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Abstract

Literature describes that some entrepreneurs in the start-up phase are make decisions based on effectual logic while others prefer causational logic. Effectual logic is described as an entrepreneurial decision-making logic, where entrepreneurs are making decisions based on resources and knowledge they have available and select between these resources to create entrepreneurial actions (Sarasvathy, 2001). In contrary, causational logic is a decision-making logic, where entrepreneurs are focussed on a specific product and are gathering resources to create this specific product where plan-based reasoning is central in the activities that are undertaken.

In cognitive sense, an entrepreneur has the ability to make entrepreneurial decisions based on two information-processing systems (Epstein, Pacini, Heier & Denes-Raj, 1996). The intuitive-experiential system is a system where the end-goal is not specified when resources are inventoried, or analytical-rational system, where entrepreneurs follow a plan-based approach based on rational thinking and forecasting. An interesting question based on this notion is if either one of these cognitive processing systems is linked to entrepreneurial decision-making logics. In other words, does the cognitive preference of an entrepreneur influence the decision-making logic? Previous study supposed that passion is able to foster creativity and recognition of new patterns that are essential in opportunity exploration and exploitation in uncertain and risky environments. Cardon, Gregori, Stevens & Patel (2012) explained that entrepreneurs can be passionate for different phases/domains in company creation. Cardon et al. (2012) described that an entrepreneur has characteristics of all the different domains, but one domain will be dominant. The different domains that are used in this study are: passion for inventing, passion for founding and passion for developing. These elements of entrepreneurial passion are similar to the dimensions described by Sarasvathy (2001), who mentioned that entrepreneurs with effectual decision-making have benefits in new market exploration and are more creative since they are not held by a specific end-goal but are able to develop their end-goal overtime.

The goal of this research is to examine whether the cognitive style of an entrepreneur is related to entrepreneurial decision-making in terms of effectuation and entrepreneurial passion. The following research question has been formed based on the described purpose:

"To what extent entrepreneurial passion of an entrepreneur moderates the potential relationship between the cognitive system and preferences in decision making process of effectuation and causation"

To capture the three main elements of the study (cognition, effectuation and entrepreneurial passion) a survey has been conducted among entrepreneurs in Malaysia. The findings of the study displayed that entrepreneurs in Malaysia have a preference for causation over effectuation and that these entrepreneurs process information rather based on intuition than rationality. The results of the analysis showed that there is no clear preference for one of the domains of entrepreneurial passion among the entrepreneurs who participated in the study. Based on scientific literature it is assumed that entrepreneurs who process information based on intuitive-experiential system adopt effectual decision-making. The conducted survey has not found significant evidence for this relation. This held for the inclusion of the different domains of entrepreneurial passion as well. When entrepreneurial passion was taken into account, still no significant relation was found and entrepreneurial passion did not



significantly moderate the effect. Another assumption that was made, is that entrepreneurs who process information based on analytical-rational system adopt causation decision-making. The outcome of the research could not find a significant relationship for these variables. When entrepreneurial passion was included in this relationship as moderator of the possible effect, the outcome did not differ.

Despite that there is no significant relationship discovered for the assumed hypothesis, this study contributes to new literature among the topics of cognition, effectuation and entrepreneurial passion. It combined new elements of entrepreneurship and found evidence based on literature for the three topics. Further research should been carried out on a larger scale and conducted on a broader population.



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1.0 Introduction

The aim of the first chapter is to explain the general area of this study: entrepreneurial processes. The explanation of the background of the study will be followed by the purpose of this study. At last the research question will be addressed.

1.1 Background of the study

The amount of journals and research in relation to entrepreneurship has grown steadily over the last decade (Duxburg, 2012). Entrepreneurship is a complex versatile phenomenon, which has been studied by multiple academic fields. These different studies introduced multiple definitions. The majority of these studies agreed that the process of change is in the centre of entrepreneurship (Audretsch, 2003). The process from starting a company to a successful venture relies on a combination of action and choices performed by an entrepreneur. The decision making process of an entrepreneur is linked with the human mind. Factors as " expressions of the cognitions, motivations, passion and emotions" are conscious and unconscious factors, which influence the decision-making process of entrepreneurs (Carsrud & Brannback, 2009).

Entrepreneurship has a significant influence on economic growth, innovations and job generation. Within entrepreneurship, there are multiple facets that together form all the activities an entrepreneur must undertake in order to grow. The sum of activities is called "entrepreneurial process". Bygrave (2004) defined entrepreneurial process as: "involving all the functions, activities, and actions associated with perceiving opportunities and creating organizations to pursue them". These entrepreneurial processes can be undertaken by a planbased philosophy, or emergent (Fisher, 2012). Some researchers belonging to the planning school suggest that business planning is inevitable for development and survival of established and new small firms (Smolka, Verheul & Burmeister-Lamp, 2015). According to planning school a systematic, prediction-oriented approach will lead to superior venture performance (Moroz & Hindle, 2011). Ansoff (1991) is one of the researches belonging to the planning school. According to planning school, an entrepreneur has the possibility to start a company based on thorough market research, multiple analyses based on the research and eventually come up with a business plan. The business plan describes the necessities the company needs and the overall funds the company needs to attract. Universities around the world teach entrepreneurship students this approach and the importance of preparing business plans (Goll & Rasheed, 1997). Sarasvathy (2001) described this traditional concept as causation model. She defines causation as a process that takes an effect as given and focuses on selecting between means that can help to create that effect.

In contrary to what is described by Sarasvathy (2001) as causation, there is a group of researchers who prefer emergent strategies, which is known as; learning, strategic flexibility and controlling resources when facing high degrees of uncertainty. This alternative way of establishing a company is based on a fixed set of means and focuses on selecting between possible effects that can be created from those set of means (Sarasvathy & Kotha, 2001). It is suggested by Sarasvathy, that under conditions of high uncertainty, expert entrepreneurs adopt a decision logic that is different to that explicated by the traditional or causation model. Setting predetermined goals in high uncertain markets is somehow needless, because it can be obsolete tomorrow, due to market change (Burns, 2015).



It is an alternative process, which omit the profound market research and multiple analyses. An entrepreneur who uses this alternative decision logic in their decision-making is not guided by a fixed business plan or is focused on a specific end-goal (Sarasvathy, 2001). This emerging model is known as effectuation. These two processes of decision-making are mainly based on the fact that, under a causation model, an entrepreneur decides based on a predetermined goal and selects means to achieve that goal (Sarasvathy, 2001), whereas the effectuation model takes the given set of means as the starting point to discover what can be created from those given set of means. In general, Sarasvathy (2001) describes that none of the two decision-making strategies is better than the other. It depends on the circumstances which type of decision-making gives advantages or disadvantages, such as; new firm, established firm, market influences, aspiration of the establisher and countless others. Sarasyathy assumed that every entrepreneur has the ability to be an effectuator (Sarasyathy, 2001). Arend, Sarooghi and Burkemper (2015) challenged this statement. Arend et al. (2015) sees great potential for theory that helps entrepreneur self-identify when they are capable for being an effectuator and whether they are not, and how to move an entrepreneur from one to another. In effectuation, it appears that entrepreneurs who are able to be an effectuator are those who have the right means, abilities, aspirations and co-creator network and have sufficiently uncertain and dynamic context to enter.

The decision-making process is studied extensively. These studies concluded that the decision-making process is diverse and influenced by multiple factors like; experience, skills, life-style, preferences and cognitive style (Ozcelik & Paprika, 2010; Riding & Pearson, 1994). Entrepreneurial cognitive style is central is these studies. Each entrepreneur processes information in a diverse way based on his/her cognitive style. The cognitive style is described as the personal approach to coordinate, process and manages incoming information (Tennant, 1988). Cognition is widely discussed among multiple researchers. Mitchel, Busenitz, Lant, McDougal, Morse & Brock (2002) defined cognition as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation and growth". When individuals encounter the possibility of becoming an entrepreneur, their cognitive style may influence the way they approach, frame and solve problems (Kickul, Gundry, Barbosa, & Whitcanack, 2009). According to Epstein (1996) an individual is able to process information based on a rational system, or experiential system. The experiential system is a system, which adapts by empirically learning from experience. This experiential system is known as an automatic, effortless and rapid way of processing and responding to information (Weiner & Healy, 2012). In contrast to the experiential system, the rational systems is an inferential reasoning system that operates according to an individual's understanding of the rules of reasoning including the importance and evaluation of evidence (Epstein, 2014). If the two information systems are linked to the decision-making process, an interesting question remains. Does an entrepreneur with an experiential or rational system have a preference for causation or effectuation? Epstein (2014) describes that experiential system is strongly connected to emotion and affect, whereas the primary motive of the rational system is operating according to reality and logic. This statement results in the inner feeling that an entrepreneur who adopts the rational information system will have a preference for causation decision-making. Epstein (2014) described in the same article his perspective on aspects that are important for the experiential system. According to his research, affect and emotions are considered to be significant important aspects in the experiential system. Affect and emotions are particularly important due to their critical role in reinforcement and motivation. An emotion that stirs motivation is entrepreneurial passion



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(Cardon, Wincent, Singh & Drnovsek, 2005). Passion is essential and in the heart entrepreneurship, because it has the ability to foster creativity and the recognition of new information patterns, which are essential to detect hopeful opportunities (Baron, 2008). Cardon, Gregoire, Stevens and Patel (2012) presented a new conceptual model. The model explains that entrepreneurial passion has different domains and dimension. Cardon et al. (2012) showed that the level of entrepreneurial passion is not equal for all entrepreneurs and that it varies with the background and experience of the entrepreneur. Entrepreneurial passion is defined by Chen et al. (2009) as "an entrepreneur's intense affective state, accompanied by cognitive and behavioural manifestations of high personal value". Two concepts are central in this definition: cognitive and behavioural. Since entrepreneurial passion is associated with cognition, as it is with decision-making, it will potentially strengthen the relation between both concepts. Since the level of entrepreneurial passion is related to the experience and background of an entrepreneur, does it holds for the preference between effectuation as well? Uncertainties that arise in new market entry, the battle of developing new companies with limitary access to resources, entrepreneurial passion is stated as the key driver of entrepreneurial action. Since entrepreneurial passion is stated as the key driver for entrepreneurial actions, it can potentially moderate the preference for causation model or effectuation model if an entrepreneur has an experiential or rational information processing system.

