willing to choose the lower level of risk taking propensity than the growth-oriented entrepreneurs, mostly founders. The risk taking propensity is positively related to intention of new business creation but it is not related to the step of starting a new business (Gartner and Liao, 2012).

The risk taking propensity has three elements: 1) uncertainty; 2) ignoring or underestimating the risk; and 3) accepting the risk. Uncertainty is the situation where the probabilities of success or failure are not known. Risk attitude usually appears when entrepreneurs are able to calculate or estimate the probabilities of success or failure (or the probabilities are clearly known). The situation when entrepreneurs realise that their previous risk attitude was risky have been caused by ignoring, underestimating and/or not perceiving the former risk. Ignoring the external cues, in this context risk, is an individual's ability to focus on (from the subjective point of view) more important information (Baron and Ward, 2004). When entrepreneurs know the risk and they are willing to bear that risk, then we are talking about risk acceptance (Verhees *et al.*, 2012). The risk taking propensity differs from particular opportunity and its risk perception.

2.3 The origins of entrepreneurial opportunity

Opportunity and its identification, evaluation and exploitation are major concepts in the entrepreneurship field. Entrepreneurial opportunities are "situations in which new goods, services, raw materials, markets and organising methods can be introduced through the formation of new means, ends, or means-ends relationships" (Eckhardt and Shane, 2003, p. 336). The role of opportunities is in meeting the market wants through innovative combination of resources to deliver added value to the market (Schumpeter, 1942).

There are two main views on the opportunity construct. One theory assumes that opportunities are discovered. Such opportunities are seen as tangible realities that are waiting to be found (Short *et al.*, 2010). Another theory assumes that opportunities are not found but created (Ardichvili *et al.*, 2003) because opportunity creation is a set of actions that occur during entrepreneurial activities. In creation theory entrepreneurs do not look for opportunities. They rather act and observe how the customers or markets respond to their actions (Alvarez and Barney, 2007). There is a middle ground consensus that "some opportunities are discovered whereas others are created" (Short *et al.*, 2010, p. 54).

Researchers from psychological theory perspectives argue that opportunity discovery relates to differences between individuals in their willingness and/or ability to search for and identify entrepreneurial opportunities (Shane and Venkataraman, 2000). Other scholars define opportunity discovery as a problem-solving process where an organised search leads to answers about unsolved problems (Hsieh *et al.*, 2007) or as discovering a “fit” between market needs and specific resources (Ardichvili *et al.*, 2003). All these definitions assume that opportunities are genuine and can be found (Short *et al.*, 2010).

Opportunity creation is a cyclical and interactive process of creating a new “fit” between market needs and resources that occur during the entrepreneurial processes. The opportunity creation concept includes redirecting and/or recombining resources to create and deliver new added value to the current market (Ardichvili *et al.*, 2003). “The opportunity creation concept may go well beyond adjustment of current matches of resources and needs and may even lead to dramatic restructuring of an existing business or radical innovation” (Ardichvili *et al.*, 2003, p. 111).

In relation to the discovery theory, which is in the centre of this study, there are other opportunity-related processes like opportunity identification, evaluation and exploitation (Gaglio and Katz, 2001, Ardichvili *et al.*, 2003, Short *et al.*, 2010). Opportunity identification “represents the most distinctive and fundamental entrepreneurial behaviour” (Gaglio and Katz, 2001, p.95). As a key aspect of the entrepreneurial process is driven by individuals’ cognitive processes such as judgments and perceptions (Short *et al.*, 2010) and usage of creative processes to identify new entrepreneurial opportunities (Gielnik *et al.*, 2012). During the opportunity evaluation process entrepreneurs appraise the feasibility of identified opportunities. Whether there is a fit between particular market needs and specific resources (Ardichvili *et al.*, 2003). When entrepreneurs perceive that this fit increases the value of combined resources, compared to current form of exploitation of those resources, then they exploit such entrepreneurial opportunity (Eckhardt and Shane, 2003).

This study is mainly focused on discovery theory and entrepreneurs’ cognitive processes during the entrepreneurial opportunity identification and evaluation processes. Thus the process of opportunity exploitation is not going to be explained more in detail.

2.4 Opportunity identification process

The process of opportunity identification describes how entrepreneurs perceive the external stimuli - information about resources and market needs - and by creative processes identify the entrepreneurial opportunities (Gielnik *et al.*, 2012). The opportunity identification process is driven by individuals' cognitive processes as perception and judgements (Short *et al.*, 2010).

In the following section there are described the individuals cognitive processes more in detail. These are used in opportunity identification process like memory, attention, risk perception and evaluation judgements.

2.4.1 Memory

Memory is depicted as cognitive system that has storage, maintenance and retrieval function of perceived external information. Memory has important impact on individual conceptual knowledge, reasoning and individual preferences (Baddeley, 1992; Haugtvedt *et al.*, 2008). The most known theory about a memory is its dichotomy on short-term and long-term. The distinction is that storage and maintenance of information in short-term memory can last from seconds to hours and in long-term memory from hours to months (Bradley and Pearson, 2012). Long-term memory also serves as storage and retrieval system of information and memories transformed to experience and knowledge.

The concept of short-term memory has been lately replaced by concept of working memory due to it is much more than just a storage system that holds the external information briefly. Working memory provides an essential role in interconnection of memory, attention and perception (Baddeley, 1992) and controls what information is stored into long-term memory (Baron and Ward, 2004). Working memory is cognitive system that interacts the new external information with knowledge and experience retrieved from long-term memory. For the aspect of this study we have to also consider another memory function that is more automatic, with large storage capacity but with extremely short retention period.

Sensory memory (also known as iconic memory, visual sensory memory or visual sensory register) is temporary high capacity storage of complete copy of external information that last approximately 300 ms. Within that time the individual has to encode the information into a more permanent working memory. If the information is not encoded within a short time of decay it is lost forever or overwritten by new information. The individuals' attention and perception plays important role within the identification process due to its role of filtering out which information is important and lately encoded into working memory.

2.4.2 Attention

Attention is a perceptual process in which individuals focus themselves on external stimuli within their range of exposure. “Attention is a key analytic mechanism in parsing experience into the schematic components that ultimately form concepts” (Barsalou, 1999, p. 604).

In external environment there is an enormous number of stimuli, this is why every individual uses perceptual filters to decide which stimuli to process. Then individuals process the external stimuli with their selective attention to create mental shortcuts used to make judgements (Barsalou, 1999; Simon *et al.*, 2000).

Selective attention serves to isolate perceived aspects of information and store them in working memory. This perceived experience is lately used to filter out the particular information that individuals are going to process. Selective attention filters out particular aspects of information compares and stores the results in schematic representation of the comparison process (Barsalou, 1999).

Individuals can use the top-down or bottom-up approach to process the external stimuli. The top-down approach is used when individuals analyse the complex stimulus and gradually reduce it onto base elements that serves as input for further processing. The bottom-up process is used to compile the specific detailed external stimuli and create the big picture to form a final perception (Barsalou, 1999). Related to the topic of this study, the bottom-up processing could be represented by gathering all the new important information about the entrepreneurial opportunity and link them together that at the end the entrepreneurial opportunity will be perceived and identified for further exploitation.

2.4.3 Perception

The entrepreneurial opportunity identification process is mainly driven by entrepreneurs' perception. Perception is an individual cognitive process by which external stimuli are received, organised and interpreted. Perception is “shaped by what we know (i.e. knowledge), by what we think we know, and what we do not know” (Renko *et al.*, 2012, p.1239). This is caused by perceptual selectivity or also in the literature named as perceptual filters. Perceptual selectivity is a process in which individuals pay attention to only a small portion of stimuli they are exposed to. It may happen because of individuals' biases, cognitive ability, frequency and timing of exposure to the stimuli, cognitive schema, entrepreneurial alertness and prior knowledge or experience. This is why some alert individuals identify entrepreneurial opportunities and not others. They perceive

connections between independent stimuli (e.g. un- or underemployed resources, unused land, shifts in government policies, or advances in technology) and then create a new means-ends framework (Ardichvili *et al.*, 2003, Baron and Ensley, 2006).

2.4.3.1 Risk perception

Previously in this paper the concept of risk taking propensity was already described as a tendency to take an action in the situations that were judged as risky. Prior taking that action there is always the process of risk perception. The perception of risk is delineated as individuals' cognitive process that individuals make during the judgements to define the riskiness of situation (Slovic, 1987; Simon *et al.*, 2000; Gartner and Liao, 2012). The risk perception unlike risk taking propensity does not differ between entrepreneurs and others (Gartner and Liao, 2012). In relation to risk perception individuals differ only in cognitive biases that lead them to perceive the environmental conditions as less or more risky. When individuals have a tendency to perceive less risk and they exploit the opportunity then they might unconsciously misjudge the risk and take risky action. Individuals' risk perception is one of the main factors of new venture creation. Those who perceive lower risk more likely decide to establish a new venture. It is proven that some entrepreneurs start new ventures even if they initially did not perceived the true risks involved. Thus they accepted the higher level of risk than they perceived. It does not mean that entrepreneurs perceive less risk than others. If entrepreneurs do so it could be caused by underestimating or misjudging the risk due to its comparison with the benefits of the entrepreneurial opportunity. Even individuals with higher risk taking propensity will not exploit the entrepreneurial opportunity if they perceive the true involved risk as high (Simon *et al.*, 2000).

2.4.4 Evaluation

Evaluation is a judgement process that compares all possible combination of resources to satisfy market needs or deliver the added value (Ardichvili *et al.*, 2003). When entrepreneurs, based on the information cues, perceive that there exist the entrepreneurial opportunity they start to gather additional information about the opportunity and evaluate the content of those information (Tang *et al.*, 2012) for its usefulness and feasibility.

