

The effects of personality and uncertainty on the decision making process and new venture outcomes of South African entrepreneurs



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"Personality is the supreme realization of the innate idiosyncrasy of a living being. It is an act of courage flung in the face of life, the absolute affirmation of all that constitutes the individual, the most successful adaptation to the universal conditions of existence, coupled with the greatest possible freedom of self-determination." [C.G. Jung, 1875-1961]

Abstract

Recent research has concluded that personality factors influence entrepreneurial success. This study used a causal steps approach, to test a model that included effectuation and causation decision processes as mediators and environmental uncertainty as a moderator, in the relationship between personality and venture success.

Conscientiousness and openness, two relevant big five personality dimensions, were shown to be positively related to the use of causation and effectuation decision logic depending on the level of uncertainty in the environment. The level of causation was further linked to venture revenue growth being more successful in low uncertainty environments supporting its nomination as a mediator for personality. Consequences for entrepreneurship research are discussed and recommendations made for further research in this area.

Keywords

Entrepreneurship, Personality, Causation, Effectuation, Uncertainty, Venture Growth

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorization and consent to carry out this research.

Michael Bean

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Introduction to the Research Problem

The role that the personality of entrepreneur plays in the way he/she goes about building their business and the resulting venture performance has been a question of interest ever since researchers first asked “Why do certain individuals start firms when others, under similar conditions, do not?” (Gartner, 1989, p. 47). Although it now appears clear that personality is an underlying determinant of entrepreneurial intent, status and success, the real nature of the interactions that link personality to entrepreneurial success remain unsettled. Recent research has called for further investigation into possible mediating and moderating processes and variables that might help researchers better understand this still tenuous link (Brandstätter, 2010; Frese, 2009; Rauch & Frese, 2007).

As a basis for such investigation several theoretical models linking personality and entrepreneurial outcomes have been proposed (Fisher, 2009; Frese, 2009). However, little empirical evidence supporting the validity of such models has been collected. The models developed by both Fisher (2009) and Frese (2009) incorporate decision logic as a mediating variable and environmental dynamism (Frese, 2009) and uncertainty (Fisher, 2009) as moderating variables.

Re-examining the theory base, this study develops and empirically tests several hypotheses on the relationships between personality, decision logic, uncertainty and entrepreneurial outcomes in South African entrepreneurs.

Specifically this study asks the questions:

1. Does the personality (conscientiousness and openness to experience) of a South African entrepreneur affect the decision approach (causal or effectual) adopted?
2. How is this relationship impacted by uncertainty?
3. Is there a relationship between the decision approach adopted and growth of the venture?
4. Is this relationship moderated by environmental uncertainty?

Background to the Problem

Over the last 20 years entrepreneurship has seen tremendous growth, both as a subject of importance in economic policy and correspondingly as a topic of interest for researchers in the social sciences (Brandstätter, 2010). Entrepreneurship is seen as a fundamental key to economic growth in the developing world and the engine room for continued prosperity in industrialised nations.

The entrepreneurial mindset, decision logic and their effect in the development of a successful new enterprise have become topics of discussion in social psychology, and education. Much of the debate focuses on whether and how it is possible to teach entrepreneurship and how best to support the development of successful, entrepreneurially minded citizens.

These attempts to develop an understanding of the entrepreneurial mindset and the unique qualities of entrepreneurs have led to numerous studies over the last four decades into the possibility of a link between personality and entrepreneurship. After early research demonstrated little fruit, Gartner (1989) proposed that no such link existed and recommended further research be abandoned. However, in the last 20 years, modern meta-analytical techniques, improved operationalisation of personality

and deeper understandings of the person-situation debate have renewed interest in the role personality may play in entrepreneurship.

To this end several meta-analytic studies have shown significant correlation between aspects of the five-factor model (FFM) of personality and entrepreneurial status and success (Brandstätter, 2010; Rauch & Frese, 2007; Zhao, Seibert, & Lumpkin, 2009). Of the five, conscientiousness and openness to experience (openness) have consistently demonstrated the strongest effect.

Despite these recent discoveries most results show only a moderate effect and there is reason to believe that the relationship between personality and entrepreneurial outcomes is neither simple nor direct. It is expected rather, that personality affects the effectiveness of a given entrepreneur to complete certain 'entrepreneurial tasks' and these then act as mediating factors in entrepreneurial success (Rauch & Frese, 2007; Zhao, Seibert, & Lumpkin, 2009).

In addition, modern understandings of the person-situation debate hold that situational variables may significantly modify behaviours expressed across different situations even though personality remains consistent (Mischel & Shoda, 1995).

A by-product of these two factors was a call to research, in greater depth, both the specific entrepreneurial tasks and sub-processes that may be affected by personality and the moderating effects of environmental variables on these relationships (Brandstätter, 2010; Frese, 2009; Rauch & Frese, 2007; Zhao, Seibert, & Lumpkin, 2009).

This study investigates causation and effectuation decision logic as a possible mediating process between personality and entrepreneurial success. The possible

moderating effect of environmental uncertainty on such a relationship is also examined.

Contribution to knowledge

This study makes a contribution to the current understanding of the complex interplay between personality, decision logic, uncertainty and their relationship to entrepreneurial success. It raises interesting questions about previous assumptions on the nature of this relationship and creates a platform for further research in this area.

Given that personality has been shown to affect entrepreneurial success this study approaches the question of why such a relationship exists. Understanding such processes contributes to a deeper understanding of the entrepreneurial mindset, cognition, and its interactions with the entrepreneurial situations. It is hoped that in time researchers will be able to map this process completely and counsel entrepreneurs toward higher rates of success by pre-selecting industries, teams and processes that play to their strengths. Further, it will allow investors to better select and fund those most likely to succeed, and entrepreneurs to make better decisions on the types of business they start and how they go about building them.

This research fulfils a small role in the greater road map of entrepreneurship research and provides useful insight to further the science of entrepreneurial development and action.

Literature Review

Given the outline of the research problem as stated above, relevant research in the area of entrepreneurship, personality, decision logic, uncertainty and venture performance is reviewed below:

This study will follow the lead of recent research into personality and entrepreneurship in defining an entrepreneur as “someone who is the founder, owner and manager of a small business and whose principal purpose is growth” (Zhao & Seibert, 2006 p. 262).

Entrepreneurship is an interesting subject within the business sciences – in recent times it has become an increasing focus of research. This is perhaps due to the understanding of the important role it plays in creating new jobs and innovating value in the world we live (Carree & Thurik, 2010).

Personality

In psychology, personality is commonly defined as the sum total of all the behavioural and mental characteristics by means of which an individual is recognized as being unique (Collins English Dictionary, 2010).

This study defines personality to be the unique characteristics of a person outside ‘ability’ that govern how such a person acts and interacts with people and the world around them. It is important to note that personality does not account for cognitive or physical abilities, though strong links between the two may exist (McCrae, 1987).

Trait based models of personality

Personality is most commonly described in terms of traits. Traits are behavioural dispositions that predispose a person to particular forms of social behaviour (Mischel & Shoda, 1995).

Allport and Odbert (1936) were the first to approach personality on the basis of traits. Assuming that all common human behavioural dispositions would be captured in common language; they conducted a lexical study of the English language isolating over 17,000 terms that described human behaviour.

Working from Allport and Odbert's list, Cattell managed to reduce this list to 35 (Cattell, 1945) and then just 16 (1945b) personality factors.

In 1961, Tupes and Christal succeeded in further organising these factors into 5 dimensions (Tupes & Christal, 1961). The status and definition of these dimensions was re-affirmed and refined by several researchers over the years including Costa and McCrae (1985).

The Five Factor Model of Personality

Over the last 30 years the Five Factor Model (FFM) of personality has become the primary taxonomy of personality traits in personality research (John & Srivastava, 1999). The five-factors have been referred to by several different labels. The most popular remain those proposed by McCrae and Costa (1985) and include 'Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness'. A short description of each of the domains is given below:

Neuroticism

Neuroticism indicates an individual's level of emotional stability. Persons high on neuroticism are more open to certain negative emotions including anxiety, hostility, depression, self-consciousness, impulsiveness and vulnerability (Zhao & Seibert, 2006).

Extraversion

Extraversion indicates an individual that is assertive, dominant, energetic, active, talkative and enthusiastic (Zhao & Seibert, 2006).

Openness to experience

Openness to experience indicates an individual who is intellectually curious and tends to seek new experiences and explore novel ideas. They are commonly innovative, creative, imaginative reflective and untraditional (Zhao & Seibert, 2006).

Agreeableness

Agreeableness indicates an individual who is strong on an interpersonal level. They are characterised as trusting, forgiving, caring, altruistic and often gullible (Zhao & Seibert, 2006).

Conscientiousness

Conscientiousness indicates an individual who is organized, persistent, hard-working and motivated in the pursuit of goals (Zhao & Seibert, 2006).

Each of the dimensions is a formative construct of six separate personality traits of each of the broad domains as listed on the IPIP NEO-PI measure are listed in Table 1.