1.2 Research purpose and design

The main purpose of this research is to explore the construct of effectuation. The second purpose is to explain cognition styles as described by Epstein (1996) and the concept of entrepreneurial passion by Cardon et al. (2012). The aim is to link the concept of cognition to the construct of effectuation and causation. Besides the potential relation between cognition and effectuation, this research will unveil the moderating effect of entrepreneurial passion on the explained relation. Based on the explained purpose of this research, the following goal can be formulated:

Finding evidence which states that cognition influences the decision between effectuation and causation model and if the level of entrepreneurial passion of the entrepreneur, has a moderating effect on the relationship. The following research question is presented:

"To what extent entrepreneurial passion of an entrepreneur moderates the potential relationship between the cognitive system and preferences in decision making process of effectuation and causation"



2. Literature review

The aim of this chapter is to review the subjects of the study. The first subjects that will be addressed are effectuation and causation. Secondly, cognition will be reviewed. The last subject that will be reviewed in the literature review is entrepreneurial passion.

2.1 Effectuation and Causation

The focus on earlier studies about entrepreneurship has been directed towards finding and exploiting opportunities (Read, Song & Smit, 2009). These studies assumed that opportunities where gathered through formal search processes and entrepreneurs make decisions based on the gathered results(Perry, Chandler & Markova, 2012). These studies are mainly directed towards rational decision-making. These studies assume that entrepreneurs make goal-driven decisions when entrepreneurial opportunities arise (Perry, Chandler & Markova, 2012). Most business schools have taught this "goal driven approach". Sarasvathy (2001) referred to this decision-making approach as causation. Exploiting existing opportunities is in the centre of the scope of an entrepreneur, when using causal processes (Read, Song & Smit, 2009). They "take a particular effect as given and focus on selecting between means to create that effect (Sarasvathy, 2001)".

Sarasvathy (2001) mentioned that entrepreneurs, who achieved an experienced level of entrepreneurship, do not follow the logic of causation as taught in business schools. These expert entrepreneurs use prior knowledge instead of the causation logic. These principles altogether are defined as the construct of effectuation. Where causation is based on selection between means to create an effect, "Effectuation processes take a set of means as given and focus on selection between possible effects that can be created with that set of means" (Sarasvathy, 2001).

The entrepreneurial theory of effectuation has become the most prominent theoretical perspective of entrepreneurial decision-making, when an entrepreneur wants to become entrepreneurial in an unknown market. The theory of effectuation created a paradigmatic shift in the way entrepreneurship is understood (Perry, Chandler & Markova, 2012). The theory of effectuation gives an entrepreneur an alternative approach, on how opportunities will possibly arise. Instead of "finding" and "exploiting" possible opportunities, the theory of effectuation suggests that opportunities are mutually created by entrepreneurs and their stakeholders (Read, Song & Smit, 2009).

The theory of effectuation as described by Sarasvathy has its theoretical roots in the work of Knight in 1921. Knight's (1921) notion of 'true' uncertainty points at the fundamentally unknown future that many entrepreneurs face when starting up a company. Under conditions of true uncertainty, probabilities of success are unknown and unknowable. This statement by Knight (1921) shows that prediction is not possible and that entrepreneurs have to find other possibilities to guide their activities. March (1991) work on learning, uncertainty, and the garbage can model of organizations, together with the notion of bounded rationality described by Simon (1991), points at the essential goal ambiguity and limited rationality underlying many organizational decisions (Kraaijenbrink & Ratinho, 2010).

Based on this notion, the effectuation model states that setting predetermined goals is initially ambiguous and not relevant, since an entrepreneur does not know what it will face in the upcoming period.



The combination of the abovementioned literature formed the basis for the work from Saravathy in 2001. The effectual reasoning model prefers logic of control, rather than prediction, endogenous goal creation, and a (partially) constructed environment. Sarasvathy improved her initially basic dimensions in the years thereafter, based on research on experienced entrepreneurs. The effectuation model nowadays contains five different dimensions:

Effectuation	Causation
Means based	Goal Driven
Affordable loss	Expected return
Strategic alliances/ Pre commitments	Competitive analysis
Exploiting contingencies	Exploiting pre-existing knowledge
Controlling an unpredictable future	Predict an uncertain future

 Table 1: Differences between Effectuation and Causation

To make the concept of effectuation practically understandable, Sarasvathy came up with a daily metaphor to explain the difference between effectuation and causation:

A simple example should help clarify and distinguish between the two types of processes. Imagine a chef assigned the task of cooking dinner. A chef can organize the task in two different ways. The first possibility is, a client choses a menu in advance. The chef will list all the ingredients needed for the menu, shops all the ingredients in the store and prepares the meal based on his menu and ingredients he bought. This process is called causation. It starts with a given or chosen menu and focuses on selecting between effective ways to prepare the meal.

The second possibility is, the client asks the chef to look through the cupboard in the kitchen for ingredients and cook a meal based on the ingredients that are available. The chef has to consider the different menus that can be prepared from the ingredients available and chose for one. This process is called effectuation. Effectuation begins with a given set of ingredients and focuses on preparing one of many possible desirable meals based on the ingredients that are available.

The effectuation approach provides the possibility to design completely new meals. The two approaches differ based on means and outcomes. According to Sarasvathy, Dew, Velamuri and Venkataraman (2003), opportunities can arise based on three different perspectives. The three different perspectives are: opportunity creation, discovery and recognition. The opportunities are influenced by uncertainty. Entrepreneurs use different strategies to cope with uncertainty in exploiting new business opportunities. According to Alsos et al. (2014), effectuation is potentially more effective in situations when high level of uncertainty is recognized. In general, effectuation is more likely to be used in early stages of new venture creation. In early stages of new venture creation the future is unpredictable, goals opaque and human action change the environment (Sarasvathy & Kotha , 2001). When the market is present and a forecast of the business can be made, goals are made and the environment is not likely to change significantly due to our actions, a strategy based on causation can be applied (Perry, Chandler & Markova, 2012). When an entrepreneur develops a new product or service in a new market, or start to operate in a new market, uncertainty will rise. In times of



opportunity creation, entrepreneurs will encounter three types of uncertainty: environmental isotropy, goal ambiguity and Knightian uncertainty (Sarasvathy&Kotha,2001). Environmental isotropy entails the difficulty to decide what can be potentially relevant in the starting phase. In the starting phase an entrepreneur faces multiple uncertainties and the level of uncertainties will influence the entrepreneurs decisions (Sarasvathy&Dew,2008). Goal ambiguity is defined as the problem that entrepreneurs face, when there is a lack of clear and defined goals. The preferences of an entrepreneur are vague and encounter constant change. Knightian uncertainty is known as true uncertainty and refers to the impossibility to forecast expected consequences for the future and possible outcomes are unknown (Malerba, 2010).

The differences between effectuation and causation are already present in the beginning of company- or product establishment. Entrepreneurs who adapt causation are constant focused on end-goal realisation (Sarasvathy, 2001). Resources and financial funds are gathered in order to achieve realisation of the product of service the founder wants to create. In contrast to the starting phase of causation, effectuation starts with making an inventory of the physical and knowledge resources that the founder possesses and develops a product based on these resources (Sarasvathy, 2001). Noteworthy, it is a cycle process were constant adaption of the creation is made. Saravathy visualized the process of starting an organization based on the effectuation method in 2005. The process of creating value is displayed as follows:



Figure 1: The process of effectuation (Dew, 2009)

Figure 1 displays the process of effectuation. This process is fundamentally different than the process a causational entrepreneur follows. According to Fiet, Herron and Sapienza (1992), entrepreneurs who create a venture based on causational processing are focused on a clearly defined objective they want to accomplish and are searching for entrepreneurial opportunities that are present in the developed industries that are similar to those objectives. The opportunities that are discovered are evaluated and selected based on the potential maximum return (Drucker, 1998). These entrepreneurs engage in analysis and planning activities as they are exploiting their current knowledge and pre-existing resources. In short, the company is envisioned from the start and all efforts are targeted for completing the pre-envisioned state (Chandler, DeTienne, McKelvie & Mumford, 2011). Entrepreneurs who follow the



effectuation process might start a company with the general aspiration to create a new company, but as they decide what they are going to do, and observe the outcome of those decisions, they use the new information to change route. This process is constantly followed in order to evaluate their current course and decide if their current course needs to be changed (Chandler, DeTienne, McKelvie & Mumford, 2011).

According to Saravathy (2001) the differences between effectuation and causation are framed in multiple behavioural principles. Entrepreneurs who use the logic of effectuation aim on affordable loss (the amount of finances the entrepreneur is willing to lose/risk), where entrepreneurs who practice causation focus on expected return. Effectuators prefer commitment with external stakeholders, where causation appliers use competitive market analyses. Entrepreneurs who apply effectuation, rather exploit contingencies than strive to avoid them and focus on controlling an unpredictable future instead of investing time in predicting an uncertain one (Alsos, Clausen & Solvoll, 2014).

Sarasvathy (2008) defined and conceptualized five main principles for effectuation and causation. Effectuation research would benefit using these main principles. In the following section in this chapter, the five different dimensions will be elaborated.

2.1.1. Means-Driven as Opposed to Goal-Driven Action

The first dimension that distinguishes causation from effectuation involves the starting point for taking action. Based on the effectuation method, "means based" focuses on using existing means. Effectuation approach, starts from means and considers what actions can these means allow and what goals can be realized from those means (Dew, Sarasvathy, Read & Wiltbank, 2009). These means are captured in three different categories: "Who I am", "What I know" and "Whom I know" (Sarasvathy & Dew, 2005).

The category "Who I am" focuses on the personal background, personality and cognition of the entrepreneur. The category "What I know" refers to the expertise and knowledge of the entrepreneur. The last category "Whom I know" refers to the personal network and partnerships. These different means are able to change over time, for instance, gathering new knowledge or expanding network. These "new means" contribute to improvement of the initial concept.

The causation approach focuses on a goal what needs to be achieved and which means will help to achieve that specific goal.

2.1.2. Affordable Loss as Opposed to Expected Return

The second dimension concerns the entrepreneur's willingness towards risk and return. When an entrepreneur adopts the causal approach, it will focus on calculating expected return and will choose for the opportunity, which will deliver the highest expected return over time (Sarasvathy, 2001). The amount of funds needed to achieve the potential return, can also be obtained from investors or loans. This strategy of relying on expected returns is hazardous in uncertain situations, since the potential losses can be enormous if the entrepreneur needs to invest a lot of funds in order to attract the expected return.

Entrepreneurs who choose to adopt the effectuation method aim to predict how much they are willing to invest in the venture (Sarasvathy, Dew, Read & Wiltbank, 2007). These choices are



not influenced by the unknown return in the future, but are guided by the amount of funds they are willing to invest, and in worst-case scenario to lose.

2.1.3. Strategic alliances as Opposed to Competitive Analysis

The third dimension refers to the entrepreneurs' behaviour towards stakeholders. An entrepreneur, who applies the causational approach, is an entrepreneur who competes with other companies. The entrepreneur performs competitive analysis and selects the market where competition comparatively low (Sarasvathy & Kotha, 2001). When the potential interesting market is chosen, the entrepreneur will search for potential partners and stakeholder that could support them to compete.