The feasibility analysis also reflects if the specific combinations of resources have any potential economic profit. "Feasibility analysis based on either market needs (value sought) or resources (value creation capability) can specify the business concept(s) that would be

feasible” (Ardichvili *et al.*, 2003, p.111). Whether or not entrepreneurs evaluate the opportunity as feasible depending on their aspiration and previous experiences. Their prior knowledge and experiences can create the “knowledge corridor” that limits or constrain the perception of opportunity feasibility. Entrepreneurs are matching the newly gathered information with their existing cognitive frameworks that delineate the prototypes and exemplars of entrepreneurial opportunity (Tang *et al.*, 2012).

If one of the prospective entrepreneurs positively evaluates the entrepreneurial opportunity and is willing to bear the risk, (s)he usually decides to exploit the opportunity by employing the entrepreneurial actions. The opportunity exploitation process is not covered by this study thus will not be elaborated more in detail.

2.5 Factors influencing the opportunity identification process

2.5.1 Prior knowledge and experience

Entrepreneurs tend to notice and elaborate information that is related to their prior knowledge, information they already know or their experience. Information asymmetry assumes that all individuals do not discover the same information at the same time due to heterogeneity in individuals’ sensitivity to external information. Every individual has different volume of information that is gathered by individual’s idiosyncratic life experience (Shane, 2000). This prior knowledge of market, ways to serve markets, and customers’ problems create a “knowledge corridor” that delineates region of opportunity identification, but not others. Additional prior knowledge is individuals’ special interests and industry knowledge. Special interest knowledge can be defined in terms of fascination and fun. Industrial knowledge is usually gathered within the years while working in a certain job. Prior knowledge and experience enables entrepreneurs to combine their personal idiosyncratic information that leads to identification of new entrepreneurial opportunities that could not have been identified by individuals without this prior knowledge or experience (Ardichvili *et al.*, 2003; Alvarez and Barney, 2007).

2.5.2 Type of opportunity

Another factor that is proved that influences the entrepreneurial opportunity identification is type of the opportunity. This study distinguishes between four different types of opportunity - 1) Dreams, 2) Problem solving, 3) Technology transfer, and 4) Business formation - based on their

dimensions of origin and degree of development (Ardichvili *et al.*, 2003). In Figure 1. is displayed how the four types of opportunities differ from each other. The origin of the opportunity is described by market needs or value sought. This value sought can be identified or unidentified, respectively known or unknown. The value sought can be also represented as a problem that the opportunity outcome is trying to solve. Degree of development of the opportunity is determined by its value creation capability. It includes general specification for a product or service that is represented by a solution to value sought. The value creation capability can be defined or undefined (Ardichvili *et al.*, 2003).

		VALUE SOUGHT	
		Unidentified	Identified
VALUE CREATION CAPABILITY	Undefined	"Dreams"	Problem solving
	Defined	Technology transfer	Business formation

Figure 1. - Types of opportunities (Ardichvili *et al.*, 2003)

The "*Dreams*" opportunity represents situation where value sought is unidentified and value creation capability undefined. It means that both problem and solutions are unknown. This situation is the best occasion for creating a new or innovative products or services. It can be done by changing a proprietary knowledge in a new direction or by technology push through its limits.

The "*Problem solving*" opportunity appears when there is a known problem or market needs but solution to this needs do not exist yet. The main goal of entrepreneurs is usually to create a specific product or services to meet the market need.

The "*Technology transfer*" opportunity is a situation where there already exist solutions on problems that have not yet been identified. In such a situation entrepreneurs are more likely looking for application of their solution than its further development.

The "*Business formation*" opportunity is most common situation in entrepreneurship. It arises from situation where both value sought and value creation capabilities are known. It means that entrepreneurs are matching known market needs with known resources to create a new venture that can deliver added value (Ardichvili *et al.*, 2003).

3. Hypothesis and conceptual model

This section describes how the literature based theories delineate the hypothesis development that leads to the design of conceptual model.

3.1 Hypothesis

Individual sets of personal characteristics and live experience distinguish entrepreneurs from non-entrepreneurial individuals. The main entrepreneurial characteristics, highly correlated to entrepreneurship, are need for achievement, internal locus of control, self-efficacy, tolerance for ambiguity, creativity, risk taking attitude, entrepreneurial alertness and entrepreneurial proclivity. These characteristics directly influence the entrepreneurial opportunity identification, evaluation and exploitation processes.

For the purpose of this study we pick out two main individual characteristics - need for achievement and entrepreneurial proclivity (proactiveness, innovativeness and risk taking propensity). Those two characteristics help us to distinguish research participants between more and less entrepreneurial.

Successful identification of entrepreneurial opportunity is fundamental behaviour for all entrepreneurs. Entrepreneurial proclivity is an individual characteristic that promotes the identification of new opportunities. It drives the entrepreneurial willingness to be the pioneer on the market and identify the opportunity first and be ahead of competitors (Brockhaus, 1980).

Entrepreneurs more than others perceive the Strengths and Opportunities of presented entrepreneurial opportunity and less likely perceive Weaknesses and Threats (Simon *et al.*, 2000). Entrepreneurs more likely than others identify the entrepreneurial opportunity because they have information the other lack (Shane, 2003). Therefore we assume that entrepreneurial proclivity has a positive influence on the amount of attention on Strengths and Opportunities and a negative influence on the amount of attention on Weaknesses and Threats of presented entrepreneurial opportunity.

H_{1a} : *Entrepreneurial proclivity positively influences the amount of attention paid to Strengths of entrepreneurial opportunity.*

H_{1b} : *Entrepreneurial proclivity negatively influences the amount of attention paid to Weaknesses of entrepreneurial opportunity.*

H_{1c} : *Entrepreneurial proclivity positively influences the amount of attention paid to Opportunities of entrepreneurial opportunity.*

H_{1d} : *Entrepreneurial proclivity negatively influences the amount of attention paid to Threats of entrepreneurial opportunity.*

Need for achievement is significantly related to establishment of new companies (Shane et al., 2003). Individuals with higher level of need for achievement are internally more motivated to achieve higher excellence in what they are doing. Higher need for achievement instigates the entrepreneurs' enthusiasm and ignites the crave for more information about the identified entrepreneurial opportunity (Pech and Cameron, 2006). Thus we assume that need for achievement has a positive influence on the amount of attention paid to Strengths and Opportunities and a negative influence on the amount of attention paid to Weaknesses and Threats of entrepreneurial opportunity.

H_{2a} : *Need for achievement positively influences the amount of attention paid to Strengths of entrepreneurial opportunity.*

H_{2b} : *Need for achievement negatively influences the amount of attention paid to Weaknesses of entrepreneurial opportunity.*

H_{2c} : *Need for achievement positively influences the amount of attention paid to Opportunities of entrepreneurial opportunity.*

H_{2d} : *Need for achievement negatively influences the amount of attention paid to Threats of entrepreneurial opportunity.*

Attention (and its selectivity) plays an important role by filtering out which information is going to be processed and stored in memory. The more focused is the individual's attention on particular information, the better will be its encoding and entering the working memory (Baron and Ward, 2004). The individual selective attention facilitates the storage of newly gained information. We assume that the amount of attention paid to the Strengths, Weaknesses, Opportunities and Threats of entrepreneurial opportunity has a positive influence on the amount of information stored in memory.

H_{3a} : *Amount of attention paid to Strengths has a positive influence on the amount of information stored in memory about Strengths of entrepreneurial opportunity.*

H_{3b} : *Amount of attention paid to Weaknesses has a positive influence on the amount of information stored in memory about Weaknesses of entrepreneurial opportunity.*

H_{3c} : *Amount of attention paid to Opportunities has a positive influence on the amount of information stored in memory about Opportunities of entrepreneurial opportunity.*

H_{3d} : *Amount of attention paid to Threats has a positive influence on the amount of information stored in memory about Threats of entrepreneurial opportunity.*

Entrepreneurial proclivity, with its essence of being first in identification of the entrepreneurial opportunity (Zhang and Bruning, 2011), can cause that entrepreneurs perceive mainly Opportunities of presented entrepreneurial opportunity (Simon *et al.*, 2000). It influences the storage of information about the entrepreneurial opportunity. Thus we assume that entrepreneurial proclivity positively influence the amount of information stored in memory about Strengths and Opportunities, respectively negatively influence the amount of information stored in memory about Weaknesses and Threats, of entrepreneurial opportunity.

H_{4a} : *Entrepreneurial proclivity positively influences the amount of information stored in memory about Strengths of entrepreneurial opportunity.*

H_{4b} : *Entrepreneurial proclivity negatively influences the amount of information stored in memory about Weaknesses of entrepreneurial opportunity.*

H_{4c} : *Entrepreneurial proclivity positively influences the amount of information stored in memory about Opportunities of entrepreneurial opportunity.*

H_{4d} : *Entrepreneurial proclivity negatively influences the amount of information stored in memory about Threats of entrepreneurial opportunity.*

Need for achievement, as internal motivation to reach higher level of excellence, stimulates individuals to gather more information about the entrepreneurial opportunity they perceive (Pech and Cameron, 2006). Thus we assume that need for achievement positively influence the amount of information stored in memory about Strengths and Opportunities, and negatively the amount of information stored in memory about Weaknesses and Threats, of entrepreneurial opportunity.

H_{5a} : *Need for achievement positively influences the amount of information stored in memory about Strengths of entrepreneurial opportunity.*

H_{5b} : *Need for achievement negatively influences the amount of information stored in memory about Weaknesses of entrepreneurial opportunity.*

H_{5c} : *Need for achievement positively influences the amount of information stored in memory about Opportunities of entrepreneurial opportunity.*

H_{5d} : *Need for achievement negatively influences the amount of information stored in memory about Threats of entrepreneurial opportunity.*

Memory plays an important role within the entrepreneurial opportunity identification process. All major memory elements - sensory memory, working memory and long-term memory - directly influence whole opportunity identification process by selecting which information will be processed, stored and compared with previously learned knowledge. Without sensory memory there would not be any attention or perception that serves to transfer the external stimuli into working memory. Working memory helps entrepreneurs to retrieve the memories and knowledge from long-term memory. It is also important for elaboration of the cues of external environment. The level of prior knowledge and experience can influence the opportunity identification process due to individual's special interests. Individual's idiosyncratic information gained from prior knowledge and experience leads to identification of a new entrepreneurial opportunity that could not have been identified by another individual without this prior knowledge or experience (Ardichvili *et al.*, 2003; Alvarez and Barney, 2007). Thus we assume that higher amount of information stored about Strengths and Opportunities has a positive, respectively Weaknesses and Threats have a negative, influence on entrepreneurial opportunity identification.