Table 1: Sub-traits of each of the FFM broad domains as defined by the IPIP (IPIP Website, 2010)

Broad Domain	Sub-traits	
Conscientiousness	self-efficacy	achievement-striving

	orderliness dutifulness	self-discipline cautiousness
Openness	imagination artistic interests emotionality	adventurousness intellect liberalism
Extraversion	friendliness gregariousness assertiveness	activity level excitement-seeking cheerfulness
Agreeableness	trust morality altruism	cooperation modesty sympathy
Neuroticism	anxiety anger depression	self-consciousness immoderation vulnerability

To understand how personality might affect entrepreneurship it is important first to discuss how personality traits interact with situations to elicit particular behaviour.

Person – Situation Debate

An assumption tied to the definition of the construct of personality is that it should remain constant over time and situations. This is substantiated by evidence of the inheritability of personality traits (Jang, Livesley, & Vernon, 1996). While most individuals do exhibit some consistency of behaviour across situations, it also been shown that this is not always the case (Mischel & Shoda, 1995).

Attempts to resolve this apparent instability of personality lead to the development of the Cognitive-Affective Processing Systems (CAPS) concept (Mischel & Shoda, 1995). The theory behind the CAPS concept holds that peoples' responses to situations depend on activated cognitive and affective mediating processes which respond to triggers in the environment.

This notion of ‘interactionism’ between personality and environmental factors was not new to personality psychology and could be traced as far back as the work of Lewin in the 1930’s (Ekehammar, 1974). Yet, even today, a common source of debate between personality psychologists and social psychologists is the question of the weight that should be attributed to the person versus the situation in determining a person’s behaviour (Tracy, Robins, & Sherman, 2009).

Personality and Entrepreneurship

The question of the effect of personality on entrepreneurial intentions and success is certainly not new to researchers. In the early years mixed success led to the conclusion by some that the idea of a particular personality type that was predisposed to entrepreneurship or entrepreneurial success was flawed, and research in this direction should be abandoned (Gartner, 1989). “I believe the attempt to answer the question “Who is an entrepreneur?” which focuses on the traits and personality characteristics of entrepreneurs, will neither lead us to a definition of the entrepreneur nor help us to understand the phenomenon of entrepreneurship.” (Gartner, 1989 pp. 48)

Recently however, meta-analytic studies of research conducted in the last 20 years have revived interest in personality as a factor in entrepreneurship:

First, Zhao and Siebert (2006) compared entrepreneurs to managers to test the relationship of the Big Five Personality dimensions on entrepreneurial status. They demonstrated significant relationships between Openness (.36), Conscientiousness (.45), Agreeableness (-.16) and Neuroticism (-.37) and becoming an entrepreneur.

Rauch and Frese (2007) took this a step further with an extensive meta-analysis of 104 previous studies into specific personality traits and their relationships to both entrepreneurial status and success. Their research demonstrated that there is a significant, but moderate to weak, general relationship between personality traits and business creation and success. They also showed significant relationships with moderate effects for some specific traits with entrepreneurial behaviour. For example: generalised self-efficacy had a strong effect (.25) on entrepreneurial success.

These meta-analytic studies hinted at, but did not assume causality in the relationships they demonstrated. Given that personality is strongly determined by genetics (Jang, Livesley, & Vernon, 1996) and was demonstrated as stable over time in adult life (Roberts & DelVecchio, 2000) hence it appears likely that personality traits affect entrepreneurial behaviour but it was up to further longitudinal studies to prove this relationship conclusively.

While the meta-analytic studies do suggest that certain personality traits are advantageous to entrepreneurs; the moderate nature of the effects demonstrated, as well as the variance across studies is indicative of a rather more complex relationship than can be explained by simple correlation (Zhao & Seibert, 2006).

One possible reason is that the situations different entrepreneurs find themselves in may vary significantly from one entrepreneur to another. Depending on the industry they chose to enter and the time they chose to launch, the situation experienced of two comparative entrepreneurs might be completely different. Understanding behaviour in context of the CAPS model of personality (Mischel & Shoda, 1995) it would appear likely that certain aspects of the situation that an entrepreneur finds himself in act as moderating variables on his personality such that his actual behaviour

may be more or less beneficial to the success of the business than if the situation had been different.

Rauch and Frese (2007) demonstrated that there is higher correlation with entrepreneurial success when traits recognised as necessary to entrepreneurial tasks are compared to traits not connected with entrepreneurial tasks. In such instances the entrepreneurial tasks are operating as mediating variables in the relationship of traits with entrepreneurial outcomes.

As the relevance of certain entrepreneurial tasks may vary based on the circumstance of the situation it is important that these mediating tasks are further examined.

The researchers in all three of the meta-analytic studies discussed above, highlighted the need for further investigation into the moderating and mediating variables in the relationship between personality and entrepreneurship.

The search for moderating and mediating variables

Existing research has examined some of the mediating variables of personality on entrepreneurship, such as the intention to adopt innovations (Marcati, Guido, & Peluso, 2008) and knowledge creation processes (Li, Huang, & Tsai, 2009) and improvisational behaviour (Hmieleski & Corbett, 2008).

Others have considered some of the moderating factors such as dynamism on leadership behaviour and performance (Ensley, Pearce, & Hmieleski, 2006), optimism and environmental dynamism on self-efficacy and performance (Hmieleski & R. A. Baron, 2008)

Still other researchers have approached the subject from a theoretical perspective and developed models as bases for further research.

Frese (2009) proposed a model of active performance characteristics and entrepreneurial success which incorporated numerous personality, human capital input factors and moderating situational variables (See Figure 1).

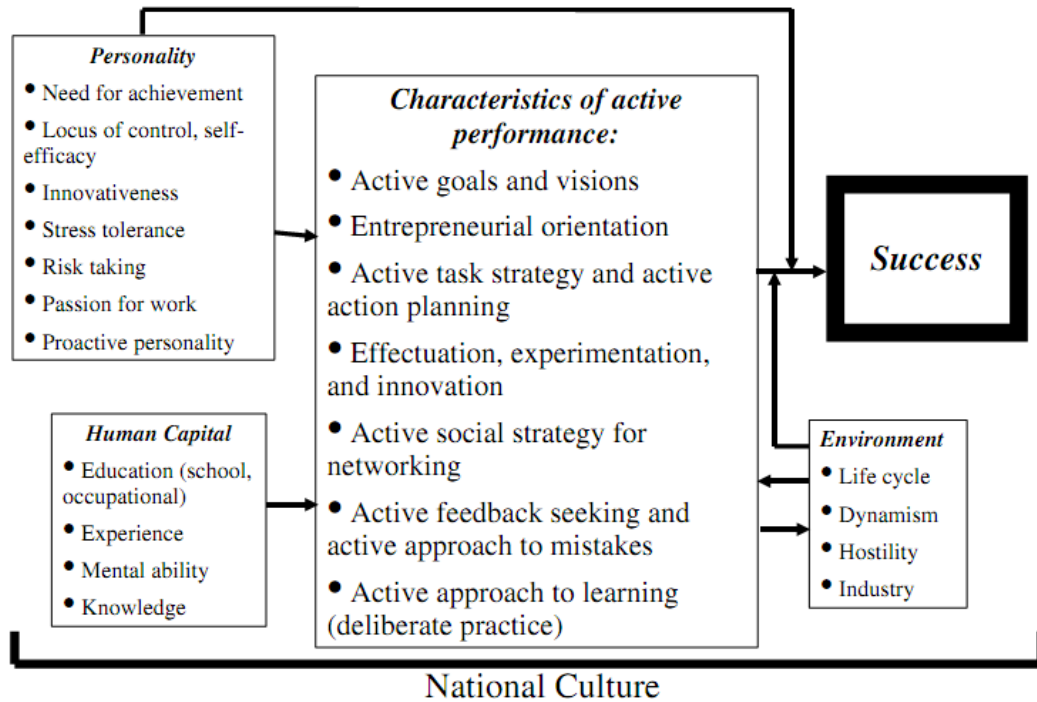


Figure 1: Model of Active Performance Characteristics and Entrepreneurial Success (Frese, 2009)

Fisher’s PUL Model (See Figure 2) which forms the theoretical basis for this research purports to link personality to entrepreneurial success through the mediating process of entrepreneurial decision-logic under the moderation of environmental uncertainty.