Entrepreneurs who apply the effectuation method, rely on pre-commitments and are eager to form strategic alliances instead of focussing on competitive analysis (Sarasvathy, 2001). In doing so, the effectuator is in control with the alliances they have formed, and enables them to control the future instead of speculating in predicting the future (Chandler, DeTienne, McKelvie & Mumford, 2011). The strategic alliance is able to share knowledge and other resources with others whom are involved in the alliance (Sarasvathy, 2008).

2.1.4. Leveraging as Opposed to exploiting pre-existing knowledge

The fourth dimension refers to the attitude of the entrepreneur towards contingencies.

Entrepreneurs, who follow the causational approach, focus on a specific goal and will try to avoid unexpected events. When an unexpected event occurs, the entrepreneur has to forecast the potential changes in strategy, which will be time consuming (Dew, Read, Sarasvathy and Wiltbank, 2009). According to Sarasvathy (2001), the causational approach is preferable when existing means as expertise in a particular new technology forms the source of competitive advantage.

Entrepreneurs who apply the effectuation approach prefer uncertain and an ever-changing environment where unforeseen contingencies arise over time. The effectuators will accept the unforeseen positive or negative contingency as a useful opportunity for the venture (Dew, Sarasvathy, Read & Wiltbank, 2009). Effectuators are much more flexible in their strategy, because they adopt the unexpected event as an opportunity instead of a problem. In doing so, the effectuator creates new and unexpected business opportunities.

According to Read (2011), an unexpected event or problem should be seen as a building block, which can be used as a resource for a new business. Every new venture is build on these building blocks. An entrepreneur has already his own building blocks, and together with the building blocks he gathered the venture is build. This example is parallel to the effectuation method where the goal is not determined at the start of the venture but evolves over time (Sarasvathy, 2001).

2.1.5 Non-Predictive as Opposed to Predictive Control

The fifth and last dimension describes the main difference in future prediction between causation and effectuation. Causational entrepreneurs focus on the predictable aspects of the unknown future (Sarasvathy, 2001). The predictable aspect of the future means that the future is controllable as far as it is predictable. Entrepreneurs who use effectuation are eager to control the future instead of trying to predict it. Effectuators will strive to control the future



instead of predicting it, because under conditions of high uncertainty, singular circumstances will make it nearly impossible to draw inferences or predicts what potentially will happen (Chandler, DeTienne, McKelvie & Mumford, 2011). These entrepreneurs see themselves as the creator of the market by bringing together stakeholders and forming strategic alliances (Sarasvathy, 2001). In doing so, these entrepreneurs have the possibility to control it (Dew, Sarasvathy, Read & Wiltbank, 2009).



2.2 Cognitive style

The way an entrepreneur organizes information has direct influence on the ability to engage in exploration, exploitation and the combination of both. Every entrepreneur has consistent individual differences in the preferred ways of organizing, processing information and experience, which is seen as cognitive style (Messick, 1976).

Mitchel (2002) defined entrepreneurial cognition as: "the knowledge structures that an individual uses to make assessments, judgments, or decisions involving opportunity evaluation, venture creation and growth". Kickul, Gundy, Barbosa and Whitcanack (2009), described the same perspective. They mentioned that individuals, who are possibly becoming an entrepreneur, frame and solve problems based on their cognitive style.

According to Epstein, Pacini, Heier & Denis-Raj (1996), cognitive preferences can be categorized into two different styles. The analytical-rational system, caused by the left hemisphere, can be described as; thinking- conceptual-logical, deliberative, effortful, intentional, systematic, explicit and verbal. It is influenced by an individual's perception of logic and reasoning orientation. In contrast, the intuitive-experiential system operates at the pre-conscious level; decisions will be made on a natural, automatic, schematic, narrative, implicit, experiential and non-verbal basis (Epstein, Pacini, Heier & Denes-Raj, 1996).

This vision is parallel to the research from Allinson & Hayes (1996), who described that individuals with an analytical cognitive style prefer a clear analysis in the process of problem solving and these individuals desire systematic methods of investigation.

In contrast, individuals who prefer an intuitive cognitive style are more comfortable with open-ended approach in problem solving (Allinson & Hayes, 1996). In a later study, Allinson (2010), conducted research about the successfulness of a company, in comparison to the cognitive style of a manager or founder. The results of the study clarify that managers who are successful in discovering and exploiting opportunities have a more intuitive cognitive style than other managers in the population.

It is relevant to describe the characteristics of cognitive style in order to understand cognitive style in a deeper way. Riding and Rayner (1998) mentioned that cognitive style is a personal characteristic that someone has since birth or receives in early stage of live and does not significantly change over time. It is an automatic way of responding to situations and information. In a later study, Krueger (2007) described the same perspective. His study concluded that the content of an expert entrepreneur knowledge base does not differ from a novice entrepreneur, but an expert entrepreneur organizes or structures the content differently. In order the measure the cognitive style belonging to an individual, Pacini and Epstein (1999) developed a measurement system to measure the two independent modes of cognition. The Rational-Experiential Inventory (REI) is a questionnaire developed by Pacini and Epstein (1999), which measures the habitual preference for either one of the two styles.

Allinson and Hayes (1996) developed another tool to measure an individual's preference for an analytical or intuitional thinking style. The measurement tool is called "Cognitive style index". "The cognitive style index evaluates cognitive style as a uni-dimensional construct, where analysis and intuition are viewed as bipolar opposites of a single continuum" (Allinson & Hayes, 1996, p. 54)

To capture the cognitive style of an individual, Epstein et al. (1996) conducted two studies towards differences in experiential and rational cognitive styles. These two studies resulted in



the cognitive-experiential self-theory (CEST). According to CEST, individuals are able to process information based on two information-processing systems, rational and experiential. The two systems are assumed to operate in parallel and to interact bi-directionally simultaneously and sequentially. According to Epstein et al. (1996) the rational system works predominantly at the conscious level and is described as intentional, analytical, affect free and primarily verbal. In contrast, the experiential system is described as, preconscious, holistic, primarily nonverbal and related to the affective state of an individual (Epstein, Pacini, Heier & Denes-Raj, 1996). This system is known as an "experiential system" because it adapts empirically learning from experience. These systems are different adaptive ways of processing information. The first system processes information primarily by empirically learning from experience while the second does by reasoning. Several factors determine the preferences of an individual for one system or another. Factors that affect the underlying preferences for one system are: (1) the preferences of an individual for one system (2) the degree to which an individual is experienced in responding to an issue in a certain manner, (3) emotional involvement and (4) previous experience (Anderson, 1982).



2.3 Entrepreneurial passion

Academic literature defines the concept of entrepreneurial passion in various ways. There is no universal or common definition that is mutually held by most researchers. In social psychological research passion is treated as a motivational construct that possesses cognitive, affective and behavioural components. Vallerand, Blanchard, Mageau, Koestner, Ratelle, Leonard, Gagne and Marsolais (2003) defined passion as "a strong inclination toward an activity that people like [affective], that they find important [cognitive], and in which they invest time and energy [behavioral]".

In line with the definition by Vallerand et al. (2003), Perttula (2003) described passion for one's job as "a psychological state characterized by intense positive emotional arousal, internal drive and full engagement with personally meaningful work activities". Both definitions imply that passion will assist one's attention and action, which is a domainspecific motivational construct (Chen, Yao & Kotha, 2009). The motivational construct is in depth elaborated by Vallerand et al. (2003). According to Vallerand et al. (2003) passion is a strong indicator of how motivated an entrepreneur is in building a venture, whether the entrepreneur is motivated to pursuing goals in times of difficulty, if the entrepreneur is able to articulate the current and future vision to the employees and if he/she is able to persuade, influence and lead employees in growing the venture. The elaboration of the emotions of an entrepreneur has not been studied extensively yet, but the amount of citations and publication about the emotions of entrepreneurs regarding the company has been increased significantly during the last decade (Omorede ,Thorgren & Wincent, 2015). In an earlier study, Cardon et al. (2005) started to make an attempt to describe the nature of passion regarded entrepreneurship. In her research, she combined the notion of passion from different researchers. Four aspects came to the surface, which were common in the different studies;

"Passion 1) is wholly or partly a strong emotion that 2) encapsulates a host of different and mixed emotions, 3) is directed toward or focused around a specific object, and 4) has motivational effect "(Cardon, Wincent, Singh & Drnovsek, 2005)

Cardon et al. (2005) used the outcome of different studies to develop a framework including theoretical mechanisms how emotional experience as passion arises and influences entrepreneurial outcomes. Based on the interactionist perspective (Russell, 2003), Cardon et al. (2005) distinguishes four primary elements of entrepreneurial emotions:

2.3.1. Individual core affective states of the entrepreneurs

The core affect of an individual is the neurophysiological state that is consciously accessible, which influences behaviours ranging from reflexive action to complex decision-making (Russell, 2003). This feeling is consciously accessible to the person experiencing it, but it happens without any cognitive process or reflection (Zajonc, 2000).

2.3.2. Affective qualities of entrepreneurial ventures

The affective qualities of an entrepreneurial venture are the emotions an entrepreneur receives regarding a specific event that occurs in his/her venture. These affective qualities are able to cause change to the core affect (Russell, 2003). The core-affective state of an individual is



seen as simple and unitary. Cacioppo & Berntson (1994) described that affective qualities towards an object are often mixed and complex to capture. For example, the first successful production cycle will cause feelings of joy, where the first financial loss will potentially cause feelings of sadness.

2.3.3. Attributed affect of entrepreneur

The attributed affect of an entrepreneur is the degree of change in core affect caused by a particular object. This is a subconscious emotion which arises spontaneous and automatically (Winter & Uleman , 1984). The core affect is the basal level of effect that is specific to an entrepreneur, while the attributed affect is the degree of change in the basal level caused by the venture/specific object (Russell, 2003).

2.3.4. Emotional meta-experiences (EMEs) of entrepreneurs

The emotional meta-experience is an element of emotions an entrepreneur experiences, when he/she tries to understand and label the initial emotional response they experienced (Cardon, Wincent, Singh & Drnovsek, 2005). The emotional change is consciously processed and is a secondary appraisal as result of change in their emotional experience (Lambie & Marcel, 2002).

