A quantitative study on the effect of Entrepreneurial Passion on effectuation in the field of entrepreneurial decision-making.

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ABSTRACT,
In today's rapidly changing world, the actions of an entrepreneur are more important than ever. In this study, it is argued that Entrepreneurial Passion and the effectuation approach to decision-making are important aspects within entrepreneurship. Consequently, this research will focus on the effect of Entrepreneurial Passion on effectuation. Three domains of passion, which are passion for inventing, founding, and developing, were included in measuring Entrepreneurial Passion. Measurement instruments for Entrepreneurial Passion and effectuation were combined and questionnaires were filled out by 395 entrepreneurs from America, South-Africa, and the Netherlands. No significant support for a relationship between Entrepreneurial Passion and effectuation was found. Results for factor analysis show that the scale for measuring effectuation displays an unknown factor, in addition to the expected factors. Due to the different backgrounds of the entrepreneurs, a possible, but not proven, explanation could be cultural differences. This research, therefore, suggest future researchers to further examine this measurement instrument.

This research is repeated with a group of only Dutch entrepreneurs, to validate the results of the international dataset and to validate the scale designed to measure effectuation. These entrepreneurs filled in 17 additional questions that were not included in the measurement instrument for effectuation. Results reflect interesting findings and encourage future studies to revise this scale and to consider adding items to the scale for more internal consistency of this measurement instrument.

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Keywords
Effectuation, Entrepreneurial Passion, passion for inventing, founding, and developing, causation, entrepreneurship, decision-making

1. INTRODUCTION

Entrepreneurship is about the discovery, creation and exploitation of opportunities that bring into existence future goods and services (Venkataraman, 1997). Entrepreneurship and the exploitation of market opportunities have a major influence on economic development since entrepreneurship and innovation are directly linked with business growth (Aghion, 2017), long term success (Baker and Sinkula, 2002), competitive advantages (Hinterhuber and Liozu, 2014) and job creation (Mair and Marti, 2009). Given the importance of entrepreneurship, especially in today's rapidly evolving global markets, it is important to research underlying entrepreneurial processes that contribute to the success of entrepreneurs.

The way entrepreneurs are making decisions for their business is more important than ever. If your decision-making over time is better than your competitors', you are more likely to perform better, become a more future-proof business, and reap the benefits of competitive advantages. Various researchers have contributed to literature about entrepreneurial decision-making (Brinckmann et al., 2010; Reymen et al. 2015; Smolka et al., 2016;). In their meta-analysis, Brinckmann et al. (2010) point out the concepts of a 'planning school' and a 'learning school' as two opposite approaches within the field of entrepreneurial performance and venture success. The planning school describes that entrepreneurs should make plan-based decisions in order to survive. The learning school, on the other hand, is described as a more flexible basis for making entrepreneurial decisions and focus on learning by doing rather than first making a plan.

In order to better understand and to explain the actions of an entrepreneur, research has been conducted on these approaches. Fisher (2012) mentions the rise of perspectives that he calls emerging theories (e.g., effectuation). He assumes that there is a contrast between these theories and the more traditional model of entrepreneurial behavior. This traditional model is also referred to as 'causal approach' by Sarasvathy (2001) and is seen as a more planful way of decision-making (Brinkmann et al., 2010). As for the so-called 'emerging theories', the term effectuation has come up frequently within the literature in the past few years. This concept has initially been introduced by Sarasvathy (2001) to explain the creation of new firms and can be described as an emergent and spontaneous way of making decisions. Within the decision-making field these logics (causation and effectuation) are often seen as prominent theoretical considerations (Smolka et al., 2016) and there is a great tendency to see effectuation and causation as opposite concepts (Moroz and Hindle, 2011). Where Brinckmann et al. (2010) indicates that the literature of decision-making suggests that causation is beneficial, other researchers support Sarasvathy's concept and view effectuation as a more appropriate method in decision-making (Perry et al., 2011). Recent research even supports that both logics add value to the decision-making process (Reymen et al., 2015) and thus should not be considered as mutually exclusive (Alsos et al., 2014; Reymen et al., 2015). In addition to these multiple perspectives towards causation and effectuation, there have also been criticisms towards effectuation that emphasize that not every entrepreneur 'can' be an effectuator (Arend et al., 2015). This implies that there are many different perspectives towards the theory of effectuation. In other words, there is more attention and research needed on effectuation theory and its relationships towards other concepts of entrepreneurship (Alsos et al., 2014).

Whereas decision-making is considered important within entrepreneurship, some authors perceive Entrepreneurial Passion as another element that plays a crucial role in entrepreneurship (Cardon et al., 2009). It is seen as a driving force for entrepreneurial activity (Murnieks, 2007), that enables us to continue to persevere (Vallerand et al., 2007). Some authors call Entrepreneurial Passion a 'hallmark' of entrepreneurship (Amabile, 1997). The concept of Entrepreneurial Passion has gained more attention in recent years, and it has been suggested that it enables entrepreneurs to recognize unique patterns and relationships based on information within the environment (Amabile, 1997). Consequently, entrepreneurs are more committed to solving problems in a creative way. Research by Cardon (2013) point out that Entrepreneurial Passion is at the heart of entrepreneurship (Cardon et al., 2013) and introduce three distinctive domains of passion, which are passion for inventing, founding, and developing. Although many studies have conducted research on outcomes of Entrepreneurial Passion, there is still a high demand from the literature to examine the effects of Entrepreneurial Passion (Cardon et al., 2009; Murnieks et al. 2014; Shane et al., 2003).

1.1 Research Gap

As decision-making and the dynamics of entrepreneurship are so important in today's business world, it is important to provide more outcomes in what factors may have an influence in decision-making. Especially suggestions have been offered to elaborate more on effectuation theory and its relationship with other elements in the entrepreneurship theory (Alsos et al., 2014). Besides, theory point out that effectuation has the potential of making a significant contribution to literature (Perry et al., 2011). Previous research on Entrepreneurial Passion argued that studies had been hindered by the lack of systematic empirical evidence for measuring the role of passion. (Cardon et al., 2013). Given the fact that many researchers are interested in and view decision-making theories and theory about entrepreneurial passion as important in entrepreneurship literature and given the calls from literature to further investigate these fields, it is surprising that links between these two variables have rarely been made. By considering Entrepreneurial Passion as a factor that motivates certain high-effort activities, Murnieks et al. (2014) suggest that it could play an important role in improving individual performance. Therefore, an argument could be made for substantiating a link between Entrepreneurial Passion and decision-making, as decision-making can be seen as an important and highly effort aspect in entrepreneurial performance. In order to respond to literature's call to advance research on the role of entrepreneurial passion and on the effectuation logic of decision-making, the research will be conducted by combining these variables. Accordingly, the following research question has been developed: ***What is the effect of Entrepreneurial Passion on effectuation in entrepreneurial decision-making?***

1.2 Contribution to literature

This research will contribute to current literature in several ways. First, it adds value to entrepreneurial research as the research on empirical measuring Entrepreneurial Passion is scarce (Cardon et al. 2013). Second, I will contribute to the current literature by analyzing whether passionate entrepreneurs tend to adopt an effectual approach. Third, by focusing on effectuation and by performing quantitative analyses, I will respond to literature's call to further research on effectuation (Perry et al., 2011) and on the lack of quantitative measurement of effectuation (Grégoire and Cherchem, 2020).

1.3 Remainder of the thesis

The remainder of the paper proceeds as follows. First, a theoretical framework is constructed with regard to the variables Entrepreneurial Passion and decision-making. Then, hypotheses and a conceptual model are developed to substantiate the research question. Next, explanations about methods, sample and analysis will be discussed in the methodology chapter. Consequently, the research will be conducted, and an overview of the results will be presented. Finally, a discussion will be provided including implications of this study and suggestions for future research, ending with a conclusion.

2. LITERATURE OVERVIEW AND HYPOTHESES

2.1 Entrepreneurial Passion

Within the research field of entrepreneurship, Entrepreneurial Passion has been increasingly examined in recent years (Cardon et al., 2013; Baum and Locke, 2004). The concept of Entrepreneurial Passion has been defined in different ways. Baum and Locke (2004) defined it as an entrepreneur's attachment, affection, and desire for their work. Much research on Entrepreneurial Passion is conducted by Cardon et al. (2008, 2009a, 2013) who arrived with an extensive definition of Entrepreneurial Passion. They describe Entrepreneurial Passion as 'consciously accessible intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and relevant to the self-identity of the entrepreneur'. Cardon et al. (2013) designed a validated scale to measure Entrepreneurial Passion. Here they particularly highlight three aspects that should be taken into consideration when using their model to measure Entrepreneurial Passion. First, passion must involve intense positive feelings. Second, these feelings are experienced for activities that are central to the individual's self-identity. Third, the feelings and identity centrality are focused on three specific entrepreneurial domains. These domains concern the roles that various entrepreneurs experience in a different way in the entrepreneurial process (Cardon et al., 2013). These roles include an individuals' passion for inventing, founding, and developing a new business. Cardon et al. highly recommend future researchers to consider the two dimensions of intense positive feelings and identity centrality as they are an integral element of passion. The degree of the experienced passion could differ within and across the three domains of passion as there are several variables that might have an influence on the degree of passion that one experiences. Cardon et al. (2013) appoint, among others, age, gender, level of education and the age of the firm as such variables. Regarding these domains of passion, they suggest taking into account the three roles separately.

2.1.1 Passion for inventing

The first role of passion is passion for inventing. This domain entails the activities that come into play when it comes to looking for opportunities in the market and coming up with new ideas that can add value to the market and to unanswered demands of the market. Here, Cardon et al. (2013) stress that this role of passion reflects an entrepreneur's attitude that 'may actively seek out new opportunities, enjoy coming up with new product or service ideas, and relish inventing new solutions to important needs and problems'.

2.1.2. Passion for founding

The second domain of Passion, which is passion for founding, relates to the perceived passion for raising funds and other necessary resources. It refers to the passion that an entrepreneur experiences with respect to the activities involved in setting up a new business. Cardon et al. (2013) call an entrepreneur with a high passion for founding a 'habitual entrepreneur' that has, in most cases, set up multiple businesses during his or her career.