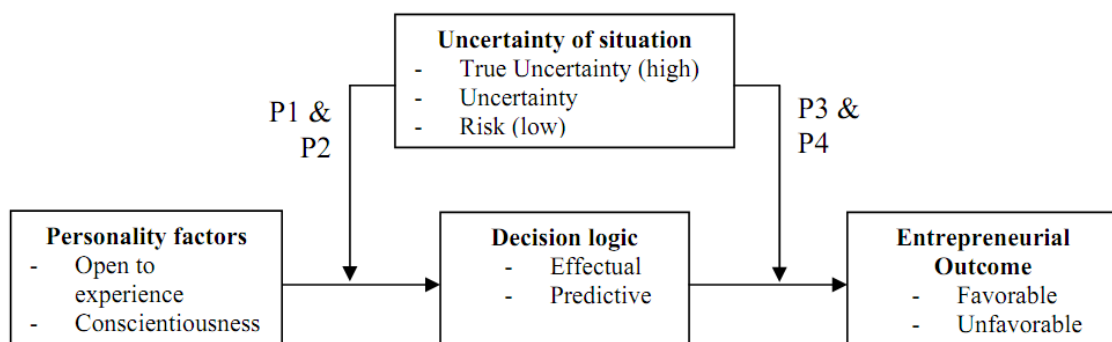


Figure 2: The PUL Model: The Relationship between Personality, Uncertainty, Logic and Entrepreneurial Outcomes (Fisher, 2009)

These two variables are discussed in greater detail below:

Environmental Uncertainty in Entrepreneurship

Uncertainty is intrinsically linked to entrepreneurship. One of the first definitions of an entrepreneur is that of Richard Cantillon in 1755, in which he defined the entrepreneur as “someone who engages in exchanges for profit; specifically, he or she is someone who exercises business judgement in the face of uncertainty.” (quoted in McMullen & D. A. Shepherd, 2006).

Environmental Uncertainty

It seems certain that different levels of uncertainty exist across different environments. Knight (1921) defined uncertainty on three levels based on the nature of the probability distribution that could be assigned to it. At a basic level he identified unpredictable events that had a known distribution as ‘risk’, events whose distribution could only be determined based on historical evidence were called ‘uncertainty’. Finally Knight termed events for which no probability distribution could be estimated as ‘true uncertainty’ (Knight, 1921).

Duncan (1972) added ‘the number of variables’ (complexity) as a contributor to uncertainty. He characterised the level of uncertainty experienced as a function of the complexity (number of uncertain environmental factors taken into account) as well as the degree to which the factors varied (static / dynamic). He found that complex-dynamic environments were the most uncertain and that the static-dynamic dimension was more significant in determining uncertainty than the complex-simple dimension (Duncan, 1972). Duncan also supported the notion of ‘perceived uncertainty’.

A further dimension of the uncertainty exposed in the literature is that the source of uncertainty may vary quite dramatically depending on the industry and environment in which the entrepreneur is operating. Sources of uncertainty might be technological changes that affect product viability or the actions of competitors in the industry, possible regulatory changes in the country or unforeseen macro-economic fluctuations (Ashill & Jobber, 2009). That the responses to these different sources of uncertainty may vary significantly was demonstrated by McKelvie, Haynie, & Gustavsson (2009).

Perceived Uncertainty

Although factors in the environment may operate to fixed probability distributions, the level of uncertainty experienced by decision makers is often subjective (Duncan, 1972; Lipshitz & Strauss, 1997).

Lipshitz and Strauss state “different individuals may experience different doubts in identical situations” (1997, p. 150). They point to a wealth of research in the study of the action-obstruction capacity of uncertainty when linked to individual differences (such as needs, values, attitudes etc). Further testimony to this, is the evidence of meta-analytical research that links entrepreneurial status and intentions to subjective personality traits of individuals (Zhoa & Siebert, 2006).

Some subjectivity in uncertainty perceived by individuals could possibly be attributed to processing of the multivariate situation described by Duncan (1972) above. McMullen and Shepherd (2006) follow this train of thought, linking the research of the “Austrian” economists which attributed the subjectivity of value, imperfect knowledge and entrepreneurial alertness to the difference between those that take entrepreneurial action and those that don’t. Their argument was that different,

subjective understandings of a situation would lead to different evaluations of the inherent uncertainty.

Milliken (1987) made in-roads into the operationalisation of perceived uncertainty as factor impacting organisational behaviour by isolating three distinct types of perceived uncertainty. He termed these state, effect and response uncertainty. State uncertainty is the uncertainty inherently associated with changes in the environment. Effect uncertainty is uncertainty around the impact such environmental changes will have on the organisation. Finally, response uncertainty is the uncertainty around being able to respond successfully to changes in the environment (Milliken, 1987). Milliken also argued that perceptions of uncertainty at each of these levels would impact perceptions at the others. For example, if the environmental state was predictable, effect uncertainty would become more prevalent in the mind of the entrepreneur than when the environmental state was unpredictable. In the same line of thought response uncertainty only becomes salient when some certainty around the effect of environmental changes exists.

Uncertainty in Entrepreneurial Decision-Making

Uncertainty is a major obstacle to effective decision-making and, especially when considered in the context of action, commonly produces hesitancy, promotes indecision and encourages procrastination (McMullen & Shepherd, 2006). This means that excess perceived uncertainty is a serious deterrent to entrepreneurship in a world where the opportunity for action may be short lived (Shane & Venkataraman, 2000).

At the same time, where possible, decision makers adapt to uncertainty using strategies that best match the particular situation they find themselves in (Lipshitz & Strauss, 1997). This is a fundamental tenet of bounded rationality and effectuation.

Decision Logic

For many years the logic behind decision-making was assumed to be rational and predictive – that is that decision makers engage in a objective, logical appraisal of the available options and the associated, predicted outcomes; and select the solution that offers the highest return for the associated risk.

Bounded Rationality

These assumptions were first challenged by Simon (1955), who questioned if such rationality always fell within the computational capacity of human thinking. In the following years, a theory of *bounded rationality* evolved to handle situations where decision makers did not have sufficient information, time or cognitive ability to make completely rational decisions. In such cases it is expected that the decision logic used will operate only within the ‘bounds’ of a person’s knowledge, abilities and experience of similar situations, truncating available information with assumptions or avoiding areas that involve unknowns to allow for simpler decision processing (Simon, 1955; 1959; 1979).

In this, bounded rationality shares much in common with modern theories of social cognition. Social cognition theory holds that in order to simplify processing of real world social situations the brain develops schemata or standardised understandings using previous social experiences that guide it in the interpretation of similar social interactions it might face in the future (Brewer & Kramer, 1985).

The way social cognition theory proposes that salient schemata are prioritised based on cognitive-affective triggers in the environment (Kiang, Yip, & Fuligni, 2008), offers clear parallels to the cognitive-affective processing systems for personality suggested by (Mischel & Shoda, 1995) and the possibility that the bounded frame used for

decision-making might also be affected by environmental variables. The conclusion that environmental variables like uncertainty could define the structure of the mental processes in decision-making adds weight to the focus of this study on the possible interplay between personality, uncertainty and decision logic.

Effectuation

Inspired by Simon's work, *effectuation* (Sarasvathy, 2001) is a form of decision logic yet further removed from traditional predictive rationality.

Predictive rationality typically follows a process of causal solution development. Causal solutions are devised in reverse; they take a desired effect (outcome) and work backwards to attempt to devise the cause (means) to achieve that outcome (Sarasvathy, 2001c). As such they are usually accompanied by clear vision of a desired future and detailed planning on how to get there.

However, in numerous interviews with successful entrepreneurs Sarasvathy (2001a) found that many had not built their businesses with either a crystal clear vision or a rational foresight of what the business would turn out to be; rather they had used a flexible, opportunistic, evolutionary process, working with what was at hand to build into an uncertain future. Effectuation is 'constructionist'; using the available or given means (cause) for which it searches for an effect (Sarasvathy, 2001), often in the process actively creating the desired future. Sarasvathy noted that effectuation was commonly associated with: experimentation in the development of product and business processes; deliberate flexibility in product and business design such that possible opportunities are not precluded; the establishment of pre-commitments and alliances allowing other parties to co-create products rather than reliance on supply

push; and decisions based on what the actor is prepared to lose rather than a rational calculation of expected future values.

A comparison of causal and effectual decision processes is shown in Table 2.

Table 2: Table contrasting Causation and Effectuation logics (Sarasvathy, 2001)

Categories of Differentiation	Causation Processes	Effectuation Processes
Givens	Effect is given	Only some means or tools are given
Decision-making selection criteria	Help choose between means to achieve the given effect Selection criteria based on expected return Effect dependent: Choice of means is driven by characteristics of the effect the decision maker wants to create and his or her knowledge of possible means	Help choose between possible effects that can be created with given means Selection criteria based on affordable loss or acceptable risk Actor dependent: Given specific means, choice of effect is driven by characteristics of the actor and his or her ability to discover and use contingencies
Competencies employed	Excellent at exploiting knowledge	Excellent at exploiting contingencies
Context of relevance	More ubiquitous in nature More useful in static, linear, and independent environments	More ubiquitous in human action Explicit assumption of dynamic, nonlinear, and ecological environments
Nature of unknowns	Focus on the predictable aspects of an uncertain future	Focus on the controllable aspects of an unpredictable future
Underlying logic	To the extent we can predict future, we can control it	To the extent we can control future, we do not need to predict it
Outcomes	Market share in existent markets through competitive strategies	New markets created through alliances and other cooperative strategies

It is perhaps important to note that effectual decision-making is not ‘irrational’ or ‘unconsidered’ but rather, in the presence of uncertainty, the effectual thinker makes a ‘rational’ choice to not exclude certain outcomes because their expected values are incalculable but might prove better than expected and not to become fixed on outcomes that may prove less beneficial than expected. Instead effectuation focuses on controlling means, adapting to environmental changes, creating many contingencies and generally managing downside risk through considerations of affordable loss and pre-commitments and alliances (Sarasvathy, 2001).