H_{6a} : *The higher amount of information stored about Strengths has a positive influence on entrepreneurial opportunity identification.*

H_{6b} : *The higher amount of information stored about Weaknesses has a negative influence on entrepreneurial opportunity identification.*

H_{6c} : *The higher amount of information stored about Opportunities has a positive influence on entrepreneurial opportunity identification.*

H_{6d} : *The higher amount of information stored about Threats has a negative influence on entrepreneurial opportunity identification.*

Risk perception of entrepreneurial opportunity is important aspect for entrepreneurial opportunity identification process and its evaluation as feasible to be exploited. Risk perception of entrepreneurial opportunity is a cognitive process that defines the risk of entrepreneurial opportunity based on acquired information. Entrepreneurs that perceive the lower risk are more likely to identify the entrepreneurial opportunity and exploit it (Simon *et al.*, 2000). Risk perception as a cognitive process that differs between individuals (Gartner and Liao, 2012) is influenced by individuals' personal characteristics and prior experience that is stored in memory. Entrepreneurs can have lower risk perception or they do not perceive the true risk.

Entrepreneurs evaluate their risk perception of displayed opportunity, prior they identify the entrepreneurial opportunity interesting or feasible for further exploitation. If the risk is perceived as high the opportunity is not going to be identified as feasible for further exploitation (Simon *et al.*, 2000). Thus we assume that risk perception has a negative influence on evaluation of entrepreneurial opportunity identification. The higher is the risk perception, the lower is the entrepreneurial opportunity identification rate.

H₇ : *Risk perception has a negative influence on entrepreneurial opportunity identification.*

Amount of attention paid to the entrepreneurial opportunity is idiosyncratic process based on the previous experience and knowledge corridor. Entrepreneurs compare the attributes configuration of presented entrepreneurial opportunities and decide where are the resources best utilised. Entrepreneurs evaluate better the entrepreneurial opportunity with more resource efficient configurations (Wood and Williams, 2013). The higher attention paid to such an entrepreneurial opportunity influence the final identification. Thus we assume that the manipulation in attributes configuration influence the amount of attention paid to them.

H_{8a} : *Higher attribute manipulation of Opportunities positively influence the amount of attention paid to the Opportunities.*

H_{8b} : *Higher attribute manipulation of Opportunities positively influence the amount of attention paid to the Threats.*

H_{8c} : *Higher attribute manipulation of Threats positively influence the amount of attention paid to the Opportunities.*

H_{8d} : *Higher attribute manipulation of Threats positively influence the amount of attention paid to the Threats.*

Perceived attractiveness of entrepreneurial opportunity also influences its identification. Entrepreneurs identify more the entrepreneurial opportunity by which they perceive higher overall attractiveness (Wood and Williams, 2013). Thus we assume that the higher perception of Strengths and Opportunities, or Weaknesses and Threats, of entrepreneurial opportunity has a positive, respectively negative, influence on its identification.

H_{9a} : *Higher perception of Strengths of entrepreneurial opportunity positively influences its identification.*

H_{9b} : *Higher perception of Weaknesses of entrepreneurial opportunity negatively influences its identification.*

H_{9c} : *Higher perception of Opportunities of entrepreneurial opportunity positively influences its identification.*

H_{9d} : *Higher perception of Threats of entrepreneurial opportunity negatively influences its identification.*

3.2 Conceptual model

The conceptual model was designed pursuant the developed hypothesis in previous section (see Figure 2.). The conceptual model shows the entrepreneurial opportunity identification process that starts with individual's attention to the external stimuli of market needs, processing those stimuli with working memory and evaluating their possible success of market needs satisfaction. Whole process leads, or does not leads, to the entrepreneurial opportunity identification.

The better the ability to focus on important external information and ability to ignore subjectively not important one (selective attention), the more easily individuals perceive and identify the entrepreneurial opportunity. Without attention there is no perception. The risk perception of the perceived entrepreneurial opportunity is an important factor for evaluating that entrepreneurial opportunity and identifying it as interesting or feasible for further exploitation.

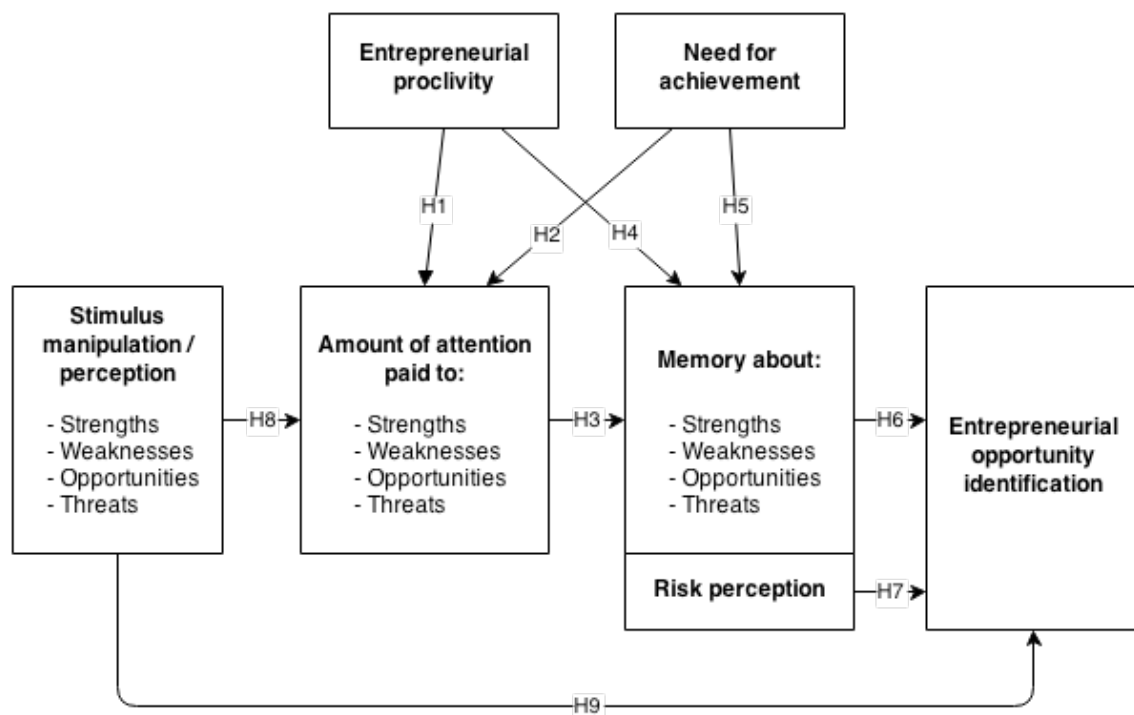


Figure 2. - Conceptual model

4. Methodology - Pilot study

This section delineates the research methodology of pilot study conducted during the Baltic Entrepreneurial Summer School in Riga (Latvia), from 12th - 24th August 2013, and on students of Wageningen University and Research Centre. Methodology is structured in following steps 1) information about respondents participated in the research; 2) design of the research; 3) stimuli presented in the research; 4) research procedure; 5) measurements of outputs; and 6) analysis plan.

4.1 Participants

In the pilot study participated 16 respondents. The respondents came from many different backgrounds, varying in their study programme (bachelor and master), specialisation, work experience and country of origin. The mean age was 25 years (SD 6.48). Sixty nine per cent of respondents were female (N=11) and 31% were male (N=5). Data were collected from 12th August till 24th August 2013.

4.2 Design

This pilot study examines students' cognitive processes during the entrepreneurial opportunity identification process. The pilot study captured the respondents' memory about entrepreneurial opportunity, its' risk perception and perceived differences in levels of stimuli manipulation. The research was conducted in four phases by usage of online-based questionnaires (in case of the Baltic Summer School respondents) and paper-based questionnaire (in case of Wageningen UR respondents).

In first phase of data collection, respondents fulfilled the online-based, respectively paper-based, questionnaire. The questionnaire was developed to research the level of respondents' entrepreneurial proclivity and need for achievement.

In second phase of data collection, respondents read four different stimuli (entrepreneurial opportunities): 1) e-shop internet venture; 2) social media venture; 3) mobile device application venture; and 4) tailor made software venture. Each entrepreneurial opportunity was presented by information based on SWOT analyses¹. Entrepreneurial opportunities were randomly ordered on the screen, respectively paper, per respondent.

¹ Analysis of Strengths, Weaknesses, Opportunities and Threats of the project

In third phase of data collection, respondents fulfilled the online-based, respectively paper-based, questionnaire. The questionnaire was developed to research if respondents' identified any entrepreneurial opportunities as feasible and personally interesting for further exploitation. Finally after 5 minutes break respondents answered open-ended questions, what do they still remember about the entrepreneurial opportunities.

In fourth phase of data collection, the stimuli manipulation (different values in attributes configuration) was tested. The entrepreneurial opportunities were presented again and respondents evaluated their perception of each Opportunities and Threats per stimuli, as high or low, on seven point Likert scale.

4.3 Stimulus material

Respondents were asked to read SWOT analysis-based information about four different entrepreneurial opportunities (see Appendix 1). Every entrepreneurial opportunity had different level of attributes configuration: 1) high Opportunities and high Threats, 2) high Opportunities and low Threats, 3) low Opportunities and high Threats, and 4) low Opportunities and low Threats. This manipulation in stimuli attributes configuration provides more detailed information about predictable attractiveness of every entrepreneurial opportunity.

4.4 Procedure

The Baltic Summer School respondents were provided with a computer with the online-based questionnaire by usage of Qualtrics system². The Wageningen UR respondents were provided with a paper-based questionnaire that was lately manually implemented in the online-based system.