2.1.3. Passion for developing

The third domain of passion is associated with entrepreneurs being passionate about establishing their venture. It is linked to the growth and expansion of the company after it has been founded (Cardon et al., 2013; Drnovsek et al., 2016) and focus on the positive feelings obtained by growing a business. Activities that belong to developing a venture include recruiting new employees, but also finding new customers (De Mol et al., 2020).

2.2 Causation, effectuation

The logics causation and effectuation are often seen as contrasted and have been intensively discussed in previous research (Sarasvathy, 2001; Reymen et al., 2015; Alsos et al., 2014). Causality is consistent with planned strategy approaches and is effect dependent, meaning that one's actions are aligned with a particular goal, which one wishes to achieve (Sarasvathy, 2001). Effectuation processes, on the other hand, are congruent with emerging or non-predictive strategies (Chandler et al., 2011) and are actor dependent, meaning that one's actions depend on what the person is about to do with the given set of means that it has (Sarasvathy, 2001). Following theory, effectuation is positively associated with uncertainty and contrastingly, causation is negatively associated with uncertainty. This theory is encouraged by research conducted by Alsos et al. (2014), that also suggests that operationalized scales of effective and causal behavior are embedded in how entrepreneurs think and make decisions. Additionally, it has also been suggested that these logics will be

reflected in how entrepreneurs act (Alsos et al., 2014). Research by Brettel (2012) makes a distinction between causation and effectuation and suggest that effectuation is superior when it comes to output and efficiency in highly innovative projects, while causation leads to the same results in projects with few innovative tasks. According to Sarasvathy (2001), both decision-making processes are an integral part of human reasoning that can occur simultaneously. Therefore, she argues that effectuation should not be conceived as a superior process to causation. She advocates, however, that 'the essential agent of entrepreneurship is an effectuator'. Using metaphors, Sarasvathy explains effectuation on the basis of five principles. These metaphors will clarify which behaviors belong to an effectuator and which belong to a causal approach. The metaphors highlight the differences between an effectual and causal approach.

2.2.1 Bird-in-hand: Means vs Ends

With the bird-in-hand principle, Sarasvathy refers to the approach where the effectuator acts on the basis of the given set of means that it has. From a causal point of view the entrepreneur first considers a given goal before starting to act. Sarasvathy (2001) nicely clarifies this with a plain example in which she sketches two situations in which a chef is given the task to cook a dinner. In the first situation, the chef first considers the available ingredients and then starts cooking a meal based on that knowledge. In the second situation, the chef chooses the menu and starts looking and gathering ingredients based on this menu The first situation demonstrates the logic of effectuation, which aims to create something new by starting with available resources (Smolka et al., 2016). while the second situation illustrates causation, which is focused on a predetermined goal.

2.2.2 Affordable loss principle: Affordable loss vs Expected returns

The principle of affordable loss is often appointed by researchers (Harms and Schiele, 2012; Perry et al., 2011; Reymen et al., 2015; Smolka et al., 2016) and reflects an approach often akin to the financial field, when an entrepreneur deals with risk. An effectuator focuses on the available means that it is willing to lose, and hereby minimizing its downside risk (Sarasvathy, 2001). A causal approach, on the other hand, does not focus on potential losses, but makes decisions based on the strategy that could offer the highest maximizing returns (Sarasvathy, 2001).

2.2.3 Lemonade principle: Contingencies vs Pre-existing knowledge

The lemonade principle shows two different ways of how entrepreneurs react to unexpected changes. Contingencies refers to the events that unexpectedly happen. Take for example the COVID-19 pandemic in which a lot of companies suddenly had to turn the strategy upside down. From an effectual standpoint, this means being able to adapt quickly. As the saying goes: when , that life gives you lemons, make lemonade, thus surprises are seen as opportunities (Smolka et al., 2016). Sarasvathy (2001) argues that taking advantage of these coincidences by acting on them is more in line with the theory of effectuation. Pre-existing knowledge belongs to the characteristics of causation and is associated with less flexibility through the tendency to adhere to a business plan (Smolka et al., 2016). Thus, when both logics are confronted with an unexpected event, they will have a different response.

2.2.4 Crazy-quilt principle: Pre-commitment vs Competitive analysis

Pre-commitments, also called strategic alliances refer to the commitments between two or more parties and refer to the act of folding hands to cooperate in the hope of deriving an advantage from specific future choices. Sarasvathy and Dew (2003) point out that you do not have to depend on predictions about the future because future uncertainties can be reduced by pre-commitments. Other researchers add that there are a number of reasons why strategic alliances with other firms can be beneficial. First, an alliance can fill a resource gap, this can be financially but also with regard to expertise and knowledge, second, by entering into an alliance, risks and costs will be shared, and third, the returns from cooperation could be higher than when operating alone (Eisenhardt and Schoonhoven, 1996). Competitive analysis, on the other hand, is a principle often associated with causality. It is primarily concerned with reducing uncertainty by focusing on competitors and identifying their strategies to assess strengths and weaknesses relative to your brand.

2.2.5 Pilot-in-the-plane: Control vs Prediction

The Pilot-in-the-plane principle relates to coping with the unknown aspects in the environment, where control is related to effectuation and prediction to causation. Effectuation focus on ways to control the future and suggests that the future does not need to be predicted when one can control it. This implies that one should act as the pilot of its own company by focusing on the aspects that are in its own control, within the environment. By contrast, causation is primarily focused on the predictable aspects of the future, e.g. making calculations to forecast the future and thus trying to get grip on the unknown.

2.3 Hypotheses

In order to answer the focal issue of this thesis, some sub questions are formulated in the form of hypotheses. These hypotheses concern the domains of Entrepreneurial Passion and effectuation. I adhere to the existing theory of causation and effectuationeffectuation should not be interpreted as better (Sarasvathy, 2001) and that both logics shall not be regarded as mutually exclusive (Alsos et al., 2014). However, since the used scale for measuring effectuation, does not measure it this way, results will be presented as yes or no. Nevertheless, it should be noted that this does not immediately rule out the possibility that there could be no overlap between effectuation and causation.

2.3.1 Passion for inventing and effectuation

An entrepreneur who is passionate about inventing is driven by the idea of creating new opportunities. Jiao et al. (2013) argue that entrepreneurs are enabled to transform information into innovative products through effective dynamic capabilities. The entrepreneur is not only enthusiastic and energetic, but also creative, which allows him to respond to new circumstances and environments (Cohen 2012). A passionate entrepreneur is also said to be flexible because he is receptive to all possible opportunities and is more likely to focus on "what else can we do" with our resources rather than focusing on the end goals (Dew et al., 2008). Thus, he likes to create new opportunities from existing resources rather than looking for problems to solve. Sometimes inventions also arise spontaneously, for example because one experiences a problem themselves or sees that something can be done better or more efficient. Since an entrepreneur is very passionate about this, there is a high chance that he will act on his intuitions and take an effecttual approach with regards to inventing. As a result, the following hypothesis was formulated:

Hypothesis 1: An entrepreneur with passion for inventing is more likely to tend towards the effectual approach of decision-making.

2.3.2 Passion for founding and effectuation

The world of business is not entirely plannable, but rather dynamic (Demil & Lecocq, 2010), especially in the early stages of a venture (Jiao et al. 2013). At the start, some entrepreneurs may have a plan in which they envision how they want to set up and grow their business; however, the question arises to what extent they stick to it when uncertainty is coming forward. Theory suggests that effectuation is positively related to high perceived uncertainty (Alsos et al., 2014). Although market research, which is a causal approach, can provide you with more knowledge of the market and thus reduce uncertainty, it requires more time and money without even having developed a product. It has been posited by research (Brinckmann et al., 2010) that a planning approach can have a downside effect on a firm's flexibility, as it can lead to organizational inertia and thus might limit a corporation in its ability to respond quickly enough to changes. Because entrepreneurs face uncertainty at the start of their business due to asymmetric information from the market, and thus a lack of knowledge, an effectual approach seems more plausible to deal with uncertainty. This has been encouraged by Sarasvathy (2001) who proposed that the effectual logic is likely to be more effective in settings that observe higher levels of uncertainty. As a consequence, the following hypothesis was developed:

Hypothesis 2: An entrepreneur with passion for founding is more likely to tend towards the effectual approach of decision-making.

2.3.3 Passion for developing and effectuation

An entrepreneur with passion for developing experiences positive feelings towards growing a firm. In order to grow and develop a company you should move forward and sometimes take risks to stay ahead of competitors. Assuming that an entrepreneur with a passion for development has already gone through earlier stages (inventing, founding) of the business, he may have acquired more knowledge and therefore may be less afraid of taking risks in uncertain situations. He probably better knows what to do and how to act. This is encouraged by studies that mention that effective behavior seems to occur most often among knowledgeable entrepreneurs (Grégoire and Cherchem, 2020; Schmidt et al. 2018; Wiltbank et al., 2006. Having already marketed their business idea, it is a dream come true to see the business grow as well. A passionate entrepreneur is therefore likely to have the ability to persevere and go to the very end. He is thus driven to achieve success and expand the business, even if it means suddenly having to go in a different direction. On the basis of the arguments provided above, the following hypothesis is formulated as follows:

Hypothesis 3: An entrepreneur with passion for developing is more likely to tend towards the effectual approach of decision-making.

2.4 Conceptual Framework

Consequently, the following framework has been created:

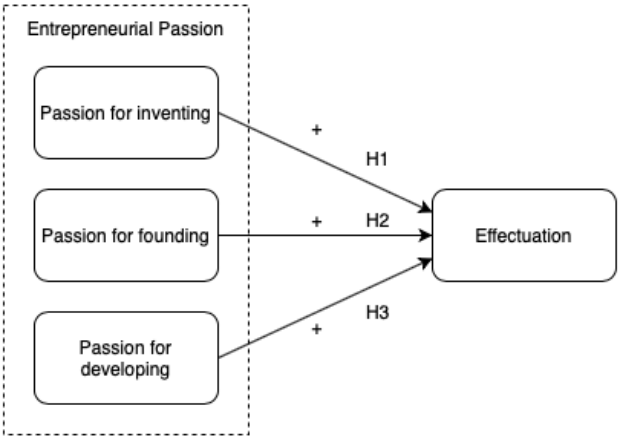

Figure 1 - Conceptual Model

3. METHODOLOGY

Studies point out that currently existing methods used for studying effectuation, primarily rely on the “interpretive insight” of the researcher (Grégoire and Cherchem, 2020) and suggest future research to consider an empirical quantitative measurement method. Therefore, questionnaires have been distributed that measure Entrepreneurial Passion in the three domains (inventing, founding, and developing) and that measure effectuation and causation.