Effectuation has been seen as particularly useful for making decisions in environments of “Knightly uncertainty (Knight, 1921), Marchian goal ambiguity (March, 1978) and

there is some suggestion in the literature that the type of decision logic employed may be adjusted depending on the merits of the situation that is faced (Lipshitz & Strauss, 1997; McMullen & Shepherd, 2006; Sarasvathy, 2001c) .

Studies into effectuation have suggested links with venture performance (Read, Song, & Smit, 2009), new market creation (Sarasvathy & Dew, 2005b), uncertainty (Chandler, DeTienne, McKelvie, & Mumford, 2009) and expertise (Dew, Read, Sarasvathy, & Wiltbank, 2009).

Effectuation has also been connected with an over-trust bias (Goel & Karri, 2006) which in turn may be a risk to venture success. However, the nature of the connection is debated (Karri & Goel, 2008; Sarasvathy & Dew, 2008b).

Fisher (2009) and Frese (2009) independently build a theoretical link between personality and effectuation. Fisher in particular, highlights the possibility of uncertainty moderating the relationship, while Frese includes the link in his general action theory approach but makes no claims as to its nature.

It is from this base that the hypotheses for this study are developed.

Research Questions and Hypotheses

The research questions that this study investigated are considered below. Utilising the general theory literature above as a base, specific hypotheses are then developed that will form the basis for empirical investigation.

Research Questions

Research Question 1: *Does the personality (conscientiousness and openness to experience) of an entrepreneur affect the decision approach (causal or effectual) generally adopted?*

Research Question 2: *Is this relationship between personality and decision logic moderated by uncertainty?*

Research Question 3: *Is there a relationship between the decision approach adopted and growth of the venture?*

Research Question 4: *Is the relationship between the decision-logic approach select and the performance of the venture moderated by uncertainty?*

Hypotheses

Based on prior research findings and related bodies of knowledge the following relationships are deduced and presented as hypotheses for empirical testing. They align quite closely to the proposals made by Fisher (2009).

Conscientiousness indicates an individual's degree of organisation, persistence, hard work and motivation in the pursuit of goal accomplishment (Zhao & Seibert, 2006). The dependability facet of conscientiousness reflects the extent to which one is organised, deliberate and methodical and can be relied on to fulfil one's duties and

responsibilities (Zhao & Seibert, 2006). These attributes intuitively share some overlap with causal / rational decision logic when it is described as “...(a) developing a business plan based on (b) extensive market research and (c) detailed competitive analyses, followed by (d) the acquisition of resources and stakeholders for implementing the plan, and then (e) adapting to the environment as it changes over time with a view to (f) creating and sustaining a competitive advantage” (Sarasvathy, 2005, pp. 542-543).

As such it is hypothesised that conscientiousness will be positively associated with causal decision logic and correspondingly negatively associated with effectual decision logic.

Hypothesis 1a: *In general conscientiousness is positively associated with causal decision logic.*

Hypothesis 1b: *In general conscientiousness is negatively associated with effectual decision logic.*

Openness to experience is a personality dimension that characterises someone who is intellectually curious and tends to seek new experiences and explore novel ideas (Zhao & Seibert, 2006). Someone high in openness can be described as creative, innovative, imaginative, reflective and untraditional (Zhao & Seibert, 2006).

The personality traits found in the openness to experience domain are: imagination, artistic interests, emotionality, adventurousness, intellect and liberalism. These traits make it likely that openness to experience would be associated with effectuation which embraces co-creation and contingencies (Fisher, 2009).

It is hypothesised that openness will be positively associated with effectual decision logic and negatively associated with causal decision logic.

Hypothesis 1c: *In general openness to experience will be positively associated with effectual decision logic.*

Hypothesis 1d: *In general openness to experience will be negatively associated with causal decision logic.*

Situational variables can have a significant impact on the cognitive-affective processing of and therefore the behaviours of persons (Mischel & Shoda, 1995). The presence of uncertainty may therefore act as a moderator on the relationship between conscientiousness and decision logic. It is proposed that under conditions of uncertainty the self-efficacy, achievement-striving traits of conscientiousness will override those of orderliness, dutifulness, self-discipline and cautiousness in many entrepreneurs resulting in a tendency away from causal decision logic toward effectual decision logic.

Hypothesis 2a: *In situations of high uncertainty the relationship between conscientiousness and causal decision logic is decreased.*

Hypothesis 2b: *In situations of high uncertainty a positive relationship between conscientiousness and effectual decision logic will arise.*

In a similar fashion to that suggested for conscientiousness the strength of the relationships between openness to experience and decision logic are expected to be moderated by uncertainty.

Lauriola and Levin (2001) showed openness to experience is associated with the propensity to take on risk. Zhao and Siebert (2006) took this further, demonstrating that openness to experience was also positively correlated with entrepreneurial status. Uncertainty decreases the entrepreneur's ability to predict the future and therefore

creates situations more suited to effectual reasoning. Sarasvathy (2001) argued that effectuation is a mode of thinking that ‘emerges’ in some individuals under conditions of high uncertainty.

It is proposed that uncertainty will strengthen the relationship between openness to experience and decision logic. In situations of high uncertainty some of those who would otherwise use causal reasoning may default to effectual reasoning, while others that are already using effectual reasoning may do so with lower inhibition.

Hypothesis 2c: *Under high levels of uncertainty the relationship between openness to experience and effectual decision logic will become more positive.*

Hypothesis 2d: *Under high levels of uncertainty the relationship between openness to experience and causal decision logic will become more negative.*

It is also likely that persons high in openness to experience will self-select ventures with higher uncertainty, in much the same way people high in openness to experience are more likely to choose entrepreneurship as a career path (Zhao & Seibert, 2006). This may be important in how the results are interpreted especially when considering relationships that include openness and uncertainty based on industry selection and for this reason is included in this study.

Hypothesis 3: *Entrepreneurs with businesses in high uncertainty environments will be higher on openness than those in low uncertainty environments.*

Read et al. (2009), in a meta-analysis summarizing data on 9897 new ventures found that effectual decision logic was positively correlated with new venture performance. Working with the principles of effectuation no conclusions on the use of causal logic was employed.

Read et al. (2009) suggested that more work is necessary to determine the conditions (particularly with variance in situational uncertainty) under which causal logic, or a combination of effectual and causal logic may still prove more effective.

To this end it is proposed that causal decision logic is a factor in entrepreneurial success in low uncertainty environments while effectual decision logic is more important as uncertainty increases.

Hypothesis 4a: *In low uncertainty environments causal decision logic will be more positively correlated with new venture revenue growth than effectual decision logic.*

Hypothesis 4b: *In high uncertainty environments effectual decision logic will be more positively correlated with new venture revenue growth than causal decision logic.*

Should the hypotheses above prove true, it becomes likely that personality can be connected to venture success through the mediating variable of decision logic under the moderation of uncertainty.

Previous attempts to connect five factor personality domains with new venture performance have achieved mixed results (Rauch & Frese, 2007). Achievement motivation, a trait of conscientiousness, has consistently been connected with new venture success.

Recent meta-analyses (Rauch & Frese, 2007; Zhao, Seibert, & Lumpkin, 2009) conclude a significant but weak positive relationship of both conscientiousness and openness to experience to new venture performance. At the same time, Rauch and Frese (2007) specifically note the paucity of research into both moderating and mediating variables in this relationship and highlight it as an area for further research.

It is proposed that uncertainty will moderate the relationship between personality and entrepreneurial outcomes with decision logic as a mediating variable.

Hypothesis 5a: *Causal decision logic will be shown to mediate the relationship between conscientiousness and new venture revenue growth.*

Hypothesis 5b: *Effectual decision logic will be shown to mediate the relationship between openness to experience and new venture revenue growth.*

Ciavarella et al. (2004) note interestingly that long-term survival of a firm is positively correlated with the conscientiousness but *negatively* correlated with openness to experience of the founder. Such findings would be in line with Wasserman's (2008) statements that often the founder is not the person to grow the business in the long-term as well as Galbraith's conclusions that new ventures would required different capacities of leadership at different stages in their life cycles (Galbraith, 1982).

It has also been suggested that the best decision approach may be a combination of effectual and causal reasoning depending on the individual decision that is being considered (Rauch & Frese, 2007).

It is therefore proposed that in order for the founder to contribute to long-term growth a combination of conscientiousness and openness to experience is required no matter the level of uncertainty (Fisher, 2009). This study does not facilitate evaluation of long-term growth but significance of the short-term version of the statement was considered.

