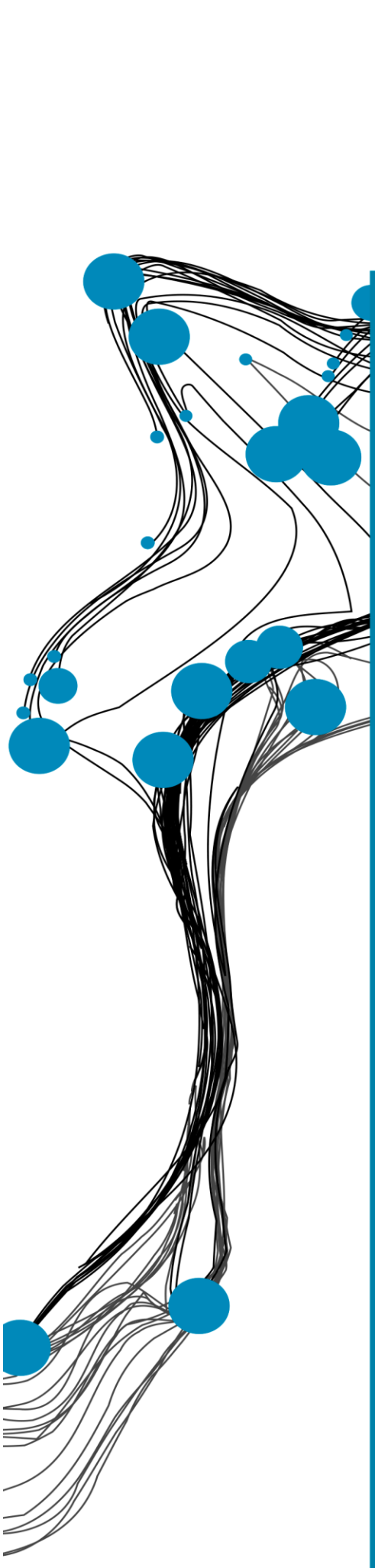

MASTER THESIS

INTOLERANCE OF UNCERTAINTY AND CULTURAL TIGHTNESS-LOOSENESS: TWO ANTECEDENTS OF EFFECTUATION-CAUSATION

Evidence from South Africa

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Preface

Before finishing the master programme at the University of Twente with this study, I have set an ambition for myself to become an entrepreneur in the near future. The study, focusing on entrepreneurial behaviours, was conducted in a typically uncertain and unexpected setting – during the pandemic caused by the COVID-19 virus. Needless to say, the whole process of working on this thesis has been a particular illustration of the thesis's topic itself: how an entrepreneur decides under conditions of uncertainty. I can see my so-called entrepreneurial mindset evolving along the journey, shifting from being lost in the middle of nowhere – no specific goal, no strategy, no plan, nothing except for a great desire to start something on my own – to recognising my strengths, what I have at hands and how I can use them to realise my dream of becoming an entrepreneur. That may sound abstract and theoretical, and yes that still does for the time being. I formulated my first business idea, listened to people's feedback and watched their reaction towards it while being hit hard by the negative effects of the pandemic, decided in pain to throw that idea away, and came up with a second idea which was not my dream at first but appeared to be more suitable with my current situation. So far I am still on my way to finetune that second idea but am more open than before to whatever exciting that might emerge and enlight my mind. Shall I call such a personal "transformation" of mine an example of what Sarasvathy (2001) labelled effectuation-causation? In any case, I am amazed by how clearly a theory in paper can work in real life. Although I have not come to the creation of any new venture yet, I have no doubt that moment would be extremely wonderful, for me as an entrepreneur to finally arrive at one important milestone of my life, and also for me as an immature researcher to finally observe how all the hypotheses developed in this thesis would be applied in my own case.

I would like to give my special thanks to dr. Stienstra, my first supervisor, and to drs. Bliek, my second supervisor, for your constructive feedback and comments, as well as your great support since the very beginning. I started this journey with a desire to analyse data from Vietnam but was awfully disappointed to not be able to do so because of the pandemic. Dr. Stienstra was a life-saver, providing me with plan B and allowing me to continue my thesis without much disruption, and for that I am truly thankful.

Also wholehearted thanks to our international student support officer and study advisor of the BMS faculty for always being emotionally and professionally supportive during my time at the University and especially since the beginning of the pandemic.

Last but of course not least, my sincere thanks and apologies to my family and friends, who have been trying so hard to put up with the "ugly stressful" me, who have been guiding me through all the tough time and who have been always beside me no matter what. Thank you.

Abstract The effectuation theory has long been criticised to be deficient in its theoretical foundation, leading to fierce calls for additional tests of the link between the notions of effectuation-causation and other established constructs. In an attempt to address such calls, the paper identifies two conceptual drivers of effectuation-causation, uncertainty and culture, and explore how they influence an entrepreneur in making decisions in the context of new venture creation. Uncertainty is examined at the individual level, measured by the degree of uncertainty intolerance, while culture captures impacts from the external environment via the concept of cultural tightness-looseness. A series of hypotheses are developed and tested using a sample of 230 entrepreneurs operating in South Africa. Results show that uncertainty intolerance and cultural tightness-looseness have significant effects on the use of causation but are not statistically related to effectuation, unlike extant literature which postulates that entrepreneurs tend to prefer effectual logics under conditions of uncertainty. Limitations of the study are identified, leaving room for improvement for future research. Replication of the study using different datasets is especially insisted to validate the obtained results. Entrepreneurs and policymakers are welcomed to benefit from practical implications of the study to improve their decision-making processes and promote entrepreneurial activities.

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1 | INTRODUCTION

Entrepreneurship research has evolved notably over the years (Ferreira, Reis, & Miranda, 2015). Yet the entrepreneur, the central subject of study, has not been thoroughly defined (Gartner, 1989). In line with Gartner (1989) who criticises the conventional trait approach describing an entrepreneur via his or her personality and assuming "the fixed state of existence" of his or her set of traits (p. 48), the author of this present paper subscribes to the viewpoint that places the entrepreneur *within the process of new venture creation*. The entrepreneur can thus be defined as someone who (1) experiences uncertainty, (2) exercises judgement to make a decision, and eventually decides to act (McMullen & Shepherd, 2006), or more precisely, (3) to create a new venture (Gartner, 1989) that is growth-oriented (Hayton, George, & Zahra, 2002).

From that viewpoint, the study of how entrepreneurs make decisions in the new venture creation has become a crucial topic of academic research in recent years. Literature has been witnessing an ongoing debate on the two contrasting approaches to decision making (Arend, Sarooghi, & Burkemper, 2015; Brinckmann, Grichnik, & Kapsa, 2010). Some researchers promote the planning method that emphasizes the benefits of having a systematic plan beforehand (Brinckmann et al., 2010), while others suggest shifting focus from predicting the future to being flexibly adaptive to changes along the way. Examples of the latter include, to name a few, bricolage theory, improvisation theory, or the action-orientation of entrepreneurs (Arend et al., 2015). Being supporters of the action-orientation, Mintzberg and Westley (2001) argue that the rational model of "thinking first", referring to the conventional linear process of "define-diagnose-design-decide" (p. 89), is not able to fully explain all possible outcomes of real-life decision-making. They propose three modes that should be combined to obtain an optimal advantage: *doing first*, *seeing first* and *thinking first*. Specifically, the "doing first" mode should be preferred under ambiguous circumstances, i.e., when the situation is non-existent before. This is particularly true for firms in high-growth and turbulent industries that involve consecutive changes in technology (Mintzberg & Westley, 2001).

Similarly, Sarasvathy (2001) contends in her seminal work that creating a venture that does not exist yet requires entrepreneurs to make decisions in the absence of a predefined goal (p. 244). Consequently, the traditional planning model with such a predefined goal could not serve as a suitable strategy in such cases. Sarasvathy (2001) distinguishes two cognitive logics employed by entrepreneurs, representing different approaches to the new venture development process, namely *effectuation* and *causation*. As opposed to causal decision-making that focuses on reaching a given target, effectual decision-making underlines using a predetermined set of means to create one or more among many possible outcomes. Such a type of process allows an entrepreneur to flexibly change his or her goals or even to assemble new ones over time.

Since its launch, the work of Sarasvathy (2001) has acquired substantial attention from scholars in the field of entrepreneurship (Grégoire & Cherchem, 2019). Despite being introduced by Sarasvathy (2001) as a newly proposed theory, the idea of effectuation versus causation was not thoroughly novel in itself (Arend et al., 2015). Similar characteristics that are considered foremost of effectuation have emerged before in the literature but not been explicitly named yet (Arend et al., 2015; Grégoire & Cherchem, 2019). Meanwhile, theories that stress the critical value of planning and disprove the idea of effectuation have constituted an important part of the entrepreneurship scholarship, leading to a lack of grounded theoretical foundation of effectuation as a standalone theory (Arend et al., 2015). These problematic issues require rigorous tests of the relationship between effectuation's concepts and other established constructs (Arend et al., 2015; Frese, Geiger, & Dost, 2019; Perry, Chandler, & Markova, 2012), suggesting a need for more empirical evidence and more in-depth knowledge of the drivers of effectuation (Grégoire & Cherchem, 2019). The present paper seeks to fill this gap by broadening the nomological network of effectuation with its antecedents in the context of new venture creation (Frese et al., 2019).

To date, uncertainty may be the most discussed antecedent of effectuation (Frese et al., 2019) since it constitutes the cornerstone to Sarasvathy's (2001) theory. Indeed, Sarasvathy (2001) stresses that effectuation is especially effective under conditions of uncertainty wherein entrepreneurs are unable to know the outcomes of a decision as well as the probability of those outcomes when the decision is made (Alvarez & Barney, 2005). Traditionally, the planning-based method, labelled *causation* in the work of Sarasvathy (2001), advocates that people can predict the future by planning formal strategies. However, high uncertainty and ambiguity in real-life situations could diminish the preciseness of any projected plans and their subsequent effectiveness (Brinckmann et al., 2010). The alternative effectual mode, on the other hand, is argued to help reduce uncertainty by enhancing the entrepreneur's control over outcomes (Reymen et al., 2015; Wiltbank, Read, Dew, & Sarasvathy, 2009), thus highly appropriate under uncertain conditions.

Theoretically, there is a strong emphasis on the importance of uncertainty in effectuation literature (Fisher, 2012; Harms & Schiele, 2012; S. Read, Dew, Sarasvathy, Song, & Wiltbank, 2009; Wiltbank et al., 2009). Yet extant empirical research appears to underestimate this notion since too few authors have attempted to measure and control for uncertainty in their papers (Perry et al., 2012). Unlike recent effectuation scholars who capture uncertainty as an inherent nature of the environmental context, the author of the present paper argues that uncertainty should be measured at the individual level. In that sense, the adopted variable should be able to reflect *the attitude of an individual towards uncertainty,* rather than how much uncertainty an individual perceives from the external environment. This first assessment would then determine whether effectuation or causation would be employed in making subsequent decisions. The author aims to do so by adopting the scale proposed by Carleton, Norton, and Asmundson (2007) from the field of psychology to capture the intolerance of uncertainty of entrepreneurs and examine how it affects them choosing either effectuation or causation to make decisions in new venture creation.

Culture is also proven to have an impact on the way entrepreneurs think and make decisions, especially when it comes to new venture creation (Mitchell, Smith, Seawright, & Morse, 2000). Empirical research has demonstrated that there exist substantial variations in entrepreneurial behaviour among different cultures (Laskovaia, Shirokova, & Morris, 2017). More specifically, the cultural context could determine how an entrepreneur selects his or her decision-making logic by shaping the environment in which the entrepreneur is active (Hayton et al., 2002). To date, scholars in the field of entrepreneurship have been mostly employing cultural values to study the effect of culture on the use of effectuation and causation (see for example Laskovaia et al. (2017), Mitchell et al. (2000)). Among extant measurements of cultural values, the most frequently used ones are Hofstede's (1980) set of dimensions. However, as Gelfand, Nishii, and Raver (2006) notice, the focus on values leads to a "subjectivist bias" and thus should be shifted to external influences on behaviour (Gelfand et al., 2006, p. 1225). From that viewpoint, Gelfand et al. (2006) introduce the concepts of tightness versus looseness to study cultural differences, emphasizing two key components – the strength of social norms and the strength of sanctioning. A tight culture is defined as one that has "many strong norms and low tolerance of deviant behaviour" (Gelfand et al., 2011, p. 1100). Individuals in a tight society are likely to feel critical examinations of their actions and are more concerned about punishments that they may suffer in case of violations of norms (Gelfand et al., 2006; Gelfand et al., 2011).

Tightness-looseness, as a separate and unique cultural dimension, is distinct from other cultural dimensions (Gelfand et al., 2006; Gelfand et al., 2011) and thus merits more attention from the stream of scholarship studying cultural differences. Since the concept was not quantifiable until Gelfand et al. (2011) introduced a scale enabling researchers to capture the degree of cultural tightness-looseness, there has been little research examining the link between this concept and effectuation-causation. The present paper seeks, therefore, to investigate cultural tightness-looseness as an antecedent of effectuation-causation and to contribute to the empirical inventory of this relationship.

Additionally, extant literature indicates that culture has an impact on individual perceptions; therefore, culture also determines how individuals perceive uncertainty. For instance, Hofstede (1980) provides empirical findings on how individuals in different cultures have different degrees of tolerance for uncertainty (Liu & Almor, 2016), resulting in the *uncertainty avoidance* in his set of dimensions which refers to the extent to which members of a certain cultural group look for structure and procedures in case of unknown situations (Hofstede, 1980). Cultural tightness-looseness, as a unique cultural dimension, is demonstrated to be related to but distinct from Hofstede's uncertainty avoidance (Gelfand et al., 2006; Gelfand et al., 2011). More specifically, tightness-looseness may both negatively and positively relate to the level of uncertainty avoidance (Gelfand et al., 2006). A tight society has strong norms and clear punishments for aberrant behaviours, thus making individuals in such societies more averse to uncertainty (Harms & Groen, 2017). One can infer that in a tight society, individuals are more likely to fear the unknown, resulting in high uncertainty avoidance, and thus more intolerant of uncertainty. However, the reverse can also be true in that

individuals equipped with clearly designed and established rules in a tight society would not need to experience stress deriving from uncertainty in their actions, resulting in low uncertainty avoidance (Gelfand et al., 2011; Harms & Groen, 2017). This suggests a relatively negative relationship between tightness and uncertainty. Investigating this inconsistent relationship between cultural tightness-looseness and uncertainty is, therefore, highly relevant for studying entrepreneurs in the new venture creation. The present paper is expected to contribute to this stream of research with empirical data.

Apart from the above-mentioned direct relationships, a moderating effect can also exist among the main variables. For instance, Mitchell et al. (2000, p. 980) posit that culture moderates the relationship between cognitive scripts and the venture creation decision. In this current study, the author proposes a slightly different model: that uncertainty moderates the relationship between culture and the venture creation decision. In that sense, different individuals in the same culture, either tight or loose, would possess different perceptions of uncertainty in the face of an unknown future, thus employing different modes of action to arrive at their decisions. Therefore, the author expects that perceived uncertainty would exert a moderating effect on the relationship between cultural tightness-looseness and the way entrepreneurs make decisions, being either effectuation or causation.

In short, this present paper seeks to examine the interrelation among cultural tightness-looseness, intolerance of uncertainty, and effectuation-causation. Overall, this paper aims to address the following research question: ***To what extent do cultural tightness-looseness and intolerance of uncertainty determine the application of effectuation and causation of the entrepreneur in the new venture creation decision?*** In attempting to answer this focal question, the paper seeks to contribute to the literature in several ways. First, the paper addresses the call for advancing our understanding of instances in which effectuation occurs (Frese et al., 2019) by linking it with two potential drivers, which are *intolerance of uncertainty* and *cultural tightness-looseness*. This would further help contribute to the literature of effectuation which is currently fragmented (Grégoire & Cherchem, 2019) and lacks theoretical foundations (Arend et al., 2015; Perry et al., 2012). Second, the paper seeks to add more insights into the emerging stream of research that examines the entrepreneurial decision-making under uncertain conditions (Chandler, DeTienne, McKelvie, & Mumford, 2011). Third, the paper addresses the call for further empirical attention in terms of tightness-looseness of different cultures (Gelfand et al., 2011) to explain cultural mechanisms that determine the entrepreneur's heuristics in making decisions.

To answer the central research question, a quantitative analysis was conducted with data gathered from South Africa. Empirically, the country offers an attractive case to study for three reasons. First, despite being a country still under development, South Africa has been witnessing economic growth in recent years, leading to the more popular than ever concepts of entrepreneurship and entrepreneurs. As such, the paper is able to contribute to the empirical research stream of entrepreneurship by providing recently collected data from a sample of entrepreneurs operating in this country. Second, since South Africa has been undergoing

massive changes related to societal and economic aspects, it illustrates typically uncertain conditions in which one can expect fertile data to study effectual and causal logic of entrepreneurial decision-making. Finally, empirical results in tightness scores of different countries in the world are currently lacking data from South Africa; this present study will also seek to fill this gap.

The paper proceeds as follows: first, the author starts by discussing the theoretical background of the three main concepts in chapter 2 building on which the conceptual framework and hypotheses are developed. Chapter 3 is then devoted to descriptions of the sample and methodology. Next, findings from analyses are discussed in chapter 4. Finally, chapter 5 presents conclusions on the implications and limitations of the research.

2 | THEORETICAL BACKGROUND

1. The effectuation theory

Effectuation theory specifically and directly discusses entrepreneurial behaviours under conditions of uncertainty that is inherent to the nature of entrepreneurship (Alvarez & Barney, 2005; Forbes, 1999). Therefore, the theory is particularly meaningful to study entrepreneurs' decision-making during the new venture creation. This section will provide an overview of effectuation's principal conceptions and its attributes contrasting with the traditional causation approach according to Sarasvathy (2001).

1.1. Effectuation and its core ideas

Effectuation refers to a "particular way of articulating an entrepreneur's actions" (Grégoire & Cherchem, 2019, p. 2), taking into account the uncertain aspect of the external environment, the limited resources in possession of the entrepreneur as well as the obstacles that he or she may have to face when deciding to create a new venture. Effectuation is different from causation in that an entrepreneur equipped with the effectual logic of decision-making will try to control the unpredictable future, while an entrepreneur following the causal approach prefers establishing and utilizing systematic plans to predict the ambiguous future (Sarasvathy, 2001).