3.1 Sample

For this research I will combine two existing datasets, from which the first one is composed of 230 entrepreneurs in South Africa (SA) and the other contains responses of 155 entrepreneurs in America (USA). As it is a requisite for this research that those entrepreneurs have founded their firm themselves the question 'how many firms have you founded?' was asked. From the SA data all respondents have founded a firm themselves. From the USA data, however, 17 respondents indicate that they did not found a firm. Therefore these 17 responses are not included in the sample. To expand the sample size of this database, I have conducted another 28 questionnaires with the same questions about Entrepreneurial Passion and effectuation and causation as was done by the existing datasets. I started the questionnaire with the question 'are you an entrepreneur?'. As one respondent answered with 'no', this response will not be taken into account for this research. All of the remaining respondents indicated that they had founded a business themselves, leaving a sample of 27 respondents. This means that the sample size is composed of 230 entrepreneurs in SA, 138 entrepreneurs in USA and 27 entrepreneurs in NL, which represents a sample size of 395 entrepreneurs.

3.2 Method

For this research a questionnaire will be used that includes a scale measuring Entrepreneurial Passion (Cardon et al. 2013) and a scale measuring effectuation and causation (Alsos et al., 2014). As I will be using the existing datasets of SA and USA, it is required to follow the same used techniques (e.g., questions and scale rankings) in order to provide significant outcomes. This will encompass consistency and thus minimize validity issues. Consequently, this research will thus be conducted by collecting empirical data through quantitative research.

3.2.1 Entrepreneurial Passion

A valid instrument for measuring Entrepreneurial Passion has been designed by Cardon et al. (2013), containing a scale with 12 items suggested to measure an entrepreneur's intense positive feelings and 3 items regarding identity centrality. As two IPF items did not sufficiently meet the criterion, a list of 13 items remain to measure Entrepreneurial Passion. These items will be measured across the three domains of Entrepreneurial Passion (inventing, founding, developing). It is suggested to use a scale ranging from at least 1-7, where 1 is totally disagree and 7 totally agree. Moreover, Cardon et al. (2013) point out several times that it is recommended to measure the aspects of intense positive feelings and identity centrality for each domain of Entrepreneurial Passion separately. The items of the scale can be seen in table 17.

3.2.2 Effectuation, causation

In order to measure whether a passionate entrepreneur tends more towards effectuation, I will use an instrument, constructed by Alsos et al. (2014)[1], that not only measures effectuation, but also causation. This instrument consists of a scale of 27 validated items. Ultimately a core set of 10 items was selected to measure effectuation and causation. This scale reflects 5 items regarding the 5 principles of causation (ends orientation, expected returns, pre-existing knowledge, competitive analysis, and prediction). And similarly, it takes 5 items for effectuation that are in accordance with the 5 principles of effectuation (means orientation, affordable loss, contingencies, pre-commitment, and control). This scale contains a ranking from 1 totally disagree to 7 totally agree.

3.2.3 Control variables

Several control variables will be considered that are likely to have an influence on the outcomes of the questionnaires. In consistency with the existing dataset, the following control variables will be used: age, gender, highest educational achievement, number of founded firms, type of industry, experience as entrepreneur in years, and firm's size by asking the number of employees.

3.2.4 Additional research

Being interested in the entire scale designed by Alsos et al. (2014) containing 27 items, I distributed questionnaires in which I asked respondents to fill in the other 17 items in addition to the 10 validated items. For this additional research I will perform the same analyses as mentioned before. Through a factor analysis, I will test whether my data assumes that these 27 items fit with causation or effectuation as suggested by Alsos. As suggested by previous research (Hair et al., 1995) it is encouraged to perform a factor analysis with a minimum sample size of 100. With only a sample size of 27 respondents, this assumption will not be met. Therefore, results might not be scientifically supported for this analysis. However, it can be of interest to see whether there appear certain trends that differ from the other analysis. By performing Cronbach's alpha in SPSS, I will test whether these items are validated or not, and whether these should be considered for measuring effectuation or causation in the future. Finally, a correlation and regression analysis will be executed. Control variables used for this additional research, remain the same.

3.3 Analysis

In order to translate the received data into valuable information, various procedures and techniques will be used. After conducting the additional questionnaire, all available data will be implemented in SPSS Statistics (version 25). Before starting to analyze data with several methods, the data will be tested by a Shapiro Wilk test to see whether the data is normally distributed. If the outcome is significant ($p>0.05$) a normal distribution can be assumed. If it turns out that the data is not normally distributed, it is suggested to use the Spearman's rank when testing on correlation. In consistency with theory (Alsos et al., 2014) and in order to meet criteria regarding validity, reliability,

[1] The questions of this scale are not presented. The original scale can be obtained from Alsos et al. (2014).

and consistency of the variables the following analysis will be performed. An exploratory (principle) factor analysis will be executed to see whether the items of the scales correspond with the components to which they should belong. In order to do this the underlying structure of the set of variables should be tested as well. This will be done via a Kaiser-Meyer-Olkin (KMO) test, prior to the factor analysis. As it is denoted by Kaiser and Rice (1974) it is better to evaluate this Kaiser's criterion not only by accepting a score that is higher than 0.5, but rather following a proposed table that advocates for a score around 0.6-0.7 to be sufficient. With regards to factor analysis, it is suggested that a rotated factor loading for a sample size of at least 300 would need to be at least 0.32 to be considered statistically meaningful (Tabachnick & Fidell, 2007). Therefore, values below 0.32 will not be shown in the resulting table. Afterwards, Cronbach's Alpha will be used to calculate the reliability of the data in order to show whether there is internal consistency between the chosen variables. A Cronbach's Alpha of at least 0.70 is widely considered as desirable (Taber, 2017). After these techniques, a correlation analysis will be executed to see whether certain variables occur simultaneously. Finally, a regression analysis will be executed to determine if there is a relationship between Entrepreneurial Passion and effectuation.

4. RESULTS

After the datasets (SA, USA, NL) were combined in SPSS, a normality test was applied to show whether data is normally distributed. The Shapiro Wilk Test indicated a significance level below 0.05 for the variables of effectuation, causation and the three separate domains of passion (Table 6). As $p<0.05$ for all these items, the hypothesis that states that the data is normally distributed, is rejected. The data is thus not normally distributed, meaning that a Spearman's Rank Order is a sound measurement for measuring correlation. Figure 2a-2e show how the histograms of these variables are relative to the desired normally distributed line.

4.1 Descriptives

See table 1a and 1b for descriptives. For performing analyses, a dataset consisting of 395 respondents was used, from which there were 297 individuals indicating to be male and 98 indicated to be female. There were no missing values. This implies that in this sample size 3/4 part (75.2%) is male and the remaining 1/4 part (24.8%) is female. With respect to age, the youngest respondent is 18 years old and the oldest is 74 years old. The average age is approximately 35 years with a standard deviation of about 11½ year. The average experience of the entrepreneurs contains around 8 years with a minimum of 0 years, a maximum of 39 years and a standard deviation of about 8½ years.

4.2 Scale validation

4.2.1 Factor analysis

Validation of the scales is done via factor analysis. Prior to this the items within the scales were tested on appropriateness for the factor analysis by the Kaiser-Meyer-Olkin Test (KMO). The 13 items for measuring Entrepreneurial Passion score a 0.881 (Table 8), a 'meritorious' score (Kaiser and Rice, 1974) and the 10 items for measuring effectuation and causation scored a 0.762, a 'middling score' (Kaiser and Rice, 1974) (Table 9). This indicates that the data is suited for the factor analysis. Consequently, scree plots are created (figure 3,4) and show for both scales that three points are plotted above the line with eigenvalue 1. The scree plot for the scale of Alsos, thus shows that there seems to be another component included in the scale than causation and effectuation. Therefore, the factor analysis will be executed on the base of eigenvalue 1, to see if a third component is present. The results for the factor analysis of effectuation and causation can be seen in table 13. At the first glance, items for effectuation perfectly load into component 1. Causation, however, shows that the first item 'goal-oriented' load both in component 2 (0.415) and 3 (0.414). The third item of causation, 'pre-existing knowledge' does not even load in component 2 or 1, but instead load with a value of 0.884 in component 3. The results for the factor analysis of Entrepreneurial Passion can be seen in table 14 and show that the items for passion for inventing perfectly fit in the first component. For Entrepreneurial Passion for founding and developing there seem to be two items that appear in both component 2 and 3. Although some items within the factor analysis of Entrepreneurial Passion load in both components, these will not be discarded for this study, as it is assumed by the designers to use these items for measuring Entrepreneurial Passion.

Table 1a Descriptives

	N	Min.	Max.	Mean	Std. Dev.
Age	395	18	74	34.61	11.448
Experience	395	0	39	7.79	8.516
Valid N (listwise)	395				

Table 1b Descriptives

Valid	Freq.	Percent	Valid Percent	Cum. Percent
0 Male	297	75.2	75.2	75.2
1 Female	98	24.8	24.8	100.0
2 Other	0	0	0	100.0
Total	395	100.0	100.0	

4.2.2 Cronbach's Alpha.

The last measurement used for the reliability of the measurement scales is the Cronbach's Alpha (Table 10a-10e). Entrepreneurial Passion for inventing scored an alpha of 0.815, Entrepreneurial Passion for founding an alpha of 0.801 and Entrepreneurial Passion for developing scored an alpha of 0.811. As all these values of Cronbach's Alpha score higher than 0.7, it can be said that these items are internal consistent. Effectuation scored an alpha of 0.772 and causation an alpha 0.596. All items, except for causation scored above the specified limit of 0.7.