Hypothesis 6a: *At all levels of environmental uncertainty environments the combination of conscientiousness and openness to experience was more positively correlated with new venture success than either trait on its own.*

Research Methodology

An explanatory study into the above relationships was conducted. Quantitative data was collected from 120 South African entrepreneurs in the Gauteng region in the form of paper based surveys. Filter criteria for selecting the entrepreneurs included:

- the business was between two and ten years old;
- the founder was still playing an active role in the business;
- the business was based in the IT, advertising or construction sector;
- the business was not a franchise of another business.

To facilitate data collection, the data collection requirements for nine separate studies into the characteristics and success of entrepreneurs were combined in a single instrument. Each of the nine researchers conducted between twelve and twenty interviews in one of the three focus industries. Data was then combined to provide a substantial pool of responses from which quantitative statistical conclusions were inferred.

Instrument Design

The research instrument (included as Appendix 1: Research Questionnaire) is a single questionnaire including a range of questions that cover the data requirements of the nine participating researchers.

The length of the questionnaire and the potential for respondent fatigue was a major consideration in the design of the survey. Researchers were asked to favour shorter operationalisation for testing each construct where this would not significantly impact

the quality of research. Each researcher was responsible for collaborating on the validity and pre-testing sections relevant to his/her research.

The result was an eighteen page document, including: a one page introduction to participants, a page outlining the contents of the survey and an administrative information page. The four sections of the questionnaire covered: the founder and founding team characteristics, approach to launching and building the business, current perceptions and practices, and finally questions on the current state of the business.

Items in each of the questionnaire sections were mostly selected from existing tested instruments although some questions (i.e. Strategic Legitimation) were developed for the survey. All questions required only short answers most in the form of 5 or 7 point Likert-scale ratings.

Sections of the instrument relevant to this particular study are discussed below:

Personality Measures

The five factor model of personality (FFM) has become a widespread method of testing personality traits (John & Srivastava, 1999). The FFM tests personality traits according to five broad domains: Openness to experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN) (Costa & McCrae, 1985).

Several instruments based on the five factor model (FFM) exist¹. The most well recognised being the Revised NEO Personality Inventory (NEO-PI-R) developed by

¹ The well recognized Myers-Briggs Type Indicator personality profile used in many companies is interesting in that it purports to measure types rather than traits. Correlation studies show that the Myers-Briggs measure does in fact measure four of the five major dimensions found in the five factor model. (McCrae & Costa, 1989)

Costa and McCrae and the Big Five Inventory (BFI) proposed by John and Srivastava (1999).

Items for this measure were selected from the International Personality Item Pool (IPIP). The IPIP is a public-domain (hosted at <http://ipip.ori.org>) pool of personality measures that correlate well with commercially available scales for both NEO-PI-R and the Lexical Big Five Inventory (Goldberg et al., 2006). Internal and external validity and reliability of the measures are well accepted (Goldberg et al., 2006).

Since its publication in 1996, the IPIP has seen a dramatic increase in its use and by 2006 items from the IPIP had been successfully translated into more than 25 different languages (Goldberg et al., 2006). This suggests good cross-cultural validity.

In order to measure the broad personality domains, 37 items from the International Personality Item Pool (IPIP) have been selected.

The IPIP 'Big Five' personality scale was chosen over the IPIP NEO-PI-R scale in compromise with the requirements of other researchers involved in the study. Although much of the research in this area focus on the NEO-PI domains the two scales are very similar and indeed have been shown to overlap (John & Srivastava, 1999). The largest discrepancy comes in the interpretation and description of the openness domain which is termed 'Intellect' under the 'Big Five' and defined more narrowly than NEO-PI openness. In order to ensure that this study might be compared with existing work that makes use of the NEO-PI-R dimensions questions from the IPIP NEO-PI-R (broad domains) on openness were also included. The added openness to experience items were: "Believe in the importance of art", "Enjoy hearing new ideas", "Enjoy wild

flights of fantasy” and “Avoid philosophical discussions”. All other items from the Big Five Intellect category overlap the openness to experience under NEO-PI-R.

A negative item on each scale was included to cater for agreement bias although this was later removed to improve the reliability of the scale.

Table 3: Items of the Big Five domains measured

Factor	Positive	Negative
Extraversion	7	1
Agreeableness	7	1
Conscientiousness	6	1
Intellect / Imagination	7	0
Openness to Experience ²	3	1

Neuroticism was excluded as it was not expected to play a role in the relationships being tested. Only ‘openness to experience’ and ‘conscientiousness’ were interrogated for this study.

For all personality items the respondent is given a statement (i.e. “I am interested in people”) and asked to respond on a 5 point Likert scale.

Scale labels were: ‘Strongly Disagree’, ‘Neutral’, ‘Some-what Agree’, ‘Agree’ and ‘Strongly Agree’. An asymmetric scale with neutral as the second option was chosen allowing better resolution on the positive end of the scale as the majority of answers were expected to fall there. The position of neutral was highlighted to respondents before they completed the questionnaire.

Finally, the personality questions were randomly ordered to encourage independent consideration of questions even where they belonged to the same sub-dimension.

² Included from the IPIP NEO-Domains scale (<http://ipip.ori.org/newNEOKey.htm>).

Decision Logic Measures

Until recently, no reliable instrument to test decision logic existed. This study makes use of an instrument developed and tested by Chandler et al. (2009) to measure the decision logic employed by the entrepreneur during the life of his/her business.

The scale includes 24 items: Seven items measure causation and the remainder are spread across the four sub-constructs (Experimentation, Affordable loss, Flexibility and Pre-commitments & Alliances) suggested by Sarasvathy (2001b) as the components of effectuation. In addition four questions suggested by Chandler et al (2009) as a fuller test for pre-commitment and alliances were also included.

Table 4: Decision Logic Items

Factor	Items
Causation	7
Experimentation	3
Affordable loss	3
Flexibility	5
Pre-commitment and Alliances	6

For all decision logic items the respondent was given a statement about the business approach employed by them and their partners (i.e. “We were flexible and took advantage of opportunities as they arose”) and asked to respond on a 5 point Likert-scale.

Scale labels presented were: ‘Strongly Disagree’, ‘Neutral’, ‘Some-what Agree’, ‘Agree’ and ‘Strongly Agree’. As with the personality items, neutral was selected as the second item on the scale allowing better resolution on the positive end of the scale as the majority of answers were expected to fall there.

Uncertainty

The moderating effects of both objective industry uncertainty as well as the entrepreneur's perceived environmental uncertainty were measured.

Industry Uncertainty

The industry in which the business was founded was used as an objective, proxy for the environmental uncertainty. In this study a decision was taken to sample entrepreneurs in 3 distinct industries to control for and compare responses to uncertainty.

The chosen industry sectors were:

- ICT, which is considered a very dynamic, highly uncertain industry;
- advertising, an intermediate more stable but still variable industry;
- and construction, which is considered a far more stable, established industry

Respondents were asked to report which of the above three industries was their main line of business.

Some variation in uncertainty may be experienced across industries. For example the uncertainty experienced by an Information Technology (IT) company providing IT infrastructure to local companies might be quite different from that experienced by a company focusing on military decision software for sale overseas. In order to account for this, respondents were asked to report the sub-category within their industries as well as give a short description of their business.

Perceived Environmental Uncertainty

General uncertainty created by the industry may not be the only uncertainty experienced by a particular entrepreneur. A significant portion of the uncertainty

experienced may be due to individual perceptions, rather than the external environment (Duncan, 1972); as such a measure for perceived uncertainty has also been included.

Two instruments for the measurement of perceived uncertainty were considered. Both follow Milliken's (1987) suggestion that environmental uncertainty should be considered in three categories: state, effect and response uncertainty; and their questions were developed accordingly.

Ashill and Jobber (2009) derived and validated a rigorous measure for Perceived Environmental Uncertainty (PEU). Their scale included nine items (three for each sub-construct) with the intention that they should be repeated for ten sub-environments to determine the source of the uncertainty. This meant that 90 items would need to be tested to for the full impact of their scale.

The 90 items required for the Ashill and Jobber (2009) scale was considered too long to include in the already long combined questionnaire. A shorted version that attempted to capture an aggregate perceived uncertainty was pre-tested on a few respondents and was found to be too complicated to be a reliable measure.

McKelvie et al (2009) used six statements with varying degrees of strength about state, effect and response uncertainty as input variables in their study of the effect of uncertainty on entrepreneurial action. By adding a five point Likert scale to these statements a six item scale was derived that tested state, effect and response uncertainty respectively. In pre-testing respondents were more comfortable responding to this instrument than the one derived from the Ashill and Jobber (2009) scale and it became a natural choice for this research study.

McKelvie's scale was derived from an experiment with a specific focus on the decision to launch new products in the software industry (McKelvie, Haynie, & Gustavsson, 2009). Hence the domain of the uncertainty assessed focuses on product viability, client preferences, technological advances and competitive action. Although this does not account for other potential factors of uncertainty such as macro-economic or socio-cultural these were considered sufficient to measure the main sources of uncertainty faced by entrepreneurs.