Cardon et al. (2012) mentioned in her study that entrepreneurial passion is a key driver for starting a new organisation, where Omorede, Thorgren and Wincent (2015) mentioned that, the passion of an entrepreneur should make a positive contribution to the decision-making ability, judgment abilities, the intent of an entrepreneur and the behaviour regarding creativity. These findings contribute to the general idea that passion is essential for an entrepreneur. In an earlier study, Cardon, Wincent, Singh and Drnovsek (2009), defined entrepreneurial passion as "consciously accessible, intense positive feeling that, results from engagement in activities with identity meaning and salience to the entrepreneur"

In this study Cardon et al. (2009) explores entrepreneurial passion as a central concept, and aims to provide a theoretical conceptualization on the nature of experienced entrepreneurial passion and the influence of entrepreneurial passion on cognition and behaviour of an entrepreneur (Cardon, Wincent, Singh & Drnovsek, 2009). Central to the definition of Cardon (2009) is the "intense positive feeling" and the "identity meaning" of an entrepreneur. Based on these cornerstones in the definition, Cardon et al. (2009) defined three-domains regarding entrepreneurial passion:

2.3.5 Entrepreneurial passion regarding inventing

Entrepreneurial passion for inventing, concerns activities an entrepreneur undertakes regarding observing the environment for new opportunities and the development of new services or products (Cardon, Wincent, Singh & Drnovsek, 2009). Entrepreneurs who are passionate regarding inventing, search more often en much deeper for innovative ideas than their competitors (Katila & Ahuja, 2002), and they strive to deliver novice solutions.

2.3.6. Entrepreneurial passion regarding founding

An entrepreneur, who experiences passion for founding, primarily enjoys the stage of founding a company, and developing identities that are intertwined with the company identity (Cardon, Zietsma, Saparito, Matherne & Davis, 2005). These entrepreneurs focus on assembling financial, social en human resources, which need to be acquired in order to create a new venture (Cardon, Sudek & Mitteness, 2009a). Some entrepreneurs are so full of passion



for founding a company, that as soon as the company is established, they sell the business altogether and start all-over again with their next company invention (Ronstadt, 1988)

2.3.7. Entrepreneurial passion regarding developing

An entrepreneur, who has passion for developing, finds passion for growth and expansion of the venture after founding (Cardon, Wincent, Singh & Drnovsek, 2009). Entrepreneurs who are passionate regarding founding are not motivated by a desire to found a company, but constantly strive to expand and let the company grow (Cliff, 1998). These entrepreneurs are mainly driven by the constant eager to grow and expand. Entrepreneurs, who are passionate for developing a company, enjoy the process of increasing sales and activities as well as hiring new employees and attracting new funds for company expansion (Cardon, Gregoire, Stevens, & Patel, 2012).

These three domains, function as categories of entrepreneurial behaviour and provides the possibility to connect certain behaviour to a specific domain. Cardon et al. (2012) mentioned that in practice the experience of entrepreneurial passion regarding these activities may vary not only in line with the contexts and challenges that entrepreneurs will get involved with during each stage of the venture development, but as well with the specific background and experiences of entrepreneurs.

Based on this sentence we are able to assume that the experience of entrepreneurial passion does not need to be equal across all the three domains. Some entrepreneurs will be more passionate for certain activities, and less passionate for the other domains.



3.0 Hypothesis

In this section the hypotheses will be elaborated. In total 6 hypotheses are described. The first 5 hypotheses are testing the overall relation between the different variables. The 6^{th} hypothesis will test the main research question of the study.

The concept of entrepreneurial processes, causation and effectuation is linked to cognition. Dew et al. (2009) argued that literature about entrepreneurial cognition suggests that theories developed in expert-novices studies in cognitive psychology are likely to shed new light on important aspects of the entrepreneurial process. The concept of effectuation is described as a decision-making process where an entrepreneur uses his/her experiences/prior knowledge to decide what is best practise in the circumstances he/she is facing (Sarasvathy, 2001). This holds for experiential learning as well. Entrepreneurs who process information based on experiential learning processing (Epstein, 2014). Based on these statements one can expect a relation between the experiential system and effectuation. The following hypothesis will be tested:

H1: Entrepreneurs with an experiential cognitive style have a preference for effectual over causal decision-making.

Sarasvathy et al. (2001) described causation as a concept where a particular effect is given and an entrepreneur will chose between means to create that specific effect. The entrepreneur conducts systematic research in order to gather information, order the gathered information and invests time to analyse the gathered information. Based on the conducted analysis derived from the gathered knowledge, an entrepreneur will make an attempt to make a logical prediction of the future (Sarasvathy & Kotha , 2001). This entrepreneurial process consists similarities with the rational cognitive style. The rational system is an inferential reasoning system that functions based on an individuals understanding of rules of reasoning including the importance and evaluation of evidence (Epstein, 2014). The primary motive of the rational system is to function based on the reality principle, to strive to be realistic and logical. Based on these described similarities one can expect a relation between the rational cognitive system and the decision-making process based on causation. The following hypothesis will be tested:

H2: Entrepreneurs with a rational cognitive style have a preference for causation over effectual decision-making.

Sarasvathy et al. (2001) made a comprehensive description about effectuation. Effectuation is a process where an entrepreneur possesses certain means and is eager to create an effect based on those means. As aforementioned, a chef has got certain ingredients in stock and will make a meal based on the ingredients he possesses (Sarasvathy, 2001). Baron (2008) described that highly activated and positive emotions such as passion are able to foster creativity and recognition of new patterns that are essential in opportunity exploration and exploitation in uncertain and risky environments. This description is similar to the study conducted by Fredrickson (1998), who claims that entrepreneurs who are driven by passion are able to recognise novel patterns of information and leverage their existing knowledge to search for



creative solutions. Entrepreneurial passion is divided into three sub-divisions. Entrepreneurs, who are passionate for inventing, will intensively search for new opportunities, will come up with new services and/or products and enjoy inventing new solutions for current problems. These entrepreneurs will constantly search for new applications and the improvement of current ones. Since these entrepreneurs seek for new opportunities, it is expected that they are less worried about the results and are focused on constant adaption of the current business ideas. Based on the similarities described between the process of effectuation and entrepreneurial passion on can except that entrepreneurs who are passionate for inventing will have a preference for effectuation. The following hypothesis will be tested:

H3: Perceived entrepreneurial passion for inventing has a preference for effectuation over causation decision-making.

Cardon et al. (2012) described that entrepreneurs who are passionate for founding are entrepreneurs who are performing tasks like attracting financial, social and human resources in order to create a new venture. Entrepreneurs, who are passionate for founding, will be more effective in venture creation, since passion for founding positively effects persistence and creative problem solving (Cardon, Wincent, Singh & Drnovsek, 2009). This is in line with Sarasvathy's (2001) statement about effectuation. Entrepreneurs who use effectuation in decision-making are more creative since they are not held by the end-goal but are constantly adapting their products or services in response to information they attract from the market. These entrepreneurs inventory what kind of means they have in stock and produce a product of service based on these means. Based on these similarities it is expected that:

H4: Perceived entrepreneurial passion for founding has a preference for effectuation over causation decision-making.

Entrepreneurs who are passionate for founding, primarily like growth and expand the venture after founding (Cardon, Wincent, Singh & Drnovsek, 2009). These entrepreneurs are constantly scanning the market for new opportunities and improvements of the current product and company, where company growth is central in this entrepreneurial passion domain. Creative problem solving and entrepreneurs absorption are significant for effectiveness in venture growth. Entrepreneurs who are passionate for developing are searching for funders and stakeholders in order to acquire funds and knowledge in order to grow. Effectual entrepreneurs are creative entrepreneurs since they are developing products or services based on the means they have available and are willing to form strategic alliances with stakeholders to control the market and obtain new knowledge (Sarasvathy, 2001). These similarities result in the following hypothesis:

H5: Perceived entrepreneurial passion for developing has a preference for effectuation over causation decision-making.



Empirical research of Winnen (2005), described that entrepreneurial passion is an emotion that will have influence on the recognition of opportunities, how mission and vision of the company is formed and how decisions are made. In a later study Baron (2008), made a similar description on the influence of affect/emotion on aspects directed towards cognition and entrepreneurial process. Baron (2008) described that affect influences many aspects of entrepreneurial cognition and behaviour and affect is important for opportunity recognition and how resources are acquired. Based on the abovementioned research, it will be interesting to study the influence of entrepreneurial passion on the relation between entrepreneurial cognition and effectuation.

H6: The relation between cognition and effectuation is moderated by entrepreneurial passion.



4.0 Methodology

The aim of this research is to study if the cognitive style of an entrepreneur influences the decision between effectuation or causation and if the level of passion moderates the effect. Measuring the level of cognition, effectuation and entrepreneurial passion will provide the answer. This chapter will describe how the research is conducted. Further, the sample will be described, research method and data analysis.

4.1 Sample

The data that is used in this study is collected in Malaysia. According to Perry et al. (2012) there is a need to empirically test the concept of effectuation on novice entrepreneurs to get a better understanding on how these entrepreneurs start a venture. This study will enrich literature with new data and analysis focussed on starting entrepreneurs.

The data is gathered trough a combination of online and offline questionnaires. The entrepreneurs were found through a database of Malaysian incubator MaGIC (69 addresses), via a national website kuala-lumpur.startups-list.com (100 addresses), via a start-up website AngelList (500 addresses), via company website Yellowpages.my (200 addresses) and the use of Facebook groups exclusively for entrepreneurs who are stationed in Malaysia. These different online sites provided names of local companies. The entrepreneurs were approached to participate in the study by making use of Facebook, LinkedIn and company emailaddresses.

In order to generate a higher response, entrepreneurs were approached directly at local bazaars. Various bazaars were visited in which entrepreneurs were approached to participate in the study by filling in the paper copy of the survey.

Approximately 1200 entrepreneurs were approached to take part in the study, a reminder was sent after a period of two weeks for those who had not filled in the survey. These activities resulted in 139 filled in questionnaires. The aim of this study is directed towards novice entrepreneurs, who at least posses a bachelor's degree and are owner and founder of the firm. Novice entrepreneurs are classified as entrepreneurs who are entrepreneur for a maximum of 5 years. After applying these filters to the gathered data a total sample size appeared of 80(n). A control for outlier is carried out to search for respondents who form an outlier in relation to the other respondents. After conducting the Mahalanobis-distance (Mahalanobis, 1936) with a threshold of 0.001, three respondents had to be removed from the data, because these three respondents will harm the test (Filzmoser, Maronna & Werner, 2004). After filtering these three respondents the data consists 77 respondents.



4.2 Research method and measurement tools

4.2.1. Cognition

In this study the cognitive style of an entrepreneur is studied as an independent variable. As previously discussed, there are various researchers who conducted a study in order to design a measurement tool for cognition. Allinson & Hayes (1996) developed the cognitive style index (CSI), which is cited very often over the past decades and provides a clear outcome (intuitive to analyse). However, the questionnaire provides a 3-point Likert scale, which only gives the respondent the possibility to fill in "true, uncertain or false".