4.3 Correlation

In the correlation matrix below (table 2) several significant correlations can be seen. There seems to be a significant negative correlation between causation and effectuation (-0.234). The table shows that there is a significant positive correlation between Entrepreneurial Passion for inventing and causation (0.225). For Entrepreneurial Passion for founding there is a significant negative correlation with effectuation (-0.147), but a significant positive correlation with causation (0.232). The correlation output also suggests that there is a significant positive correlation between Entrepreneurial Passion for founding and Entrepreneurial Passion for inventing (0.486). For Entrepreneurial Passion for developing there seems to be a significant positive correlation with causation (0.287) and it is also significant positively correlated to Entrepreneurial Passion for inventing (0.525) and Entrepreneurial Passion for founding (0.622).

Table 2 Correlation

		1	2	3	4
1	Effectuation				
2	Causation	-.234**			
3	EP_inv	-.089	.225**		
4	EP_fnd	-.147**	.232**	.486**	
5	EP_dev	-.096	.287**	.525**	.622**

***. Correlation is significant at the 0.01 level (2-tailed)*

4.4 Hypotheses testing

The results of the regression can be seen in Table 3. The table shows two models. Model 1 presents the regression results of all control variables in relation to effectuation. Model 2 presents the regression results of the relationship between Entrepreneurial Passion for inventing, founding and developing towards effectuation, with all control variables included. As can be seen R^2 is 0.048, meaning that 4.8% of the variance of effectuation is accounted by the whole model. The F score shows a significant result, meaning that the independent variables in the regression table reliably predict the dependent variable. The variance inflation factor (VIF) shows a score below 10, meaning that there is no multicollinearity, thus the independent variables are not highly correlated to each other.

4.4.1 Hypothesis 1

The results in table 3 show a β of -0.080 with a related p-value of 0.447 for the relationship between Entrepreneurial Passion for inventing and effectuation. There is no evidence to support H1 as there is no significant relation found between Entrepreneurial Passion for inventing and effectuation. Therefore, the hypothesis that an entrepreneur with passion for inventing is more likely to tend towards the effectual approach of decision-making, will be rejected.

4.4.2 Hypothesis 2

Table 3 shows a significant result at the 10 percent level for the relationship between Entrepreneurial Passion for founding and effectuation (β = -0.165; p= .0520). However, p is higher than α (0.05) at the 5% level and thus not significant. If the alpha were to be 0.10, there would be a significant relationship where for each increasing point of Entrepreneurial Passion for founding effectuation would decrease by -.165 (other variables held constant). However, this is not yet evidence for the acceptance of this hypothesis, as the regression table suggests a negative relationship with Entrepreneurial Passion for founding and effectuation. Therefore, this hypothesis is rejected, meaning that no significant evidence is found for the hypothesis that an entrepreneur with passion for founding is more inclined to the effectuation approach to decision making.

4.4.3 Hypothesis 3

The regression analysis shows a β of 0.063 and a p-value of 0.463 for the relation between Entrepreneurial Passion for developing and effectuation, which means that there is no significance evidence for H3. Therefore, the hypothesis that an entrepreneur with passion for developing is more likely to tend towards the effectual approach of decision-making is rejected as well.

4.5 Control variables

The control variable employees show a significant relationship towards effectuation (β=-0.280; p=0.000). This implies that for a point increase in employees, effectuation will decrease with 0.280 (other variables held constant). There can also be seen a significant relation with American respondents and effectuation (β=0.676; p=0.006). Here for every point increase in American, effectuation will decrease with 0.676. On a significance level of 10% gender shows a significant result (β=-0.280; p=0.071).

4.6 Low explained variance

As the explained variance of the model is only 4.8%, the model has a quite limited explanatory power. Therefore, the data has been split up into two subsets. The first subset includes effectuation items with a score lower than 4. The other subset includes effectuation items with a score higher than 4. Subsequently, histograms are plotted for the three separate domains of Entrepreneurial Passion. See figure 5a-5f. As can be seen for subgroup 2, the histograms for all domains of Entrepreneurial Passion show a more bell-shaped curve than the histograms of subgroup 1. There is still an outlier for 7 'totally agree' for both groups, however the group scoring high on effectuation shows a somewhat more normal distribution than the group scoring low on effectuation.

Table 3 Regression results

Variables	Model 1	Model 2
(Constant)	4.497***	5.528***

Control variables		
Age	-.002	-.002
Gender (dummy)	-.295*	-.280*
Ventures	.046	.075
Experience	-.005	-.004
Employees	-.191***	-.190***
Industry (dummy)	.072	.079
Undergraduate (dummy)	.293	.316
SA (dummy)	-.199	-.189
Dutch (dummy)	-.183	-.199
USA (dummy)	-.677***	-.676***
Independent variables		
EP inventing (H1)		-.080
EP founding (H2)		-.165*
EP developing (H3)		.063
Fit statistics		
Adjusted R-squared	.040	.048
F-value	2.633***	2.544***
Highest VIF	3.149	3.162

****, ** and * coefficients are statistically significant at 1, 5, and 10 percent, respectively (based on two-sided testing)*

4.7 Additional research

Using solely the 27 responses from Dutch entrepreneurs who also completed the additional 17 questions of the Alsos scale, preliminary analyses will also be conducted for this additional research. Knowing that such a small database does not show statistically significant results, I am only showing the most important information.

4.7.1 Descriptives

The descriptives (table 18a-18c) show that the data exist of 24 males (89.9%) and 3 females (11.1%). There are no missing values. The minimum measured age is 20 and the maximum measured age is 65 years. The respondents have an average age of approximately 39 years, and the standard deviation is around 14 years. The level of experience ranges from 1 to 35 years, with an average experience of roughly 13 years with a standard deviation of about 10 years.

4.7.2 Normality

The Shapiro-Wilk test for normality (table 19) shows a significance level above 0.05 for all variables, except for Entrepreneurial Passion for founding, which has a score of 0.013. This means that for effectuation, causation and Entrepreneurial Passion for inventing and developing the H0 hypothesis, that states that the data is normally distributed, will not be rejected. For these 4 variables, it may be assumed that the data is normally distributed.

4.7.3 Scale validation

Consequently, a factor analysis was performed. KMO tests suggested for both scales a sufficient outcome (table 20,21). Table 23 shows the rotated component matrix for effectuation and causation. For this scale, the items that were approved by Alsos are highlighted in grey. All items for causation fall below component 1, with some overlapping component 2 as well. For effectuation, on the other hand two items (E2_1 and E2_3) are not displayed at all, meaning that their value falls below 0.32. Three items (E3_1, E3_2 and E3_3) negatively load in component 1 and several items load in both components. From the initial 5 items for causation, only the last item, called C5_3 in the factor analysis, load on both components. However, it has a negative loading of -0.332 on component 2. From the initial 5 items for effectuation, the first, fourth and fifth item load on the component 2 side. Item 2 (E2_1) does not give any outcomes at all, meaning that the factor value is below 0.32. Furthermore, item 3 (E3_3) only load in component 1 with a value of -.602. The rotated component matrix for Entrepreneurial Passion can be seen in table 24. It shows much overlap and there is not really much that can be said about it. Table 22a-22e presents the outcomes of the reliability statistics. It shows that an alpha lower than 0.7 is scored by Entrepreneurial Passion for inventing (α = 0.428), founding (α=0.572) and developing (α =0.564). Effectuation (α =0.714) and causation (α =0.848) have a sufficient score.

4.7.4 Correlation

Table 4 presents the correlation results and shows that there is a significant negative correlation for Entrepreneurial Passion developing and effectuation (-0.479) and a significant positive correlation for Entrepreneurial Passion for developing to causation (0.436) and Entrepreneurial Passion for inventing (0.483).

Table 4 Correlation

		1	2	3	4
1	Effectuation				
2	Causation	-.075			
3	EP_inv	-293	.347		
4	EP_fnd	-.169	.231	.104	
5	EP_dev	-.479*	.436*	.483*	.189

**. Correlation is significant at the 0.05 level (2-tailed).*

4.7.5 Regression

The regression analysis for the additional study was performed and results can be seen in table 5. No significant regression outcomes were found in the results of the regression analysis (model 2). Therefore, in terms of regression, nothing can be said about interrelationships for this study.

Table 5 Regression results

Variables	Model 1	Model 2
(Constant)	4.424***	6.464*
Control variables		
Age	.011	.011
Gender (dummy)	.792	.581
Ventures	.288	.227
Experience	-.029	-.040
Employees	-.265**	-.152
Industry (dummy)	.106	-.0.45
Undergraduate (dummy)	-.404	-.322
Independent variables		
EP inventing (H1)		-.072
EP founding (H2)		-.011
EP developing (H3)		.274
Fit statistics		
Adjusted R-squared	.186	.144
F-value	1.850	1.439
Highest VIF	6.514	8.201

****, ** and * coefficients are statistically significant at 1, 5, and 10 percent, respectively (based on two-sided testing)*

4.8 Summary of the results

Assessment on the distribution of the data showed that none of the variables from the scales, were normally distributed. Validation of the scale revealed that the scale of Alsos et al., which measures effectuation and causation, included two items of causation that fell into a third component, while there should only be two factors visible. The Cronbach's Alpha for causation scored below the desired score of 0.7 (Taber, 2017). For the items of Entrepreneurial Passion, there were 2 items that were present in another component in addition to the fitting component. Cronbach's Alpha for these domains were sufficient. No significant outcomes were observed for the formulated hypotheses, based on a confidence level of 5%. This implies that the p-values of these hypotheses were above 0.05. Due to the lack of this significance, all hypotheses are rejected. For the additional research, all five variables were normally distributed. Cronbach's Alpha's, however, showed scores below 0.7 for the domains of Entrepreneurial Passion. Effectuation scored a sufficient score and the alpha of causation scored well above the limit of 0.7. Not much could be said about the factor analysis of the Entrepreneurial Passion scale because nearly all items fell into multiple components. For the scale of effectuation and causation, several items, not included in the original scale, showed a good fit with the matching variable and a few that do appear in the current Alsos scale did not reflect this. From the regression analysis, there were no significant outcomes found.