First questionnaire focused on respondents' personal characteristics. After answering all 32 questions in this section respondents continued to second task.

Secondly, they read provided information about four different stimuli sets displayed on the screen, respectively presented on paper. When respondents finished with reading they clicked on the "Next" button to reach next stimuli set. Respectively they took another paper with different stimuli set. Respondents did this procedure until they end up with the reading of all four stimuli sets.

Thirdly, respondents filled in the online-based, respectively paper-based, questionnaire asking them on their risk perception, perception of feasibility and interest for further exploitation of

² Qualtrics Survey Software - www.qualtrics.com

presented entrepreneurial opportunities. In open-ended questions participants wrote down the details they still remember about the entrepreneurial opportunities they read.

Fourthly, respondents were provided the four already presented stimuli sets to evaluate how they perceive their opportunities and threats configuration.

4.5 Measures

The personal characteristics - entrepreneurial proclivity (proactiveness, innovativeness and risk taking propensity) and need for achievement - were measured based on the computer-based, respectively paper-based, questionnaire with 32 statements with a seven point Likert scale, where respondents agreed (1) or disagreed (7) with the statements. The statements were selected based on the previous researches conducted by Verhees *et al.* (2011) and Zang and Brunning (2011).

Memory data measurements were based on recall test conducted by four open-ended questions: what details do respondents still remember about the entrepreneurial opportunities that they read. Content analysis was employed to analyse the data. The recalled attributes have been checked and counted together to gain the final number.

Risk perception was measured with a seven point Likert scale where respondents evaluated their risk perception (1 - not at all, 7 - extremely risky) of all four entrepreneurial opportunities.

The dependent variable, entrepreneurial opportunity identification, was measured with a seven point Likert scale where respondents evaluated their perception of how feasible and interesting for further exploitation do they perceive all four entrepreneurial opportunities (1 - not at all, 7 - very feasible/interesting).

The respondents' perception of stimuli attributes configuration was measured with a seven point Likert scale (1 - low, 7 - high).

4.6 Analysis plan

One-way ANOVA and regression analysis supported by descriptive statistics were used to execute the data to test if the respondents' perception of the manipulation in attribute configuration has been proved.

5. Methodology - Main research

This section delineates the research methodology in following steps 1) information about respondents participated in the research; 2) design of the research; 3) stimuli presented in the research; 4) research procedure; 5) measurements of outputs; and 6) analysis plan.

5.1 Participants

In the research 45 students of Wageningen University and Research Centre in the Netherlands participated. The participants came from many different backgrounds, varying in their study programme (bachelor, master, doctoral), specialisation, work experience and country of origin. All 45 respondents were valid (no missing values) and used for further research. The mean age was 25 years (SD 3.237). Fifty six per cent of respondents were female (N=25) and 44% were male (N=20). Data were collected from 26th September till 4th October and from 29th October till 1st November 2013.

5.2 Design

This study examines respondents' cognitive processes during the entrepreneurial opportunity identification process. The study captured the respondents' attention, memory and risk perception of presented entrepreneurial opportunity. The research was conducted in three phases by usage of eye-tracking system and computer-based questionnaire. Data were collected in the laboratory room where only one respondent was present, to ensure the measures were independent. The researcher informed respondents about the procedure and that the eye-tracking system does not cause any damage to their eyes.

In first phase of data collection, participants fulfilled the computer-based questionnaire. The questionnaire was developed to research the level of respondents' entrepreneurial proclivity and need for achievement.

In second phase of data collection, the respondents were displayed four different stimuli (entrepreneurial opportunities): 1) e-shop internet venture; 2) social media venture; 3) mobile device application venture; and 4) tailor made software venture. Each entrepreneurial opportunity was presented by information based on SWOT analyses but with different values in attributes configuration. Entrepreneurial opportunities were randomly ordered on the screen per respondent.

In third phase of data collection, respondents fulfilled the computer-based questionnaire. The questionnaire was developed to research the perceived feasibility and interest for further exploitation, respondents' risk perception, evaluation and what do respondents remember about the entrepreneurial opportunities.

5.3 Stimulus material

Respondents were asked to read SWOT analysis-based information about four different entrepreneurial opportunities (see Appendix 1). Every entrepreneurial opportunity had different level of attributes configuration: 1) high Opportunities and high Threats, 2) high Opportunities and low Threats, 3) low Opportunities and high Threats, and 4) low Opportunities and low Threats. This manipulation in stimuli attributes configuration provides more detailed information about the predictable perception of every entrepreneurial opportunity.

In third phase of the research were respondents instructed to evaluate (on a seven point Likert scale) their risk perception, feasibility and interest for further exploitation of presented entrepreneurial opportunities. Data were collected by fulfilling the computer-based questionnaire by usage of Qualtrics Survey Software. For more information about the questionnaire see the measures section and Appendix 3.

5.4 Procedure

Respondents were individually taken into the research room in Leeuwenborch building, Wageningen University and Research Centre. Firstly they fulfilled the computer-based questionnaire focused on their personal characteristics.

Secondly, they read the stimulus information on the 19" LCD display Samsung 940 B with 1280x960 pixels resolution where the eye-tracking device (RED SensoMotoric Instruments) was installed. The maintained distance between participants and the display was ca. 40 cm (ca. 16 inch).

Researcher informed respondents about the procedure of the research and about the following calibration of eye-tracking system. The calibration procedure run by following the red fixation point that displayed on the white screen (in the middle and in the corners). After the calibration procedure participants began the first task out of four. The first stimulus set was displayed on the screen, ready for reading. During tasks computer recorded the fixations and saccades (later used as dwell time) of respondents' eyes. When respondents finished with reading

they said “OK” as a command for researcher to present another stimuli set. This procedure was followed in all four stimuli sets.

When all four eye-tracking device tasks were finished, respondents filled in the computer-based questionnaire on another computer.

After finishing the experiment, the participants were with kind regards seen out of the room.

5.5 Measures

The personal characteristics - entrepreneurial proclivity (proactiveness, innovativeness and risk taking propensity) and need for achievement - were measured based on the computer-based questionnaire with 32 statements with a seven point Likert scale, where participant agreed (1) or disagreed (7) with the statement. The statements were selected based on the previous researches conducted by Verhees *et al.* (2011) and Zang and Brunning (2011) and adjusted for the respondents' student perspective.

The perception of entrepreneurial opportunity attributes was tested on a seven point Likert scale. Participants were asked how attractive they perceive the displayed opportunity, from low (1) to high (7).

To answer the first two hypotheses we measured the participants' eye-movements during the reading task. Eye-movements consist of “eye-fixations on the visual stimulus and saccades between them” (Wedel and Pieters, 2006, p. 246). For the analysis of eye-movements we used the dwell-time, that consist of eye-fixations and saccades, for defined areas of interest (Strengths, Weaknesses, Opportunities, Threats) of all four displayed entrepreneurial opportunities.

Memory data measurements were based on recall test conducted by four open-ended questions: what details do participants still remember about the displayed entrepreneurial opportunities. Content analysis was employed to analyse the data. The recalled attributes have been checked and counted together to gain the final number.

Risk perception was measured with a seven point Likert scale where participants evaluated their risk perception (1 - not at all risky, 7 - extremely risky) of all four entrepreneurial opportunities.

The dependent variable, entrepreneurial opportunity identification, was measured with a seven point Likert scale where participants evaluated their perception of how feasible and interesting for further exploitation they perceive all four entrepreneurial opportunities (1 - not at all, 7 - very feasible/interesting).

5.6 Analysis plan

Principal Component Analysis (PCA) were used to analyse the data from questions researching the respondents' personal characteristics - entrepreneurial proclivity and need for achievement - to receive one component score per each personal characteristics for further research.

The variables to cases command was used to restructure the data set. All respondents evaluated four different entrepreneurial opportunities. Each evaluation is treated as a case with scores for feasibility, interest for further exploitation, risk taking, Strength, Weaknesses, Opportunities, Threats and dwell times. After restructuring we have 180 cases (i.e. $n = 180$).

One-way ANOVA and regression analysis were used to execute the data according the hypothesis supported by descriptive statistics.

6. Results

6.1 Stimuli manipulation - pilot test

The stimuli manipulation of attributes configuration was tested in the pilot test. The SWOT analysis attributes were manipulated with high vs. low Opportunities and high vs. low Threats. Final results approved the desired manipulation. Means of respondents' perception of the entrepreneurial opportunities' attributes are listed below:

1) Social media venture

- high Opportunities ($Mean = 5.38$, $sd = 1.204$), low Threats ($Mean = 4.25$, $sd = 1.571$)

2) Tailor made SW venture

- high Opportunities ($Mean = 5.81$, $sd = 0.981$), high Threats ($Mean = 5.63$, $sd = 1.204$)

3) E-shop venture

- low Opportunities ($Mean = 5.06$, $sd = 1.389$), high Threats ($Mean = 5.63$, $sd = 1.408$)

4) Mobile device venture

- low Opportunities ($Mean = 4.69$, $sd = 0.873$), low Threats ($Mean = 5.25$, $sd = 1.390$)

6.2 Personal characteristics

Principal Component Analysis (PCA) was conducted to analyse the respondents' personal characteristics. The Kaiser-Meyer-Olkin measure verified the Need for Achievement adequacy as a great for the analysis (KMO = 0.800). The values of all variables examined in the diagonal elements of the anti-image correlation matrix are > 0.75, which is well above the acceptable limit of 0.5. The Bartlett's test of sphericity is highly significant ($\chi^2 (10) = 423.602$, $p < .001$) therefore the factor analysis is appropriate. Based on the Eigenvalue and point of inflection in Scree Plot we should extract 1 components that explains 64.233% of the variance. This component represents the Need for Achievement.