The causal approach, or the traditional perspective of entrepreneurship literature, accentuates the critical role of a predefined goal based on which the entrepreneur selects appropriate means to arrive at that goal (Sarasvathy, 2001). This planning approach rests on a vital premise that formal business strategies help to better predict the future and to prepare the entrepreneur for any potential challenges, and that better prediction eventually leads to better firm performance (Brinckmann et al., 2010). Empirical findings also demonstrate that business planning plays an important role in enhancing firm performance and reducing the likelihood of firm failure (Delmar & Shane, 2003). Instead of jumping directly into actions and immersing in trial-and-error learning, entrepreneurs should rather consider business planning the precursor of actions since business planning helps entrepreneurs to "turn abstract goals into concrete activities" (Delmar & Shane, 2003, p. 1166). Indeed, worldwide business courses hitherto have been built around the notion of planning and strategy by presenting and promoting the use of specific techniques to formulate more accurate forecasts of the future (Wiltbank et al., 2009). In all, prediction draws a linear process between the entrepreneur and his or her predefined goals, assuming that the future will happen the way it is predicted through planning.

However, this is not always the case, especially under conditions of uncertainty. As Mintzberg (1994, p. 110) describes as "the fallacy of prediction", prediction relies on an unrealistic premise that the world would not be moving when a plan is being established. Likewise, Sarasvathy (2001) challenges the long-held belief in the utmost importance of planning by arguing against the predominant assumption about the existence of

markets and other artifacts (p. 243). In her influential work, she contends that entrepreneurship is characterized by future events that "can only be seized and exploited" and not "analysed and predicted" (Sarasvathy, 2001, p. 250). In such uncertain settings where goals cannot be predefined, effectuation appears to be more effective in explaining entrepreneurial behaviours. Moreover, due to the intrinsic novelty of entrepreneurship and new venture creation, there exists limited past information and knowledge, thus hindering the effectiveness of planning and predicting. Therefore, the conventional planning models appear to be less useful in shaping the appropriate approach for the entrepreneur to deal with uncertainty (Grégoire & Cherchem, 2019; Reymen et al., 2015; Wiltbank et al., 2009). Instead of adhering to a predefined goal, effectual entrepreneurs would have new goals emerge from the interactions with other stakeholders during the process (Reymen, Berends, Oudehand, & Stultiens, 2017).

The effectual process as described in the effectuation theory begins with an entrepreneur confronting the shortage of information and resources under uncertainty and having to decide to whether or not participate in the new venture creation (Arend et al., 2015). If the entrepreneur decides to engage in the process, he or she would have to make some decisions to create effects that are feasible given available means in hand. Through the interplay of the entrepreneur's aspiration and the feedback from stakeholders, new effects arise and are refined to be aligned with the initial aspiration. Available means can also change over time via the dynamic cooperation between the entrepreneur and his or her stakeholders, given the fact that new commitments with external stakeholders are created and modified gradually throughout the whole venture creation. This iterative process allows various goals and effects to emerge and be polished, leading to the creation of the new venture, which meets the entrepreneur's initial ambition, as the outcome. Figure 1 illustrates the process.

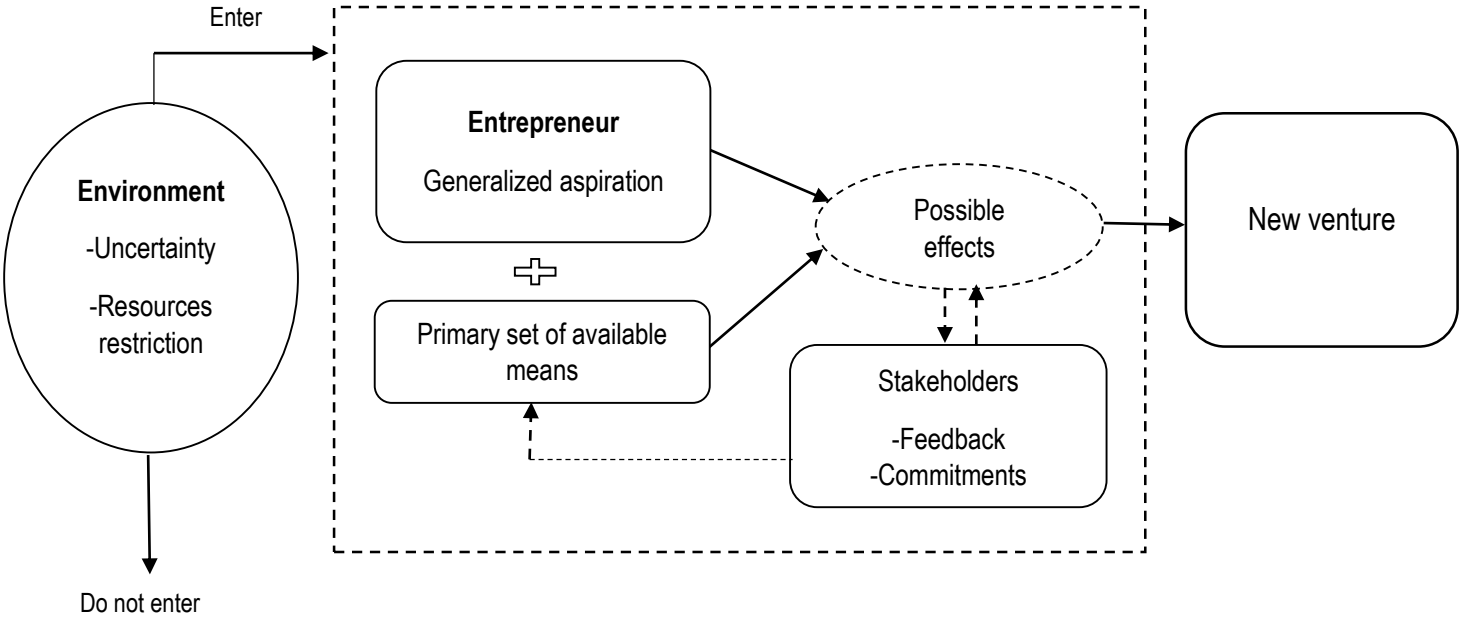

Figure 1-Effectual process (adapted from Sarasvathy (2001) and Arend et al. (2015))

1.2. Dimensions of effectuation

Central to the effectuation theory is its focus on the controllable aspects of the unpredictable future, rather than attempting to predict an uncertain one (Sarasvathy, 2001, p. 251). To be able to control the future, an effectuating entrepreneur would proactively leverage his or her primary set of available means to determine what he or she could do; this normally leads to a range of various feasible options that need not be in the same direction. Among the possible outcomes based on available means, the entrepreneur would choose the one(s) that could assure him or her a certain level of affordable loss rather than an expected return. The continuous interaction between the entrepreneur and other factors surrounding him or her would help mould his or her goals. These goals did not exist before but might emerge along the process of gathering commitments and feedback from outside alliances, and of exploiting contingencies that become apparent over time (Sarasvathy, 2001).

In the following section, the author identifies five principles based on which effectual and causal logics are contrasted (Alsos, Clausen, & Solvoll, 2014; Chandler et al., 2011; Fisher, 2012; S. Read et al., 2009; Sarasvathy, 2001).

(1) Basis for taking action: Available means versus Predefined goals

The effectuation theory as proposed by Sarasvathy (2001) starts with the idea of an entrepreneur facing restricted availability of resources and information from the external environment. In such type of layout, the entrepreneur with effectual logic would utilise the set of means at his or her immediate disposal. The primary means of entrepreneurs consist of three fundamental resources that are under their control (Fisher, 2012; Sarasvathy, 2001; Wiltbank, Dew, Read, & Sarasvathy, 2006) – they notice (a) who they are, i.e., their personalities, abilities and initial aspirations, (b) what they know, i.e., the knowledge sphere that they have access to, and (c) whom they know, i.e., social network connections in their possession (Sarasvathy, 2001). By exploiting these available means, the effectual entrepreneur allows novel goals to be *endogenously* formulated, constructed and improved in an ongoing process (Fisher, 2012; Sarasvathy, 2001).

The causal entrepreneur, on the other hand, starts with a precisely pre-envisioned venture (Chandler et al., 2011) defining exactly which goals he or she is trying to achieve in the long term. By determining goals beforehand and constructing plans to achieve them, the causal entrepreneur assumes the existence of markets and all relevant information that he or she could use to perform analyses. This assumption is challenged by Sarasvathy (2001) who postulates that the planning approach might be difficult, if not impossible, to realise under uncertainty.

(2) View of risk and resources: Affordable loss versus Expected return

The effectuation theory posits that the entrepreneur makes decisions based on what he or she considers affordable loss (Sarasvathy, 2001), referring to what the entrepreneur is willing to lose in the worst-case scenario (Chandler et al., 2011; Fisher, 2012). Again, this approach appears to be effective for entrepreneurs

in an uncertain setting, as affordable loss reasoning does not accentuate the presence of exogenous data but relies solely on endogenous information of the entrepreneur, i.e., his or her financial situation and commitment to the decision of creating a new venture based on his or her estimation of the worst-case scenario (Dew, Sarasathy, Read, & Wiltbank, 2009, p. 112). In contrast, the causal logic implies that the entrepreneur focuses on maximising potential future returns by means of strategic analyses: a business' profit potential is, therefore, necessary to determine how much the entrepreneur is willing to invest (Alsos et al., 2014).

(3) Attitude towards others: Strategic relationships versus Competitive analyses

The effectuation theory advocates that the effectual entrepreneur focuses on building partnerships and alliances with others rather than spending efforts in analysing competitors (Fisher, 2012; Sarasvathy, 2001). Considering relationships with other stakeholders one of his or her primarily available means (as in "whom I know"), the effectual entrepreneur can readily use those alliances and knowledge exploited from them to examine possible options, or even create new ones, before making decisions (Galkina & Chetty, 2015). Indeed, strategic relationships with stakeholders, which can be changeable during the process (Alsos et al., 2014), are utilised to reduce the uncertainty of the new venture creation (Sarasvathy, 2001).

On the other hand, the causal logic highlights the classic competitive analysis from Porter's five-forces model to purposely identify a limited number of potential partners which can positively add up to the company's value while considering other ones as competitors (Sarasvathy, 2001).

(4) Attitude towards unexpected events: Contingencies exploitation versus Pre-existing knowledge exploitation

This criterion refers to the attitude of the entrepreneur in the face of unexpected events: he or she can either capitalise on these contingencies or try to avoid them using his or her pre-existing knowledge (Sarasvathy, 2001; Wiltbank et al., 2006). More specifically, an entrepreneur using effectual decision-making logic remains flexible (Chandler et al., 2011), is open to contingencies of any kind that may happen and is more willing to exploit the most out of them to learn and improve throughout a creative process (Berends, Jelinek, Reymen, & Stultiens, 2014). In contrast, causation gives prominence to the exploitation of one's pre-existing knowledge to effectively deal with and avoid unexpected contingencies which are considered unfavourable to the entrepreneur and his or her long-term goals (Alsos et al., 2014; Berends et al., 2014).

(5) View towards the future: Controlling versus Predicting

According to Sarasvathy (2001), the effectual decision-making processes rest on the logic of controlling: the entrepreneur uses effectual logic to be able to control the uncertain and unpredictable future (S. Read et al., 2009). It helps answer the central question "To the extent that we can control the future, we do not need to predict it" (Sarasvathy, 2001, p. 252). This controlling logic allows the entrepreneur to develop his or her business step-by-step without knowing how it will look like at the end (Alsos et al., 2014).

The causal logic, on the other hand, focuses on the predictable facets of the future, assuming that well-prepared predictive plans of different scenarios would help the entrepreneur control the future, thus answering the question "To the extent that we can predict the future, we can control it" (Sarasvathy, 2001, p. 252). Hence, the predicting logic requires the entrepreneur to develop analyses of how future markets evolve over time (Alsos et al., 2014).

2. Uncertainty

Sarasvathy's (2001) original argumentation is built on the distinction of risk versus uncertainty (Alvarez & Barney, 2005). More precisely, *risky* contexts refer to those whose possible future outcomes and the probability of occurring of these outcomes are known when the decision is made (Alvarez & Barney, 2005, p. 778). In contrast, the context is described as *uncertain* when the possible outcomes and their probability are not known at the time the decision is made. Sarasvathy (2001) highlights this pivotal conceptual distinction since these two different contexts could lead to a decision-maker choosing different approaches in arriving at his or her final decisions. More specifically, if the decision-maker judges that he or she is facing a risky future whose events are predictable, he or she will tend to use classical analytical techniques to make his or her decisions, suggesting the use of causal processes. Conversely, in dealing with an uncertain and unpredictable future, the decision-maker will engage himself or herself in an iterative learning process to discover the underlying distribution pattern of the future, representing the use of effectual processes.

In conceptualising uncertainty, Meijer, Hekkerta, and Koppenjan (2007) suggest that the literature of strategic management offers a constructive notion of uncertainty that can be applied in studying entrepreneurial behaviours. Within this stream of scholarship, the influential work of Milliken (1987) defines *perceived environmental uncertainty* as an "individual's perceived inability to predict something accurately" (p. 136) due to the lack of relevant information about the future (Siebelink, Halman, & Hofman, 2016; Vecchiato & Roveda, 2010). The so-called "environmental" label denotes that the source of uncertainty comes from the external environment (Milliken, 1987), while the term "perceived" suggests that the degree of uncertainty is subjective and thus depends on how different individuals perceive it in different ways (McMullen & Shepherd, 2006; Meijer et al., 2007). As such, perceived uncertainty relies on the decision maker's "subjective judgements of environmental conditions" (Meissner & Wulf, 2014, p. 625), and thus varies from individual to individual (Siebelink et al., 2016).

In studying effectuation theory, a growing number of researchers have been examining the entrepreneur's application of effectual and causal logics under conditions of uncertainty in various settings. However, as Perry et al. (2012) and Welter and Kim (2018) notice, scholars are struggling and failing to operationalize and inject uncertainty into the effectuation model. Based on the distinction between objective and subjective uncertainty as previously argued, there are so far two streams of research in studying effectuation theory. The first stream considers uncertainty as an inherent character of the environmental setting. For example, Wiltbank et al. (2009, p. 117) contend that prediction in angel investing is less attractive in environments

characterised by high uncertainty since uncertainty can reduce the accuracy of predictive strategies which assume that predictions can be established based on historical data (S. Read et al., 2009; Reymen et al., 2015). In such unpredictable contexts, the logic of non-predictive control seems to be more efficient by relaxing that assumption and minimising the decision-makers' dependence on prediction (Mintzberg, 1994; Wiltbank et al., 2009). Likewise, the qualitative study of Fisher (2012) studying the firm founding process proves the entrepreneurs' prevalent use of effectuation, which promotes flexible and adaptive decision making, over causation in uncertain environments.

The second stream, recognising the importance of examining the "perceived" degree of uncertainty which is more *individual*, has been attempting to operationalise this variable as such. For instance, Harms and Schiele (2012), when studying the entrepreneurial processes in international settings, find that the high perceived dynamism of foreign markets, an element denoting uncertainty in internationalisation, will cause entrepreneurs to adopt the effectual logic. Likewise, Frese et al. (2019) find supportive results for the positive relationship between perceived uncertainty and the founder's preference for experimentation, illustrating the use of effectual logics in making decisions. Similarly, the recent work of Jiang and Tornikoski (2019) studying the perception of uncertainty as an antecedent of effectuation and causation during the new venture creation journey provides results that are more or less in line with previous research. According to their findings, entrepreneurial behaviour is first dominated by causation when entrepreneurs do not perceive uncertainty (Jiang & Tornikoski, 2019, p. 23). Over time, when entrepreneurs do perceive a higher degree of uncertainty, they actively combine causation and effectuation. Entrepreneurs will then switch back to causation when they perceive less uncertainty from the external environment.

Nonetheless, the majority of, if not all, aforementioned extant literature in effectuation examines the *degree of environmental uncertainty* (as perceived by entrepreneurs) and how it influences the approaches taken by entrepreneurs to make decisions. In this present paper, the author argues that there is a need to study *the attitude and reaction of individuals towards uncertainty* and how this personal variable act as an antecedent to entrepreneurial behaviours. Put differently, the entrepreneur may find uncertain situations either acceptable or unacceptable, reflected by his or her intolerance of uncertainty. As such, the conceptualisation of uncertainty in this study is one more step closer to the individual level, limiting the uncertainty variable to the entrepreneur himself.

From that viewpoint, the present paper attempts to use the scale developed by Carleton et al. (2007) in the psychological field to measure uncertainty at the individual level, allowing the author to examine how this variable affects entrepreneurs in making their decisions in the new venture creation. Uncertainty, in this context, is captured by the intolerance of uncertainty which refers to "the tendency of an individual to consider the possibility of a negative event occurring unacceptable, irrespective of the probability of occurrence" (Carleton et al., 2007, p. 105). In particular, intolerance of uncertainty assesses reactions of individuals to the uncertain future and is conceptually linked to their anxiety and worry. Anxiety, in turn, is defined as the

response to a threat that may or may not occur in the future while worry can be interpreted as the heightened level of anxiety (Carleton et al., 2007, p. 105). This definition emphasises an individual's inability to identify negative events due to the lack of any "definitive way of predicting such events" (Carleton et al., 2007, p. 106), in line with the definition of environmental uncertainty in strategic management literature as previously argued.

Research has shown that there is a strong relationship between intolerance of uncertainty and worry. More specifically, intolerance of uncertainty results in the need for additional information as a means to lower the level of uncertainty (Buhr & Dugas, 2002), while high worriers require more evidence than their lower counterparts in making decisions (Tallis, Eysenck, & Mathews, 1991). Furthermore, Dugas, Freeston, and Ladouceur (1997) contend that intolerance of uncertainty leads to worry when individuals overestimate the probability of occurrence, however highly unlikely, of future events, or when they consider the extremely low probability of occurrence of these events as unacceptable. Additionally, a person with a high intolerance of uncertainty is likely to appraise uncertain information as potentially threatening and therefore tends to avoid such uncertain situations (Carleton et al., 2007; Dugas et al., 2005). Taken together, these findings suggest that intolerance of uncertainty acts as a predictor of worry (Buhr & Dugas, 2002), with increased intolerance of uncertainty leading to increased worry (Dugas et al., 2005). Worry, in turn, impairs the ability of an individual in solving problems. Put differently, high intolerance of uncertainty results in high worriers who tend to interpret situations negatively (Tallis et al., 1991), avoid problems deemed uncertain (Dugas et al., 1997), attempt to gather as much evidence as possible (Tallis et al., 1991), thus leading to a delay in the decision-making process (Dugas et al., 1997; Tallis et al., 1991). Indeed, the IUS-12 scale proposed by Carleton et al. (2007) contains two underlying factors in line with prior studies: the Prospective Anxiety subscale, referring to anxiety about future events perceived as threatening, and the Inhibitory Anxiety subscale, referring to uncertainty inhibiting actions.