Entrepreneurial Outcomes:

In the questionnaire several dimensions of entrepreneurial success were measured including: the rate of growth experienced by the business in numbers of employees, revenue and profitability. For this study revenue growth was selected as the best measure of the new venture success given its common use both in the literature and because it is not subject to the fluctuations that might be expected of other financial measures in the early years of a venture.

Without access to audited financials respondents were asked to report their business's revenue in the last financial year. Given that there might be some sensitivity around the actual number, respondents were given ten ranges from under R1 million to over R100 million and asked to report in which their business fell. The mid-point of each range was then taken as an approximation for their most recent business revenue.

Reliability and Validity

Existing instruments, of proven reliability and validity have been used as the basis for measurement of both Personality and Decision Logic. Internal reliabilities and Cronbach alpha's were checked for personality measures, causation and the sub-constructs of effectuation. As a formative construct, effectuation reliabilities for

effectuation itself was not investigated (Chandler, DeTienne, McKelvie, & Mumford, 2009).

The reliability of using industry a measure of uncertainty is unclear but the longstanding use of industry betas to account for industry volatility in securities portfolios suggests general acceptance that the majority of companies in an industry are susceptible to the same unstable industry market forces. The validity in this measure might also been questioned where companies operate right on the boarder of the reported industry – to identify such outliers a sub-industry and description of the company’s core business activities was requested and outliers were scanned to check that they could be comfortably classified within the industry in question.

The measure for perceived uncertainty was derived from a previous study that successfully separated different responses to different types of uncertainty and was therefore expected to provide similar distinction for this study. When component analysis was unable to distinguish between effect and response uncertainty in the sample responses, these were combined to represent uncertainty that was related to the confidence of the respondent about how he and his business would handle dynamism in the market while state uncertainty remained intact.

Although not exhaustive revenue growth is considered a stable and objective measure of new venture performance (Hmieleski & R. A. Baron, 2009), this is especially in early firms where profitability may be obscured by re-investment and economies of scale challenges. In addition revenue growth is a common measure of venture performance in existing literature, 26 of the 48 studies analysed by Read et al. (2009) in their meta-analysis of the effectuation’s effect on performance used sales or revenue, sometimes in combination with other factors, to interpret venture performance.

To further increase the integrity of the study the first few respondents were asked for feedback on the questionnaire to highlight any potentially confusing questions that might affect the reliability or validity of data capture. No problems were reported.

Population and Sample Description

The population for this study includes all entrepreneurs that have started businesses in South Africa in the last ten years in the IT, advertising and construction industries.

The sample consisted of 121 entrepreneurs across the three target industries but as non-probability sampling was employed inferences to the population should be made with some caution. Three researchers were assigned to each target industry and each was expected to get at least twelve survey responses. Using personal networks and industry association listings relevant entrepreneurs were approached to complete the survey. The sample was snowballed by asking respondents to suggest further contacts in their industries. With personal referrals the response rate was high with most non-responses due to inaccessibility during the timing of the study rather than a refusal to participate. No obvious sampling bias was evident but some sample demographics are discussed under the results section.

Data Collection Process

As required by the University of Pretoria, ethical clearance for data collection using the method and instrument described here was applied for and granted on Monday, 2 August 2010.

All data collection was by informed consent with no incentive other than access to the research conclusions offered. Respondents were informed at the beginning of each session that the responses would be treated anonymously. They were also told that all

the questions in the survey are optional and they are free to withdraw from the study at any point.

Because of the length of the survey and the potential for respondent fatigue that might result in lower validity of responses, as well as to encourage full completion of the survey all data was collected under researcher supervision.

In most cases the survey was completed in person with the respondent in the form of a structured interview. These responses are later captured by the researcher into a computer based tool to compile the main database of responses. In a few cases where the interviewee was not available for an in-person interview supervision was administered via telephone or an internet chat program.

Some researchers may choose to forgo paper surveys in favour of a smartphone based questionnaire that captured data directly to an online database. The questions on the smartphone version of the questionnaire were identical to those on the paper survey.

Respondents were approached via phone or email to request their participation in the study. A follow up email thanking them for their support and offering them a copy of the final research report was sent 4 weeks after conclusion of the interviews.

Data Preparation

Where respondents had mistakenly or intentionally not completed certain questions pair-wise deletion was used, dropping measurement of those constructs for that respondent, but data on completed constructs was retained.

Most of the questions are based on Likert-type scale ratings which facilitate simple numerical weighting of the responses. Reverse coded items were multiplied by negative one and weighted to match their positively coded equivalents. To achieve

this, items were coded: Disagree (-2); Neutral (0); Slightly agree (1); Agree (2); Strongly Agree (3)

Initially descriptive statistics were used to identify outliers and demonstrate that variables were approximately normally distributed and suitable for regression analysis. Where sensible, Cronbach Alpha measures of internal reliability across certain constructs were calculated to determine if any questions should be dropped.

A measure of venture performance controlling for the age of the business was calculated using an exponential relationship to explain revenue growth over time.

Data Analysis

The units of analysis for this study are the individual entrepreneur, the founding team and the business that they have founded. Data was analysed using quantitative statistics. Preliminary analysis involved analysis of the sample across all the measures of interest. This included standard descriptive statistics, frequency analyses and scatter plot diagrams.

Moderation and mediation was tested using moderated causal steps analysis (R. M. Baron & Kenny, 1986) with some consideration to recommendations by Edwards and Lambert (2007).

Although moderated causal steps analysis is subject to certain flaws it is the most widely used method of evaluating moderation and mediation models (Edwards & Lambert, 2007).

The details of the analysis are included in the results section as the choices of analysis are more easily explained in the context of the data.

Results

The nine researchers surveyed a combined total of 120 entrepreneurs. Most surveys were initially collected on a paper questionnaire (see Appendix 1: Research Questionnaire) and then captured by the researcher into a web interface prepared for this purpose. Some data was captured directly to digital using mobile phones running a customised survey application. Initial checks revealed several capturing errors which researchers were asked to double check and correct where possible; in particular researchers were asked to check questions that were left out and where point allocations in the organisational behaviour questions did not total 100 points as expected. A few respondents were contacted to verify their answers. When analysis was begun 18 records (10%) were disregarded because they were either incomplete, captured incorrectly or had not yet been verified.

Preliminary Analysis

Some preliminary analysis of the sample data was conducted; this included basic analysis of important sample demographics as well as descriptive and confirmatory analysis of the target constructs. It is important to note that the unit of analysis varies across some of the constructs which adds to the complexity of later analysis. The personality variables and the perceived uncertainty variables consider the traits and perceptions of the respondent as an individual while decision logic considers the actions of; and growth the results achieved by the founding / managing team working together. The degree to which the respondent, as a member of the founding team is responsible for setting the agenda of the team might vary significantly and so care

must be exercised in taking weak statistical relationships as evidence that there is no connection between founder attributes and business approaches.

Broader than this, the significant variance in the properties of the populations of entrepreneurs between the three focus industries is also highlighted.

Respondent Demographics

In South Africa racial ethnicity is a strong determinant of social identity and often serves as a moderator or proxy for numerous background variables; 77 of the respondents (75.5%) were Caucasian; 19 (18.6%) were Black; five (4.9%) were of Indian ethnicity and only one was Coloured. It is uncertain how closely these numbers represent the population of South African entrepreneurs in the focus industries. However, it is likely that there is an over representation of White entrepreneurs due to the demographics of the researchers (six white; two black; one coloured and one person of Sudanese decent) who approached entrepreneurs predominantly through their social networks.

The respondent's ages when they started their businesses varied from 20 to 65 with a mean of 31.94 yrs and a Std Deviation of 9.2 yrs. This distribution was skewed to the left suggesting the majority of the sample group fell in the 20-35yr age group. This is not expected to be inconsistent with the expected population of entrepreneurs although may have been skewed slightly towards this age group due to the ages of the researchers and the snowballing sampling technique which may have lead the researchers to contact people within their peer group.