5. DISCUSSION

5.1 Key findings

5.1.1 Effectuation, causation

Results from the factor analysis show that the items for effectuation perfectly load into the corresponding components. Causation on the other hand, shows two items falling in a third component. As 'pre-existing' knowledge with a value of 0.884 only fell in the third component, one may wonder whether this point should not be tied to a variable other than causation. The first item of causation 'goal-oriented' also fell into the third component, in addition to the matching component. So, it turns out that they both have something corresponding to an unknown variable. One possible explanation for this phenomenon could have to do with the origin of the entrepreneurs. Due to differences in culture, they could have a different view or attitude towards doing business.

5.1.2 Entrepreneurial Passion

For the scale of Entrepreneurial Passion, the third item of Entrepreneurial Passion for founding, that measures intensive positive feelings, loaded in component 2 and 3. One could argue that this question '*Nurturing a new business through its emerging success is enjoyable*' contains aspects of passion for developing as it suggests that 'emerging success' is enjoyable, which is an aspect of passion for developing as well. Another item that loaded in component 2 and 3 is the item with regards to Identity Centrality for passion for developing. For this question: *'Nurturing and growing companies is an important part of who I am'* one could argue that 'nurturing' could be interpreted as an action that belongs rather to the beginning phase of the firm. Histograms of the three domains of passion showed that the distributions are skewed to the left (figure 2a-2e). There were many respondents that scored themselves with a 7 'totally agree'. What is striking is that this mainly was the case for American and South-African respondents, of which some even filled in this score for almost all questions related to Entrepreneurial Passion. From the Dutch population, there was a frequency of three responses that ranked all questions of Entrepreneurial Passion for founding with a 7 'totally agree'. For Entrepreneurial Passion for developing this was only one response, and for Entrepreneurial Passion for inventing, nobody filled in all questions with 'totally agree'. The Dutch population thus shows another pattern in answering these questions (table 27a-27f). As mentioned earlier, for this finding, one may also question if it is due to cultural differences in the population.

5.1.3 Hypotheses

Hypotheses were formulated to answer the central question of this research: '*What is the effect of entrepreneurial passion on effectuation in entrepreneurial decision-making*?'. The three developed hypotheses split up Entrepreneurial Passion into three separate domains and suggest that each domain of passion increases the likelihood of an entrepreneur employing the effectual approach to decision-making. However, as discussed in the results section, no significant results were found to support these hypotheses.

5.1.3.1 Entrepreneurial Passion for inventing

Results showed that no significant relationship was found for the inventing domain of Entrepreneurial Passion. Perhaps passionate

entrepreneurs for inventing prefer to find new opportunities rather than creating them with the current means they have.

5.1.3.2 Entrepreneurial Passion for founding

No significant relationship was found for Entrepreneurial Passion for founding and effectuation. This contradictory result could be due to the notion that it is more difficult for starting businesses to attract enough financial resources (Korosteleva and Mickiewicz, 2011). This may indicate that entrepreneurs with a passion for founding tend towards a less effectual approach as it is required that start-ups and new ventures need to have a well-substantiated business plan to acquire funding.

5.1.3.3 Entrepreneurial Passion for developing

For the third hypothesis, no significant relationship was found as well. The regression analysis showed a significant negative relation at the 10% level of confidence. Based on this finding Entrepreneurial Passion for developing could be regarded as the variable that is most unrelated to effectuation, compared to the other domains of passion. This could be related to the employee variable for which it is found that for each point in employee, there is a decrease in effectuation. Meaning that the more employees, the less effectuation seems to be applied. Reasoning that a growing firm is likely to have an increased number in employees as well, there is a motive to assume that an approach containing less effectuation is used. One argument could be that it would be more convenient and efficient to work with a plan since it is difficult for an entrepreneur to manage too many employees with no clear vision.

5.1.4 Additional research

For the additional analysis, no significant information was retrieved from the regression analysis. The factor analysis, however, showed that there are several items that are not included in the current Alsos scale that score a high value on the factor analysis. This implies that these items could potentially make a valuable contribution to the Alsos scale. Therefore, this should be tested with a larger sample to increase the validity of these results. Another interesting observation from the factor analysis is that three items of the current scale (E3_3, C5_3, E2_1) do not seem to fit the rest of the results. This demonstrates that they do not fit into the related components of effectuation and causation. Again, a larger sample should be used to validate this claim, as cultural differences could also have had an impact. Another finding is the difference of the result of Cronbach's Alpha for causation between the first study (α=0.596) and the additional research (α=0.848). This may indicate that adding more causality items to the scale could provide more internal consistency for measuring causation.

5.1.5 Remarkable findings between study 1 and 2

As the results show, the dataset containing 395 entrepreneurs displayed different outcomes for Cronbach's Alpha's than the dataset of 27 Dutch entrepreneurs. Whereas causation scores a Cronbach's Alpha below the required 0.7 in the total dataset, it scored a Cronbach's Alpha of nearly 0.9 in the dataset with only Dutch respondents. Another remarkable finding was the reversed scores of Cronbach's Alpha for the three domains of passion between the two datasets. For the initial dataset these domains scored a relatively high Cronbach's Alpha, whereas the scores were insufficient for the dataset with 27 Dutch entrepreneurs.

5.2 Practical implications

In the first instance, this research has no real practical implications. Except that it shows that a link between an entrepreneur's passion and effectuation is lacking. Based on the results of this research, it can be suggested that for entrepreneurs, passion is not necessarily a requirement for an effectual approach to decision-making.

5.3 Limitations and recommendations for future research

5.3.1 Limitations

As with any research there are limitations included. Starting with the current situation around COVID-19, which made it more difficult to engage respondents in completing the questionnaire. With regard to the analysis, it should be noted that this research is conducted in such a way that outcomes are interpreted as yes, there is a relationship between Entrepreneurial Passion and effectuation or no there is no relationship between these variables. As previous researchers (Reymen et al. 2015, Smolka et al., 2016) have debated, it is suggested not to rule out a possibility of the simultaneous use of effectuation and causation. This can be seen as a limitation for this research.

5.3.2 Recommendations for future research

This research is conducted through quantitative methods. Follow-up studies should consider the simultaneous use of quantitative as well as qualitative measurement. This has been encouraged by Perry et al (2011), who point out that it might lead to more significant outcomes. With respect to the sample used, it can be interesting for future studies to examine a different population or to further examine the Dutch population as this sample size was too small to provide significant results. The additional conducted research found certain tendencies in Alsos' factor analysis that showed that some items have potential to be included in the scale. Hence, it would be recommended to test these additional items of the Alsos scale with a bigger sample size. Doing this could provide interesting findings as the research with the 27 Dutch respondents reported that some of the items scored high in the factor analysis, while some items, currently included in the scale, did not. Moreover, there appeared to be another factor in the Alsos scale, it is therefore encouraged to further examine this scale to find out what variable belongs to this factor. One possible explanation could be cultural differences; however, this should be examined in more depth.

6. CONCLUSION

The purpose of this research was to examine ***the effect of Entrepreneurial Passion on the decision-making logic effectuation*.** Here I was interested in the relationships between the three dimensions of Entrepreneurial Passion, which are passion for inventing, founding, and developing. Three hypotheses were developed that stated that passionate entrepreneurs, for each domain of passion, are more likely to tend towards the effectual approach of decision-making. For this research two different questionnaires were used to measure the effect of Entrepreneurial Passion on effectuation. The first questionnaire measures effectuation and causation through a scale designed by Alsos et al. (2014). The second questionnaire measures Entrepreneurial Passion and is also a scale-based instrument, designed by Cardon et al. (2013). Prior to the analyses, these scales were tested on validity. This was done by a factor analysis and a Cronbach's Alpha. This research has not found any significant evidence for supporting these hypotheses. This implies that an entrepreneur with passion for inventing, founding, or developing is not more likely to tend towards the effectual approach of decision-making. Therefore, the answer to the research question is that there is no direct effect of Entrepreneurial Passion and effectuation. Recommendations were made to revise the Alsos scale by using a larger sample size and to further analyze this scale as there showed up another factor in the factor analysis.

7. ACKNOWLEDGEMENTS

Coming to the end of this thesis, I would like to thank a number of people for their support during the development of this thesis. First, I would like to express my sincere thanks to my first supervisor, Dr. M.R. Stienstra, for his guidance during the process of writing my thesis. Your essential advice, critical view, comments, enthusiasm, and the interesting conversations we had have helped and motivated me greatly to deliver the thesis, as it is now. Additionally, I would like to thank my second supervisor, Dr. D.E. Proksch for viewing and assessing my thesis. Your suggestions allowed me to dive deeper into the data to see if there were any interesting findings that could account for the low explained variance, rather than just accepting the results. My gratitude also goes to the entrepreneurs who took the time and effort to complete my questionnaires. Finally, I would like to thank my family and friends who helped me gain new insights and who motivated and supported me during the process.