In short, prior studies suggests that intolerance of uncertainty, or the reaction of an individual in the face of uncertain situations, has a strong impact on how individuals make decisions. Hence, adopting the notion of intolerance of uncertainty is highly appropriate to examine the approaches taken by entrepreneurs, i.e., effectuation or causation, when creating their ventures.

3. Culture and cultural tightness-looseness

Research on entrepreneurs making decisions is of great interest among entrepreneurship scholars (Shepherd, Williams, & Patzelt, 2015). However, this stream of literature is increasingly fragmented and in need of further research that captures the contextual factors of entrepreneurial decisions (Shepherd et al., 2015, p. 38), encouraging a deeper investigation of the relationship between entrepreneurs and the culture in which they operate and make decisions.

Culture can be defined as a "set of shared *values*, beliefs, and expected behaviours" of a society that are more than often unconscious, even irrational (Hayton et al., 2002, p. 33) and firmly carved in individuals' minds to guide their thoughts and feelings (Carpenter, 2000). Similarly, Mueller and Thomas (2001) define culture as the "underlying system of *values* peculiar to a specific group or society" (p. 51) shaping individuals' personality traits and behaviours. Also stressing on the *values* rooted in the concept of culture, Mitchell et al. (2000) posit that cultural values affect "the way human societies organise knowledge and social behaviours" (p. 979) via a certain set of cognitive scripts. Likewise, Kono, Ehrhart, Ehrhart, and Schultze (2012, p. 371) contend that cultural values of the society in which people live determine how they perceive leadership. With regard to the well-documented relationship between culture and entrepreneurship (Laskovaia et al., 2017), cultural values are believed to stipulate a society to either support or hinder entrepreneurial behaviours by encouraging or disproving the development of certain personality traits associated with entrepreneurship (Hayton et al., 2002; Mueller & Thomas, 2001). Cultural values can thus be viewed as an antecedent to human behaviour in general and play a significant role in affecting how entrepreneurs make their decisions in creating their new ventures (Mitchell et al., 2000).

On theoretical as well as empirical grounds, research on culture has been mostly inclined to the use of cultural values to study discrepancies across cultures (Gelfand et al., 2006). Indeed, researchers have come to multiple scales to measure cultural values, among which those developed by Hofstede (1980) and the extended contribution later of the GLOBE project (House, Hanges, Javidan, Dorfman, & Gupta, 2004) are the two prominent scales. Nevertheless, Gelfand et al. (2006) point out that this extensive reliance upon values has triggered criticism in that values cannot fully explain cultural differences in behaviour from both empirical and theoretical perspectives. More specifically, the subjectivity created by this bias limits the study of culture to indicators *internal to* the individual level (Gelfand et al., 2006). From that viewpoint, Gelfand et al. (2006) advocate for a shift in focus to simultaneously study *external influences,* for example, social norms and constraints, on behaviour. In that sense, national culture shapes individual behaviour by not only (dis)encouraging personality traits but also facilitating the emergence of formal institutions (Gelfand et al., 2006; Gelfand et al., 2011; Harms & Groen, 2017).

In an attempt to fill the aforementioned gap, Gelfand et al. (2006) introduce the concept of *cultural tightness-looseness* defined as "the strength of social norms and the degree of sanctioning within societies" (p. 1226) which can be measured by a 6-item scale developed and tested later by Gelfand et al. (2011). According to Gelfand et al. (2006), formal institutions are shaped by culture (Harms & Groen, 2017). Therefore, the degree of support that a culture has for entrepreneurship can be examined through the emergence of supportive formal institutions considered legitimate by that culture (Harms & Groen, 2017). The author of this present paper subscribes to this view and will employ tightness-looseness to measure the effect of culture on entrepreneurial behaviours.

Initially, the concept of cultural tightness-looseness was theorised and quantified by the Finnish-American anthropologist Pertti Pelto. More specifically, a society is said to be "tight" (or "loose") when it possesses (or lacks) all or most of the features listed in the 12-point tight-loose scale resulting from his study of 21 societies (Pelto, 1968). Pelto's distinction of tightness versus looseness is based on the idea that cultures vary in the strength of norms and sanctioning and that the variation could be attributed to societies' ecological characteristics (Gelfand et al., 2006; Li, Gordon, & Gelfand, 2017), which can be classified into three broad categories, namely kinship systems, dependence on agriculture, and population density (Pelto, 1968). In particular, societies with high population density and a heavy reliance on food crop are tighter because these conditions require stringent social structure in order to keep people working cooperatively towards the common goal (Pelto, 1968). The reverse is true for societies with low population density and less dependence on agriculture because they do not need as much coordinated behaviour (Li et al., 2017). The notion of cultural tightness-looseness has been prevalent in social sciences since then (Gelfand et al., 2006; Li et al., 2017). Later, Triandis (1989) develops tightness-looseness in the psychological field, positing that the way the self behaves is different across cultures. He argues in his paper that cultural tightness-looseness should be clearly discriminated with other dimensions of cultural variation. Triandis (1989) also suggests a different perspective to study tightness-looseness: the degree to which a society is described as homogeneous or heterogeneous. More specifically, a homogeneous society has relatively similar norms and values of in-groups and strictly requires its members to behave according to these norms, resulting in a low degree of tolerance for deviant behaviours (Triandis, 1989). This society is labelled "tight" with clear norms, as opposed to loose societies which are heterogeneous with unclear norms and greater tolerance for deviance from the norms (Triandis, 1989). Likewise, Carpenter (2000) describes tight cultures as those in which norms are explicit and rigorously enforced to ensure that individuals comply with them. These cultures are homogenous "with respect to particular attitudes and behaviours", whereas loose cultures are heterogeneous and thus grant their people more flexibility in choosing proper behaviours (Carpenter, 2000, p. 41).

Despite the long-standing recognition of the importance of cultural tightness-looseness among scholars, not until the recent influential work of Gelfand et al. (2006) has the construct been conceptualised systematically and later quantifiable with the scale proposed by Gelfand et al. (2011) via their extensive 33-country study. According to Gelfand et al. (2006, p. 1226), the theory of societal tightness-looseness consists of two key components: the strength of social norms and the strength of sanctioning. The former refers to how clear and pervasive norms are within societies, whereas the latter indicates how societies tolerate deviant behaviours of their group members (Gelfand et al., 2006; Gelfand et al., 2011). Based upon the two components and the notion of sociological antecedents of tightness-looseness suggested by Pelto (1968), Gelfand and her colleagues (2011) develop a model examining the system in which external influences on multiple levels evolve, interact and decide how societies become either tight or loose over time, and how this integrated process affects individual psychological adaptations (Figure 2).

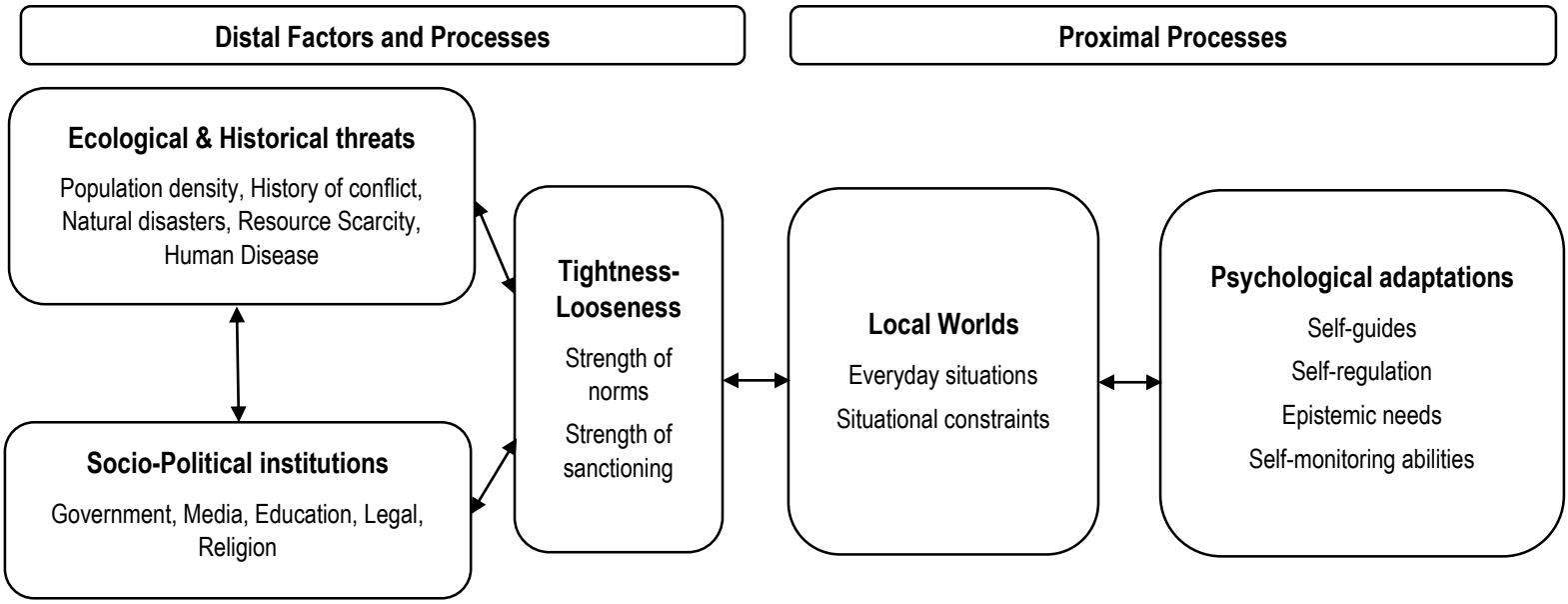

Figure 2-System model of tightness-looseness (Adapted from Gelfand et al., 2011)

As an antecedent of tightness-looseness, ecological and historical threats intensify a society's need for powerful norms and sanctioning to ensure people conform with them, in order to survive in the face of the chaos resulted from high population density, the dearth of natural resources, natural disasters, territorial threats from its neighbours, and spread of diseases (Gelfand et al., 2011, p. 1101). In other words, such challenges require a country to develop as strong norms and low tolerance for deviance as possible to align individual behaviours and attitudes to prevailing norms, and ultimately to deal with these threats. The degree of tightness-looseness is also reflected in the characteristics of socio-political institutions in a country. A tight country allows for the prevalence of institutions that promote narrow socialisation limiting the range of behaviours deemed acceptable. For example, in such countries, autocratic governing rules are more prevalent, media networks face stronger censorship and political control, educating systems exert stronger control and monitoring over children, religions play a more critical role in terms of moral conventions, and legal systems impose more severe punishment resulting in people's higher adherence to laws (Gelfand et al., 2006; Gelfand et al., 2011; Stoermer, Bader, & Froese, 2016). Moreover, compared to loose countries, tight countries have a higher degree of situational constraints, meaning the range of behaviours and attitudes considered appropriate across everyday situations is more restricted, leaving almost no leeway for individual discretion (Gelfand et al., 2011).

At the individual level, people in tight countries, exposed to more serious situational constraints in their daily life, recognise that they do not have many choices of acceptable behaviours and that their actions are almost always subject to evaluation as well as social censure (Gelfand et al., 2011). Thus these individuals are more likely to develop their self-guides so that they are more cautious of how they should behave in everyday

situations, have higher impulse control, higher need for structure, and higher self-monitoring abilities (Gelfand et al., 2011).

Additionally, Gelfand et al. (2011) show that cultural tightness-looseness is a unique dimension and distinct from, although closely related to, other existing cultural dimensions, such as Hofstede's five dimensions (collectivism-individualism, power distance, masculinity-femininity, uncertainty avoidance, and long-short term orientation) or the GLOBE's "as is" dimensions. Building upon this idea, several authors advance it further by positing that cultural tightness-looseness is indeed the moderator that catalyse the relationship between cultural values and individual behaviours (Stoermer et al., 2016), suggesting that tightness-looseness is an expression of the strength of cultural values (Stoermer et al., 2016) or that it is a more general measure beyond specific values (Crossland & Hambrick, 2011).

In summary, cultural tightness-looseness relates to the strength of social norms and sanctions that can be expressed through formal institutions at the country level as well as individual psychological adaptations at the individual level. More specifically, a tight country is expected to have explicitly powerful norms and punishment system to ensure its members' conformity and cooperative behaviours towards a common goal. In contrast, a loose country creates a leeway for its people to be more flexible in choosing their attitudes and behaviours and has a greater tolerance for behaviours deemed deviant.

4. Conceptual framework

One well-constructed antecedent of human behaviour is the culture in which an individual makes decisions. Indeed, extant literature proved that culture has a significant effect on how entrepreneurs make decisions (Laskovaia et al., 2017). As two different logical processes employed by entrepreneurs in making decisions, effectuation and causation have been increasingly studied in their connection with culture, and theoretically as well as empirically demonstrated to be influenced by several established cultural dimensions. It is thus reasonable to expect that cultural tightness-looseness, as a novel but a unique and distinct measure of culture, should also have an impact on the entrepreneurial decision-making process.

In a tight culture with explicit norms and powerful punishment, social deviants are perceived as threats. Hence, there is a substantial lack of tolerance for those persons or ideas considered deviant from the rest of society (Mueller & Thomas, 2001, p. 61). Entrepreneurship is inherently related to novel, innovative and creative behaviours; therefore, a tight culture appears to be less supportive of entrepreneurship which could be regarded as illegitimate (Harms & Groen, 2017; Uz, 2015). In that unfavourable environment where entrepreneurs could not receive enough support from external agents such as legal, economic, and media institutions, they would need to rely more on statistical analyses to compensate for the lack of such strategic relationships, suggesting an inclination toward causation. Furthermore, as norms and sanctioning are clear and prevailing in a tight culture, psychological adaptations would lead to individuals developing more cautious and dutiful behaviours (Gelfand et al., 2006; Gelfand et al., 2011). Thus, entrepreneurs in a tight culture would

depend more on pre-existing knowledge to ensure that they conform to societal norms in making decisions and less on contingencies regarded as unexpected threats. Moreover, a tight culture might also possess a firmly established and validated protocol requiring entrepreneurs to follow in the new venture creation. It is thus reasonable to expect that entrepreneurs in a tight culture with a greater need for structure would adhere more to this conventional planning model to create their new ventures.

In contrast, a loose culture with weak social norms and a high tolerance for deviant behaviours would leave more rooms for entrepreneurs to continuously experiment and exploit contingencies, elaborate relationships with and benefit from the support of external institutions, thus allowing for the use of effectual approaches in creating new ventures. To summarise:

> *H1a: Entrepreneurs who perceive their culture as tight are more likely to employ causal logics in their decision-making process.*
>
> *H1b: Entrepreneurs who perceive their culture as loose are more likely to employ effectual logics in their decision-making process.*

Triandis (2001) reasons that individual perception depends on the information that is sampled from the external environment. Therefore, culture, as the collection of shared elements about sampling the environment, contributes substantially to guiding people about "what to pay attention to and how much to weigh the elements that are sampled" (Triandis, 2001, p. 908). It is thus expected that cultural tightness-looseness will have an impact on how the entrepreneur assesses uncertain situations.

The conceptualisation of uncertainty in the stream of social identity literature suggests that humans have a fundamental need to strive to reduce the feeling of uncertainty by conforming to group norms that define attitudes and behaviours, thereby increasing consensus among group members (Smith, Hogg, Martin, & Terry, 2007). As previously discussed, a tight culture develops explicit norms and rules throughout its history to effectively deal with all situations considered as threatening to its survival. In that sense, uncertainty can be seen as a threat that individuals in a tight culture are averse to and try to tackle via their solid in-group consensus and homogeneity. This portrait appears to be in line with the description of people with a high intolerance of uncertainty who tend to interpret uncertain situations as threatening. Therefore:

> *H2: Entrepreneurs who perceive their culture as tight are more likely to be intolerant of uncertainty.*

As previously argued, actions, in general, are uncertain, let alone entrepreneurial actions whose attributed uncertainty is further reinforced by the intrinsic novelty of entrepreneurship (McMullen & Shepherd, 2006, p. 133). Under conditions of uncertainty, effectual logics are believed to be the optimal choice for entrepreneurs in making decisions (Fisher, 2012; S. Read et al., 2009; Sarasvathy, 2001; Wiltbank et al., 2009). Prior studies suggest when the entrepreneur perceives the degree of environmental uncertainty to be high, he or she tends to prefer effectuation over causation, and vice versa (Frese et al., 2019; Jiang & Tornikoski, 2019). However,

the intolerance of uncertainty of an entrepreneur may act as the first filter (Buhr & Dugas, 2002) or a predisposition to determine whether he or she finds such potential uncertainty acceptable, irrespective of the perceived degree of uncertainty from the external environment.

Tallis et al. (1991) contend that people who are intolerant of uncertainty, i.e. who score high on the IUS-12 scale, require as much additional information as possible to be able to make the final decision. Such elevated evidence requirements in an entrepreneur suggest that he or she may prefer leveraging as much pre-existing knowledge as possible to operate under conditions of uncertainty. Additionally, entrepreneurs who are intolerant of uncertainty are more likely to see the uncertain future as a threat (Carleton et al., 2007; Dugas et al., 2005), and thus do not appreciate the future as it contains unexpected contingencies. Furthermore, the prospective anxiety factor of the IUS-12 suggests that people intolerant of uncertainty expect to be able to organise their plans in advance with a precisely targeted goal. All in all, these descriptions point to the use of causation in making decisions. The reverse holds for effectual entrepreneurs who are relatively tolerant of uncertainty: being not afraid of uncertain situations and proactive and effective in dealing with such uncertainty allows them to embrace contingencies emerging during their new venture creation, shape and formulate new goals as they step forward, and consider an uncertain future as one full of opportunities to be exploited. Therefore, the author of this present paper hypothesizes that:

> *H3a: Entrepreneurs who are more intolerant of uncertainty are more likely to employ causal logics in their decision-making process.*
>
> *H3b: Entrepreneurs who are less intolerant of uncertainty are more likely to employ effectual logics in their decision-making process.*

Given this considerable effect of uncertainty, it is expected that this variable could act as a moderator perturbing the relationship between cultural tightness-looseness and effectuation-causation. As Alchian (1950, p. 216) contends, under uncertainty, individuals will differ in their judgements and opinions even when accompanied by the best available information. Additionally, intolerance of uncertainty is subjective and can vary from individual to individual, even if they share the same cultural background. Indeed, literature shows that there is significant heterogeneity with regard to entrepreneurial cognitions (Forbes, 1999) and that the state of uncertainty is not perpetual for entrepreneurs (Galkina & Chetty, 2015), reinforcing the idea that intolerance of uncertainty can modify behaviours of entrepreneurs from the same culture.