Principal Component Analysis was conducted also to research the Entrepreneurial proclivity. The Kaiser-Meyer-Olkin measure verified the sampling adequacy as a good for the analysis (KMO = 0.743). The values of variables examined in the diagonal elements of the anti-image correlation matrix were not > 0.5 for all variables. Thus the 5 following factors were excluded:

- I believe I have to take great financial risks to seize opportunities.
- I want to have the courage to seize opportunities.
- I believe I should stick to existing activities.
- I know how to stick to existing activities.
- I stick to existing activities.

Then the PCA was conducted one more time. The KMO measure verified the Need for Achievement adequacy as a great for the analysis (KMO = 0.833). Now the values of all variables examined in the diagonal elements of the anti-image correlation matrix are > 0.66, which is well above the acceptable limit of 0.5. The Bartlett's test of sphericity is highly significant ($\chi^2 (231) = 3,455.674$, $p < .001$) therefore the factor analysis is appropriate. Five components had Eigenvalues over Kaiser's criterion of 1 and in combination explained 74.56% of the variance. The scree plot was slightly ambiguous and showed inflexion that would justify retaining one component. Because there are all variables loaded highly onto the first factor and there should be just one component representing the Entrepreneurial proclivity thus we extracted 1 component that explains 47.65% of the variance.

6.3 Stimuli manipulation

The support of the stimuli manipulation was crucial for the whole research. The difference in evaluation of entrepreneurial opportunities was influenced by the different levels in attribute configuration of the SWOT analysis (high / low Opportunities; high / low Threats). The stimuli manipulation was finally approved by comparing the means of perception of the entrepreneurial opportunities listed below and in the Figure3.:

1) Social media venture

- high Opportunities (*Mean* = 65.53, *sd* = 23.646), low Threats (*Mean* = 49.16, *sd* = 21.313)

2) Tailor made SW venture

- high Opportunities (*Mean* = 63.11, *sd* = 19.590), high Threats (*Mean* = 61.13, *sd* = 21.069)

3) E-shop venture

- low Opportunities (*Mean* = 52.87, *sd* = 19.233), high Threats (*Mean* = 61.93, *sd* = 18.835)

4) Mobile device venture

- low Opportunities (*Mean* = 51.67, *sd* = 23.290), low Threats (*Mean* = 61.00, *sd* = 24.303)

		Threats	
		Low	High
Opportunities	High	1) Social media venture	2) Tailor made SW venture
	Low	4) Mobile device venture	3) E-shop venture

Figure 3. - Stimuli manipulation

6.2 Influence of independent variables on entrepreneurial opportunity identification process

The results in Table 1 revealed that both personal characteristics - entrepreneurial proclivity and need for achievement - do not have any significant influence on the time devoted to reading, collecting the information about the entrepreneurial opportunities. According to the results we can conclude that hypothesis $H_{1a,b,c,d}$ and $H_{2a,b,c,d}$ - predicting influence of personal characteristics on the amount of attention paid to the collection of information about entrepreneurial opportunities by reading - are not confirmed. It describes that the level of entrepreneurial proclivity and need for achievement does not influence the amount of attention paid to the Strengths, Weaknesses, Opportunities or Threats of entrepreneurial opportunities. It means that within the reading process the individuals do not significantly differ between more or less entrepreneurial by paid amount of attention to presented attributes of entrepreneurial opportunities.

Table 1 Influence of Entrepreneurial proclivity and Need for achievement on amount of attention

	Strengths	Weaknesses	Opportunities	Threats
Entrepreneurial proclivity	0.063	0.003	-0.029	0.074
Need for Achievement	-0.112	-0.044	-0.075	-0.041
F	1.159	0.168	0.670	0.505
R ²	0.013	0.002	0.008	0.006
N	179	179	179	179

* $p < 0.05$

Table 2 reports the results of controlled group based on the dummy variables of the stimuli manipulation of Opportunities and Threats of presented entrepreneurial opportunities (there were no manipulation in Strengths and Weakness). Results show that the personal characteristics do not have any statistical significant influence on the amount of attention paid to the gathering the information about entrepreneurial opportunities by reading. Hypothesis 8 predicts the influence of attributes manipulation to the amount of attention paid to them. Results report that manipulation with attribute configuration of entrepreneurial opportunity has statistically significant influence on amount of attention paid to them. The higher manipulation in Opportunities positively influence the amount of attention paid to the Opportunities ($\beta = 0.216$, $p < 0.05$) and Threats ($\beta = 0.196$,

$p < 0.05$). The higher manipulation in Threats negatively influence the amount of attention paid to the Opportunities ($\beta = -0.344$, $p < 0.05$) and positively to the Threats ($\beta = 0.192$, $p < 0.05$).

Table 2 Influence of personal characteristics and manipulation (dummy variables) on amount of attention paid to the entrepreneurial opportunities

	Strengths	Weaknesses	Opportunities	Threats
Entrepreneurial proclivity			-0.029	0.074
Need for Achievement			-0.075	-0.041
Dummy variables - Opportunities			0.216**	0.196**
Dummy variables - Threats			-0.344**	0.192**
F			9.121**	3.849**
R ²			0.173	0.081
N			179	179

* $p < 0.10$, ** $p < 0.05$

Hypothesis 3, 4 and 5 predict an influence of personal characteristics and amount of attention paid to the entrepreneurial opportunities on amount of information stored in memory about them. As predicted in $H_{3a,b,c,d}$ the influence of amount of attention paid to the entrepreneurial opportunities on amount of information stored in memory was mostly statistically significant. The only result that was not confirmed is (H_{5b}) influence on amount of attention paid to the Weaknesses ($\beta = 0.108$, $p > 0.05$).

The statistically significant results in Table 3 describe that the entrepreneurial proclivity (as a personal characteristics) influence the amount of information stored in memory about the Weaknesses' ($\beta = -0.159$, $p < 0.05$) and Opportunities' attributes ($\beta = 0.144$, $p < 0.05$) of the entrepreneurial opportunities. Thus it confirms H_{4b} and H_{4c} - individuals with higher entrepreneurial proclivity remember more information about the Opportunities and less about the Weaknesses than others. Another statistical significant result is influence on amount of information stored in memory about Strengths ($\beta = -0.223$, $p < 0.05$). Its negative value leads to the rejection of H_{4a} - entrepreneurial proclivity negatively influence the amount of information stored in memory about the Strengths of displayed entrepreneurial opportunities. The H_{4d} - influence of entrepreneurial proclivity on the amount of information stored in memory about Threats - is not confirmed because it has not been statistically significant ($\beta = 0.045$, $p > 0.05$).

The influence of the level of need for achievement on amount of information stored in memory was statistically significant just for the relationship with the amount of information stored about the Opportunities ($\beta = 0.274$, $p < 0.05$). Thus there is evidence that individuals with higher need for achievement remember more information just about the Opportunities (H_{5c}). Other results ($H_{5a,b,d}$) were not statistically significant.

Table 3 Influence of personal characteristics and attention on the amount of information stored in memory about the attributes

	Strengths	Weaknesses	Opportunities	Threats
Amount of attention paid	0.183*	0.108	0.307*	0.157*
Entrepreneurial proclivity	-0.223*	-0.159*	0.144*	0.045
Need for Achievement	-0.038	-0.084	0.274*	-0.023
F	5.607*	3.128*	13.887*	1.674
R ²	0.087	0.051	0.191	0.028
N	179	179	179	179

* $p < 0.05$

The results in Table 4 and 5 represents the influence of personal characteristics, memory and perception on the entrepreneurial opportunity identification process represented by identifying the feasibility of entrepreneurial opportunities and the willingness to their further exploitation. Table 4 shows results based on the research of respondents and Table 5 shows results of controlled group based on the attributes manipulation in Opportunities and Threats (as a dummy variables).

The risk perception ($\beta = -0.156$, $p < 0.05$), perception of Strengths ($\beta = 0.317$, $p < 0.05$) and Opportunities ($\beta = 0.204$, $p < 0.05$) have a significant influence on the feasibility level of entrepreneurial opportunities. The hypothesis H_{6d} , H_7 and H_{9c} have been also proved in the attribute manipulation. It means that amount of information stored in memory about the Threats ($\beta = -0.152$, $p < 0.10$) and risk perception ($\beta = -0.312$, $p < 0.05$) have a negative influence on entrepreneurial opportunity identification and that higher perception of the Opportunities of entrepreneurial opportunity positively influence its identification. The same results appear even if there are personal characteristics included in the process. In Table 5 we can see that some results differ. There is also another statistically significant influence on the feasibility level, the entrepreneurial proclivity ($\beta = 0.150$, $p < 0.05$).

Table 4	Influence of personal characteristics, memory about and perception of entrepreneurial opportunity on its identification					Influence of personal characteristics, memory about and perception of entrepreneurial opportunity on its identification based on manipulation (dummy variables)			
	Feasibility	Feasibility	Further exploitation	Further exploitation		Feasibility	Feasibility	Further exploitation	Further exploitation
Memory about Strengths	-0.053	-0.025	0.123	0.183**					
Memory about Weaknesses	-0.036	-0.025	-0.119	-0.089					
Memory about Opportunities	0.075	0.058	0.140**	0.064	0.053	0.112	0.076	0.179**	0.101
Memory about Threats	-0.062	-0.078	-0.111	-0.126	-0.110	-0.152*	-0.143*	-0.140*	-0.112
Risk perception	-0.156**	-0.157**	-0.057	-0.055	-0.023	-0.312**	-0.319**	-0.212**	-0.227**
Perception of Strengths	0.317**	0.317**	0.317**	0.291**	0.227**				
Perception of Weaknesses	-0.106	-0.110	0.024	0.004	0.026				
Perception of Opportunities	0.204**	0.194**	0.216**	0.211**	0.172*	0.152**	0.152**	0.089	0.088
Perception of Threats	0.033	0.032	-0.101	-0.117	-0.123	0.113	0.114	-0.038	-0.036
Entrepreneurial Proclivity		0.091		0.149**	0.131*		0.150**		0.167**
Need for Achievement		-0.006		0.115*	0.116*		0.009		0.115
Feasibility					0.201**				0.413**
F	11.839**	9.853**	9.423**	8.863**	8.966**	6.350**	5.263**	3.554**	3.931**
R ²	0.385	0.392	0.333	0.367	0.392	0.154	0.176	0.093	0.138
N	179	179	179	179	179	179	179	179	179

* p < 0.10 , ** p < 0.05

* p < 0.10 , ** p < 0.05

Tables 4 and 5 represents results of the willingness to further exploitation of entrepreneurial opportunities and how are they influenced by their perception, the amount of information respondents stored in memory about them and by personal characteristics. In the third column are results of direct influence of perception and amount of information stored in memory, based on the conceptual model. The statistically significant results influencing the willingness to further exploitation are amount of information stored in memory about the Opportunities ($\beta = 0.140$, $p < 0.05$) and perception of Strengths ($\beta = 0.317$, $p < 0.05$) and Opportunities ($\beta = 0.216$, $p < 0.05$). These relationships differ in the results based on the manipulation. In that case there are statistically significant variables of risk perception ($\beta = 0.212$, $p < 0.05$) and amount of information stored in memory about the Opportunities ($\beta = 0.179$, $p < 0.05$) and Threats ($\beta = -0.140$, $p < 0.10$).