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APPENDIX A

Abbreviation	Meaning
C1, C2	Causation item 1, Causation item 2, etc.
E1, E2	Effectuation item 1, Effectuation item 2, etc.
EP	Entrepreneurial Passion
EP_Dev	Entrepreneurial Passion for Developing
EP_Fnd	Entrepreneurial Passion for Founding
EP_Inv	Entrepreneurial Passion for inventing

Normality

Table 6 Test of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Causation	.074	395	.000	.976	395	.000
Effectuation	.071	395	.000	.988	395	.003
EP_inventing	.187	395	.000	.842	395	.000
EP_founding	.179	395	.000	.833	395	.000
EP_developing	.141	395	.000	.898	395	.000

Table 7 Descriptives - Normality

			Statistic	Std. Error
Causation	Mean		5.0704	.04568
	95% confidence interval	Lower Bound	4.9806	
		Upper Bound	5.1602	
	5% Trimmed mean		5.1024	
	Median		5.2000	
	Variance		.824	
	Std. Deviation		.90784	
	Minimum		1.20	
	Maximum		7.00	
	Range		5.80	
	Interquartile Range		1.20	
	Skewness		-5.86	.123
	Kurtosis		.923	.245
Effectuation	Mean		3.8648	.06605
	95% Confidence interval	Lower Bound	3.7350	
		Upper bound	3.9947	
	5% Trimmed mean		3.8481	
	Median		3.8000	
	Variance		1.723	
	Std. Deviation		1.31275	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		2.00	
	Skewness		.185	.123
	Kurtosis		-.512	.245

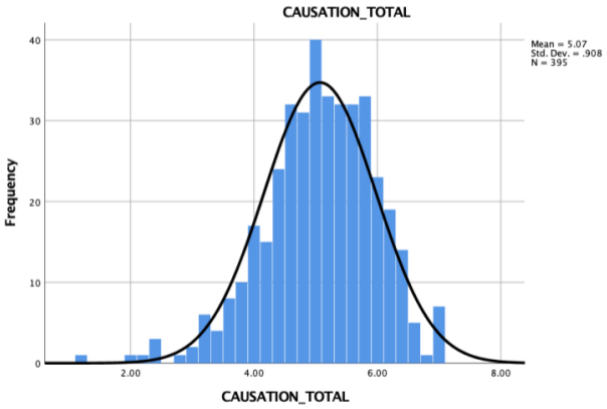

Figure 2a Histogram - Causation

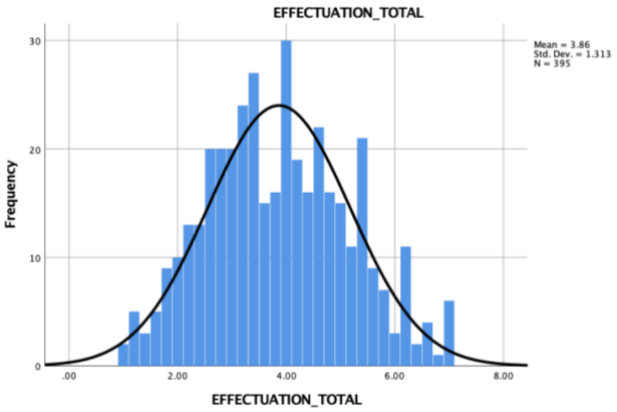

Figure 2b Histogram - Effectuation

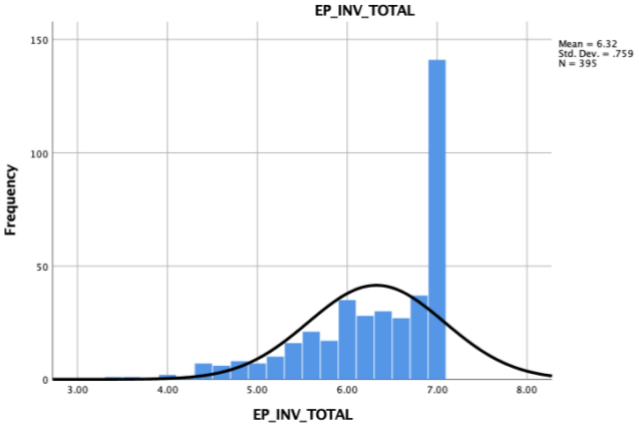

Figure 2c Histogram – Entrepreneurial Passion for inventing

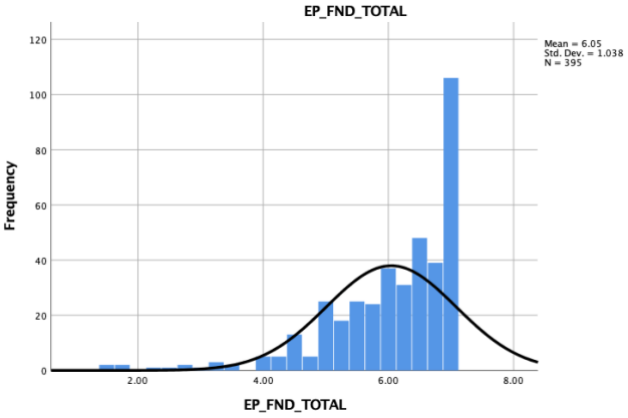

Figure 2d Histogram - Entrepreneurial Passion for founding

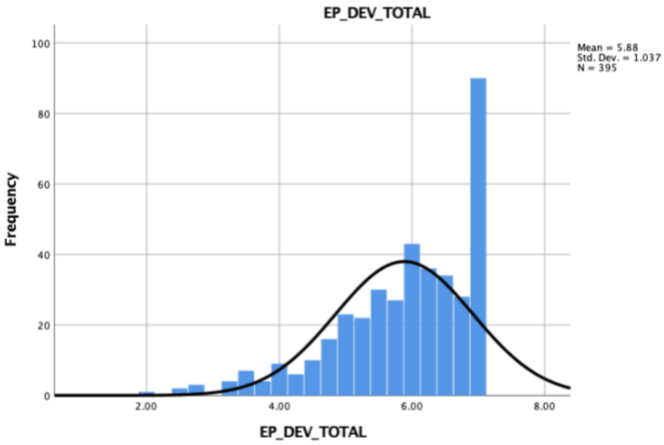

Figure 2e Histogram - Entrepreneurial Passion for developing

Validity

Table 8 KMO and Bartlett's Test - Entrepreneurial Passion Scale

Kaiser-Meyer-Olkin Measure of sampling Adequacy		.881
Barthlett's Test of Sphericity	Approx. Chi-Square	2269.587
	df	78
	Sig.	.000

Table 9 KMO and Bartlett's Test – Effectuation, Causation

Kaiser-Meyer-Olkin Measure of sampling Adequacy		.762
Barthlett's Test of Sphericity	Approx. Chi-Square	799.845
	df	45
	Sig.	.000

Table 10a Reliability Statistics – Entrepreneurial Passion_inventing

Cronbach's Alpha	N of items
.815	5

Table 10b Reliability Statistics - Entrepreneurial Passion_founding

Cronbach's Alpha	N of items
.801	4

Table 10c Reliability Statistics - Entrepreneurial Passion_developing

Cronbach's Alpha	N of items
.811	4

Table 10d Reliability Statistics - Effectuation

Cronbach's Alpha	N of items
.772	5

Table 10e Reliability Statistics - Causation

Cronbach's Alpha	N of items
.596	5

Table 11 Total Variance Explained

		Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.011	30.112	30.112	3.011	30.112	30.112	2.817
2	1.668	16.680	46.792	1.668	16.680	46.792	2.148
3	1.058	10.578	57.370				
4	.844	8.436	65.806				
5	.818	8.181	73.986				
6	.622	6.217	80.203				
7	.583	5.827	86.030				
8	.534	5.339	91.369				
9	.502	5.023	96.392				
10	.361	3.608	100.00				

Extraction Method: Principal Component Analysis

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

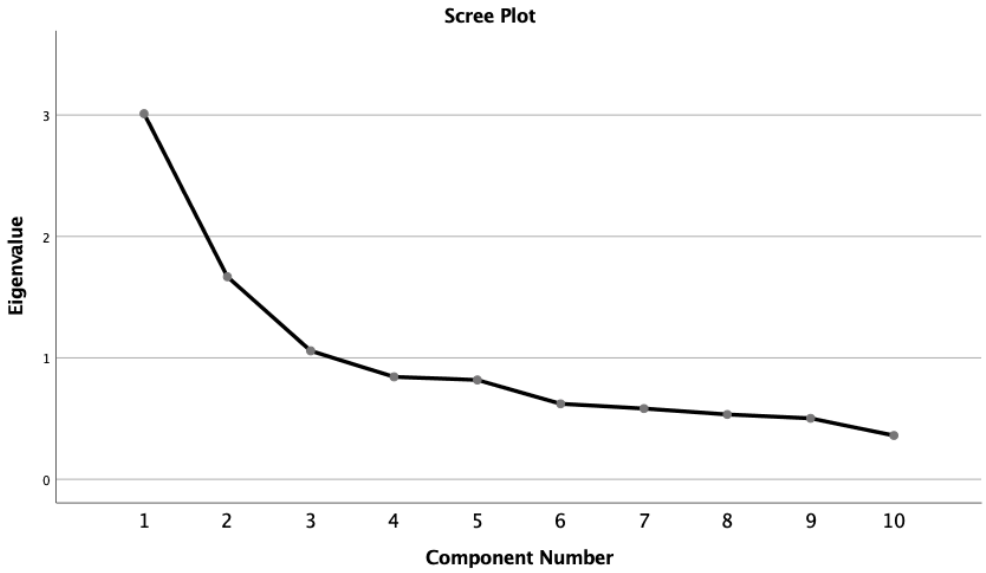

Figure 3 Scree Plot - Effectuation, Causation

Table 12 Total Variance Explained

		Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.635	43.343	43.343	5.635	43.343	43.343	2.977	22.898	22.898
2	1.558	11.986	55.328	1.558	11.986	55.328	2.775	21.348	44.246
3	1.082	8.324	63.653	1.082	8.324	63.653	2.523	19.407	63.653
4	.804	6.184	69.837						
5	.718	5.524	75.361						
6	.541	4.158	79.519						
7	.509	3.914	83.433						
8	.466	3.583	87.015						
9	.393	3.025	90.041						
10	.369	2.839	92.880						
11	.358	2.757	95.638						
12	.308	2.370	98.009						
13	.259	1.992	100.000						

Extraction Method: Principal Component Analysis

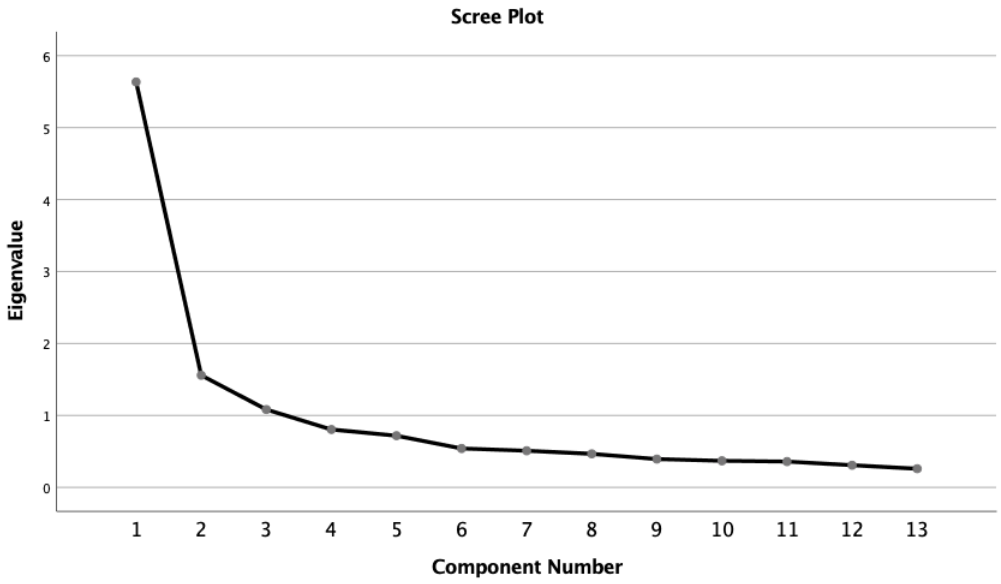

Figure 4 Scree Plot - Entrepreneurial Passion

Table 13 Rotated Component Matrix[a]