Hypothetically, intolerance of uncertainty can amplify the effect that cultural tightness-looseness imposes on effectuation-causation. That is, in a tight culture, an entrepreneur intolerant of uncertainty would be even more likely to adopt the causal approach in creating his or her new venture. Therefore:

> *H4: Intolerance of uncertainty acts as a moderator on the relationship between cultural tightness (looseness) and causation (effectuation).*

Figure 3 illustrates the main hypotheses of the present paper.

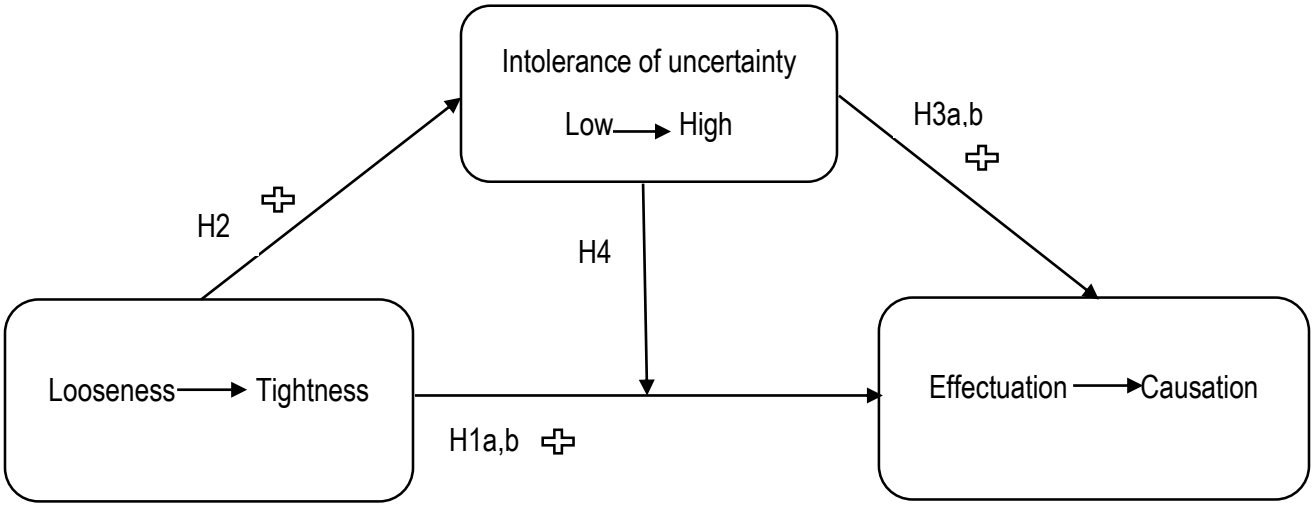

Figure 3-Theoretical framework

3 | METHODOLOGY

1. Research setting and data sample

To test the proposed hypotheses, a data sample was collected from entrepreneurs in South Africa. According to the theory of cultural tightness-looseness, ecological and historical threats shape the degree of tightness of a country (Gelfand et al., 2006; Gelfand et al., 2011). From that viewpoint, the South African culture is expected to be a relatively tight one. Throughout its history, South Africa suffered from long-running conflicts, internally as well as with external parties. The most important periods in the country's history include Dutch and British colonial years starting from the early 17th century until 1931-1934 when the Union Party was established and eliminated the last powers of the British government from the country. After 1948, the racial segregation in South Africa was strengthened more than ever, creating the *apartheid* period of the country. The white minority had legal power over the vastly larger black majority, leading to oppositions and rebellions within the country until 1994 when South Africa held its first universal election, which was initially limited to white people, marking the end of the apartheid. Thus, having to face continuous territorial and cultural threats requires South Africa to develop relatively strong norms and low tolerance of deviant behaviours to enhance order and social coordination over time (Gelfand et al., 2011). On the other hand, South Africa is well-known for having a pluralistic culture, especially in its wide range of ethnics, official languages and religions. Moreover, the country has been experiencing many thousands of popular protests and repressions in recent years, partly due to remnants of the so-called apartheid period. Taken together, these characteristics suggest that South African culture is rather a heterogeneous and loose culture. Therefore, it is interesting to examine whether entrepreneurs in South Africa perceive their culture as tight or loose. This special setting is also likely to strengthen the uncertainty that entrepreneurs have to face during the new venture creation, making the sample highly suitable for this present research.

In terms of economy, South Africa has a much higher GNI per capita compared to the average of the Sub-Saharan African countries, according to the World Bank. However, regarding entrepreneurship, data from the Global Entrepreneurship Monitor (GEM) indicate that entrepreneurs in South Africa possess fear of failure rates higher than the global average, despite having higher rates of perceived opportunities and job creation expectation. Moreover, governmental support for entrepreneurship appears to be relatively weak. These situations result in entrepreneurial intentions, established business ownership and entrepreneurial activities rates in South Africa being much lower than the global average.

To ensure the generalizability of the results, it is suggested to maintain the minimum ratio of observations to independent variables at 5:1 but preferably 15 to 20 observations per independent variable (Hair, Black, Babin, & Anderson, 2014). For multiple regression, it is recommended to obtain at least 50 and preferably 100 observations to maintain the power at 0.8 (Hair et al., 2014). Therefore, data for this thesis, gathered

from 230 valid responses from entrepreneurs operating in South Africa, can be considered statistically sufficient. The questionnaire was conducted in English, one of the official languages in South Africa. Although the original work of Sarasvathy (2001) discriminates experienced and novice entrepreneurs, stating that expertise contributes a cornerstone for differentiating the effectual and causal approaches, this research is based on a general sample while controlling for the years of experience of entrepreneurs.

2. Variable operationalisation

To measure cultural tightness-looseness, the scale developed by Gelfand et al. (2011) was employed. Respondents replied to a six-item Likert scale (*with one reverse-coded item*), ranging from 1 being "strongly disagree" to 6 being "strongly agree", that reveals their perceptions about the clarity and number of social norms and sanctions as well as the overall compliance with social norms in the country (Gelfand et al., 2011). The higher the score is, the tighter the country is as perceived by the entrepreneur.

The indicators of perceived uncertainty are based on the 12-item Likert scale as proposed by Carleton et al. (2007), ranging from 1 being "not at all characteristic of me" to 5 being "entirely characteristic of me". The scale is a reduced version of the original 27-item of Intolerance of Uncertainty Scale (IUS) and is labelled IUS-12 (Carleton et al., 2007). Using data from two samples, these authors were able to remove 15 items that appear to be redundant, while maintaining the high internal consistency of the reduced version as well as the high correlation between the original IUS-27 and the IUS-12. The resulting IUS-12 consists of two independent factors indicating Prospective Anxiety (represented by seven items describing fear and anxiety based on future events) and Inhibitory Anxiety (represented by five items describing uncertainty inhibiting action or experience) (Carleton et al., 2007). The higher the score is, the higher the entrepreneur's degree of uncertainty intolerance is.

To measure effectuation-causation, the scale proposed by Alsos et al. (2014) was employed. This scale includes 10 items representing five dimensions of effectuation and the corresponding five principles of causation, consistent with the original theory of Sarasvathy (2001) as previously analysed. The scale was tested and validated with two separate samples indicating its construct and discriminant validity. Moreover, the results show that the five principles representing effectuation are significantly positively related to uncertainty, while the other five representing causation are negatively related to uncertainty, thus making the scale highly suitable for the present paper. By implementing this scale, the author subscribes to the view that, although effectuation and causation carry seemingly contrasting dimensions, they are indeed two different strategies and are not mutually exclusive. This is also in line with the original reasoning of Sarasvathy (2001).

3. Method of analysis

Data gathered from the survey were analysed using SPSS. The author used multiple regression to test the four proposed hypotheses, after examining whether the dataset meets the assumptions for performing regression. Additionally, the reliability of the scales and data were tested based on Cronbach's alpha.

Exploratory factor analyses were also employed to identify underlying patterns in the collected dataset and assess the validity of construct measurements, after determining whether it is appropriate to perform the technique using several criteria such as KMO measure and Barlett's test of sphericity. Within the scope of this study, the principal axis factoring method was chosen since the primary concern is to identify latent constructs that define the interrelationships among the original variables (Hair et al., 2014). More importantly, principal axis factoring (or common factor analysis CFA) accounts for an error term of each variable that is explained by its unique factor, whereas such error terms are overlooked in the principal component analysis (Field, 2018; Hair et al., 2014). Therefore, CFA is more suitable for self-reported scales used in this present study. Additionally, the oblique rotation was applied since this solution, unlike orthogonal rotation, allows underlying factors to be correlated, which is also more realistic and allows researchers to be flexible in interpreting results (Hair et al., 2014).

4. Control variables

In the regression analysis, seven personal characteristics and two firm characteristics were used as control variables that could specifically account for the main ideas developed in this paper.

First, individual characteristics of entrepreneurs have an apparent effect on their behaviours and thus can explain differences in choosing either effectual or causal approaches in creating new ventures. *Age of the entrepreneur* was captured via their exact ages, while *Gender* was included as a dummy variable with 1 being female and 0 otherwise. A study of Melo, Silva, and Almeida (2019) shows that there exists a positive and statistically significant relationship between female gender and the use of causation. A possible explanation is that women are in general more risk-aversion than their male counterparts and, therefore, prefer the use of statistical analyses in making their decisions. *Nationality* was included as a dummy variable, with 0 indicating South African entrepreneurs and 1 otherwise. As Ngota, Mang'unyi, and Rajkaran (2018) contend in their study, African immigrant entrepreneurs contribute substantially to their host country's economy in general. Therefore, it should impose no serious problem to include them in the data sample and study their perception of the South African culture and how it affects their decision-making style. *Study degree* was measured based on the highest educational level completed, including high school and lower, community college, bachelor, honours, master, and doctorate degrees. *Study background* refers to whether entrepreneurs have technical or non-technical understanding. *Experience* was reflected via two measurements. First, it was measured as the *number of years* over which the respondent has been operating as an entrepreneur in South Africa. Theoretically, entrepreneurial expertise is argued to be the baseline of the effectuation theory (Dew, Read, Sarasvathy, & Wiltbank, 2009; Stuart Read & Sarasvathy, 2005; Sarasvathy, 2001). More specifically, expert entrepreneurs tend to avoid predictive strategies, focus on the controllable aspects of the environment by matching current patterns with their past experiences to creatively employ the available means at their hands, and appreciate contingencies as they emerge along their journey, suggesting their inclination towards the use of effectual approaches in creating their new ventures (Stuart

Read & Sarasvathy, 2005). Second, the *number of ventures* founded by each entrepreneur was also controlled.

Regarding firm characteristics, there were two control variables, including firm size and industry type. *Firm size* was measured as the number of employees. *Industry type* was included as dummy variables based on two categories, with 0 being primary and secondary industries, and 1 being tertiary industry.

4 | ANALYSIS RESULTS

1. Sample description

Descriptive statistics of the sample are presented in Table 1. Preliminary data screening shows no missing values. In general, respondents of the study are of varying ages, ranging from 18 to 74 years old, with an average of around 35 years old. There are more male than female entrepreneurs (174 versus 56) and more South African than foreign entrepreneurs (194 versus 36) in the sample. Almost half of the respondents obtained a Bachelor degree (46.5%), and most of them majored in a non-technical study program (69.1%). Their years of experience range from 0 to 39 years, averaging 7.43 years and most of the participants have 1-5 years working as entrepreneurs (around 60% of the sample).

Table 1 - Descriptive statistics of the data sample

Variable	Min	Max	Mean	SD	Category	Frequency	Percentage
Age	18	74	34.71	10.64			
Gender					Male	174	75.65%
					Female	56	24.35%
Nationality					South African	194	84.35%
					Foreign	36	15.65%
Degree					High school	35	15.22%
					Community college	22	9.57%
					Bachelor degree	107	46.52%
					Honour degree	8	3.48%
					Master's degree	50	21.74%
					Doctorate degree	8	3.48%
Study background					Technical	71	30.87%
					Non-technical	159	69.13%
Ventures started			2.11	1.06	1 venture	83	36.09%
					2 ventures	73	31.74%
					3 ventures	39	16.96%
					4 ventures or more	35	15.22%
Years of experience	0	39	7.43	7.59			
Number of employees			3.08	1.35	1 employee	33	13.48%
					2 employees	41	17.83%
					3-5 employees	80	34.78%

	6-10 employees	38	16.52%
	11-49 employees	28	12.17%
	50-249 employees	9	3.91%
	250 employees or more	1	0.43%
Industry	Primary and secondary	87	37.83%
	Tertiary	143	62.17%

2. Preliminary analyses

The examination of box plots shows some extreme cases for some of the variables (Figure 1 – Appendix A). To check if these outliers affect the data, Mean and 5% Trimmed mean values of these items were compared: no extremely large difference was found (Figure 2 – Appendix A). Another sample countercheck was carried to reaffirm that there were no suspicious outliers that could affect the subsequent results of the analysis. Additionally, Mahalanobis distances for the combination of four main variables (summated scores), i.e., causation, effectuation, cultural tightness-looseness, and intolerance of uncertainty, were calculated and compared to a chi-square distribution with the same degree of freedom, in this case, 4. The obtained p-values were then compared to 0.001 (Hair et al., 2014); if any p-value is below this threshold then the respective case should be identified as a potential outlier. For this specific dataset, no outlier was detected using Mahalanobis distances (Figure 3 – Appendix A).

Graphical analyses were conducted to test for normality, one of the most fundamental assumptions of the next multivariate statistical techniques. Histograms and normal probability Q-Q plots of individual variables were examined, revealing signals of abnormal distribution for several items. For example, Figure 4 (Appendix A) illustrates the normal Q-Q plot of Goal-oriented, an element of causation, showing a light departure from normality represented by the straight diagonal line, suggesting a relatively negative skewness. A slightly negative skewness can also be observed in data of Expected returns and Competitive analysis. Likewise, data distribution of several elements of effectuation is slightly non-normal. Means of the five items representing effectuation lie in the range from 3 to 4, lower than those of causation. Meanwhile, five elements of causation have an average higher than 5 on a 7-point Likert scale, except for Pre-existing knowledge which scores 3.8 (Table 2), suggesting that entrepreneurs participating in this study score moderately high on the causation subscale. In all, this first data screening reveals that respondents of this present study tend to prefer causal over effectual heuristics when making their decisions.

Checking Q-Q plots of the six variables measuring cultural tightness-looseness shows that data are normally distributed, a good sign for subsequent analyses. On the other hand, there is evidence of non-normal distribution and skewness for some items in the scale of intolerance of uncertainty. However, as a large sample size of above 200 observations can diminish the detrimental effect of non-normality (Hair et al., 2014), all these aforementioned departures from normality can be negligible.

3. Scales validation and reliability analyses

This section discusses results obtained from exploratory factor analyses that were conducted to validate the scales measuring the three main variables.

3.1. Effectuation – Causation

Preceding factor analysis, KMO statistic was evaluated to measure sampling adequacy and Barlett's test of sphericity to verify the appropriateness of the technique (details as shown in Figure 1 – Appendix B). More specifically, the KMO statistic equals 0.753 indicating middling sampling adequacy (Field, 2018; Hair et al., 2014). Measures of sampling adequacy (MSA) for individual variables are also well above 0.5 (the diagonal of the anti-image correlation matrix as highlighted in Figure 2 – Appendix B). Moreover, Bartlett's test of sphericity is significant, suggesting that there exist significant correlations among at least some of the ten variables in question (Hair et al., 2014) and thus factor analysis is appropriate.

A closer look at the correlation matrix (Figure 3 – Appendix B) reveals that five elements of causation correlate weakly to each other since almost all Pearson correlation coefficients are below 0.3, except for two pairs Expected returns-Competitive analysis ($r = 0.335$, $p < 0.001$) and Uncertain future-Competitive analysis ($r = 0.457$, $p < 0.001$). Field (2018) suggests excluding variables that have too many correlation coefficients below 0.3. However, there are grounded theoretical backing that these five elements are representatives of the five principles of causation (Alsos et al., 2014), and thus they will be retained in subsequent analysis. On the other hand, five elements of effectuation appear to have moderate to strong relations with each other with all coefficients significantly higher than 0.3 ($p < 0.001$). Overall, the measures of effectuation and causation are negatively correlated though not very strongly, which is in line with the study of Alsos et al. (2014). One exceptional case is the weakly positive correlation between Pre-existing knowledge and Means oriented but this relationship is not statistically significant ($r = 0.021$, $p = 0.373$).

To determine which dimensions to retain, the author applied the Kaiser's criterion extracting factors with Eigenvalues above 1. This first attempt results in three factors that in combination explain 59% of the variance (Figure 4 – Appendix B). However, Kaiser's criterion is only appropriate when there are less than 30 variables and communalities after extraction are greater than 0.7 (Field, 2018), whereas the shared variance explained by these three factors are well below this threshold (Figure 5 – Appendix B). The scree plot indicates an even more ambiguous picture where there seem to be either 3 or 7 factors that could be extracted (Figure 6 – Appendix B). On the other hand, extant literature suggests that effectuation and causation are two contrasting measures. Moreover, examining the pattern matrix of this first extraction after an oblique rotation (Figure 7 – Appendix B) shows that five elements of causation load high on factor 2 and 3, with Goals-oriented's loading being relatively low (0.337). Similarly, all five items measuring effectuation load high on factor 1 although Commitments seem to have minor cross-loading on factor 3. Therefore, another extraction was carried, restricting the number of retained factors at 2. The resulting new pattern matrix (Figure 8 – Appendix B) shows a clearer picture where all five measures of effectuation load high on factor 1 and four measures of

causation load high on factor 2. However, Pre-existing knowledge does not load high on any factor (loadings below 0.3 were excluded from the table). Indeed, this item loads high on factor 3 in the initial extraction, making this result expectable. Based on existing literature in the field (Alsos et al., 2014), this item will still be included in the summated score of causation variable for subsequent analyses.

In conclusion, factor analysis indicates that the 10-item scale developed by Alsos et al. (2014) describe two separately underlying dimensions, namely effectuation and causation. There are 11 residuals (or the differences between the observed correlation coefficients and the ones reproduced from the model) with absolute values greater than 0.05, equivalent to 24% (Figure 9 – Appendix B). This percentage is well below 50%, thus it is reasonable to conclude the good fit of the model (Field, 2018).

Reliability analysis was conducted with each of the two factors (details as shown in Figure 10a, b, c – Appendix B). Effectuation has high internal consistency, Cronbach's $\alpha = 0.805$. All variables have item-total correlations above 0.3 and none of the variables would increase the overall α if they were deleted. In contrast, causation has relatively low consistency, Cronbach's $\alpha = 0.567$. Specifically, Pre-existing knowledge has a low item-total correlation ($r = 0.135$), if this item were deleted the overall α would increase to 0.632. Nonetheless, as previously explained, the item was still included in the summated score of causation in later analyses because of theoretical backing (Alsos et al., 2014).