The influence of personal characteristics - entrepreneurial opportunity and need for achievement - on the process of entrepreneurial opportunity identification is the main curiosity of this paper. The fourth column in Table 5 shows that there are only two factors that significantly influence the willingness to further exploitation of entrepreneurial opportunities, its risk perception ($\beta = -0.227$, $p < 0.05$) and the level of entrepreneurial proclivity ($\beta = 0.167$, $p < 0.05$). The same results in Table 4 differ. Next to the entrepreneurial proclivity ($\beta = 0.149$, $p < 0.05$) there are also other statistically significant factors - the amount of information stored in memory about the Strengths ($\beta = 0.183$, $p < 0.05$), perception of Strengths ($\beta = 0.291$, $p < 0.05$), perception of Opportunities ($\beta = 0.211$, $p < 0.05$) and level of need for achievement ($\beta = 0.115$, $p < 0.10$).

Table 4 confirms that next to feasibility is statistically significant ($\beta = 0.201$, $p < 0.05$) also the amount of information stored in memory about the Strengths ($\beta = 0.188$, $p < 0.05$), perception of Strengths ($\beta = 0.227$, $p < 0.05$), perception of Opportunities ($\beta = 0.172$, $p < 0.10$), level of entrepreneurial proclivity ($\beta = 0.131$, $p < 0.10$) and the level of need for achievement ($\beta = 0.116$, $p < 0.10$) statistically influence the willingness to further exploitation.

The fifth column in Table 5 ascribes the influence of feasibility as a mediation factor. Based on the results of manipulation the feasibility is the only statistically significant explanatory variable ($\beta = 0.413$, $p < 0.05$) of the willingness to further exploitation of entrepreneurial opportunities.

7. Conclusion

This research explored the entrepreneurial phenomenon of opportunity identification process from the cognitive perspective. The eye-tracking system was employed to track and measure the attention to the presented entrepreneurial opportunities. Respondents' perception has been measured via online questionnaire.

This research examined that respondents' personal characteristics - entrepreneurial proclivity and need for achievement - have a significant influence on the amount of information stored in their memory about Opportunities' attributes of projected SWOT analysis. Additionally, the entrepreneurial proclivity has a significant influence also on internal aspects of presented entrepreneurial opportunities (Strengths and Weaknesses). Our research method does not prove that personal characteristics significantly influence the amount of attention paid to the presented stimuli (more about it in Discussion). The amount of attention paid to the Strengths, Opportunities and Threats positively influence the amount of information stored in memory about those attributes. Overall risk perception of entrepreneurial opportunities has a negative influence on their identification as feasible. Higher level of perception of Strengths and Opportunities has a positive influence on their identification as feasible.

Figure 3. represents the redrawn conceptual model developed on the statistically significant results of the analysis.

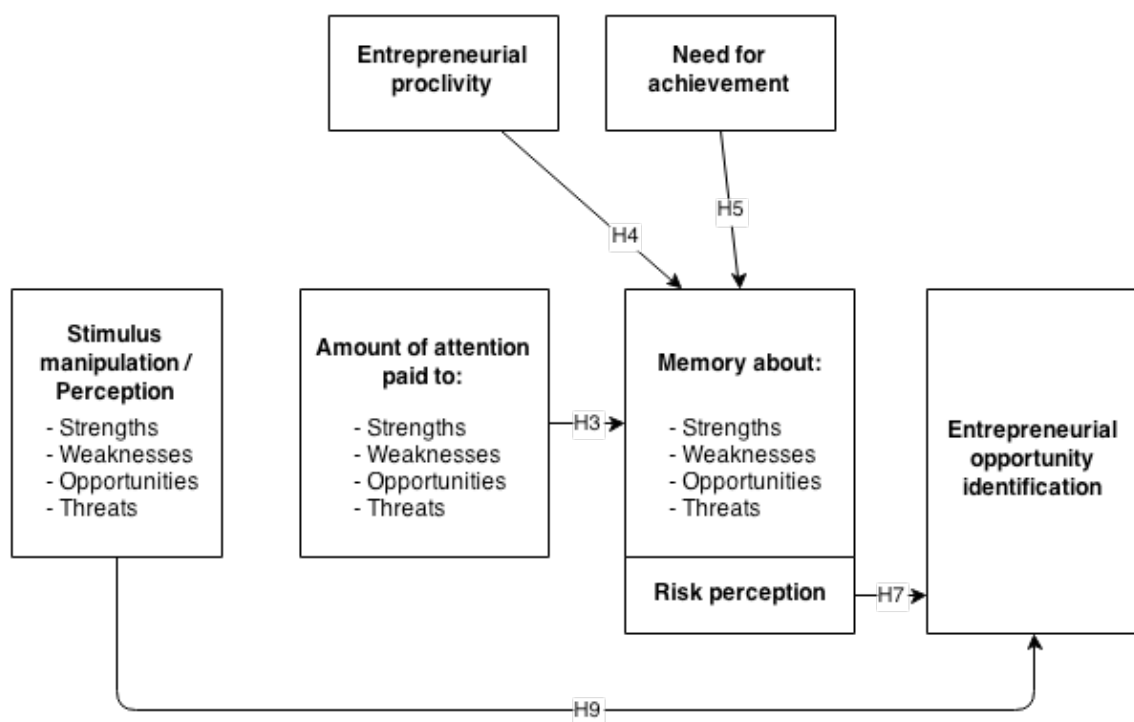


Figure 3. - Redrawn model of proved hypothesis

Figure 4. describes the relationships between analysed variables enriched with the variable of willingness for further exploitation of entrepreneurial opportunities.

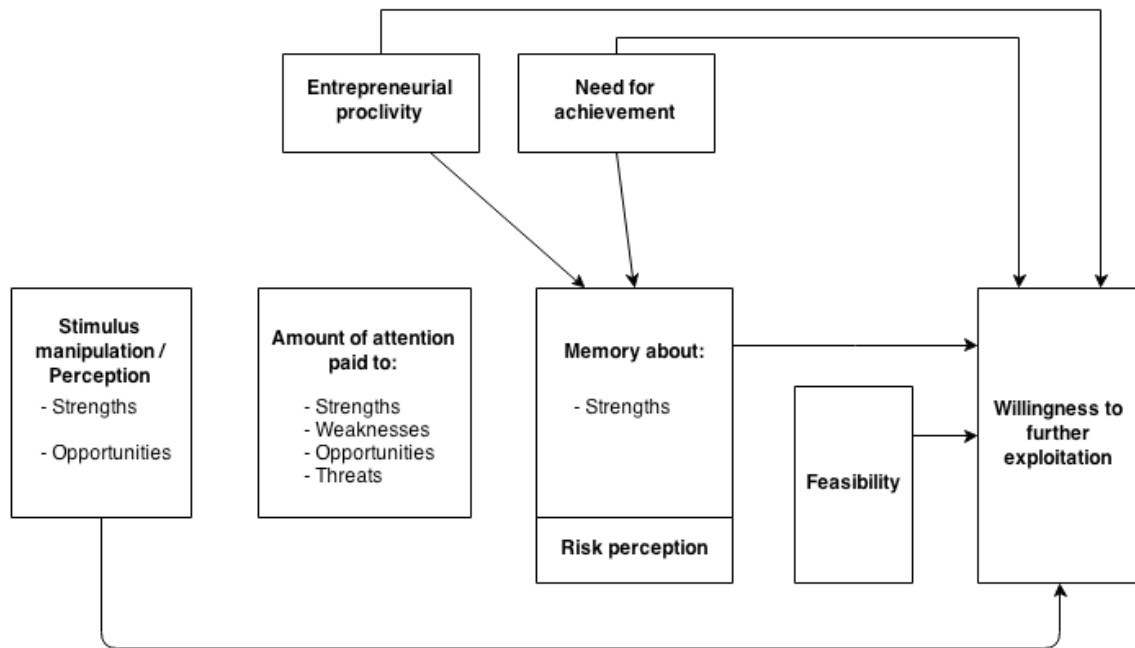


Figure 4. - Redrawn model including willingness to further exploitation

The perception of entrepreneurial opportunities and their risk perception have been determined as a significant condition for the entrepreneurial opportunity identification. Thus if there is a need to stimulate the entrepreneurship, the entities involved in the process should mainly ensure the increase of entrepreneurs' perception of the business as secured and with it decrease their risk perception.

8. Discussion

Contrary to expectations of the Wood and Williams (2013) - the better the resources are utilised, the higher amount of attention supposed to be paid to the entrepreneurial opportunity by entrepreneurs - the results of this research demonstrated that personal characteristics do not have significant influence on the time devoted to reading (dwell time) needed for gathering the information about the entrepreneurial opportunity. It could be explained that during the reading process it does not matter if the individuals differ in their personal characteristics because they always read carefully the whole text for further better evaluation of gathered information. It could be also caused due to the research methodology and stimulus materials that have been chosen. The stimulus have been designed the way where actually all information, all four areas of interest,

could be evaluated as important for the reader. The respondents' attention could be also influenced by the researcher project introduction and mentioning that the respondents should read the text carefully for the next evaluation. To avoid that would be next time better to implement the researched areas of interest to the document with more distinct information.