In contrary to Allinson & Hayes (1996), Epstein et al. (1996) provided a measurement tool with a 5-point Likert scale ("strongly disagree" (1) to "strongly agree"(5), a wider range of possibilities gives a more liable outcome (Zikmund, Babin, Carr & Griffin, 2013). The Relational-Experiential Inventory (REI) scale measures the two independent modes of cognition based on 10 items. The REI consists two scales, need for cognition (NFC) and faith in intuition (FI). The NFC scale represents the analytical-rational system and the FI scale treats the intuitive-experiential system. This questionnaire has been set up to determine the information processing style of an individual and has been widely used in psychology and cognition literature (Evans, 2008). This cognition measurement tool is easy applicable and has a high validity, despite the low amount of items that are used in the questionnaire (Epstein, 2014). Three items from the REI scale need to be reversed coded. These items are: 1,2 and 5. These items will be recoded into 1=5, 2=4, 3=3, 4=2 and 5=1.

4.2.2. Causation & effectuation

In the past decade various researchers conducted studies in order to deliver a measurement scale for effectuation. Despite the multiple attempts, the majority of these attempts lacked correlation and validity (Şahbaz, 2017). Brettel et al. (2012) introduced a scale, which unfortunately, lacked internal consistency by low correlations between effectuation principles and for instance. Johansson and McKelvie (2012) lacked construct and discriminant validity in their research.

Alsos et al. (2012) developed a scale for measuring effectuation and causation. These two different, yet related scales provide a better distinction between the two concepts. Former scales considered effectuation and causation as exclusive and polar opposites. The new measurement scale developed by Alsos et al. (2014) take both concepts individually into consideration. In total 10 items are measured by the scale, five items each for effectuation and causation. By assigning scores to five items, effectuation and causation is measured based on a 7-point Likert scale. The scale ranges from "strongly disagree" (1) to "strongly agree" (7) (Epstein, Pacini, Heier & Denes-Raj, 1996), (Brettel, Mauer, Engelen & Küpper, 2012).

4.2.3 Entrepreneurial passion

Empirical literature mentioned multiple definitions of entrepreneurial passion with the same perspective, but lacked a sound measurement instrument. Cardon et al. (2012) conducted a study in order to develop an accurate measurement scale for measuring entrepreneurial



passion. This study presented that entrepreneurial passion consist three task specific domains; intense positive feeling towards the domain of inventing, founding and developing an organisation and the centrality of these domains towards the self-identity of entrepreneurs. These dimensions are empirically and conceptually distinct from each other and from other emotions such as hopefulness, positive experience and negative emotions and entrepreneurial self-efficacy.

The measurement instrument contains a questionnaire with 13 items measuring entrepreneurial passion across the three domains of inventing, founding and developing. The different items are measured based on a 7-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7).

4.3 Method of analysis

IBM SPSS Statistics 25 is used to analyse the data gathered from the survey. The first analysis that has been conducted is the reliability analysis, followed by explanatory factor analysis and is ended with testing the normality of the distribution.

4.3.1 Reliability analysis

We analysed our data based on IBM SPSS Statistics packages 25. The first test that needs to be conducted is the Cronbach's Alpha test (α). The Cronbach's Alpha tests the internal consistency of the survey (Dooley, 2001). Multiple scholars have different perspectives if the data has an acceptable level of consistency. Hair et al. (2010) described that 0.7 is an acceptable level of internal consistency, in contrary to Loewenthal (2010), who finds 0.6 acceptable.

The first variable that was subject to Cronbach's Alpha, is cognition. As aforementioned, the cognition scale is divided into NFC and FI. The α for NFC is 0.426. The threshold describes that this is unacceptable. According to Streiner (2003), the length of the scale will negatively influence the Alpha level. Since the scale in this research is relatively small and validated, this statement may not be omitted, only for improving Cronbach's Alpha. The α of FI is 0.812 and indicates a good reliability measure. The second variable that has been tested with Cronbach's Alpha, is effectuation. Both scales, developed by Alsos et al. (2014) represent an acceptable level. The scale for effectuation has an α of 0.864 and causation scores an α of 0.620. The last variable that has been tested is entrepreneurial passion. The scale of Cardon et al. (2012) divides entrepreneurial passion into three domains. All the domains represent an acceptable level α . Passion for inventing score an α of 0.825 and passion for founding has an α of 0.821. Passion for developing is the last domain and scores an α of 0.847.

4.3.2. Factor analysis

Factor analysis is a tool, which uses mathematical procedures for simplification of interrelated measures to discover if there are patterns in a set of variables (Child, 2006). This analysis identifies any underlying structure between the variables and tests the relation between them.



The Kaiser-Meyer-Olkin (KMO) will be executed to test whether the sampling adequacy is correct. This test will confirm if factor analysis is the right tool to determine the amount of factors. Besides, the KMO tests if the correlation between pairs of variables can or cannot be explained by other variables (Kaiser & Cerny, 1977). The threshold of the KMO is 0.5 according to (Hair, Black, Babin & Anderson, 2010). Some studies mention that 0.5 is acceptable, but H.F. Kaiser and J. Rise (1974) discussed KMO in depth and displays that 0.5 is miserable and even 0.7 is middling. In this study 0.7 will be seen as acceptable. If the KMO is below 0.7, the data has a widespread correlation, which will not be suitable for factor analysis (Hair, 2010). In order to create a simple structure rotation will be executed. After rotation the factors will be more easily interpreted. Since we expect that the factors are uncorrelated we make use of the varimax (orthogonal) rotation technique (Field, 2009).

At last the Bartlett's test of Sphericity will be conducted. This test will conduct an analysis to see if there is an identity matrix. An identity matrix is a matrix where the analysed variables are not significantly correlating with each other.

Cognition scale (REI)

The Kaiser-Meyer-Olkin (KMO) is conducted to determine whether the sample is adequate and indicates whether the variables should be reconsidered. That is the case if the KMO < 0.7(Kaiser & Rise, 1974). The conducted KMO-test based on the derived data displays a KMO of 0.689. This indicates a good and adequate sample size. The Bartlett's Test of Sphericity has been carried out to determine if the data is organised as an identity matrix. An identity matrix is a matrix where every individual variable correlates very low with all other variables and we are able to conclude that there is no relation between the items in the scale. (Field, 2009). The performed Bartlett's Test of Sphericity shows that the P-value is < 0.001, which indicates that we can reject the 0-hypothesis and are able to conclude that there is no identity matrix.

A principle component test is conducted, since it is assumed that there is not a lot of measurement error in the scale (Hair, 2010). We expect that the test will display two components/factors, since we deal with two principles (NFC and FI). This would be the case if two components will have an Eigenvalue > 1.0. The conducted test explains that there are three factors in the variable cognition.

All the statements in factor 1 correspond well with each other, but statement 4 "I prefer complex to simple problems" and "Thinking hard and for a long time about something gives me little satisfaction" are corresponding with factor 3. Item 5, 'Thinking hard and for a long time about something that gives me little satisfaction" from Need for Cognition scores a very low Eigen Value if this item is compared with the other items in the scale.

FACTOR		FACTOR		FACTOR
1		2		3
FI1	.777	NFC1	.706	
FI2	.656	NFC2	.617	
FI3	.773	NFC3	.725	
FI4	.759	NFC4	.556	643
FI5	.685	NFC5	.095	.819

Table 2: Factor-loading Need for cognition



In order to make two factors SPSS conducted a factor analysis based on two fixed factors, instead of an Eigenvalue of 1.0.

Effectuation/Causation scale

The KMO for effectuation/causation is .749, which indicates a good sample size and sampling adequacy. The Bartlett's test of Sphericity (P-value) <0.001 and indicating that there is no identity matrix. The principle component analysis shows that there are two components/factors derived based on the statements belonging to the scale (after rotation). This is in line with our expectations, since the Alsos et al. (2014) scale has two different subscales (causation and effectuation).

FACTOR		FACTOR	
1		2	
CAUS1	.857	EFFE1	.763
CAUS2	.724	EFFE2	.614
CAUS3	.807	EFFE3	.520
CAUS4	.773	EFFE4	.616
CAUS5	.849	EFFE5	.690

Table 3: Factor-loading Causation

Entrepreneurial passion

The KMO for entrepreneurial passion is .757, which again indicates a good sample size and sampling adequacy. The Bartlett's test of Sphericity (P-value) <0.001 and indicating that there is no identity matrix in the scale. The principle component analysis shows that there are three components/factors derived based on the statements belonging to the scale (after rotation). This is in line with our expectations, since the Cardon et al. (2012) scale has three different items (passion for founding, inventing and developing).

FACTOR		FACTOR			FACTOR
1		2			3
PASS1	.780	PASS6	.784	PASS10	.884
PASS2	.869	PASS7	.887	PASS11	.886
PASS3	.854	PASS8	.471	PASS12	.858
PASS4	.603	PASS9	.828	PASS13	.518
PASS5	.640				

Table 4: Factor-loading Entrepreneurial passion



Monte Carlo simulation

The Alsos (2014) scale is based on two factors (Need for cognition and Faith in intuition). Despite the effort, which is taken to extract two factors, the data delivers three factors. A possible explanation could be the limited amount of respondents. A data simulation should be executed to determine the amount of factors if simulation wise more data should have been gathered.

The Monte Carlo simulation is a statistical method, which calculate with probabilistic or stochastic system. Based on repeated random sampling this method obtains results. This simulation method is used when there are a lot of uncertainties expected in the research and/or the conducted analysis does not correspond with the scale. The Monte Carlo simulation is able to simulate up to 10.000 samples (or less) (Matala, 2008).

This tool is no longer available in SPSS Statistics and has to be conducted based on Syntax in SPSS Statistics. A code provided by O'Connor (2000), gives SPSS Statistics the possibility to provide simulated data and compute the amount of factors based on the data.

As in factor analysis, all the effectuation and causation statements have been taken together. The Monte Carlo simulation, simulated based on a 95% confidence level and 1000 samples. Based on the simulated data, in total two factors where extracted, in which the raw data EV exceeds the random data EV. The same simulation is derived from the Epstein et al. (1996) scale statements and Cardon et al. (2005) statements. The simulated data delivers the same amount of factors as the scale presents.