3.2. Intolerance of uncertainty

A principal axis factoring with oblique rotation was conducted on the 12 items measuring intolerance of uncertainty. KMO = 0.888 indicating meritorious sampling adequacy (Figure 1 – Appendix C). Measures of sampling adequacy for individual variables are also well above 0.5 (Figure 2 – Appendix C). Barlett's test is significant suggesting that factor analysis is appropriate.

Both Kaiser's criterion and scree-plot suggest that there are two factors to be retained (Figure 3 and 4 – Appendix C). These two factors, with associated Eigenvalues above 1, together explain 57% of the variance. Factor loadings after rotation are shown in Figure 5 – Appendix C. The first 5 items load high on factor 1 while the remaining 7 factors cluster on factor 2 although the last two items seem to have minor cross-loading on factor 1 (Figure 6 – Appendix C). In summary, these results are in line with the study of Carleton et al. (2007) who found that these 12 items can be divided into two sub-scales measuring Inhibitory anxiety and Prospective anxiety, respectively.

Regarding reliability analysis, both Inhibitory and Prospective anxiety scales have high consistency with Cronbach's $\alpha = 0.867$ and 0.811, respectively (Figure 7a, b – Appendix C). Nevertheless, the study of Lauriola, Mosca, and Carleton (2016) show support for the use of the bi-factor model instead of a mere two-factor model in assessing individual intolerance of uncertainty via the IUS-12 scale. More specifically, the general IU factor, independent from the two subscale factors, accounts for 75-80% of the variance in their study. As such, Lauriola et al. (2016) propose the cautious use of two subscales which account for less

variance than the general factor. Given that Cronbach's α of the general factor is 0.882 (Figure 7c – Appendix C), it is of high reliability using this scale as a unidimensional factor in representing intolerance of uncertainty in subsequent analyses.

3.3. Cultural tightness-looseness

First, KMO = 0.757 indicating sufficient sampling adequacy (Figure 1 – Appendix D). Measures of sampling adequacy for individual items are well above 0.5 except for the 4th item (representing "Freedom" in the reverse-coded form) whose MSA = 0.378 (Figure 2 – Appendix D). Barlett's test is significant suggesting that factor analysis is appropriate.

The correlation matrix reveals that five items correlate moderately to strongly with each other, and these correlation coefficients are statistically significant. Only the 4th item has insignificant correlations with the other five elements (Figure 3 – Appendix D). Together these signals suggest excluding this item in subsequent analysis. However, theoretical backing clearly indicates that this item represents a component of cultural tightness-looseness and therefore should be retained (Gelfand et al., 2006; Gelfand et al., 2011).

A first principal axis factoring with oblique rotation was conducted on the 6 items measuring cultural tightness-looseness. However, factor plot of this first attempt shows an ambiguous picture where the 4th item does not load high on any of the two extracted factors while the 6th has cross-loadings (Figure 4 – Appendix D). Therefore, a new component factor analysis with orthogonal rotation was conducted, focusing on the minimum number of factors needed to account for the maximum portion of the total variance. The resulting scree plot indicates 1 component to be extracted (Figure 5 – Appendix D), in line with Gelfand et al. (2011). However, a closer look at the rotated component matrix and the new component plot (Figure 6, 7 – Appendix D) discloses that five items load high on component 1 while item number 4 loads high on component 2. Nevertheless, previous literature demonstrates that all six items describe cultural tightness-looseness as a whole and no single item should be deleted (Gelfand et al., 2011). Reliability analysis was conducted on these six items, resulting in Cronbach's α = 0.711 (Figure 8 – Appendix D) which is above the generally accepted lower limit of 0.70 (Field, 2018; Hair et al., 2014). Overall, there is moderate evidence that cultural tightness-looseness, represented by the six-item scale proposed by Gelfand et al. (2011), can be used in subsequent analyses.

4. Descriptive statistics

Table 2 presents descriptive statistics of the measures. As can be seen from the table, mean of causation score is higher than that of effectuation score (5.08 versus 3.86), suggesting that on average entrepreneurs participating in this specific study tend to use more causal than effectual heuristics in making decisions. Likewise, means of four principles of effectuation are lower than their opposite counterparts of causation, with the exception of the Contingencies element which appears to be used more than its paired item Pre-

existing knowledge (4.31 versus 3.80). This latter principle also scores much lower than the overall mean of causation while the other four all score higher.

Regarding Intolerance of uncertainty, the average score is 2.56 while the maximum score is 4.67. Particularly noteworthy is the third element ("Avoid surprises") which scores especially higher than the average (3.89), while the ninth and eleventh elements ("Uncertainty paralyses me" and "Doubt", respectively) score notably lower than the general mean (1.81 and 1.82, respectively). Generally speaking, the respondents of this sample have an average degree of uncertainty intolerance, not too extremely high nor too low.

The mean score of cultural tightness-looseness is 3.63 out of a maximum score of 6, suggesting that South African culture was perceived as a relatively tight rather than loose one by the respondents of the study.

5. Correlation analysis

Pearson's correlations between variables are shown in Table 3 below. It can be seen that causation is significantly related to the other three main variables. More specifically, there is a negative relationship between causation and effectuation as expected and that relationship is significant at the 0.001 level ($r = -0.280$, $p < 0.001$). Causation is also significantly and positively related to cultural tightness-looseness ($r = 0.181$, $p < 0.01$) and intolerance of uncertainty ($r = 0.135$, $p < 0.05$). On the other hand, there is no significant relationship between effectuation and the other main variables, except for the reported negative relationship with causation. Lastly, cultural tightness-looseness is significantly and positively related to intolerance of uncertainty ($r = 0.203$, $p < 0.01$), suggesting a first supportive proof for the second hypothesis.

Regarding control variables, there appears to be a positive relationship between female gender and the use of effectual logics ($r = 0.149$, $p < 0.05$), contrasting to the aforementioned study of Melo et al. (2019). Additionally, effectuation is negatively related to the study level of entrepreneurs ($r = -0.130$, $p < 0.05$) and the firm's number of employees ($r = -0.275$, $p < 0.001$). In contrast, causation is positively related to the latter ($r = 0.188$, $p < 0.01$). Last but not least, there are significant relationships between the degree of uncertainty intolerance and the study level ($r = -0.207$, $p < 0.01$) and the field of study of the entrepreneur ($r = 0.201$, $p < 0.01$). Overall, there is no substantial correlation ($r > 0.9$ according to Field (2018) or $r > 0.7$ according to Hair et al. (2014)).

Table 2 - Descriptive statistics of the variables

Variable	N	Min	Max	Mean	SD
Goal-oriented	230	1	7	5.75	1.24
Expected returns	230	1	7	5.17	1.65
Pre-existing knowledge	230	1	7	3.80	1.69
Competitive analysis	230	1	7	5.58	1.36
Uncertain future	230	1	7	5.08	1.40
Causation	**230**	**2.00**	**7.00**	**5.08**	**0.89**
Means-oriented	230	1	7	3.46	2.00
Affordable loss	230	1	7	4.54	1.77
Contingencies	230	1	7	4.31	1.81
Commitments	230	1	7	3.67	1.85
Unpredictable future	230	1	7	3.33	1.92
Effectuation	**230**	**1.00**	**7.00**	**3.86**	**1.40**
Unforeseen events upset me	230	1	5	2.41	1.07
Not having information	230	1	5	3.24	1.16
Avoid surprises	230	1	5	3.89	0.90
Unforeseen events spoil things	230	1	5	2.46	1.22
Know the future	230	1	5	3.04	1.30
Taken by surprise	230	1	5	2.43	1.12
Organise in advance	230	1	5	3.19	1.25
Uncertainty keeps me from living	230	1	5	2.32	1.28
Uncertainty paralyses	230	1	5	1.81	1.08
Function under uncertainty	230	1	5	2.10	1.13
Doubt	230	1	5	1.82	1.00
Uncertain situations	230	1	5	2.02	1.22
Intolerance of uncertainty	**230**	**1.00**	**4.67**	**2.56**	**0.76**
Social norms	230	1	6	4.20	1.34
Expectations	230	1	6	3.77	1.41
Appropriate behaviour	230	1	6	3.69	1.39
Freedom (reverse coded)	230	1	6	2.79	1.35
Acting inappropriately	230	1	6	4.03	1.31
Comply with norms	230	1	6	3.31	1.34
Cultural tightness-looseness	**230**	**1.00**	**6.00**	**3.63**	**0.87**

Table 3 - Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Age												
(2) Gender	.154*											
(3) Nationality	.060	.034										
(4) Degree	-.028	-.064	.146*									
(5) Study	-.016	.182**	.003	-.148*								
(6) Ventures	.265***	-.146*	.033	-.034	.053							
(7) Experience	.697***	.000	.031	-.057	.024	.568***						
(8) Employees	.175**	-.108	.055	.129	.046	.352***	.276***					
(9) Industry	-.196**	.004	.139*	.131*	.216**	.007	-.110	.025				
(10) Causation	.097	-.064	.017	.123	.019	.030	.071	**.188****	.028			
(11) Effectuation	-.070	**.149***	.100	**-.130***	.042	-.111	-.048	**-.275*****	.005	-.280***		
(12) Tightness[a]	-.090	.014	.056	.003	.143*	-.029	-.044	.040	.034	.181**	-.020	
(13) Uncertainty	.059	.067	.022	**-.207****	**.201****	-.120	.004	-.085	-.054	.135*	.122	.203**

**Significance at the 0.05 level; **Significance at the 0.01 level; ***Significance at the 0.001 level*

[a]*Tightness refers to Cultural tightness-looseness*

6. Testing hypotheses

The proposed hypotheses were tested using hierarchical regression analysis after checking whether assumptions were met.

6.1. Assumptions

First, plotting residuals against predicted outcomes shows that the relationships between the independent and dependent variables are linear (Figure 1a-e – Appendix E) and that there is no suspicious heteroscedasticity in the data. Second, normal probability plots of standardized residuals suggest that error terms are normally distributed (Figure 2a-e – Appendix E).

Third, the Durbin-Watson test was conducted to test serial correlations between error terms, in other words, the assumption of independent errors. The test statistic can vary from 0 to 4, with a value of 2 indicating no correlation between residuals, a value greater than 2 suggesting negative correlations whereas a value below 2 indicating positive correlations (Field, 2018). The resulting test statistics show that the assumption is met (Table 1 – Appendix E).

Finally, VIF values are all below 10 (Table 2 – Appendix E). Combined with the fact that there is no substantial correlation between variables as previously discussed, the assumption of no multicollinearity in the data is met.

6.2. Causation as the dependent variable

Table 4 below presents the summarized results of the models regressing cultural tightness-looseness and uncertainty intolerance on causation while controlling for effects of control variables.

Model 1 refers to the baseline with only control variables as predictors, while models 2 and 3 refer to two separate models with cultural tightness-looseness and uncertainty intolerance being independent variables, respectively. When adding cultural tightness-looseness as the independent variable (Model 2), $\Delta R^2 = 0.032$ suggests that cultural tightness-looseness accounts for 3.2% of the variance in the use of causation and that this change is statistically significant ($F = 7.861$, $p < 0.01$) (Figure 1 – Appendix F). The adjusted R^2 also increases by 0.03 and the standard error of the estimate decreases by 0.014. Moreover, the F-test of whether the model is significantly better at predicting the dependent variable than using no predictors shows that Model 2 significantly improved the prediction of causation ($F = 2.199$, $p < 0.05$). Controlling for other variables, the regression coefficient b = 0.19, 95% C.I. (0.056,0.324) $p < 0.01$ associated with cultural tightness-looseness suggests that when the entrepreneur's score on the cultural tightness-looseness scale increases by 1 point, his or her respective score on the scale of causation will increase by 0.19 point. In summary, results show that cultural tightness-looseness is a significant predictor of causation. Therefore, ***H1a is confirmed***.

Table 4 - Regression results: Causation as the outcome

Variables	Model 1	Model 2	Model 3
Constant	4.28**	3.570**	3.703**
Control variables			
Age	0.009	0.011	0.008
Gender	-0.150	-0.152	-0.142
Nationality	-0.030	-0.059	-0.056
Degree	0.066	0.065	0.086
Study background	0.075	0.023	0.007
Ventures started	-0.054	-0.046	-0.030
Experience	-0.001	-0.002	-0.002
Number of employees	**0.113***	**0.106***	**0.118***
Industry	0.046	0.056	0.066
Independent variables			
Tightness		**0.190***	
Uncertainty			**0.206***
Fit statistics			
R^2	0.059	0.091	0.086
Adjusted R^2	0.020	0.050	0.044
Model F	1.522	2.199*	2.050*

N = 230. Unstandardized coefficients are reported. All reported significance levels are two-tailed.
**significance at the 0.05 level; **significance at the 0.01 level; ***significance at the 0.001 level*

In model 3 where intolerance of uncertainty is added as the predictor, $\Delta R^2 = 0.027$ suggests that intolerance of uncertainty accounts for 2.7% of the variance of causation as the outcome variable and that this change is statistically significant ($F = 6.459$, $p < 0.05$) (Figure 2 – Appendix F). Compared to a model with no predictor, intolerance of uncertainty as the independent variable has significantly improved the prediction of causation at the 5% level ($F = 2.050$, $p < 0.05$). Controlling for control variables, the regression coefficient $b = 0.206$, 95% C.I. (0.047,0.365) $p < 0.05$ associated with intolerance of uncertainty suggests that when the score of intolerance of uncertainty increases by 1 point, the respective score of causation will increase by 0.206 points. Therefore, ***H3a is confirmed***.

6.3. Effectuation as the dependent variable

Table 5 presents models with effectuation as the outcome variable.

Model 1 includes only control variables, while model 2 adds cultural tightness-looseness as the main independent variable. Results show that R^2 increases by only 0.01 equivalent to 1% of the variance in the

use of effectuation accounted for by cultural tightness-looseness. This change in R^2 is also not statistically significant (F = 0.219, p = 0.64) (Figure 3 – Appendix F), indicating that adding cultural tightness-looseness is not statistically better than using only control variables to predict the use of effectuation among South African entrepreneurs. Although model 2 as a whole significantly improved the ability to predict the outcome compared to simply using the mean outcome to predict the model (F = 3.120, p < 0.01), the associated t-statistic of cultural tightness's b-value is not statistically significant (t = -0.468, p = 0.64). Overall, the effect size is not substantial enough to conclude H1b, thus ***H1b is not confirmed***.

Table 5 - Regression results: Effectuation as the outcome

Variables	Model 1	Model 2	Model 3
Constant	5.411**	5.593**	5.026**
Control variables			
Age	-0.018	-0.019	-0.019
Gender	0.398	0.398	0.403
Nationality	0.509*	0.526*	0.492
Degree	-0.105	-0.105	-0.092
Study background	0.047	0.060	0.001
Ventures started	-0.073	-0.075	-0.057
Experience	0.026	0.026	0.025
Number of employees	**-0.260****	**-0.258****	**-0.257*****
Industry	-0.027	-0.030	-0.014
Independent variables			
Tightness		-0.049	
Uncertainty			0.137
Fit statistics			
R^2	0.124	0.125	0.129
Adjusted R^2	0.088	0.085	0.089
Model F	3.454**	3.120**	3.234**

N = 230. Unstandardized coefficients are reported. All reported significance levels are two-tailed.
**significance at the 0.05 level; **significance at the 0.01 level; ***significance at the 0.001 level*

Adding intolerance of uncertainty in model 3, compared to model 1, increases R^2 from 0.124 to 0.129, equivalent to 5% of the variance of the outcome variable that can be explained by uncertainty intolerance as the predictor. This small portion of change is not statistically significant (F = 1.224, p = 0.27) (Figure 4 – Appendix F). Although model 3 can significantly improve the ability to predict the use of effectuation compared to a model without predictors (F = 3.234, p < 0.01), intolerance of uncertainty is still not significantly better than only incorporating control variables in the model. Moreover, the associated t-statistic of cultural

tightness's b-value is not statistically significant (t = 1.106, p = 0.27), indicating that intolerance of uncertainty is not a significant predictor of effectuation. Thus, ***H3b cannot be confirmed***.

6.4. Intolerance of uncertainty as the dependent variable

Table 6 summarizes results of the regression model testing the causal relationship between cultural tightness-looseness and intolerance of uncertainty. As can be seen from the table, cultural tightness explains 3.3% of the variance in the entrepreneur's degree of uncertainty intolerance ($\Delta R^2 = 0.141 - 0.108 = 0.033$). The whole model, controlling for the effects of other variables, is significantly better in predicting the outcome of the dependent variable compared to no predictors (F = 3.607, p < 0.001). More specifically, an increase of 1 point on the scale of cultural tightness-looseness will lead to a respective increase of 0.162 points on the scale of uncertainty intolerance, all control variables held constant (t = 2.905, p < 0.01). Thus, ***H2 is confirmed***.

Table 6 - Regression results: Intolerance of uncertainty as the outcome

Variables	**Model 1**	**Model 2**
Constant	2.807***	2.202***
Control variables		
Age	0.005	0.007
Gender	-0.039	-0.041
Nationality	0.123	0.099
Degree	-0.096**	-0.097**
Study background	0.333**	0.288**
Ventures started	-0.119*	-0.112
Experience	0.004	0.003
Number of employees	-0.022	-0.028
Industry	-0.098	-0.090
Independent variables		
Tightness		**0.162****
Fit statistics		
R^2	0.108	0.141
Adjusted R^2	0.072	0.102
Model F	2.970**	3.607***

N = 230. Unstandardized coefficients are reported. All reported significance levels are two-tailed.
**significance at the 0.05 level; **significance at the 0.01 level; ***significance at the 0.001 level*

6.5. Intolerance of uncertainty as the moderator

PROCESS add-on written by Andrew Hayes (Hayes, 2018) was used to test the proposed moderating effect of uncertainty intolerance on the relationship between cultural tightness-looseness and the use of causation-effectuation among entrepreneurs in South Africa.

Table 7 - Regression results: Intolerance of uncertainty as the moderator

Variables	Model 1	Model 2
Constant	4.229***	5.379***
Control variables		
Age	0.010	-0.020
Gender	-0.140	0.403
Nationality	-0.089	0.503
Degree	0.083	-0.091
Study background	-0.023	0.015
Ventures started	-0.033	-0.057
Experience	-0.001	0.025
Number of employees	**0.112***	**-0.254*****
Industry	0.075	-0.016
Independent variables		
Tightness	0.158	-0.073
Uncertainty	**0.177***	0.152
Tightness*Uncertainty	-0.064	0.010
Fit statistics		
R^2	0.1109	0.1306
Model F	2.185*	3.1159**

N = 230. Unstandardized coefficients are reported. All reported significance levels are two-tailed.
**significance at the 0.05 level; **significance at the 0.01 level; ***significance at the 0.001 level*

Table 7 presents the main findings. In model 1 with causation as the outcome variable, controlling for covariates, the overall model fit is F = 2.185, p = .013, R^2 = 0.111, meaning that the model significantly explains 11.1% of the variance in the dependent variable at the 0.05 level. The contribution of each independent variable can be translated as follows: cultural tightness-looseness b = 0.158, t(217) = 1.885, p = .061, is not a significant predictor of causation; intolerance of uncertainty b = 0.177, t(217) = 2.001, p = .046, is a significant predictor of causation at the 0.05 level in that for every 1 unit increase in intolerance of uncertainty (one point), there will be a 0.177 unit increase in causation (point). The interaction term is found to be not statistically significant, b = -0.064, t(217) = -0.583, p = .561. Therefore, ***H4a is rejected***.