	Component		
	1	2	3
E1_Means-oriented	.802		
E5_unpredictable future	.791		
E3_Contingencies	.714		
E4_Commitments	.640		
E2_Affordable loss	.616		
C4_Competitive analysis		.802	
C5_Uncertain future		.729	
C2_Expected returns		.672	
C1_Goal-oriented		.415	.414
C3_Pre-existing knowledge			.884

Extraction method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 3 iterations

Table 14 Rotated Component Matrix

	Component		
	1	2	3
EP5_inventing5	.774		
EP2_inventing2	.758		
EP4_inventing4	.744		
EP3_inventing3	.723		
EP1_inventing1	.622		
EP7_founding2		.839	
EP5_founding1		.762	
EP9_founding4		.706	
EP8_founding3		.662	.406
EP11_developing2			.836
EP12_developing3			.789
EP10_developing1			.697
EP13_developing4		.468	.548

Extraction method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 5 iterations

Correlation

Table 15 Correlations (Spearman's rho)

		Effectuation	Causation	EP_inv	EP_fnd	EP_dev
Effectuation	Correlation coefficient	1.000	-.234**	-.089	-.147**	-.096
	Sig. (2-tailed)	.	.000	.078	.003	.057
	N	395	395	395	395	395
Causation	Correlation coefficient	-.234**	1.000	.225**	.232**	.287**
	Sig. (2-tailed)	.000	.	.000	.000	.000
	N	395	395	395	395	395
EP_inv	Correlation coefficient	-.089	.225**	1.000	.486**	.525**
	Sig. (2-tailed)	.078	.000	.	.000	.000
	N	395	395	395	395	395
EP_fnd	Correlation coefficient	-.147**	.232**	.486**	1.000	.622*
	Sig. (2-tailed)	.003	.000	.000	.	.000
	N	395	395	395	395	395
EP_dev	Correlation coefficient	-.096	.287**	.525**	.622**	1.000
	Sig. (2-tailed)	.057	.000	.000	.000	.
	N	395	395	395	395	395

**. Correlation is significant at the 0.01 level (2-tailed)

Regression

Table 16 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.574	10	4.357	2.633	.004[b]
	Residual	635.407	384	1.655		
	Total	678.981	394			
2	Regression	54.240	13	4.172	2.544	.002[c]
	Residual	624.741	381	1.640		
	Total	678.981	394			

a. Dependent Variable: EFFECTUATION_TOTAL

b. Predictors: (Constant), American_Dummy, Experience, Male_Dummy, Undergraduate_Dummy, Dutch_Dummy, Industry_Prim_Sec_Dummy, Age, Ventures, Employees, South_African_Dummy

c. Predictors: (Constant), American_Dummy, Experience, Male_Dummy, Undergraduate_Dummy, Dutch_Dummy, Industry_Prim_Sec_Dummy, Age, Ventures, Employees, South_African_Dummy, EP_inventing, EP_founding, EP_developing

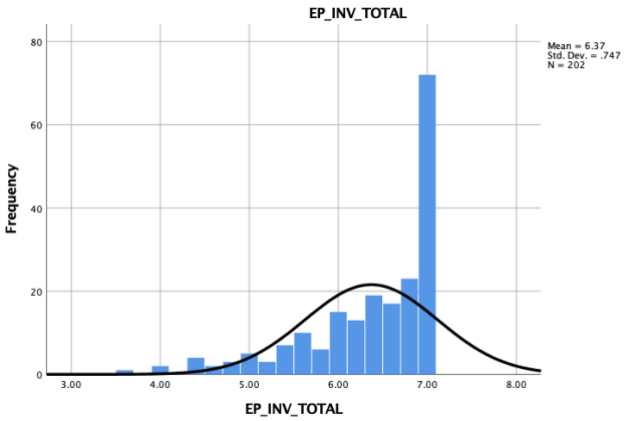

Figure 5a - Histogram of EP_inv for subgroup 1 (<4)

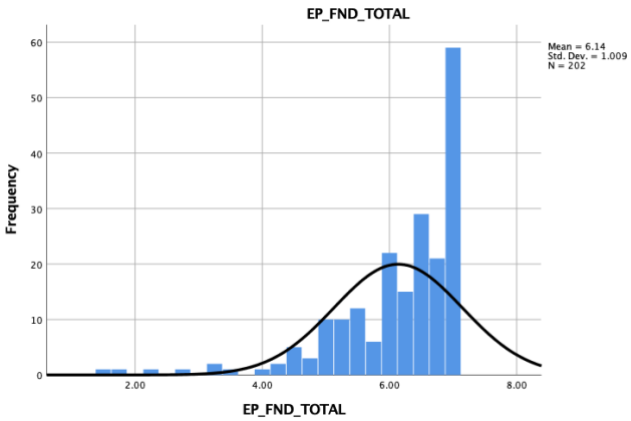

Figure 5b - Histogram of EP_fnd for subgroup 1 (<4)

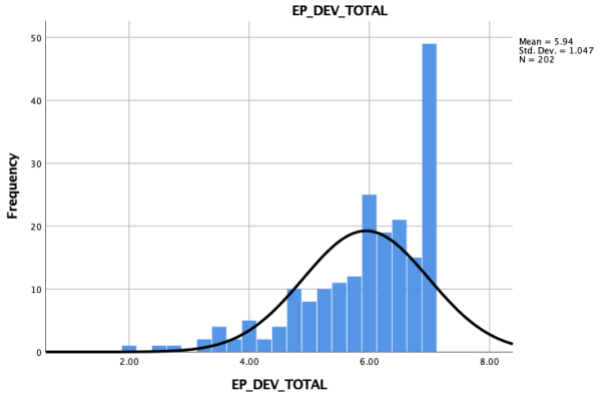

Figure 5c - Histogram of EP_dev for subgroup 1 (<4)

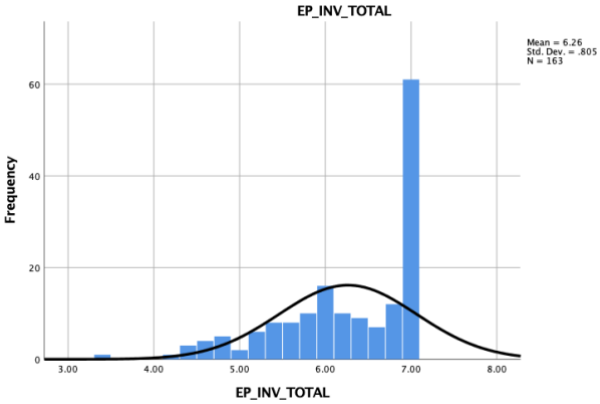

Figure 5d - Histogram of EP_inv for subgroup 2 (>4)

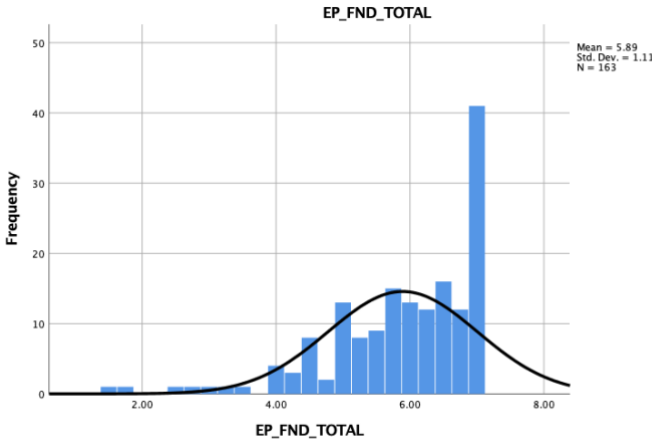

Figure 5e - Histogram of EP_fnd for subgroup 2 (>4)

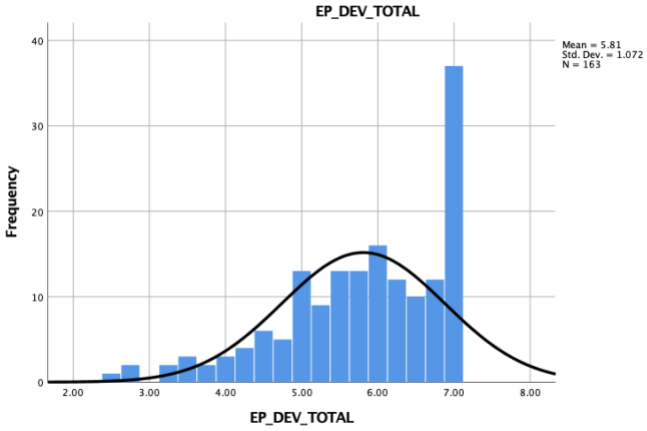

Figure 5f - Histogram of EP_dev for subgroup 2 (>4)

Table 17 Scale of Cardon

1	IPF-inv_1	It is exciting to figure out new ways to solve unmet market needs that can be commercialized.
2	IPF-inv_2	Searching for new ideas for products/services to offer is enjoyable to me.
3	IPF-inv_3	I am motivated to figure out how to make existing products/services better.
4	IPF-inv_4	Scanning the environment for new opportunities really excites me.
5	IC-inv_1	Inventing new solutions to problems is an important part of who I am.
6	IPF-fnd_1	Establishing a new company excites me.
7	IPF-fnd_2	Owning my own company excites me.
8	IPF-fnd_3	Nurturing a new business through its emerging success is enjoyable.
9	IC-fnd_1	Being the founder of a business is an important part of who I am.
10	IPF-dev_1	I really like finding the right people to market my product/service to.
11	IPF-dev_2	Assembling the right people to work for my business is exciting.
12	IPF-dev_3	Pushing my employees and myself to make our company better motivates me.
13	IC-dev_1	Nurturing and growing companies is an important part of who I am.