Due to the stimuli manipulation, where the SWOT strengths and weaknesses were neutral, we consider the results connected with opportunities and threats of the stimuli. Similar to Simon *et al.* (2000), the results supported hypothesis that the level of individual personal characteristics - entrepreneurial proclivity and need for achievement - have a significant influence on the amount of information stored in memory about the Opportunities.

The results also proved the hypothesis that amount of attention paid to the entrepreneurial opportunities has a significant influence on the amount of information stored in memory about it. Nevertheless, what individuals remember about the entrepreneurial opportunities does not significantly influence their identification. It can be explained that the amount of information stored in memory do not play the most important and/or final role in the entrepreneurial opportunity identification process and can be just one segment of decisive evaluation process.

The main factors that significantly influence the entrepreneurial opportunity identification process, based on our model, are risk perception and perception of entrepreneurial opportunity attribute configuration. As well as Simon *et al.* (2000), results proved that the level of risk perception has a significant influence on the level of entrepreneurial opportunity identification (represented by feasibility). Perception of entrepreneurial opportunity consists of evaluation of its perceived attributes configuration. Therefore we can deduce that the individual subjective perception of entrepreneurial opportunity is the most important factor during the entrepreneurial opportunity identification process.

9. Implications

The results have not confirmed the main biases of literature review that entrepreneurs perceive more the Strengths and Opportunities than they perceive the Weaknesses and Threats (Simon *et al.*, 2000; Pech and Cameron, 2006) and that they differ in their risk perception (Gartner and Liao, 2012). The level of personal characteristics does not have significant impact on the risk perception and perception of entrepreneurial opportunities. Both more and less entrepreneurial individuals perceive and identify the entrepreneurial opportunities similarly. The difference is that more entrepreneurial individuals remember more about the Opportunities than Threats. Thus the

bias that entrepreneurs identify the entrepreneurial opportunities more because they have information that others lack (Shane, 2003) has been proved in the sense of how entrepreneurs take advantage of gathered information during their entrepreneurial opportunity evaluation processes.

The results of this study are beneficial for agencies or entities that are interested in stimulation of entrepreneurship, e.g. banks, governmental and non-profit organisations (NGOs), entrepreneurs searching for new partners or investors and others. The results revealed that the main factors that influence the entrepreneurial opportunity identification process are risk perception and subjective perception of the entrepreneurial opportunity.

In case there is an interest in stimulation of entrepreneurship then the involved subjects must try to decrease the perceived risk and increase the entrepreneurs' perception of entrepreneurial opportunities. It can be solved by for example lowering the barriers for running a business. From governmental point of view it could be increase of benefits or securities (lower taxes, investment incentives, lower administrative burden, no or lower minimum wage, etc.) that the government can offer to the entrepreneurs. Banks and NGOs should stimulate the entrepreneurship by supporting the entrepreneurs with some aspects of running the business (e.g. lower interest rates on borrowed money, helping with the market analysis etc.) or minimising the potential threats, e.g. by creating the umbrella organisation.

10. Limitations and suggestions for future research

The study examined sample of 45 international students of Wageningen University and Research Centre, in the Netherlands. Nevertheless the sample was combined by students of different educational background, nationalities and knowledge background it would be good to conduct the research again on a bigger and more diversified sample. Or conduct the research on sample of already established entrepreneurs and then compare the results with non-entrepreneurs.

Even if it was not proved but another possible limitation could be the choice of a bit controversial topic concerning the social network venture targeting the homosexual population. Also the level of perceived Threats of mobile device venture running in Greece has not been as low as we expected. It could be maybe caused by underestimating the respondents' awareness and perception of the financial crises that was in that time in Greece. Thus for the next research it would be better to choose another entrepreneurial opportunities with the same level of attribute configuration.

The SWOT analysis was chosen to easily divide the stimuli attributes in four quadrants, in areas of interest, which are easily traceable by eye-tracking system. The results of this research could maybe differ if we put the same information about the entrepreneurial opportunity into the randomly placed coherent text. For example use the eye-tracking system on information gathered on the internet websites or newspapers with many different topics (politics, business, sports, entertainment etc.) and track which topics and areas interest the respondents more, depending on their personal characteristics.

In this research we studied the influence of chosen personal characteristics on entrepreneurial opportunity identification process. We intentionally leave out the factor of further exploitation of entrepreneurial opportunity because it does not fit to the initial idea of this study. We at least measured and researched the individuals' willingness to further exploitation. It would be interesting to compare the results of this study also with the results of the strategy how would respondents exploit the entrepreneurial opportunity, for example by creating the detailed business plan. Or make the research with the same group of respondents five years later. The best would be if the respondents could exploit one of the four mentioned entrepreneurial opportunities and we could compare the results. The results of this project could explain us which personal characteristics play the major role in the exploitation process and how respondents differ between them.

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12. Appendixes

12.1 Appendix 1 - design of stimuli

Next four entrepreneurial opportunities introduce the four different SWOT analyses that group of entrepreneurs elaborated to decide what kind of business they should be entering. Respondents should imagine them as a member of this group and that they are helping the group to identify the entrepreneurial opportunity and decide which entrepreneurial opportunity is better for the further exploitation.

E-shop venture (Opportunities - , Threats +)

E-shop venture

One of the entrepreneurial opportunities that a group of entrepreneurs considers is to build an E-shop venture. After some market research they specified that their E-shop will be specialised on white electronics (washing machines, dishwashers, microwaves etc.) and that the target market will be customers in BENELUX (Belgium, Netherlands, Luxembourg).

Strengths <ul style="list-style-type: none">• Experienced team of programmers• Low rental costs (no costs for physical stores)• Good connections with white electronics producers• Most team members have experience with the BENELUX market	Opportunities <ul style="list-style-type: none">• Increasing online sales of Electronics• Estimated no market growth for white electronics in the coming years• Almost every household is a potential customer
Weaknesses <ul style="list-style-type: none">• Small geographical market• Limited experience outside the BENELUX• Low customer loyalty due to low purchase frequency (every 10 years on average)	Threats <ul style="list-style-type: none">• Many alternative E-shops available• Low profit margins• Potential entrance of brick and mortar white electronics shops

Social network venture (O+ , T-)

Social network venture

One of the entrepreneurial opportunities that a group of entrepreneurs considers is to build a new online social network. The network will target and connect the global gay population. The target group has been chosen intentionally. Research shows that this target group has higher savings than average and they are willing to pay for high quality products and services. Thus the social network of this target group is used for direct advertising of top brands / high value products and services producers.

Strengths <ul style="list-style-type: none">• Experienced team of programmers• One member of the team has a strong knowledge of the gay community• Support of venture capitalists for money raising	Opportunities <ul style="list-style-type: none">• Need for high quality, branded products and services (high profit margin)• 30% higher savings of gay population in comparison to hetero population (possibility of higher spending)• 200% growth potential every year on worldwide market• High adoption rate of social media in the gay community
Weaknesses <ul style="list-style-type: none">• No previous experience with the gay community as a target market• No previous experience on social media marketing• High labour costs for maintaining the network	Threats <ul style="list-style-type: none">• Other entrepreneurs pick-up the same idea• Gay population using and creating new Facebook groups and subgroups for networking

Mobile device application venture (O- , T-)

Mobile device application venture

One of the entrepreneurial opportunities that a group of entrepreneurs considers is to create a mobile device application. The growing trend of usage of mobile devices among kids and previous experience with cookbook production inspired the group to create a cookbook mobile app targeted at kids in Greece. For better acceptance of the app, it will be endorsed by the Hannah Montana brand.

Strengths <ul style="list-style-type: none">• Experienced team of programmers• Previous experience with cookbook project• Endorsement of Hannah Montana brand	Opportunities <ul style="list-style-type: none">• 3% growth of Mobile devices among kids in the last years• High popularity of Hannah Montana among kids• Raising interest of Greek kindergartens and basic schools in enabling/providing kids with courses focused on creative cooking and food preparation
Weaknesses <ul style="list-style-type: none">• No experience with working with kids• No previous experience with creating Apps• High marketing costs (Communication)	Threats <ul style="list-style-type: none">• Small, geographically limited market• Strong cultural heritage and habits in local Greek cuisine• Low adoption rate of Apps in Greece and by kids

Tailor made software venture (O+ , T+)

Tailor made software venture

One of the entrepreneurial opportunities that a group of entrepreneurs considers is to create a tailor made software venture. A high quality team of own programmers is able to create the specialised high quality products that clients ask for. The target market for this project are companies that need unique software or programmes for their business. Due to the saturated market in Western Europe this project will be target Central and Eastern Europe.