Similarly, in model 2 where effectuation is incorporated as the outcome variable, controlling for covariates, the overall model fit is $F = 3.116$, $p < .001$, $R^2 = 0.131$, suggesting that the model significantly explains 13.1% of the variance in the dependent variable at the 0.01 level. However, none of the three predictors, namely cultural tightness-looseness, intolerance of uncertainty and the interaction term representing the moderating effect, significantly contributes to the predictive accuracy of the outcome variable. Therefore, ***H4b is also rejected***.

7. Additional findings

The coefficients of the number of employees are found to be statistically significant in all models with causation-effectuation as outcome variables. In other words, the number of employees of a venture statistically determines the use of causal and effectual heuristics of an entrepreneur. More specifically, the coefficients of the number of employees as a control variable are positive when the model predicts the use of causation and negative when effectuation is the outcome variable. Put differently, it appears that the more employees the venture has, the more likely the entrepreneur is to apply causal logics, and consequently the less likely he or she is to apply effectual logics, in making his or her decisions.

Interestingly, neither number of ventures started nor years of experience have any statistically significant relationship with causation or effectuation, contrary to what extant literature has confirmed: that expert entrepreneurs prefer effectual logics more frequently than novice entrepreneurs (Johansson & McKelvie, 2012).

5 | DISCUSSION AND CONCLUSION

1. Key findings

Findings from analyses of this study help advance our current understanding of the link between culture and uncertainty, the hitherto two most widely discussed antecedents to effectuation, and causation-effectuation. Congruent with previous expectations, the author was able to confirm hypothesis H1a which states that, other things being equal, the tighter a culture is as perceived by the entrepreneur, the more likely he or she is to adopt the causal approach to make decisions in creating his or her new ventures. Similarly, a high degree of intolerant of uncertainty encourages an entrepreneur to apply causal processes in making decisions, confirming H3a. In other words, as an entrepreneur interprets uncertain situations as threats, he or she is likely to mobilise causation behaviour when it comes to creating a new venture.

However, the reverse did not hold true for effectuation (i.e., disproving H1b and H3b): the author could not find any statistically significant relationship between effectuation and either cultural tightness-looseness or uncertainty intolerance in this study. Indeed, causation correlates substantially with these two antecedents, while effectuation does not have any significant relationships with the latter. Clearly, this piece of finding could not lend support to one foundational idea of the effectuation theory that effectuation is more frequently preferred over causation under conditions of uncertainty (Sarasvathy, 2001). In terms of empirical research, this unexpected result also contrasts to the outcome of Alsos, Clausen, Hytti, and Solvoll (2016) who found that uncertainty, measured by four elements employed in the study of Chandler et al. (2011), is significantly and positively related to effectuation behaviour, measured by the scale of Alsos et al. (2014). The striking finding of this present study may be traced back to the fact that entrepreneurs of the current data sample score higher, on average, on causation than effectuation scale.

Interestingly, correlation and reliability analyses show that correlations among the five elements representing effectuation are significant and stronger than those representing causation and that effectuation is a better construct than causation, using the scale proposed by Alsos et al. (2014). Indeed, as the aforementioned researchers reason in their study, they attempted to produce a better scale for effectuation as compared to the instrument of Chandler et al. (2011). Hence the primary focus on effectuation and its elements might result in insufficient attention to causation, the contrasting concept of effectuation. By all means, this suggests an improvement on the current scale measuring causation, especially the element illustrating “pre-existing knowledge” which was supposed to be part of causation but eventually did not load high on either effectuation or causation in the factor analysis.

Apart from the main relationships between causation-effectuation and their antecedents, results also show how these two antecedents are related to each other. As previously expected, cultural tightness-looseness

is found to be significantly and positively related to the degree of uncertainty intolerance, consistent with H2. Practically speaking, as an entrepreneur perceives culture as tighter, he or she is more intolerant of uncertainty. In other words, the tighter a culture is as perceived by the entrepreneur, the more likely he or she is to interpret uncertain situations as threatening.

Counterintuitive to hypotheses H4a and H4b are that the expected moderating effect of uncertainty intolerance on the link between cultural tightness-looseness and effectuation-causation could not be found. Put differently, the effect was not statistically large enough to be deemed significant and thus the author could not confirm her initial expectation within the scope of this study.

Last but not least, the number of employees, one of the control variables included in the study, is found to statistically and significantly determine the use of causation and effectuation among entrepreneurs operating in South Africa. It appears that the bigger a firm is and consequently the more employees it has, the more likely the entrepreneur is to prefer causal over effectual logic. Additionally, the more striking result for control variables is that an entrepreneur's experience, measured by his or her years of doing business, does not have any statistical impact on his or her preference of causation-effectuation. This is counterintuitive to the initial theoretical notion of expertise, one of the fundamental pillars of the effectuation theory, which postulates that expert entrepreneurs tend to prefer effectual over causal approach in creating a new business (Dew, Read, et al., 2009).

In summary, this current study has contributed to the stream of research of effectuation theory in several ways: extending the nomological network of effectuation-causation by linking these concepts with other established constructs; validating one of the promising scales to measure effectuation-causation; and introducing, for the first time, two alternative notions representing uncertainty and culture in studying their effects on effectuation-causation.

More precisely, while the majority of literature in causation-effectuation is lacking grounded theoretical foundation as well as empirical data (Arend et al., 2015; Grégoire & Cherchem, 2019), this study contributes to the field by providing quantitative explanations to partially confirm the effects of potential antecedents to causation-effectuation. Additionally, the study is among the first to broaden the nomological network of causation-effectuation on two levels, namely the individual level, measured by the degree of uncertainty intolerance of each entrepreneur, and the environmental level, which is reflected in the degree of tightness-looseness of the culture wherein the entrepreneur operates.

On the empirical level, as the effectuation theory is moving to its mature stage, there is a need to have a theoretically and empirically sound scale to measure causation-effectuation and thus to facilitate more empirical contribution to the field (Eyana, Masurel, & Paas, 2018, p. 805). Yet effectuation scholars have not reached an agreement on any scale, leaving this matter opened to debate. Several existing survey instruments (for example, the scales of Alsos et al. (2014); Chandler et al. (2011)) have not been universally

endorsed yet. Thus, the present study, in attempting to apply the 10-item scale developed by Alsos et al. (2014), employed exploratory factor analysis to validate this scale with the data sample of entrepreneurs operating in South Africa. In addition, by applying the scale of intolerance of uncertainty (Carleton et al., 2007) used in the psychological field, the author of this current study was able to formally operationalise uncertainty and inject it into the equation to examine its impact on the use of causation-effectuation. In terms of the external impacts from the environment, the concept of cultural tightness-looseness was explored and introduced for the first time as an alternative representation of culture, apart from other widely known measures, to study the effect of culture on the use of causation-effectuation.

2. Limitations and future research

The author acknowledges that there exist a number of limitations within the scope of this study leaving room for improvement from more in-depth research to validate the findings. First, the dataset contains both South African and non-South African entrepreneurs who are all operating their own businesses. Although taking into account a small number of immigrant entrepreneurs should not impose any bias on the results as previously argued, the author admits that a more ideal context could have been adopted wherein solely local South African entrepreneurs were included. This motivates future research to strive for a different sample to achieve a better generalisability. Secondly, culture has been argued to be changeable and not permanent (Laskovaia et al., 2017) and therefore, longitudinal studies taking into account the probability of changes occurring in a culture over time are highly encouraged in the future.

Thirdly, although significant regression results were detected for causation behaviour, the causation variable as a summated scale accommodates in itself one relatively weak component, namely *Pre-existing knowledge*, which did not load high on factor representing causation nor correlate sufficiently enough with the other four components. This faint combination might cause unobserved chaos in subsequent results, i.e., the significant relationships between cultural tightness-looseness, uncertainty and causation, making them less reliable and generalisable. Overcoming this matter requires further and deeper investigation in conceptualising and operationalising causation-effectuation "towards a better" and universally accepted measurement scale (Alsos et al., 2014, p. 1). Consequently, more research with different datasets in different contexts is called for to empirically validate such desired measurements.

Another recommendation for future work comes from the fact that empirically supportive result for how the use of effectuation varies at the individual level remains unsettled (Grégoire & Cherchem, 2019, p. 6). For instance, the results of this present study could not provide any meaningful relationship between an entrepreneur's expertise and his or her preference towards effectuation as theoretically expected. According to Grégoire and Cherchem (2019), this inconclusiveness may be due to the fact that scholars conceptualise effectuation in different ways as well as collect data to measure it using different methods. Therefore, the author of the current study strongly recommends a uniform approach in studying effectuation, re-insisting the urgency of establishing a better measurement scale for this concept.

Last but not least, the author acknowledges that there may exist another version of the conceptual framework wherein national culture plays the role of a moderator of the relationship between intolerance of uncertainty and the use of causation-effectuation. For instance, in their paper, Mitchell et al. (2000) argue that cultures differentiate in norms and values about new venture creation and thus may moderate the cognition-venture creation decision relationship. In other words, when fitting this reasoning into the context of this present study, cultural tightness-looseness may act as a moderator affecting the relationship between intolerance of uncertainty, representing the cognitive perspective of entrepreneurial activities, and causation-effectuation, representing the heuristics used by entrepreneurs to create a new venture. Future work is, therefore, encouraged to explore this option at the theoretical as well as the empirical level to further explain various possibilities of interactions among these three variables.

3. Practical implications

The obtained results imply practical implications for entrepreneurs and policymakers. For entrepreneurs, there is evidence that cultural context has an impact on determining which approach an entrepreneur tends to prefer in making decisions to create a new venture. Moreover, at the individual level, how the entrepreneur faces, treats and deals with uncertain situations in real life is also related to the heuristic he or she is likely to use in subsequent decision-making processes. This reaction to uncertainty is, in turn, determined by the culture wherein the entrepreneur operates. Recognising the interplay between these two predictors and causation-effectuation implies that an entrepreneur could improve his or her self-reflection to better understand his or her own decision-making style and to be aware of the potential influences from contextual factors. Consequently, the entrepreneur could better adapt himself or herself throughout his or her journey of creating a new venture. Although examining whether a causal entrepreneur outperforms an effectual one in terms of future performance is beyond the sphere of this present study, it is a justifiable inference that entrepreneurs could always investigate whether their decision-making style at a certain moment is a good fit for their venture while embracing cultural impacts and thus seek for a better approach by changing accordingly. In that sense, the author of this current study subscribes to the view that, despite being two contrasting logics, causation and effectuation are not extremely dichotomous but they are indeed two ends on a continuum scale that can be interchangeable and jointly applied.

From the perspective of policymakers, being cognizant of the salient influences that cultural contexts could exert on entrepreneurs allows for the establishment of policies of higher quality that could significantly and meaningfully improve entrepreneurship of a country. These policies could be initiated and implemented at different levels and areas, i.e., national, industrial, organisational, and probably even individual level. For instance, having in mind that a tight culture could accelerate the probability of entrepreneurs being highly intolerant and afraid of uncertainty, policymakers are encouraged to come up with programs that help lessen such behaviours among entrepreneurs, allowing them to be ready in effectively dealing with uncertainty which is an inherent and unavoidable characteristic of entrepreneurship. Such policies may include, but not limited

to, creating a supportive environment for entrepreneurs, promulgating special laws and measures to protect start-ups, enabling easy-to-access financial funding for entrepreneurs, organising entrepreneurial courses, facilitating information flow from government to entrepreneurs in a sense that helps reduce the lack of information which causes uncertainty, and so on. The degree and format of such policies depend on the nature and status of each industry, requiring national policymakers to have a clear vision of the general picture. Last but not least, as important as promoting a supportive entrepreneurial environment is to educate prospective entrepreneurs in an efficacious way. Although stating whether causation or effectuation surpasses the other is an immature claim, it is crucial to alert entrepreneurs to the co-existence of causation and effectuation as two contrasting heuristics, thus allowing them to proactively choose their suitable decision-making style instead of framing them into the conventional method of doing business.

4. Conclusion

The present study was conducted to answer the following research question: *To what extent do (1) cultural tightness-looseness and (2) intolerance of uncertainty determine the application of effectuation and causation of the entrepreneur in the new venture creation decision?* Findings of the study, analysed using a data sample of 230 entrepreneurs operating in South Africa, confirm the potential impacts of cultural tightness-looseness and uncertainty on causation, but not effectuation. Furthermore, cultural tightness also exerts its influence on the uncertainty intolerance of entrepreneurs by intensifying the degree by which entrepreneurs treat uncertain conditions as threatening.

In answering the focal question, the study attempts to contribute to the field of effectuation theory by extending the nomological network of causation-effectuation, examining the so-called effects of two antecedents, namely cultural tightness-looseness and intolerance of uncertainty, and helping advance our understanding of their inter-relationships. Several limitations of the study are identified, requiring future work to replicate it with different datasets in order to validate the results. Entrepreneurs and policymakers could benefit from the study's key findings and practical implications to improve decision-making processes, promote entrepreneurship and strengthen entrepreneurial activities.

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Appendix A – Preliminary analyses

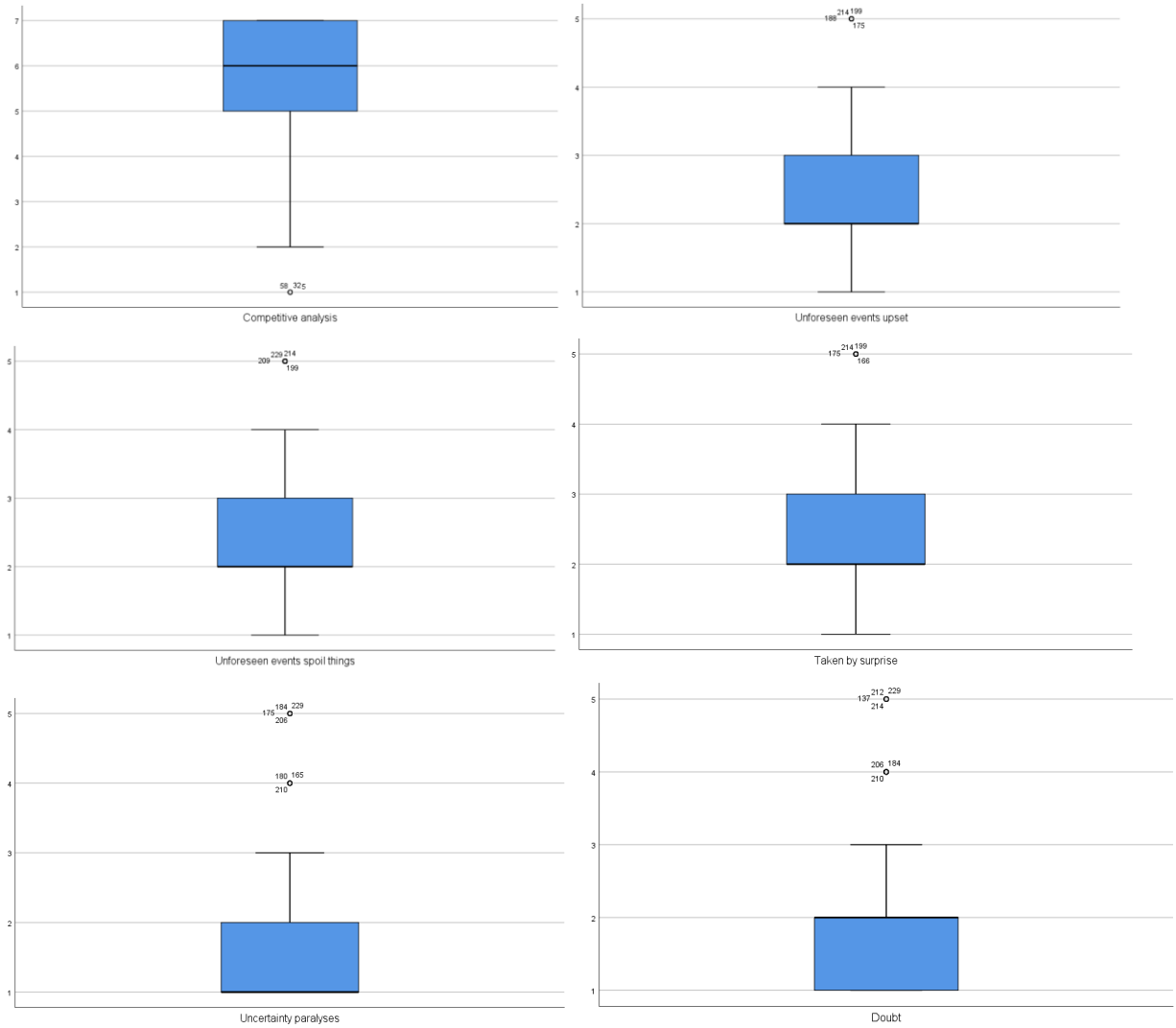

Figure 1-Boxplots detecting potential outliers

Variables	Mean	5% Trimmed mean
Competitive analysis	5.58	5.71
Unforeseen events upset me	2.41	2.36
Unforeseen events spoil things	2.46	2.40
Taken by surprise	2.43	2.37
Uncertainty paralyses	1.81	1.69
Doubt	1.82	1.72

Figure 2-Comparing mean vs trimmed mean to assess outliers

MAH_3	prob3
17.70087	.00141
15.82724	.00326
14.50413	.00585
14.35311	.00625
12.24276	.01563
11.92173	.01794
11.24348	.02396
10.48077	.03306
10.38491	.03442
10.24722	.03646
10.10343	.03872
9.62890	.04717
9.35487	.05282
9.17419	.05689
9.13321	.05785
9.01317	.06077
8.85699	.06478
8.78984	.06657
8.70818	.06882
8.61222	.07156

Figure 3-Mahalanobis distance and p-values of the first 20 cases in ascending order