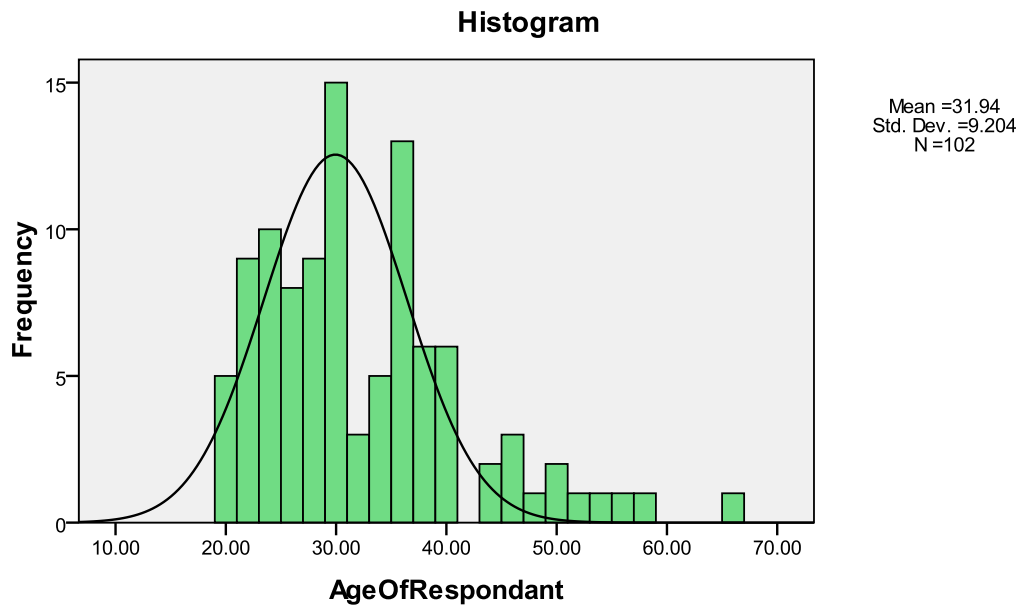


Figure 3: Frequency plot of the ages of the respondents

With regard to industry experience 70 of the respondent’s (68.6%) said their business related to their previous work experience. Previous experience in venture creation on the other hand was a little lower; 54 respondents (52.9%) had founded a business before and 63 (61.8%) of the respondents had worked in a start-up before.

Founding Teams

Although this study considers only the personality and perceived uncertainty of the respondent many businesses are started by a founding team and not a single individual. In these situations the decision logic and company growth may be impacted by the affects of the personalities of the other members of the founding team that were not respondents in the study. For this reason the structure of the founding teams has also been considered.

The founding teams considered in this study were typically 1 (30.4%) or 2 people (39.2%) and most (95.1%) had four or less members.

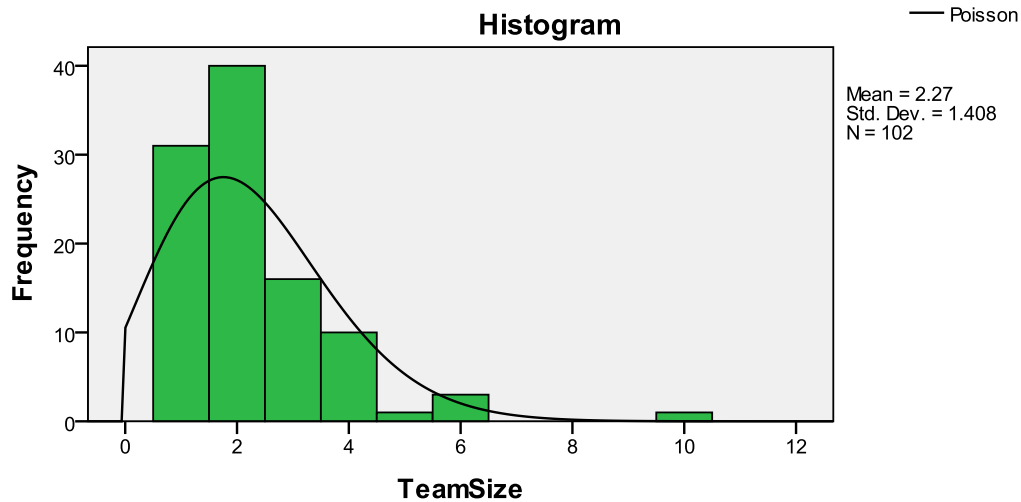


Figure 4: Frequency plot of the founding team's size

It seems natural that as teams increase in size the effect of a single individual will become diluted. For analysis where constructs based on the individual as a unit of analysis were compared with constructs relating to the founding team cases with smaller founding teams were weighted more heavily than those with larger teams as there was likely to be less interference between the respondent's personality and actual business behaviour and outcomes. The weighting effect was calculated based on the proportion of the team the respondent made up. Where the respondent started the team on his own a full weighting was applied; where there were two members the case was weighted only one half; where there were three members one third and so on.

Education

Across the full sample of founding members several different levels and focus areas of education were evident. In particular there appeared a strong correlation between the type and level of education and the industry to which the company belonged (See Table 6). Most of the founding members had either a Bachelors degree or no-tertiary education however this must be considered against the distribution of education in the

underlying South African population rather than an indication that honours, masters or doctorate graduates don't start businesses.

It was interesting to note that people of similar education level tend to start businesses together (see Table 5), there was a weak but significant correlation between doctorate and masters degrees within founding teams and a weak, but significant negative correlation between high school and university educated persons partnering on the same team. This added homogeneity amongst the members of teams should serve to reduce the confounding effect of trying to relate the attributes of a single team member to the actions of the team.

Table 5: Non-parametric correlation of education levels within founding teams

Spearman's rho	High school	Certificate	Bachelors	Honours	Masters	Doctorate
High school	1.000	-.157	-.273**	-.236*	-.269**	-.108
Certificate	-.157	1.000	-.028	-.141	-.158	-.068
Bachelors	-.273**	-.028	1.000	-.156	-.084	.001
Honours	-.236*	-.141	-.156	1.000	.004	-.063
Masters	-.269**	-.158	-.084	.004	1.000	.294**
Doctorate	-.108	-.068	.001	-.063	.294**	1.000

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

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

Industry

Of the 102 records at the start of analysis 41 (40%) were Information Technology companies 24 (23.5%) were Advertising companies and 37 (36.5%) were Construction companies. Significant differences were found in the samples in each of these industries.

The average age of the founding teams in each industry appears to increase from information technology which is the lowest up to construction which is the highest however a t-test reveals that the only a significant difference in the mean ages appears

between information technology and construction teams with weak evidence that advertising falls between the two.

Interestingly the average education level (computed using a proxy-ordinal scale on education level) shows a significant difference in the average education of Information Technology teams when compared to Advertising teams but no significance between construction and either Information Technology or Advertising.

Table 6: A cross tabulation of education level of founding team members by industry

	Advertising	Construction	Information Technology	Total
High school	4	25	35	64
Certificate	6	5	11	22
Bachelors	10	35	25	70
Honours	6	3	19	28
Masters	3	6	12	21
Doctorate	0	0	2	2

Education focus area also varied across industries (See Table 7). As would be expected, those starting construction companies predominantly came from an engineering background. For IT companies the bias is towards founders with engineering, computer science or ‘other’ (probably high school with no tertiary study) backgrounds. Entrepreneurs in the Advertising industry had a broader range of backgrounds including art and social science which fits an instinctive description of the people in the industry.

Table 7: A cross tabulation of education focus area by industry

	Advertising	Construction	Information Technology	Total
Engineering	0	30	10	40
Economics	0	3	0	3
Statistics	0	0	1	1
Art	3	0	1	4
Business	6	9	22	37

Science	0	0	1	1
Computer Science	2	0	10	12
Social Science	2	0	0	2
Teaching	0	0	0	0
Other	6	8	32	46

Ultimately, the above show that there is a significant difference in the backgrounds of people that founded businesses in each of these industries and highlights that it is necessary to understand that entrepreneurs are not a single homogenous group and may differ significantly from industry to industry. The level of interference that personality may play in affecting how people get into industries as well as extraneous variables unique to industries may serve to complicate the nature of the considered relationships and it is important to consider all the results from this study in this light.

The mean revenue reported by companies in each of the industries considered is plotted against the age of the business below.

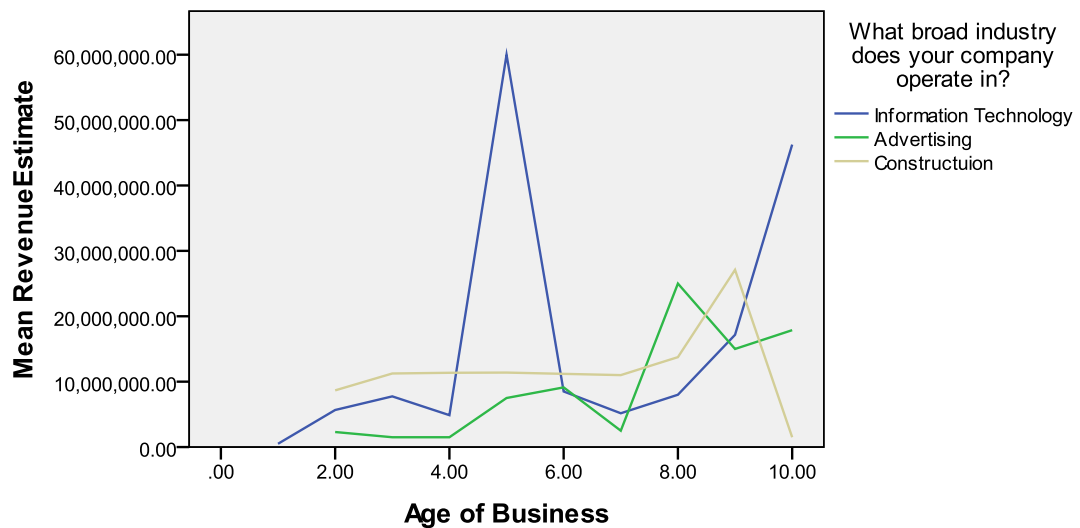


Figure 5: Mean revenues of businesses by industry

It is interesting to note the stability in the construction industry when compared to advertising and IT. The IT industry shows the most volatility in earnings which adds weight to the use of industry as a proxy for uncertainty.