Strengths <ul style="list-style-type: none"> • Experienced team of programmers • High quality tailored made products • Good relationships with potential clients 	Opportunities <ul style="list-style-type: none"> • High profit market • 20% growth in purchase on tailored made software estimated for next year (last year 18% growth) • Increasing number of companies that need to adapt or interconnect their business software
Weaknesses <ul style="list-style-type: none"> • No foothold with customers, based on installed software • High initial investments • No specialization (no economies of scale or scope) 	Threats <ul style="list-style-type: none"> • High turnover required (1 bln. Euro), otherwise the competition will "destroy" us • High and dense competition of big companies • Restricted target market of potential clients – affordable only for 200+ employees enterprises

12.2 Appendix 2 - questionnaire design - personal characteristics

Entrepreneurial proclivity - adopted by Verhees *et al.* (2011)

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
If I see opportunities, I am willing to start activities that are new to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I look for opportunities to work on something new.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe I should stick to existing activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I am willing to take great risks (with chances for very high profits).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want to have the courage to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe I have to take great financial risks to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am willing to start activities that another did not do, yet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I like to respond before another does.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If there are opportunities, I believe I have to be one of the first to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I am good at starting activities that are new to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I see opportunities to work on something new.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to stick to existing activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I know how to take great risks (with chances for very high profits).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can have the courage to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to take great financial risks to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am good at starting activities that another did not do, yet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I can respond before another does.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If there are opportunities, I know how I can be one of the first to take them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I start activities that are new to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always working on something new.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stick to existing activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I am starting to take great risks (with chances for very high profits).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the courage to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take great financial risks to seize opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I start activities that other did not do, yet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I see opportunities, I respond before another does.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If there are opportunities, I am one of the first to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Need for achievement - adopted by Zang and Brunning (2011) and adjusted for students' perspective

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I try to be the best in my class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work very hard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important for me to have the best grades.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I push myself to "be all that I can be".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try very hard to improve on my performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12.3 Appendix 3 - questionnaire design - perception, recall test and general information

	Highly Unfeasible	Unfeasible	Somewhat Unfeasible	Neither Feasible nor Unfeasible	Somewhat Feasible	Feasible	Strongly Feasible
How feasible do you perceive the Electronics E-shop venture?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How feasible do you perceive the Gay social network venture?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How feasible do you perceive the Cookbook mobile App venture?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How feasible do you perceive the Tailor made software venture?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Highly Uninteresting	Uninteresting	Somewhat Uninteresting	Neither Interesting nor Uninteresting	Somewhat Interesting	Interesting	Strongly Interesting
How interesting for you is the Electronics E-shop venture for further exploitation?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How interesting for you is the Gay social network venture for further exploitation?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How interesting for you is the Cookbook mobile App venture for further exploitation?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How interesting for you is the Tailor made software venture for further exploitation?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

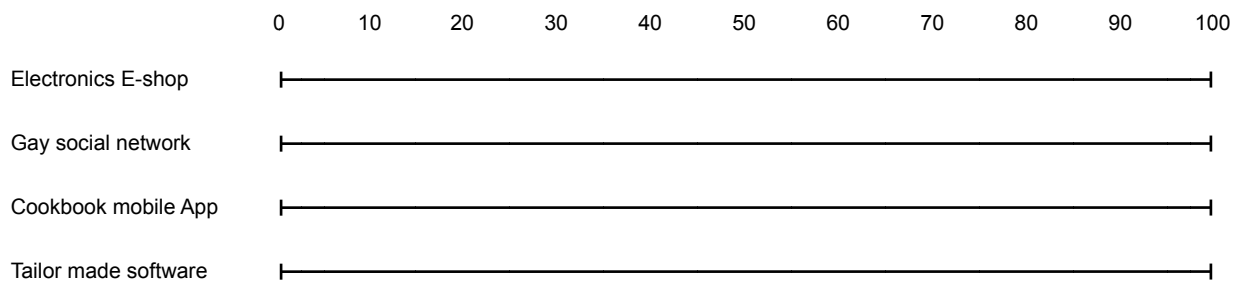
How risky do you perceive the following venture?

0 = Not at all risky , 100 = Extremely risky

	0	10	20	30	40	50	60	70	80	90	100
Electronics E-shop	<input type="range"/>										
Gay social network	<input type="range"/>										
Cookbook mobile App	<input type="range"/>										
Tailor made software	<input type="range"/>										

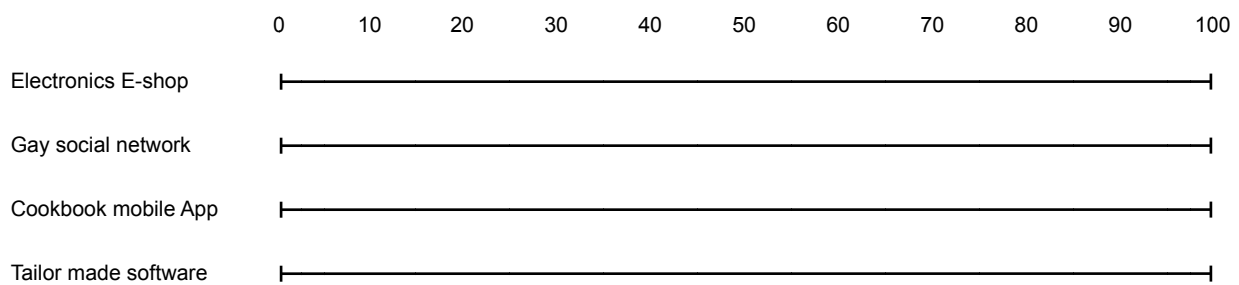
How strong do you perceive the Strengths of the following venture?

0 = Weak , 50 = Neither Strong nor Weak , 100 = Strong



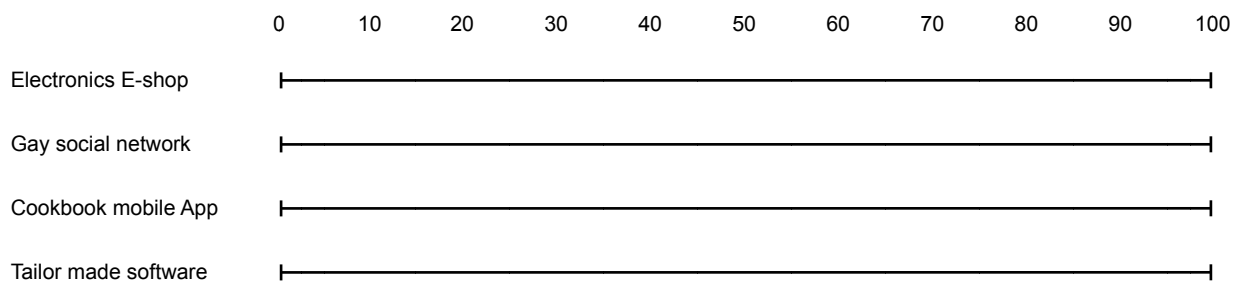
How weak do you perceive the Weaknesses of the following venture?

0 = Not weak , 50 = Neither Weak nor Not weak , 100 = Weak



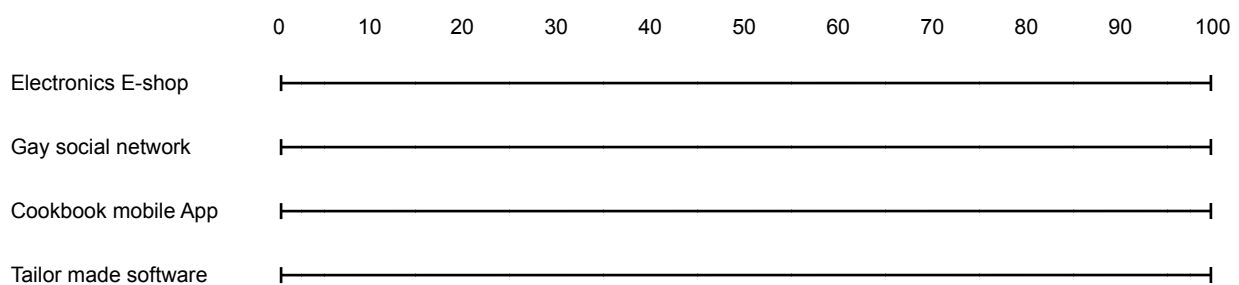
How strong do you perceive the Opportunities of the following venture?

0 = Weak , 50 = Neither Strong nor Weak , 100 = Strong



How serious do you perceive the Threats of the following venture?

0 = Unserious , 50 = Neither Serious nor Unserious , 100 = Serious



Recall memory test

When reading about the **Electronics E-shop venture** we provided you information about it. Please, write down all details you still remember:

When reading about the **Cookbook mobile App venture** we provided you information about it. Please, write down all details you still remember:

When reading about the **Gay social network venture** we provided you information about it. Please, write down all details you still remember:

When reading about the **Tailor made software venture** we provided you some information about it. Please, write down all details you still remember:

General information

What is your gender? ☐ Male ☐ Female

What year were you born?

What is your country of origin?

What is your currently studying level of education? ☐ Bachelor ☐ Master ☐ Doctoral ☐ Other

What is your study program?

Do you own a smartphone or tablet? ☐ Yes ☐ No

How often do you buy online?

☐ Daily ☐ 2-3 Times a Week ☐ Once a week ☐ 2-3 Times a Month ☐ Once a Month ☐ Less than Once a Month ☐ Never

How often do you use any social networks?

(Facebook, Twitter, LinkedIn etc.)

☐ Daily ☐ 2-3 Times a Week ☐ Once a week ☐ 2-3 Times a Month ☐ Once a Month ☐ Less than Once a Month ☐ Never

Do you have any working experience? ☐ Yes ☐ No

How many years of full-time equivalent working experience do you have?

1 year of full-time equivalent = 8 hours work per day * 5 days per week * 52 weeks = 2.080 hours per year

☐ Less than 1 ☐ 1-2 ☐ 2-3 ☐ 3-4 ☐ 4-5 ☐ More than 5

In which industry or industries do you have working experience?

* Multiple options possible

- | | |
|--|---|
| <input type="radio"/> Forestry, fishing, hunting or agriculture support | <input type="radio"/> Arts, entertainment or recreation |
| <input type="radio"/> Professional, scientific or technical services | <input type="radio"/> Retail trade |
| <input type="radio"/> Mining | <input type="radio"/> Accommodation or food services |
| <input type="radio"/> Management of companies or enterprises | <input type="radio"/> Transportation or warehousing |
| <input type="radio"/> Utilities | <input type="radio"/> Other services (except public administration) |
| <input type="radio"/> Admin, support, waste management or remediation services | <input type="radio"/> Information and Communication Technologies |
| <input type="radio"/> Construction | <input type="radio"/> Marketing and Communication |
| <input type="radio"/> Educational services | <input type="radio"/> Finance or insurance |
| <input type="radio"/> Manufacturing | <input type="radio"/> Self-employed / Entrepreneur |
| <input type="radio"/> Health care or social assistance | <input type="radio"/> Real estate or rental and leasing |
| <input type="radio"/> Wholesale trade | |