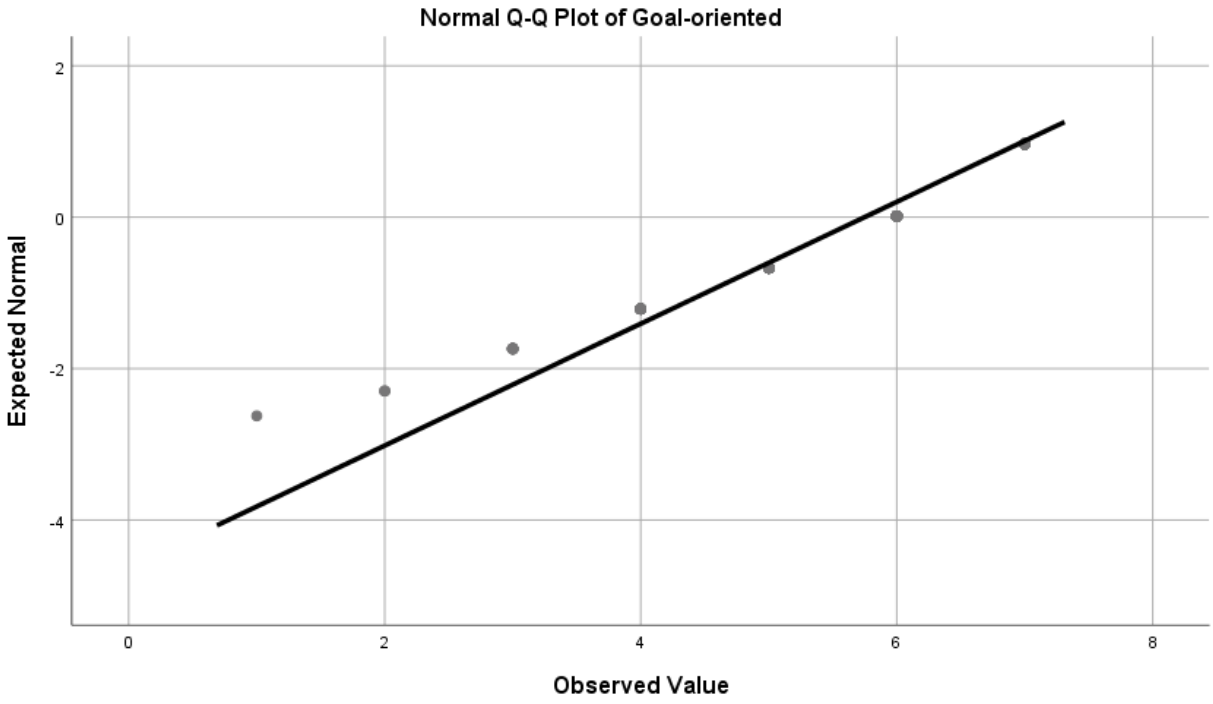

Figure 4- Normal Q-Q plot of Goal-oriented

Appendix B – Factor analysis and reliability analysis: Effectuation – Causation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.753
Bartlett's Test of Sphericity	Approx. Chi-Square	532.676
	df	45
	Sig.	.000

Figure 1 - KMO and Bartlett's Test: Effectuation-Causation

Anti-image Correlation	Goal-oriented	.826[a]	-.205	-.048	-.065	-.131	.090	-.073	.069	.107	.030
	Expected returns	-.205	.682[a]	-.030	-.223	-.080	-.100	.167	-.002	-.108	.102
	Pre-existing knowledge	-.048	-.030	.572[a]	-.003	-.067	-.185	-.066	.188	.065	.097
	Competitive analysis	-.065	-.223	-.003	.640[a]	-.393	-.028	.043	-.119	.077	.014
	Uncertain future	-.131	-.080	-.067	-.393	.721[a]	.068	-.002	.052	-.024	.026
	Means-oriented	.090	-.100	-.185	-.028	.068	.713[a]	-.187	-.319	.109	-.466
	Affordable loss	-.073	.167	-.066	.043	-.002	-.187	.852[a]	-.155	-.126	-.090
	Contingencies	.069	-.002	.188	-.119	.052	-.319	-.155	.797[a]	-.276	-.052
	Commitments	.107	-.108	.065	.077	-.024	.109	-.126	-.276	.772[a]	-.319
	Unpredictable future	.030	.102	.097	.014	.026	-.466	-.090	-.052	-.319	.773[a]

a. Measures of Sampling Adequacy(MSA)

Figure 2 - Anti-image matrices: Effectuation-Causation

Correlation Matrix[a]

		Goal-oriented	Expected returns	Pre-existing knowledge	Competitive analysis	Uncertain future	Means-oriented	Affordable loss	Contingencies	Commitments	Unpredictable future
Correlation	Goal-oriented	1.000	.279	.121	.218	.274	-.229	-.129	-.235	-.234	-.254
	Expected returns	.279	1.000	.078	.335	.261	-.060	-.198	-.072	-.049	-.161
	Pre-existing knowledge	.121	.078	1.000	.063	.116	.021	-.016	-.202	-.174	-.132
	Competitive analysis	.218	.335	.063	1.000	.457	-.045	-.114	-.002	-.105	-.116
	Uncertain future	.274	.261	.116	.457	1.000	-.175	-.139	-.154	-.130	-.197
	Means-oriented	-.229	-.060	.021	-.045	-.175	1.000	.428	.532	.327	.624
	Affordable loss	-.129	-.198	-.016	-.114	-.139	.428	1.000	.395	.331	.407
	Contingencies	-.235	-.072	-.202	-.002	-.154	.532	.395	1.000	.477	.485
	Commitments	-.234	-.049	-.174	-.105	-.130	.327	.331	.477	1.000	.501
	Unpredictable future	-.254	-.161	-.132	-.116	-.197	.624	.407	.485	.501	1.000
Sig. (1-tailed)	Goal-oriented		.000	.034	.000	.000	.000	.026	.000	.000	.000
	Expected returns	.000		.118	.000	.000	.183	.001	.138	.232	.007
	Pre-existing knowledge	.034	.118		.172	.039	.373	.407	.001	.004	.022
	Competitive analysis	.000	.000	.172		.000	.248	.043	.489	.056	.039
	Uncertain future	.000	.000	.039	.000		.004	.018	.010	.024	.001
	Means-oriented	.000	.183	.373	.248	.004		.000	.000	.000	.000
	Affordable loss	.026	.001	.407	.043	.018	.000		.000	.000	.000
	Contingencies	.000	.138	.001	.489	.010	.000	.000		.000	.000
	Commitments	.000	.232	.004	.056	.024	.000	.000	.000		.000
	Unpredictable future	.000	.007	.022	.039	.001	.000	.000	.000	.000	

a. Determinant = .094

Figure 3 - Correlation matrix: Effectuation-Causation

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rot Sum Sq Loa
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	T
1	3.190	31.898	31.898	2.704	27.036	27.036	
2	1.647	16.468	48.366	1.079	10.786	37.823	
3	1.064	10.641	59.007	.422	4.216	42.038	
4	.807	8.065	67.072				
5	.792	7.924	74.996				
6	.661	6.611	81.608				
7	.572	5.716	87.324				
8	.510	5.103	92.427				
9	.466	4.658	97.084				
10	.292	2.916	100.000				

Extraction Method: Principal Axis Factoring.

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

Figure 4-First extraction using Kaiser's criterion: Effectuation-Causation

Communalities

	Initial	Extractio
Goal-oriented	.190	.22
Expected returns	.201	.24
Pre-existing knowledge	.100	.16
Competitive analysis	.277	.49
Uncertain future	.268	.38
Means-oriented	.509	.81
Affordable loss	.281	.29
Contingencies	.436	.54
Commitments	.356	.45
Unpredictable future	.515	.57

Extraction Method: Principal Axis Factoring.

Figure 5 - Communalities: Effectuation-Causation

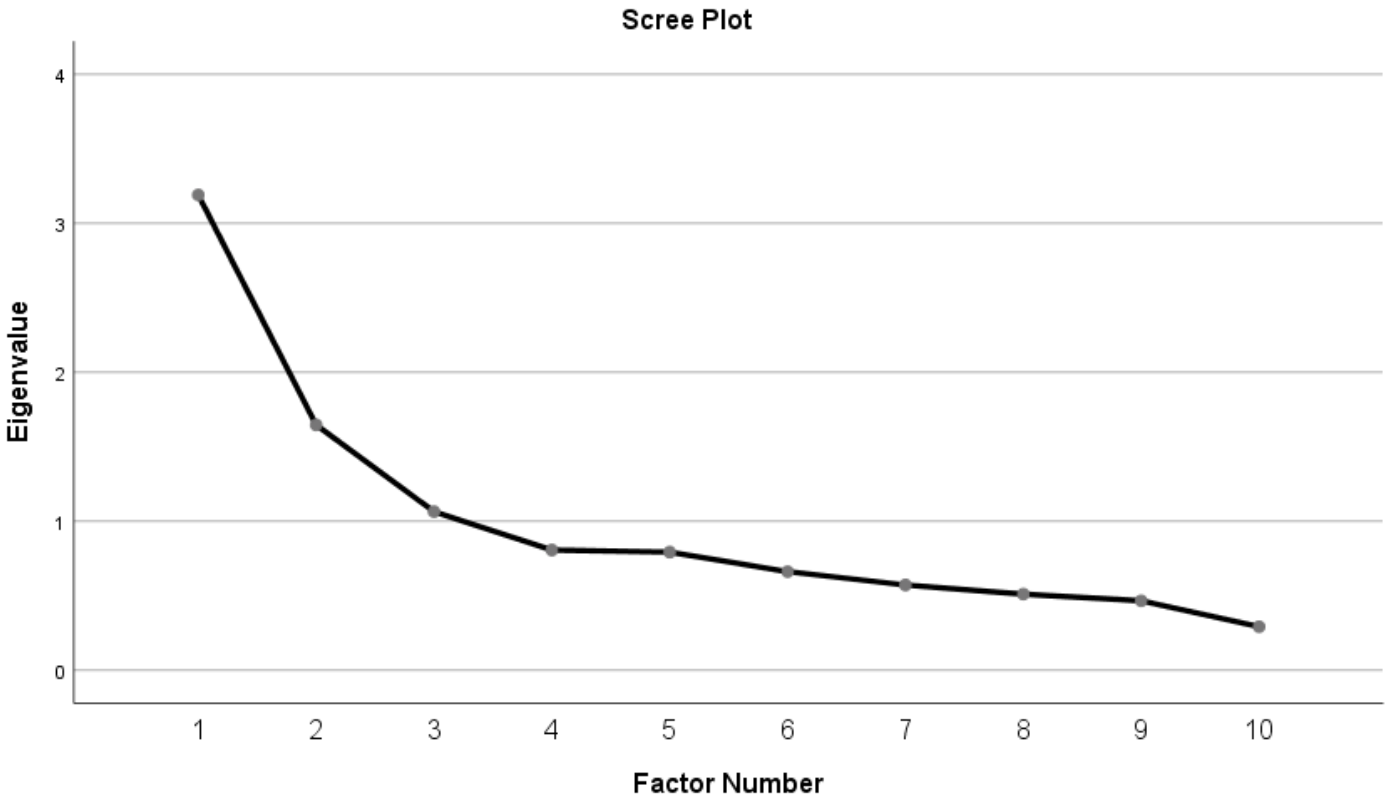

Figure 6 - Scree plot: Effectuation-Causation

Pattern Matrix[a]

	Factor 1	2	3
Goal-oriented	-.173	.337	.126
Expected returns	-.007	.493	.005
Pre-existing knowledge	.026	.055	.393
Competitive analysis	.102	.734	-.037
Uncertain future	-.053	.601	.007
Means-oriented	.944	-.003	.322
Affordable loss	.511	-.092	.007
Contingencies	.632	.089	-.279
Commitments	.452	.026	-.397
Unpredictable future	.705	-.067	-.091

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.[a]

a. Rotation converged in 7 iterations.

Figure 7 - First extraction pattern matrix

Pattern Matrix[a]

	Factor 1	2
Unpredictable future	.768	
Contingencies	.751	
Means-oriented	.747	
Commitments	.593	
Affordable loss	.523	
Pre-existing knowledge		
Competitive analysis		.740
Uncertain future		.608
Expected returns		.496
Goal-oriented		.350

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.[a]

a. Rotation converged in 4 iterations.

Figure 8 - New pattern matrix

		Goal-oriented	Expected returns	Pre-existing knowledge	Competitive analysis	Uncertain future	Means-oriented	Affordable loss	Contingencies	Commitments	Unpredictable future
Residual[b]	Goal-oriented		.070	.033	-.048	.005	-.008	.070	-.019	-.030	.016
	Expected returns	.070		.002	-.006	-.046	.032	-.082	.014	.058	-.015
	Pre-existing knowledge	.033	.002		-.029	.017	.128	.075	-.096	-.078	-.006
	Competitive analysis	-.048	-.006	-.029		.034	-.007	-.015	.028	-.027	-.005
	Uncertain future	.005	-.046	.017	.034		-.033	.025	-.019	.025	.013
	Means-oriented	-.008	.032	.128	-.007	-.033		.040	.007	-.104	.064
	Affordable loss	.070	-.082	.075	-.015	.025	.040		.008	.007	-.017
	Contingencies	-.019	.014	-.096	.028	-.019	.007	.008		.047	-.075
	Commitments	-.030	.058	-.078	-.027	.025	-.104	.007	.047		.036
	Unpredictable future	.016	-.015	-.006	-.005	.013	.064	-.017	-.075	.036	

Extraction Method: Principal Axis Factoring.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 11 (24.0%) nonredundant residuals with absolute values greater than 0.05.

Figure 9 - Residuals: Effectuation-Causation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.805	.804	5

Figure 10a - Cronbach's Alpha: Effectuation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.567	.585	5

Figure 10b-Cronbach's Alpha: Causation

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Goal-oriented	19.63	15.125	.346	.130	.505
Expected returns	20.20	12.984	.361	.164	.490
Pre-existing knowledge	21.58	15.362	.135	.023	.632
Competitive analysis	19.80	13.872	.421	.261	.461
Uncertain future	20.30	13.624	.431	.251	.453

Figure 10c-Item-Total statistics: Causation

Appendix C – Factor analysis and reliability analysis: Intolerance of uncertainty

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.888
Bartlett's Test of Sphericity	Approx. Chi-Square	1176.309
	df	66
	Sig.	.000

Figure 1 - KMO and Bartlett's Test: Uncertainty

Anti-image Matrices

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Anti-image Correlation	Unforeseen events upset	.884[a]	-.294	.015	-.265	-.020	-.211	.060	-.060	-.006	.033	-.136	-.027
	Not having information	-.294	.868[a]	-.085	.046	-.141	-.083	-.145	-.038	.085	-.108	-.048	.105
	Avoid surprises	.015	-.085	.837[a]	-.039	-.288	.048	-.055	-.188	.088	.008	.041	.002
	Unforeseen events spoil things	-.265	.046	-.039	.924[a]	-.114	-.158	-.121	-.008	.040	-.080	-.060	-.102
	Know the future	-.020	-.141	-.288	-.114	.888[a]	-.071	-.327	-.001	-.091	-.021	-.006	-.081
	Taken by surprise	-.211	-.083	.048	-.158	-.071	.924[a]	-.083	-.162	-.148	.083	.034	-.121
	Organize in advance	.060	-.145	-.055	-.121	-.327	-.083	.866[a]	-.130	.067	.002	.102	-.064
	Uncertainty keeps me from living	-.060	-.038	-.188	-.008	-.001	-.162	-.130	.920[a]	-.142	-.174	.029	-.271
	Uncertainty paralyses	-.006	.085	.088	.040	-.091	-.148	.067	-.142	.835[a]	-.472	-.370	.000
	Function under uncertainty	.033	-.108	.008	-.080	-.021	.083	.002	-.174	-.472	.877[a]	-.089	-.124
	Doubt	-.136	-.048	.041	-.060	-.006	.034	.102	.029	-.370	-.089	.881[a]	-.266
	Uncertain situations	-.027	.105	.002	-.102	-.081	-.121	-.064	-.271	.000	-.124	-.266	.916[a]

a. Measures of Sampling Adequacy(MSA)

Figure 2 - Anti-image matrices: Uncertainty

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.289	44.074	44.074	4.808	40.064	40.064	4.076
2	1.560	13.000	57.074	1.071	8.924	48.988	3.596
3	.923	7.690	64.764				
4	.731	6.095	70.859				
5	.656	5.466	76.325				
6	.561	4.672	80.997				
7	.474	3.952	84.948				
8	.467	3.888	88.837				
9	.399	3.323	92.160				
10	.382	3.187	95.347				
11	.322	2.682	98.028				
12	.237	1.972	100.000				

Extraction Method: Principal Axis Factoring.

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

Figure 3 - Kaiser's criterion: Uncertainty

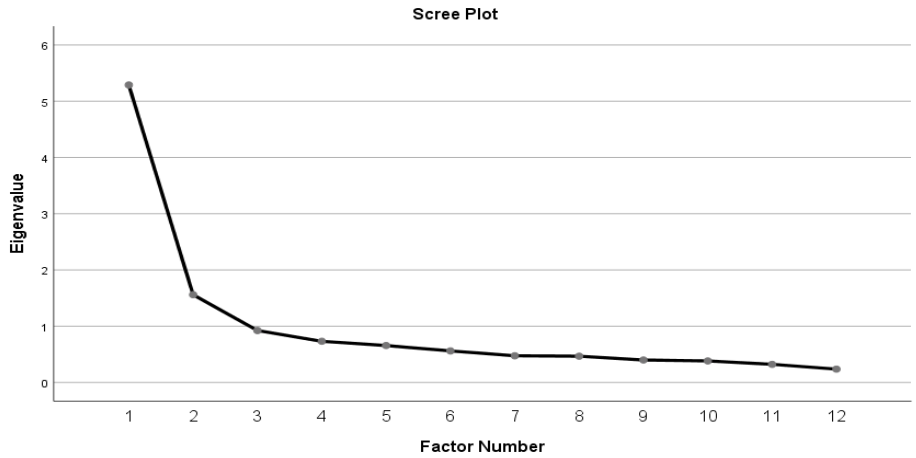

Figure 4 - Scree Plot: Uncertainty

Figure 5 - Factor plot: Uncertainty

Pattern Matrix[a]

	Factor 1	Factor 2
Uncertainty paralyses	.905	
Doubt	.799	
Function under uncertainty	.766	
Uncertain situations	.599	
Uncertainty keeps me from living	.490	.374
Know the future		.710
Organize in advance		.704
Avoid surprises		.561
Not having information		.530
Unforeseen events spoil things		.455
Taken by surprise	.352	.427
Unforeseen events upset	.322	.402

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.[a]

a. Rotation converged in 10 iterations.