APPENDIX B

Descriptives

Table 18a Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
Age	27	20	65	39.26	14.249
Experience	27	1	35	13.30	10.302
Valid N (listwise)	27				

Table 18b Statistics - Gender

N	Valid	27
	Missing	0

Table 18c Descriptives - Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 Male	24	88.9	88.9	88.9
	1 Female	3	11.1	11.1	100.0
	2 Other	0	0	0	100.0
	Total	27	100.0	100.0	

Normality

Table 19 Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Causation	.130	27	.200*	.956	27	.298
Effectuation	.110	27	.200*	.975	27	.736
EP_inventing	.157	27	.084	.932	27	.076
EP_founding	.159	27	.077	.899	27	.013
EP_developing	.187	27	.016	.941	27	.130

Validity

Table 20 KMO and Bartlett's Test - Entrepreneurial Passion Scale

Kaiser-Meyer-Olkin Measure of sampling Adequacy		.585
Barthlett's Test of Sphericity	Approx. Chi-Square	106.093
	df	78
	Sig.	.019

Table 21 KMO and Bartlett's Test - Effectuation, Causation Scale

Kaiser-Meyer-Olkin Measure of sampling Adequacy		.631
Barthlett's Test of Sphericity	Approx. Chi-Square	167.079
	df	91
	Sig.	.000

Table 22a Reliability Statistics - Entrepreneurial Passion_inventing

Cronbach's Alpha	N of items
.428	5

Table 22b Reliability Statistics - Entrepreneurial Passion_founding

Cronbach's Alpha	N of items
.572	4

Table 22c Reliability Statistics - Entrepreneurial Passion_developing

Cronbach's Alpha	N of items
.564	4

Table 22d Reliability Statistics – Effectuation

Cronbach's Alpha	N of items
.714	13

Table 22e Reliability Statistics - Causation

Cronbach's Alpha	N of items
.848	14

Table 23 Rotated Component Matrix[a]

	Component	
	1	2
C2_2	.754	
C3_3	.690	
C4_1	.650	
C1_1	.643	
C3_1	.642	.391
E3_1	-.612	
E3_3	-.602	
C3_2	.597	
C1_2	.587	.378
E3_2	-.531	
C4_3	.525	
C5_1	.505	
C2_3	.440	
C5_3	.397	-.332
C2_1	.367	
E2_1		
E4_3		.797
E4_1		.731
E5_1		.668
E5_2		.603
C4_2	.411	-.592
E1_1		.581
C5_2	.381	-.561
E4_2	-.366	.434
E1_2		.425
E2_2		.334
E2_3		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 3 iterations.

Table 24 Rotated Component Matrix[a]

	Component		
	1	2	3
EP1_inventing1	.402	-.471	.431
EP2_inventing2			
EP3_inventing3	.596		.391
EP4_inventing4			.778
EP5_inventing5			.605
EP6_founding1	.721		-.380
EP7_founding2		.790	
EP8_founding3	.828		
EP9_founding4		.838	
EP10_developing1			.477
EP11_developing2	.370	-.512	
EP12_developing3	.804		
EP13_developing4	.794		

Extraction method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 5 iterations

Correlation

Table 25 Correlations (Spearman's rho)

		Effectuation	Causation	EP_inv	EP_fnd	EP_dev
Effectuation	Correlation coefficient	1.000	-.0.75	-.293	-.169	-.479*
	Sig. (2-tailed)	.	.709	.138	.399	.011
	N	27	27	27	27	27
Causation	Correlation coefficient	-.075	1.000	.347	.231	.436*
	Sig. (2-tailed)	.709	.	.076	.246	.023
	N	27	27	27	27	27
EP_inv	Correlation coefficient	-293	.347	1.000	.104	.483*
	Sig. (2-tailed)	.138	.076	.	.605	.011
	N	27	27	27	27	27
EP_fnd	Correlation coefficient	-.169	.231	.104	1.000	.189
	Sig. (2-tailed)	.399	.246	.605	.	.345
	N	27	27	27	27	27
EP_dev	Correlation coefficient	-.479*	.436*	.483*	.189	1.000
	Sig. (2-tailed)	.011	.023	.011	.345	.
	N	27	27	27	27	27

*. Correlation is significant at the 0.05 level (2-tailed).

Regression

Table 26 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.569	7	.938	1.850	.135[b]
	Residual	9.636	19	1.655		
	Total	16.206	26			
2	Regression	7.673	10	4.172	1.439	.249[c]
	Residual	8.533	16	1.640		
	Total	16.206	26			

a. Dependent Variable: EFFECTUATION_TOTAL

b. Predictors: (Constant, Experience, Male_Dummy, Undergraduate_Dummy, Industry_Prim_Sec_Dummy, Age, Ventures, Employees,

c. Predictors: (Constant), Experience, Male_Dummy, Undergraduate_Dummy, Industry_Prim_Sec_Dummy, Age, Ventures, Employees, EP_inventing, EP_founding, EP_developing

APPENDIX C

Table 27a Frequency table - EP inventing (study 1)

		Frequency	Percent	Valid Percent	Cumulative percent
Valid	3.40	1	.3	.3	.3
	3.60	1	.3	.3	.5
	4.00	2	.5	.5	1.0
	4.20	1	.3	.3	1.3
	4.40	7	1.8	1.8	3.0
	4.60	6	1.5	1.5	4.6
	4.80	8	2.0	2.0	6.6
	5.00	7	1.8	1.8	8.4
	5.20	10	2.5	2.5	10.9
	5.40	16	4.1	4.1	14.9
	5.60	21	5.3	5.3	20.3
	5.80	17	4.3	4.3	24.6
	6.00	35	8.9	8.9	33.4
	6.20	28	7.1	7.1	40.5
	6.40	30	7.6	7.6	48.1
	6.60	27	6.8	6.8	54.9
	6.80	37	9.4	9.4	64.3
	7.00	141	35.7	35.7	100.0
	Total	395	100.0	100.0	

Table 27b Frequency table - EP founding (study 1)

		Frequency	Percent	Valid Percent	Cumulative percent
Valid	1.50	2	.5	.5	.5
	1.75	2	.5	.5	1.0
	2.25	1	.3	.3	1.3
	2.50	1	.3	.3	1.5
	2.75	2	.5	.5	2.0
	3.00	1	.3	.3	2.3
	3.25	3	.8	.8	3.0
	3.50	2	.5	.5	3.5
	4.00	5	1.3	1.3	4.8
	4.25	5	1.3	1.3	6.1
	4.50	13	3.3	3.3	9.4
	4.75	5	1.3	1.3	10.6
	5.00	25	6.3	6.3	17.0
	5.25	18	4.6	4.6	21.5
	5.50	25	6.3	6.3	27.8
	5.75	24	6.1	6.1	33.9
	6.00	37	9.4	9.4	43.3
	6.25	31	7.8	7.8	51.1
	6.50	48	12.2	12.2	63.3
	6.75	39	9.9	9.9	73.2
	7.00	106	26.8	26.8	100.0
	Total	395	100.0	100.0	

Table 27c Frequency Table EP_developing (study 1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	.3	.3	.3
	2.50	2	.5	.5	.8
	2.75	3	.8	.8	1.5
	3.25	4	1.0	1.0	2.5
	3.50	7	1.8	1.8	4.3
	3.75	4	1.0	1.0	5.3
	4.00	9	2.3	2.3	7.6
	4.25	6	1.5	1.5	9.1
	4.50	10	2.5	2.5	11.6
	4.75	16	4.1	4.1	15.7
	5.00	23	5.8	5.8	21.5
	5.25	22	5.6	5.6	27.1
	5.50	30	7.6	7.6	34.7
	5.75	27	6.8	6.8	41.5
	6.00	43	10.9	10.9	52.4
	6.25	36	9.1	9.1	61.5
	6.50	34	8.6	8.6	70.1
	6.75	28	7.1	7.1	77.2
	7.00	90	22.8	22.8	100.0
	Total	395	100.0	100.0	

Table 27d Frequency Table EP_inventing (study 2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4.60	1	3.7	3.7	3.7
	4.80	1	3.7	3.7	7.4
	5.00	1	3.7	3.7	11.1
	5.20	1	3.7	3.7	14.8
	5.40	1	3.7	3.7	18.5
	5.60	3	11.1	11.1	29.6
	5.80	4	14.8	14.8	44.4
	6.00	2	7.4	7.4	51.9
	6.20	2	7.4	7.4	59.3
	6.40	4	14.8	14.8	74.1
	6.60	5	18.5	18.5	92.6
	6.80	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table 27e Frequency Table EP_founding (study 2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4.50	3	11.1	11.1	11.1
	5.00	1	3.7	3.7	14.8
	5.50	1	3.7	3.7	18.5
	5.75	4	14.8	14.8	33.3
	6.00	5	18.5	18.5	51.9
	6.25	2	7.4	7.4	59.3
	6.50	5	18.5	18.5	77.8
	6.75	3	11.1	11.1	88.9
	7.00	3	11.1	11.1	100.0
	Total	27	100.0	100.0	

Table 27f Frequency table EP_developing (study 2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.50	1	3.7	3.7	3.7
	4.00	1	3.7	3.7	7.4
	4.25	1	3.7	3.7	11.1
	4.75	2	7.4	7.4	18.5
	5.00	2	7.4	7.4	25.9
	5.25	2	7.4	7.4	33.3
	5.50	2	7.4	7.4	40.7
	5.75	2	7.4	7.4	48.1
	6.00	6	22.2	22.2	70.4
	6.25	4	14.8	14.8	85.2
	6.50	2	7.4	7.4	92.6
	6.75	1	3.7	3.7	96.3
	7.00	1	3.7	3.7	100.0
	Total	27	100.0	100.0	