			Causation				
			æ			Entrepreneurial	
NFC & FI			Effectuation			passion	
Raw	Radom	Data		Random	Data		
Data	EV		Raw Data	EV		Raw Data	Random Data EV
4,014	1,719		3,376	1,765		4,675	1,910
1,764	1,468		2,077	1,522		2,463	1,661
0,866	1,298		0,982	1,350		1,637	1,490
						0,910	1,348

Table 5:	Monte Carlo simulation

4.3.3. Normal distribution

A normal distribution means that the variables are symmetrically bell-shaped curved. It is essential that the dependent variables are approximately bell-shaped curved, since the independent variables are not based on possible relations in this study. The dependent variables causation and effectuation are statistically proven as normally distributed. This is proven, by testing the variables on the Shapiro & Wilk, kurtosis and skewness-test. The Shapiro & Wilk has proven the variable Faith in Intuition (FI) to be normally distributed, but



this did not held for need for cognition (NFC). SPSS provides a data-changing tool: LOG10. LOG10 changed the data and thereafter NFC met the Shapiro & Wilk criterion. Besides the tests conducted, a visual graph like Q-Q plot (Appendix 7) provides inside about the normality of the distribution. The dots in the Q-Q plot are following the normal distribution line, which ensures that the data is normal distributed.

4.3.4. Control variable

There is always a possibility that the variables that are tested during the study are influenced by other variables than the independent ones. To make sure that the dependent variables are not influenced by other variables than the independent ones, the dependent variables need to be controlled. The variables that control the dependent variables are: gender and age. Bardasi, Sabarwal and Terrel (2011) conducted a study about female performances in entrepreneurship. They have found evidence that gender, influences the decision-making process of an entrepreneur. The second control variable is age. According to study conducted by Shepherd, Zacharakis and Baron (2003), decision-making is influenced by experience. Since experience and age are often two parallel variables it could be the case that age is able to influence decision-making.



5. Result

5.1 Descriptive statistics.

This study is based on a sample size of (n=) 77. The initial dataset consisted 81 respondents, however 3 respondents are omitted because they significantly influenced the internal correlation negatively. These entrepreneurs/respondents are all higher educated (bachelor or university) and are founders of the company they lead and own. The study is conducted among entrepreneurs who life in Malaysia. It appeared that (n=) 51 female (66%), (n=) 24 male (31%) and (n=2) other (3%). The age of the respondents is ranging from minimum 22 years old to 60 years old at maximum, with a (\bar{x}) mean of 32 years old (σ = 6,578). The entrepreneurs who participated in this study have an average entrepreneurial working experience of 2,55 years (σ = 1,389). The majority of the respondents operate in the "consumer good" industry (n=27), which is 35%, followed by "other industry" (n=14), which is 18%. The intention to start a company varied among the entrepreneurs. The majority started a company by "following a dream" (n=19) which is 25%, followed by the eager to "contributing to make the world a better place" and "opportunity to improve my financial situation", which are both (n=11) 14%. Among the 77 respondents, only (n=9) 12% is familiar with the term "effectuation".

Please state your gender?		Frequency	Percentage	Cumulative Percentage
	Male	24	31,2	31,2
	Female	51	66,2	97,4
	Other	2	2,6	100
	Total	77	100	

	Ν	Minimum	Maximum	Mean	Std. Deviation
What is your age?	75	22	60	31,92	6,578

	Ν	Minimum	Maximum	Mean	Std. Deviation
How many years have you been an					
entrepreneur?	77	0,5	5	2,552	1,3898

					Std.
	Ν	Minimum	Maximum	Mean	Deviation
Causation	77	3	7	5,0545	0,8358
Effectuation	77	1,4	7	4,3195	1,28237
NFC	77	2	3,8	2,8805	0,4196
FI	77	1,8	5	3,639	0,69437
Passion_for_inventing	77	3,2	7	6,0234	0,63327
Passion_for_founding	77	3	7	5,8474	0,90062
Passion for developing	77	2	7	5,8377	0,93521

The statements that together form cognition are: "need for cognition" and "faith in intuition". The NFC-statements have a mean (\bar{x}) of 2,88 (σ =0,419) and the FI-statements have a mean (\bar{x}) of 3,64 (σ =0,694). These results indicate that the respondents in this study have a preference for FI, over NFC. The second scale developed by Epstein (1996) divides causation from effectuation. The statements forming causation have a mean (\bar{x}) of 5,05 (σ =0,839) and the statements forming effectuation have a mean (\bar{x}) of 4,32 (σ =1,282). These figures give the



impression that causation is in favour over effectuation. The last scale developed by Cardon et al. (2012) divides entrepreneurial passion into three items/domains: passion for founding, passion for developing and passion for inventing. Passion for founding has a mean (\bar{x}) of 5,85 (σ =0,90). Passion for inventing has a mean (\bar{x}) of 6,02 (σ =0,633) and passion for developing has a mean (\bar{x}) of 5,84 (σ =0,935). Here the differences are minute. Further elaboration will confirm or disprove the first impression based on the mean (\bar{x}) and std. deviation (σ =0,419).

5.2 Correlation

As aforementioned the data will be treated as normal distributed. Since the data is normal distributed, the potential correlation between the variables will be tested with Pearson correlation. The threshold for a significant result is below p < 0.05. The significant results are displayed in Bold. The correlation coefficients displayed in yellow are significant at a level of 0.01. The grey fields display a significant level of 0.05.

		1	2	3	4	5	6	7	8
1	Gender								
2	Age	-0,007							
3	Need for cognition	0,220	-0,066						
4	Faith in intuition	0,166	-0,123	<mark>0,294**</mark>					
5	Causation	-0,111	-0,031	0,116	0,125				
6	Effectuation	0,146	0,061	0,144	0,034	-0,052			
7	Passion for founding	0,126	-0,074	0,183	0,224*	<mark>0,377**</mark>	0,095		
8	Passion for inventing	0,021	-0,022	0,135	0,223	<mark>0,378**</mark>	-0,149	<mark>0,412**</mark>	
9	Passion for developing	0,046	-0,253*	0,081	0,081	<mark>0,442**</mark>	-0,026	<mark>0,362**</mark>	0,098

Table 6: Pearson correlation variables of interest * p<.05, **p<.01,

Based on the above displayed table 6, there are a few relationships between the variables. The variable age correlates negatively with passion for developing (R=-0.253 p=0.04). The test variables display no further correlations between the variables among the Pearson correlation test. Need for cognition correlates highly with faith in intuition (R=0.294, p=0.029). Passion for founding shows a correlation with faith in intuition (R=0.224 p=0.050). Besides the correlation with faith in intuition, passion for founding correlates highly with causation (R=0.377 p=0.001). This holds for the other two domains as well. Passion for inventing correlates with highly with causation (R=0.378 p=0.001) so does passion for developing (R=0.442 p=0.000). An additional analysis will determine if there are significant differences between Pearson correlation and Spearman correlation. As aforementioned, the Pearson correlation will be performed if the data is not normally distributed (Field, 2009). Since we assume the data to be normally distributed, it is expected that the tests will display similar results (Bishara, 2012). Spearman correlation is described as more robust.



		1	2	3	4	5	6	7	8
1	Gender								
2	Age	-0,071							
3	Need for cognition	0,222	-0,073						
4	Faith in intuition	0,168	0,152	<mark>0,269**</mark>					
5	Causation	-0,055	-0,068	0,035	0,115				
6	Effectuation	0,165	0,136	0,120	0,050	0,063			
7	Passion for founding	0,101	-0,103	0,152	0,262	<mark>0,410**</mark>	0,046		
8	Passion for inventing	-0,030	-0,090	0,088	0,167	<mark>0,301**</mark>	-0,040	<mark>0,444**</mark>	
9	Passion for developing	0,007	-0,241*	0,075	0,071	<mark>0,412**</mark>	-0,002	<mark>0,470**</mark>	0,341**

Table 7: Spearman correlation variables of interest * p<.05, **p<.01

The Spearman correlation test shows the same significant correlations between the variables as the Pearson correlation test presents, except for passion for developing. The Pearson correlation test showed that there is no significant relation between passion for developing and passion for inventing, but the Spearman correlation test concluded that there is a significant correlation between these two domains of entrepreneurial passion (R=0.431 p=0.002). Furthermore, there are no significant changes in the correlation test. Some variables score a minor improvement in significance, where others get weaker. It is expected that some variables score slightly different in the Spearman test, that in the Pearson test. In our study we will use the outcome from the Pearson correlation test, since the data is treated as normally distributed.



5.3 Hypothesis

In the following section, the formulated hypothesis will be tested. The first hypothesis that will be tested is:

H1: Entrepreneurs with an experiential cognitive style have a preference for effectual over causal decision-making.

Assumptions check for multiple regression analysis

To confirm that the multiple regression test can be applied on the above displayed hypothesis, the model needs to be checked for the assumptions belonging to multiple regression analysis. The model is tested for all the following assumptions:

- Residuals are normally distributed
- Residuals are independent from the prediction
- Homoscedasticity among the error term
- No multicollinearity between the variables (VIF) (two explanatory variables who are strongly related)

According to Rogerson (2001) VIF score needs to be below 5. The VIF score for the below presented analysis is 1,035.

	Model 1				Model 2		
Variables	В	SE	Т		В	SE	Т
Constant	3.663	.762	4.807		3.594	1.15	3.124
Control variables							
Age	.012	.022	.533		.012	.023	.535
Gender	.338	.290	1.165		.335	.295	1.134
Variable of interest							
Faith in intuition					.017	.219	.080
F change	.816				.671		
R Square	.022				.031		
				1			
Change in Adjusted R Square				1	.009		

Table 8: OLS Regression effect FI on Effectuation *p < .10, **p < .05, ***p < .01, ****p < 0.001

Test:

H1 is not confirmed. The regression analysis demonstrates that there is no significant relation between faith in Intuition and effectuation B = .017, p=.937 (P< α =0.05)



H2: Entrepreneurs with a rational cognitive style have a preference for causation over effectual decision-making.

According to Rogerson (2001) VIF score needs to be below 5. The VIF score for the below presented analysis is 1,052.

	Model 1			Model 2		
Variables	В	SE	Т	В	SE	Т
Constant	5.338	.510	10.470	4.824	.867	5.556
Control variables						
Age	004	.015	270	005	.015	323
Gender	208	.194	- 1.070	191	.196	975
Variable of interest						
Need for Cognition				.147	.200	.733
F change	.607			.538		
R Square	.017			.024		
Change in Adjusted R Square				.007		

Table 9: OLS Regression effect NFC on Causation *p < .10, **p<.05, ***p<.01, ****p<0.001

Test:

H2 is not confirmed. The regression analysis demonstrates that there is no significant relation between rational cognitive style and causation B = .147, p= .466 (P< α =0.05)



H3: Perceived entrepreneurial passion for inventing has a preference for effectuation over causation decision-making.

According to Rogerson (2001) VIF score needs to be below 5. The VIF score for the below presented analysis is 1,001.