Figure 6 - Pattern matrix: Uncertainty

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.867	.870	5

Figure 7a - Cronbach's Alpha: Inhibitory anxiety

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.811	.809	7

Figure 7b - Cronbach's Alpha: Prospective anxiety

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.882	.881	12

Figure 7c - Cronbach's Alpha: Uncertainty intolerance

Appendix D – Factor analysis and reliability analysis: Cultural tightness-looseness

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.757
Bartlett's Test of Sphericity	Approx. Chi-Square	323.772
	df	15
	Sig.	.000

Figure 1 - KMO and Bartlett's Test: Cultural tightness-looseness

Anti-image Matrices

		Social norms	Expectations	Appropriate behaviour	Cul4Reversed	Acting inappropriately	Comply with norms
Anti-image Covariance	Social norms	.702	-.221	-.027	.031	-.086	-.002
	Expectations	-.221	.472	-.236	-.062	.008	-.119
	Appropriate behaviour	-.027	-.236	.542	.063	-.093	-.118
	Cul4Reversed	.031	-.062	.063	.978	-.094	.003
	Acting inappropriately	-.086	.008	-.093	-.094	.779	-.202
	Comply with norms	-.002	-.119	-.118	.003	-.202	.673
Anti-image Correlation	Social norms	.782[a]	-.383	-.044	.037	-.116	-.002
	Expectations	-.383	.706[a]	-.467	-.091	.013	-.211
	Appropriate behaviour	-.044	-.467	.758[a]	.087	-.143	-.195
	Cul4Reversed	.037	-.091	.087	.378[a]	-.107	.004
	Acting inappropriately	-.116	.013	-.143	-.107	.791[a]	-.279
	Comply with norms	-.002	-.211	-.195	.004	-.279	.813[a]

a. Measures of Sampling Adequacy(MSA)

Figure 2 - Anti-image matrices: Cultural tightness-looseness

Correlation Matrix[a]

		Social norms	Expectations	Appropriate behaviour	Cul4Reversed	Acting inappropriately	Comply with norms
Correlation	Social norms	1.000	.532	.388	.011	.268	.290
	Expectations	.532	1.000	.636	.067	.305	.470
	Appropriate behaviour	.388	.636	1.000	-.011	.347	.468
	Cul4Reversed	.011	.067	-.011	1.000	.106	.038
	Acting inappropriately	.268	.305	.347	.106	1.000	.411
	Comply with norms	.290	.470	.468	.038	.411	1.000
Sig. (1-tailed)	Social norms		.000	.000	.433	.000	.000
	Expectations	.000		.000	.155	.000	.000
	Appropriate behaviour	.000	.000		.432	.000	.000
	Cul4Reversed	.433	.155	.432		.055	.281
	Acting inappropriately	.000	.000	.000	.055		.000
	Comply with norms	.000	.000	.000	.281	.000	

a. Determinant = .239

Figure 3 - Correlation matrix: Cultural tightness-looseness

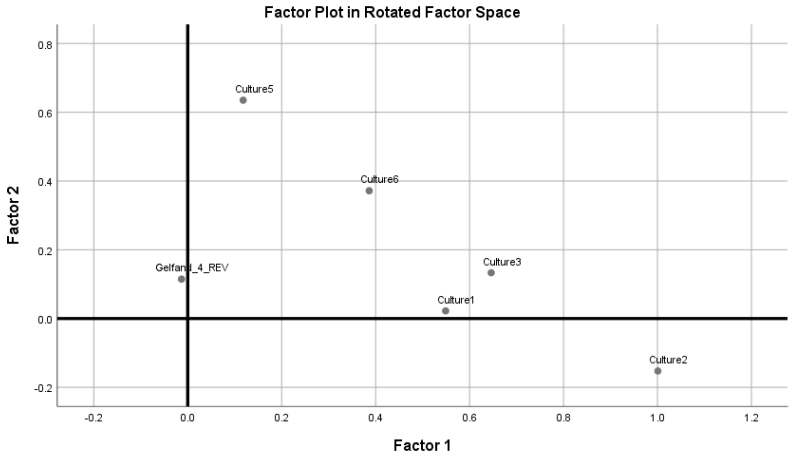

Figure 4 - Factor plot 1st extraction: Cultural tightness-looseness

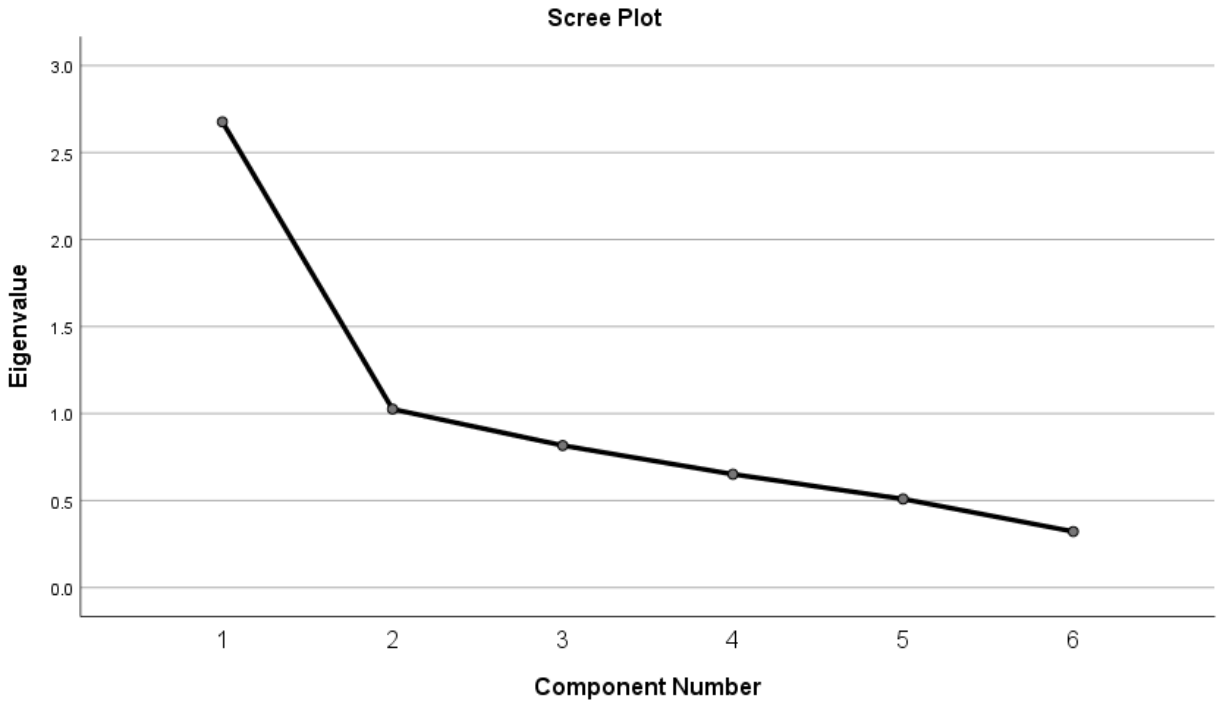

Figure 5 - Scree plot 2nd extraction: Cultural tightness-looseness

Rotated Component Matrix[a]

	Component	
	1	2
Expectations	.835	
Appropriate behaviour	.808	
Comply with norms	.714	
Social norms	.682	
Acting inappropriately	.574	.328
Cul4Reversed		.957

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Figure 6 - Rotated Component Matrix: Cultural tightness-looseness

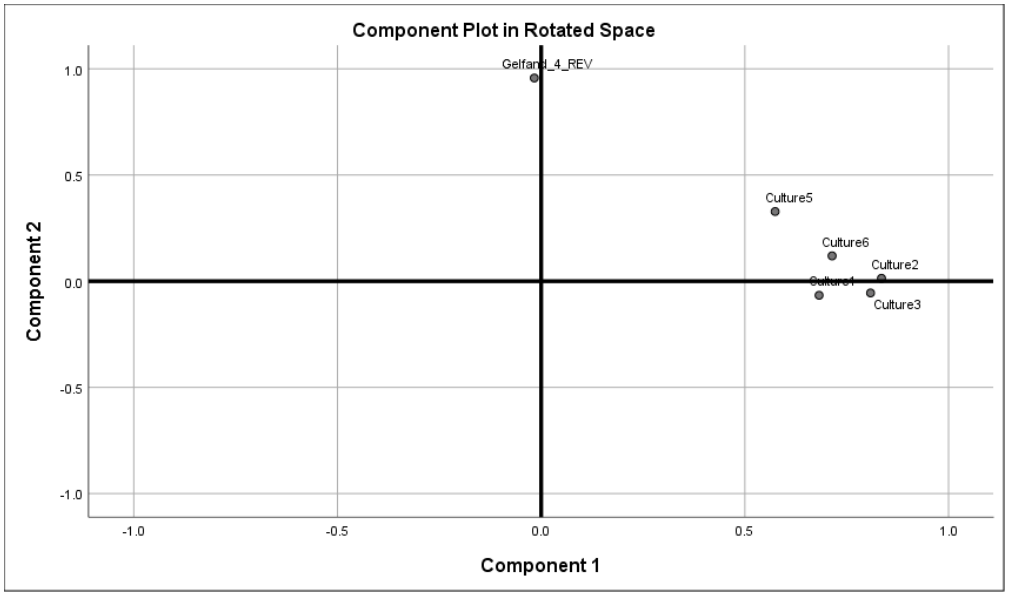

Figure 7 - Component plot 2nd extraction: Cultural tightness-looseness

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.711	.709	6

Figure 8 - Cronbach's Alpha: Cultural tightness-looseness

Appendix E – Regression assumptions

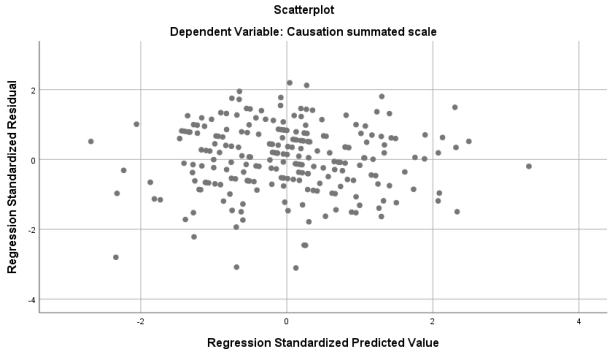

Figure 1a - Scatterplot Culture-Causation

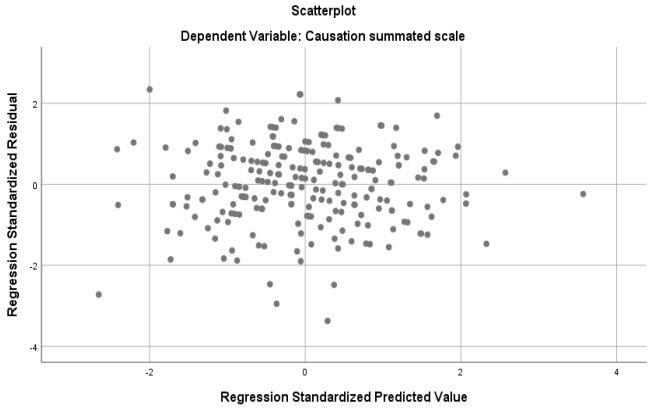

Figure 1b - Scatterplot Uncertainty-Causation

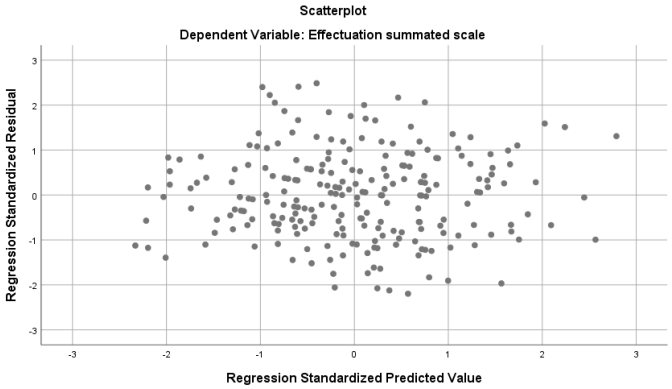

Figure 1c - Scatterplot Culture-Effectuation

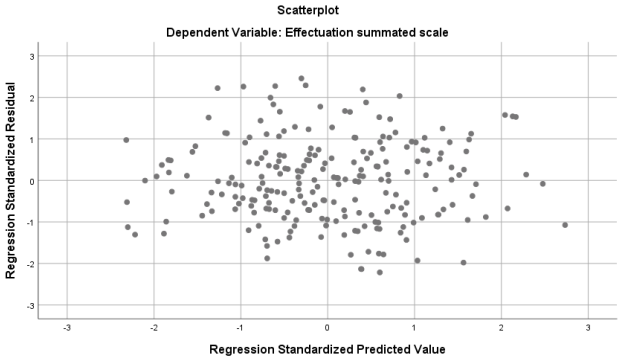

Figure 1d - Scatterplot Uncertainty-Effectuation

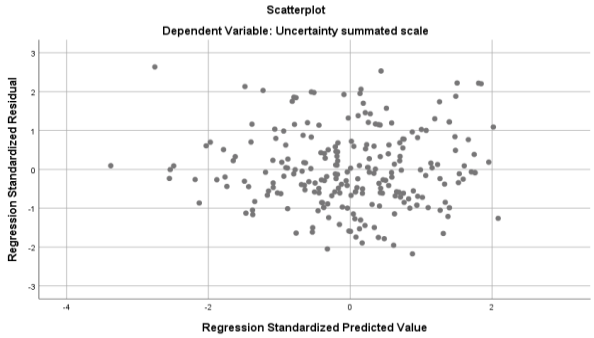

Figure 1e - Scatterplot Culture-Uncertainty

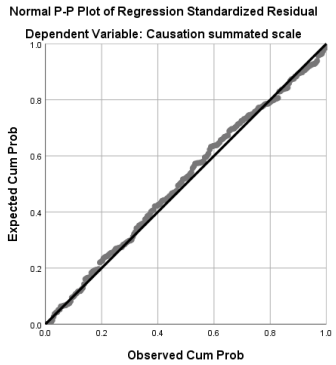

Figure 2a - Normal P-P Plot: Culture-Causation

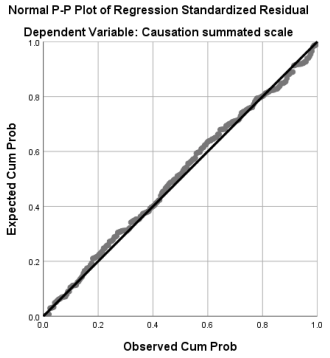

Figure 2b - Normal P-P Plot: Uncertainty-Causation

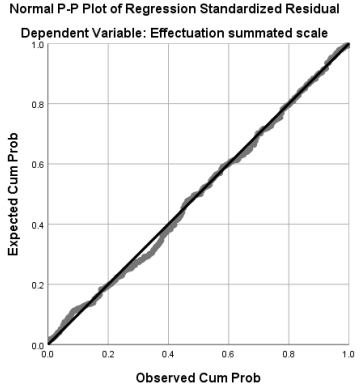

Figure 2c - Normal P-P Plot: Culture-Effectuation

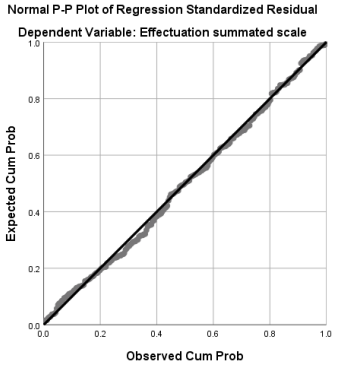

Figure 2d - Normal P-P Plot: Uncertainty-Effectuation

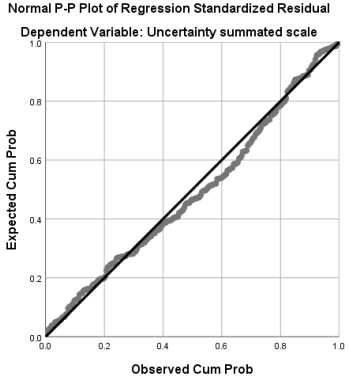

Figure 2e - Normal P-P Plot: Culture-Uncertainty

Table 1 - Durbin-Watson statistics

Model	Durbin-Watson statistic
Culture-Causation*	1.971
Uncertainty-Causation*	1.920
Culture-Effectuation*	2.045
Uncertainty-Effectuation*	2.017
Culture-Uncertainty*	1.945

**Controlling for control variables*

Table 2 - Multicollinearity

	Causation		Effectuation	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Age	.456	2.195	.456	2.195
Gender	.889	1.125	.889	1.125
Nationality	.954	1.048	.954	1.048
Degree	.909	1.100	.909	1.100
Study background	.883	1.133	.883	1.133
Ventures started	.593	1.688	.593	1.688
Experience	.353	2.834	.353	2.834
Number of employees	.837	1.195	.837	1.195
Industry	.872	1.147	.872	1.147
Culture	.963	1.038	.963	1.038
Uncertainty	.892	1.122	.892	1.122

Appendix F – Regression results

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.242[a]	.059	.020	.88559	.059	1.522	9	220	.141	
2	.302[b]	.091	.050	.87209	.033	7.861	1	219	.006	1.971

a. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age

b. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age, Culture summated scale

c. Dependent Variable: Causation summated scale

Figure 1 - Regression results: Culture-Causation

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.242[a]	.059	.020	.88559	.059	1.522	9	220	.141	
2	.293[b]	.086	.044	.87480	.027	6.459	1	219	.012	1.920

a. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age

b. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age, Uncertainty summated scale

c. Dependent Variable: Causation summated scale

Figure 2 - Regression results: Uncertainty-Causation

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.352[a]	.124	.088	1.33896	.124	3.454	9	220	.001	
2	.353[b]	.125	.085	1.34134	.001	.219	1	219	.640	2.045

a. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age

b. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age, Culture summated scale

c. Dependent Variable: Effectuation summated scale

Figure 3 - Regression results: Culture-Effectuation

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.352[a]	.124	.088	1.33896	.124	3.454	9	220	.001	
2	.359[b]	.129	.089	1.33828	.005	1.224	1	219	.270	2.017

a. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age

b. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age, Uncertainty summated scale

c. Dependent Variable: Effectuation summated scale

Figure 4 - Regression results: Uncertainty-Effectuation

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.329[a]	.108	.072	.72935	.108	2.970	9	220	.002	
2	.376[b]	.141	.102	.71732	.033	8.438	1	219	.004	1.945

a. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age

b. Predictors: (Constant), CV_Industry, CV_Gender, CV_Experience_years, CV_Nationality, CV_Degree, CV_number_of_Employees, CV_Study, CV_Ventures_started, CV_Age, Culture summated scale

c. Dependent Variable: Uncertainty summated scale

Figure 5 - Regression results: Culture-Uncertainty