	Model 1			Model 2		
Variables	В	SE	Т	В	SE	Т
Constant	3.663	.762	4.807	5.551	1.59	3.465
Control variables						
Age	.012	.022	.533	.011	.022	.507
Gender	.338	.290	1.165	.342	.289	1.182
Variable of interest						
Passion for inventing				303	.230	-1.321
F change	.816			1.746		
R Square	.022			.046		
Change in Adjusted R Square				.023		

Table 10: OLS Regression effect passion for inventing on Effectuation *p < .10, **p<.05, ***p<.01, ****p<0.001

Test:

H3 is not confirmed. The regression analysis demonstrates that there is no significant relation between passion for inventing and effectuation B = -.303, p= .191 (P< α =0.05)



H4: Perceived entrepreneurial passion for founding has a preference for effectuation over causation decision-making.

According to Rogerson (2001) VIF score needs to be below 5. The VIF score for the below presented analysis is 1,024.

	Model 1			Model 2		
Variables	В	SE	Т	В	SE	Т
Constant	3.663	.762	4.807	2.856	1.247	2.29
Control variables						
Age	.012	.022	.533	.013	.023	.591
Gender	.338	.290	1.165	.306	.294	1.042
Variable of interest						
Passion for founding				.134	.164	.819
F change	.816			.671		
R Square	.022			.031		
Change in Adjusted R Square				.009		

Table 11: OLS Regression effect passion for founding on Effectuation *p < .10, **p<.05, ***p<.01, ****p<0.001

Test:

H4 is not confirmed. The regression analysis demonstrates that there is no significant relation between passion for founding and effectuation B = .134, p= .416 (P< α =0.05)



H5: Perceived entrepreneurial passion for developing has a preference for effectuation over causation decision-making.

	Model 1				Model 2		
Variables	В	SE	Т		В	SE	Т
Constant	3.663	.762	4.807		3.684	1.364	2.70
Control variables							
Age	.012	.022	.533		.012	.023	.507
Gender	.338	.290	1.165		.339	.293	1.156
Variable of interest							
Passion for developing					003	.163	019
F change	.816				.000		
R Square	.022				.022		
				1			
Change in Adjusted R Square				1	.000		

According to Rogerson (2001) VIF score needs to be below 5. The VIF score for the below presented analysis is 1,071.

Table 12: OLS Regression effect passion for developing on Effectuation *p < .10, **p<.05, ***p<.01, ****p<0.001

Test:

H5 is not confirmed. The regression analysis demonstrates that there is no significant relation between passion for developing and effectuation B = .00, p= .985 (P< α =0.05)



H6: The relation between cognition and effectuation is moderated by entrepreneurial passion.

In order to test if the relation between cognition (NFC and FI) and effectuation/causation is moderated by entrepreneurial passion multiple tests can be performed. Hayes (2013) introduced PROCESS, which is a tool what can be installed in SPSS Statistics. This SPSS Statistics tool calculated multiple regression model. The model is calculated based on a 95% confidence interval and a bootstrap sample of 5000.

	Coeff	Т	Р	LLCI	ULCI
Constant	17.50	2.28	.025	2.232	32.77
Faith in intuition	-3.236	-1.481	.143	-7.591	1.118
Passion for inventing	-2.304	-1.781	.079	-4.882	.273
Interaction FI*Passion inventing	.566	1.549	.126	163	1.295
Constant	1.25	.184	.854	-12.265	13.914
Faith in intuition	.641	.342	.734	-3.096	5.476
Passion for founding	.495	.445	.658	-1.726	2.805
Interaction FI*Passion for founding	101	331	.742	856	.706
Constant	8.726	1.532	.127	-2.549	20.00
Faith in intuition	-1.139	746	.458	-4.184	1.905
Passion for developing	-2.304	-1.781	.410	-2.705	1.116
Interaction FI*Passion for develop.	.566	1.549	.427	308	.720

Test:

Based on the above presented PROCESS analysis it can be stated with 95% confidences interval, that entrepreneurial passion does not has a moderating effect on the relation between Faith in intuition (FI) and effectuation. Non of the presented P values (P=.126 P=.642 P=.427) is <0.05.



	Coeff	Т	Р	LLCI	ULCI
Constant	3.331	.738	.463	-5.643	12.278
Need for cognition	415	308	.760	-3.105	2.275
Passion for inventing	.330	.446	.657	-1.146	1.806
Interaction NFC*Passion inventing	.057	.260	.795	380	.494
Constant	.502	.117	.906	-8.077	9.081
Need for cognition	.718	.595	.554	-1.688	3.124
Passion for founding	.724	.984	.328	-0.742	2.189
Interaction NFC*Passion for founding	.107	523	.603	516	.302
Constant	3376	969	.336	-10.321	3.568
Need for cognition	1.570	-1.765	.082	202	3.343
Passion for developing	1.257	2.170	.033	102	2.412
Interaction NFC*Passion for develop.	218	.339	.147	514	.078

Test:

There is no significant moderating effect proven based on the Hayes (2013) test. None of the different domains of entrepreneurial passion correspondents significantly as a moderator between need for cognition and causational decision-making. Based on table 13 and table 14 we are able to reject H6, and conclude that there is no significant moderating effect of entrepreneurial passion between cognition and entrepreneurial decision-making.



6. Discussion

In this section an elaboration will be given about the results of the research. A validated questionnaire is used to gather the data. The dataset consists Malaysian novice entrepreneurs who work and live in Malaysia. The results derived from the analysis performed in SPSS Statistics are quite surprising. There has been relatively little research done towards information processing and decision-making combined with entrepreneurial passion. These different concepts are captured with the scale of Alsos et al. (2014), Epstein et al. (1996) and Cardon et al. (2012). This research has been carried out among Malaysian entrepreneurs who are currently in the starting phase (0-5 years). The results from the conducted research show that none of the six hypotheses can be supported with empirical evidence. There is no significant evidence found for information processing influencing effectuation or causation. Theory describes that entrepreneurs who believe that the future is more or less predictable (causational thinking) conduct systematic research to derive market information in order to find the right product (Sarasvathy, Dew, Read & Wiltbank, 2007). In contrast to our expectation based on scientific literature, no significant evidence for this statement was found. Our study is built on population of entrepreneurs in Malaysia. Begley and Tan (2001) described several social-cultural differences between entrepreneurs from Asia and Western countries. Research conducted by Varnum, Grossmann, Kitayama and Nisbett (2010) support this statement. This study found evidence for cognitive differences between Asian and Western countries. Inhabitants from Asian countries are more holistic, in contrary to Western inhabitants, who tend to be more analytic. Based on these social-cultural differences it is plausible to expected different results if the study would be carried out in other countries.

The relationship between entrepreneurial passion and the preference for effectuation over causation is stated in three hypotheses, because entrepreneurial passion contains three domains of passion. These hypotheses are formed based on theory described by Baron (2008) and Fredrickson (1998). According to Baron (2008), highly activated and positive emotions, such as passion can foster creativity and helps to recognize new patterns that are vital in exploration and exploitation of opportunities in uncertain environments. Fredrickson (1998) claims that entrepreneurs, who are passionate, are able to recognize novel patterns of information and are searching for creative solutions based on their existing knowledge. It was expected/hypothesized that a relation between effectuation and entrepreneurial passion would be claimed based on the analysis. In contrary to our expectations, no significance can be claimed. A possible explanation in the lack of significance can be found in emotional differences between Western and Asian countries. Lim (2016) claims differences in arousal emotions between Western and Asian countries. Western countries experience more high arousal emotions, in contrast to Asian countries that are experiencing more low arousal emotions as sadness and reflection. Therefore the outcome of the analysis should be claimed with care.

The last part of the research was to find evidence for a moderating effect of entrepreneurial passion between information processing and entrepreneurial decision-making. This model was tested based on the combination of rational information processing, causational decision-making, the combination of intuitive/experiential decision-making and effectual decision-making. In both tests all three domains of entrepreneurial passion where included as a moderator of the effect. Since no statistical evidence was found in hypothesis one and two, the expectation for a moderating effect of entrepreneurial passion were minute. The performed test proved that no statistical evidence was found for entrepreneurial passion,



moderating the relationship between information processing of an entrepreneurs and decisionmaking.

The outcome of this research is not in line with the paper Chen et al. (2009) and Vallerand et al. (2003) who indicates that entrepreneurial passion is a motivational construct what is directly linked to affective, cognitive and behavioural components. Despite the fact that no significance could be found for our hypothesis, this study shows that, based on literature, a relationship between the different aspects of entrepreneurship exists, but cannot be statistical confirmed based on the performed study.

6.1 Limitations and critics

Like in every research, this research contains deficiencies. This section will elaborate the limitations and critics. The first limitation that will be elaborated is the Cronbach Alpha. The Cronbach Alpha of causation (Alsos, (2014)) scores a low level. This is not the only variable that is tested with a low Cronbach Alpha level. It appeared that need for cognition (Epstein 1996), scores a lower Cronbach Alpha than is preferred. According to Field (2009) a reason for the lower Cronbach Alpha can be directed towards the small scale. The Alsos scale (2014) contains in total 10 items, where 5 items represent causation. The same holds for the Epstein scale (1996). This scale holds 10 items, where 5 items represent need for cognition. However, some researchers criticize the internal consistency reliability measure. Green, Lissitz and Mulaik (1977) criticized Cronbach's Alpha measure by addressing the limitations it has in relation to test dimensionality and Cronbach (1951) discussed his own developed reliability measure by describing the misuse of the reliability measure in relation to short questionnaires. Since both scales have a limited length we will not focus too much on the internal consistency reliability measure, but will treat it as validated and reliable.

The dataset, which is used in this study is acquired by K. Lohuis (2018), a fellow student from the University of Twente. It is a limited dataset since it contains 77 entrepreneurs in a country with 518.000 entrepreneurs. The data should been generalized with care, since the dataset may not fully reflect the whole population. Nevertheless, O'Connor (2000) extended it to 1000 respondents and based on the total sample the analysis will present statistically proven explorative outcome.

The demographic spread of the sample is a disadvantage for generalization for other countries (Banerjee & Chaudhury, 2010). Respecting the described limitation so far, the results from this research are applicable on entrepreneurs who live in Malaysia, but generalization towards other counties should been done with care. Since the study only contains entrepreneurs from Malaysia, it lends itself perfectly for comparison with other studies that are directed towards one country.



6.2 Implication for practice

The aim of this study was to examine the relationship between cognitive style and preference for causational or effectual decision-making and if entrepreneurial passion moderates the effect. Although no relationship could be proven from the performed analyses, the conducted study contributes to the literature of entrepreneurship and presents insight in the combination of multiple components of entrepreneurship in theoretical form. Every entrepreneur has its own reason for starting a company, where some will be financially successful while others are not. The presented study helps understanding the entrepreneurs' way of thinking and their decision-making process. The study clarifies that there is no statistical evidence for a relationship between someone's cognitive system and their preference for either causation or effectuation. T.M. Begley and W.L. Tan (2001) described that there are social-cultural differences between Asian en Western countries. Since this study is focused on entrepreneurs from Malaysia, it would be very interesting to compare these findings to other countries and find answer if these differences are present.

This study is exclusively directed towards novice entrepreneurs. Entrepreneurs who are in the sample are entrepreneurs who don't own a company over 5 years. Since it only contains novice entrepreneurs, it would be interesting to compare the outcomes of this study to a study, which is directed towards expert entrepreneurs. Sarasvathy (2001) described that entrepreneurs, who achieved an experienced level of entrepreneurship, do not follow the logic of causation as taught in business schools, but use their experience. Based on this notion it is expected that a study among expert entrepreneurs will come up with a high percentage "effectual" entrepreneurs. Future research towards these differences will confirm if there is a significant difference between expert en novice entrepreneurs.

Another topic what has been studied in depth is the concept of cognition in relation to entrepreneurial decision-making. These results are relevant for social studies and business psychologists who are able to understand the combination of these two concepts in relation towards each other. This study has shown that there is no significant relation between the cognitive system of an entrepreneur and their decision-making preferences towards entrepreneurial activities. In contrary to what has been described by Blume and Covin (2011), entrepreneurs who make decisions based on intuition and experience do not tend to have a preference for effectual decision-making. This was also the case for the stated hypothesis about analytical cognitive style and applying causation. It is stated by Sarasvathy et al. (2007) that entrepreneurs who are making analytical decisions, have a preference for causational decision-making. The performed research failed to find evidence for this relationship.



6.3 Conclusion

This study is conducted in order to get an understanding if entrepreneurial passion has a moderating influence on cognition and the decision-making preference of an entrepreneur. Entrepreneurial passion is measured based on the measurement scale developed by Cardon et al. (2012). Epstein (1996) developed the REI-scale, which is used to capture the cognitive system of the entrepreneur. Based on the REI-scale, one is able to conclude if an individual has preferences for processing information based on analytical and rational or experiential and intuitional basis. Entrepreneurial decision-making is measured by making use of the Alsos-scale (Alsos, Clausen & Solvoll, 2014). The obtained data, which is gathered through the presented scales, provided answer on the central research question in this study:

"To what extent entrepreneurial passion of an entrepreneur moderates the potential relationship between the cognitive system and preferences in decision-making process of effectuation and causation"

Every entrepreneur is passionate about inventing products or services, founding a company and/or developing it. Some are more passionate to one of the domains than to the others. The aim was to discover which domain of entrepreneurial passion strengthens the relationship between the cognitive system of the entrepreneur and the decision-making logic.

After conducting multiple statistical analyses on the derived data we are able to conclude that no statistical evidence is found that entrepreneurs who are passionate about inventing, founding or developing, process information based on an experiential system and use effectual logic in their decision-making. Furthermore, no statistical evidence was found that one of the domains of entrepreneurial passion strengthen the use of rational cognitive system and the preference for causal decision-making. Testing rational cognitive system based on the REI-scale (Epstein, 1996) with causal decision logic according to the Alsos (2014) scale could not change the lack of significance. The lack of statistical significance was also present after testing experiential cognitive system and effectual decision-making.



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Appendix

This section will provice an impression of the analysis used to analyse the derived data.

1. Reliability Statistics

	Cronbach's Alpha	
	Based on	N of
Cronbach's Alpha	Standardized Items	Items
0,864	0,864	5

2. Item-Total Statistics

	Scale	Scale			
	Mean if	Variance if	Corrected	Squared	Cronbach's
	Item	Item	Item-Total	Multiple	Alpha if Item
	Deleted	Deleted	Correlation	Correlation	Deleted
Passion [It is exciting to	24,35	6,629	0,606	0,444	0,795
figure out new ways to					
solve unmet market needs					
that can be					
commercialized.]					
Passion [Searching for	24,19	6,378	0,741	0,648	0,754
new ideas for					
products/services to offer					
is enjoyable to me.]					
Passion [I am motivated to	24,07	6,644	0,743	0,623	0,757
figure out how to make					
existing products/services					
better.]					
Passion [Scanning the	24,21	7,718	0,523	0,348	0,816
environment for new					
opportunities really					
excites me.]					
Passion [Inventing new	24,37	6,736	0,526	0,312	0,823
solutions to problems is an					
important part of who I					
am.]					



3. Factor analysis:

The below presented analysies give an impression on how factor analysis is conducted. The example consists the analysis on variables causation and effectuation.

4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of S Adequacy.	0,749	
Bartlett's Test of Sphericity	Approx. Chi-Square	267,572
	df	45
	Sig.	0,000

	Initial Eigenvalues			Extracti	on Sums of Sc	Rotation Sums of Squared Loadings ^a	
		% of	Cumulative		% of		· · ·
Component	Total	Variance	%	Total	Variance	Cumulative %	Total
1	3,376	33,765	33,765	3,376	33,765	33,765	3,345
2	2,078	20,779	54,544	2,078	20,779	54,544	2,126
3	0,982	9,822	64,366				
4	0,837	8,375	72,741				
5	0,803	8,031	80,772				
6	0,577	5,770	86,542				
7	0,481	4,810	91,352				
8	0,349	3,491	94,842				
9	0,292	2,916	97,758				
10	0,224	2,242	100,000				

Extraction Method: Principal Component Analysis.

When components are correlated, sums of squared loadings cannot be added to obtain a total variance.



Component Matrix ^a		
	Comp	onent
	1	2
Decision making [We develop the business based on the resources that we have available, without any clear vision of what the business will become in the end.]	0,846	0,139
Decision making [Instead of calculating how much profit we will gain if we invest, we invest based on the resources that we have at our disposal.]	0,702	0,189
Decision making [We constantly change how we envision the business	0,792	0,153
Decision making [We base our cooperation with others on informal agreements, which are changed depending on what they can offer.]	0,762	0,131
Decision making [We let the business develop step- by-step and have no clear idea of what it will look like in the end.]	0,864	-0,011
Decision making [We use the long-term goal that we have set as the starting point and strive to acquire the resources that we need in order to achieve this goal.]	-0,356	0,712
Decision making [An evaluation of the businessâ€ [™] profit potential is decisive when we decide how much to invest.]	-0,089	0,608
Decision making [We work systematically in order to achieve long-term goals and do not consider short- term opportunities.]	0,028	0,533
Decision making [We analyze the competitive market offerings and position our products and prices accordingly.]	-0,279	0,576
Decision making [We base our strategic decisions on rigorous analysis of how the market and competitive situations will evolve over time.]	-0,012	0,699





5. Monte Carlo simulation

The Monte Carlo simulation presents the results of the need for cognition and faith in intuition variables.

Run MATRIX procedure:

PARALLEL ANALYSIS:

Principal Components & Random Normal Data Generation

Specifica	ations	for this	Run:			
Ncases	81					
Nvars	10					
Ndatsets	1000					
Percent	95					
Raw Data	Eigenv	alues, &	Mean &	Percentile	Random Data	Eigenvalues
	Root	Raw D	ata	Means	Prcntyle	
1,00	00000	3,376	451	1,597011	1,765686	
2,00	00000	2,077	937	1,398182	1,522606	
3,00	00000	,982	207	1,253954	1,350429	
4,00	00000	,837	478	1,131464	1,212946	
5,00	00000	,803	094	1,021327	1,095700	
6,00	00000	,576	984	,920109	,990320	
7,00	00000	,481	.000	,821786	,898006	
8,00	00000	,349	089	,724090	,798772	
9,00	00000	,291	.601	,623062	,704212	
10,00	00000	,224	158	,509015	,600095	
EN	id matr	IX				



Model Description

Model Name	MOD_6	
Series or Sequence	rawdata	
	2	
	3	percntyl
Transformation	None	
Non-Seasonal Differencing	0	
Seasonal Differencing	0	
Length of Seasonal Period	No periodicity	
Horizontal Axis Labels	root	
Intervention Onsets	None	
For Each Observation	Values not	
		joined



6. Normal distribution

Here an impression is given of the conducted normal distribution test. The test presents an example of the variable need for cognition.

Descriptives			Statistic	Std. Error
NFC	Mean	•	2,8805	0,04782
	95%	Lower Bound	2,7853	
	Confidence	Upper Bound	2,9758	
	Interval for Mean			
	5% Trimmed	d Mean	2,8701	
	Median		2,8000	
	Variance		0,176	
	Std. Deviation	on	0,41960	
	Minimum		2,00	
	Maximum		3,80	
	Range		1,80	
	Interquartile	Range	0,60	
	Skewness		0,377	0,274
	Kurtosis		-0,238	0,541
NFCLG10	Mean		0,4550	0,00718
	95%	Lower Bound	0,4407	
	Confidence Interval for Mean	Upper Bound	0,4693	
	5% Trimmed	d Mean	0.4549	
	Median		0,4472	
	Variance		0,004	
	Std. Deviatio	on	0,06298	
	Minimum		0,30	
	Maximum		0,58	
	Range		0,28	
	Interquartile	Range	0,09	
	Skewness		0,023	0,274
	Kurtosis		-0,281	0,541

Tests of Normality

	Kol	mogorov-Sı	nirnov ^a	Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
NFC	0,148	77	0,000	0,960	77	0,016	
NFCLG10	0,121	77	0,007	0,970	77	0,061	



Histrogram



7. Normal Q-Q Plot of NFC





8. Descriptive statistics

A few examples illustrate how the_descriptive statistics are conducted.

Please state your gender?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	24	31,2	31,2	31,2
	Female	51	66,2	66,2	97,4
	Other	2	2,6	2,6	100
	Total	77	100	100	

	Ν	Minimum	Maximum	Mean	Std. Deviation
What is your age?	75	22	60	31,92	6,578
Valid N (listwise)	75				

	N	Minimum	Maximum	Mean	Std. Deviation
How many years have you been an					
entrepreneur?	77	0,5	5	2,552	1,3898
Valid N (listwise)	77				

	Ν	Minimum	Maximum	Mean	Std. Deviation
Causation	77	3	7	5,0545	0,8358
Effectuation	77	1,4	7	4,3195	1,28237
NFC	77	2	3,8	2,8805	0,4196
FI	77	1,8	5	3,639	0,69437
Passion_for_inventing	77	3,2	7	6,0234	0,63327
Passion_for_founding	77	3	7	5,8474	0,90062
Passion_for_developing	77	2	7	5,8377	0,93521
Valid N (listwise)	77				