Personality

After running some preliminary scale reliability statistics (Cronbach alpha's) the negative items in all personality measures (one per scale) were removed, this improved the internal reliability of all personality construct scales. Three likely reasons for this are: some respondents may have mistaken the negative statements as positive; using an asymmetric Likert-scale meant that the resolution for reverse scaled items was reduced which may have lowered the possibility of good correlation with their positive counter parts; and/or some agreement bias may have been present. Once the negative items were removed all reliabilities for personality constructs proved satisfactory (> 0.7).

Average scales were computed from the items attributed to each personality construct. Average scales were selected in order to allow comparison with wording of the original scale of the questions asked and to facilitate meaningful comparisons between the personality constructs as some contained more test items than others (DiStefano, Zhu, & Mindrila, 2009). Reliabilities, means and standard deviations for the adjusted personality measures are shown in Table 8:

Table 8: Descriptive statistics and reliabilities of considered personality dimensions

Personality Construct	N	Min	Max	Mean	Std. Dev	Reliability (alpha)
Agreeableness	102	-.14	3.00	1.8319	.62881	.756
Conscientiousness	102	-1.00	3.00	1.5686	.85543	.787
Extraversion	102	-1.00	3.00	1.9020	.80134	.868
Openness	102	.62	2.92	2.0445	.48776	.776

One of the challenges with self-report personality scales is that certain personality characteristics may be considered desirable and may therefore suffer respondent bias. Even though respondents were told that the questionnaire was anonymous the

presence of the interviewer may create a bias toward socially acceptable traits especially agreeableness and possibly conscientiousness although all measures were skewed to the right. Scores for openness were quite high – not a single respondent scored negatively and the vast majority scored above 1.5. This could be interpreted as support for findings in previous research that suggest a connection between openness and entrepreneurial status (Rauch & Frese, 2007; Zhao & Seibert, 2006; Zhao, Seibert, & Lumpkin, 2009).

Frequency plots showing the distributions of responses for each personality construct from -2 (Disagree) to +3 (Strongly Agree) are shown in figures 5-8:

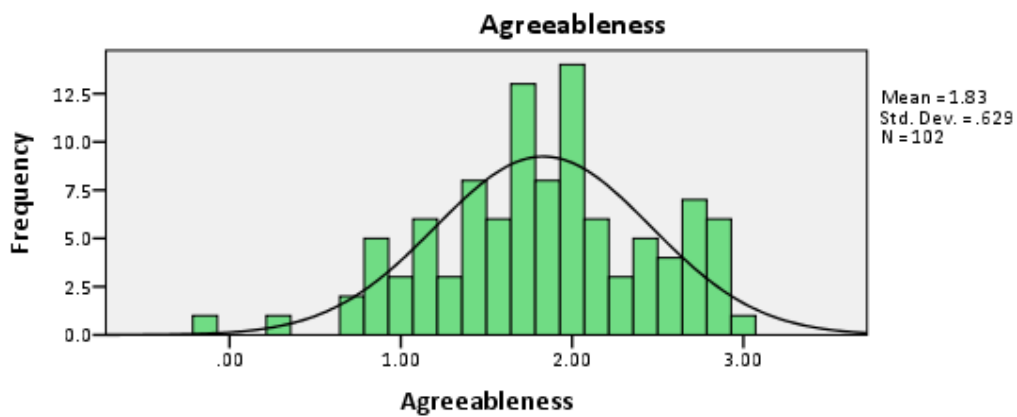


Figure 6: Frequency distribution of the agreeableness measure in the sample

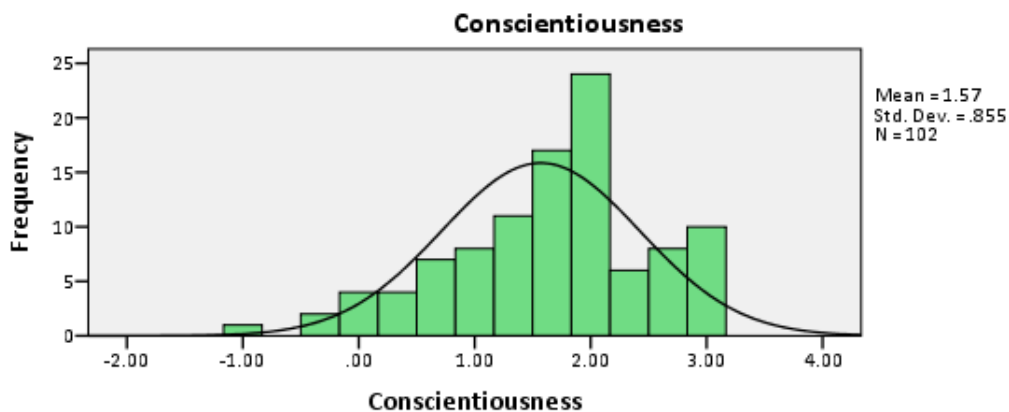


Figure 7: Frequency distribution of Conscientiousness within the sample

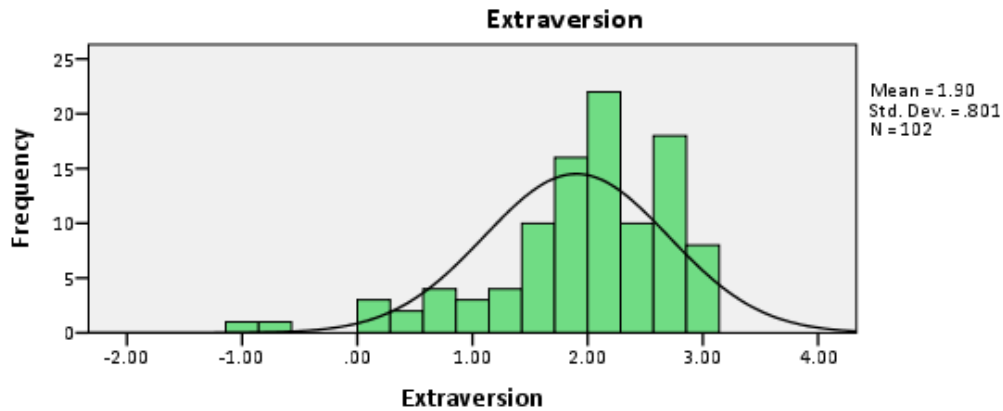


Figure 8: Frequency distribution of Extraversion within the sample

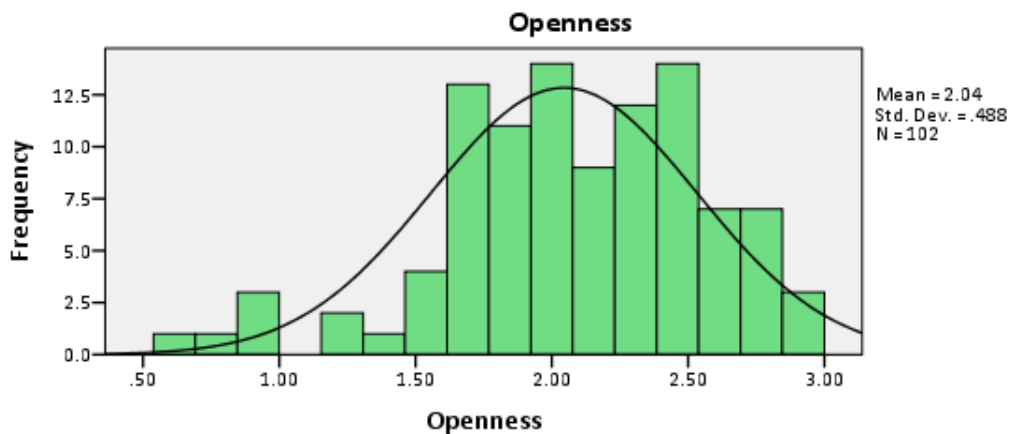


Figure 9: Frequency distribution of Openness within the sample

Principal factor analysis with oblique rotation (Oblimin) targeted at four factors served to confirm the loading of most personality questions to their intended dimensions. Oblique rotation was selected as items from the IPIP can load onto more than one of the Big Five dimensions and the selection of items used in this study may not result in a purely orthogonal measure of the dimensions.

A statistically significant correlation between agreeableness and the other personality traits was found, this creates a challenge in producing regression models with the full combination of personality variables due to the co-linearity, especially between agreeableness and extraversion that might result. Fortunately there was no significant correlation between openness and conscientiousness so linear models incorporating both these focus variables could be analysed.

Table 9: Parametric correlations between measured personality dimensions

	1	2	3	4
1. Agreeableness	1	.296**	.617**	.347**
2. Conscientiousness	.296**	1	.169	.088
3. Extraversion	.617**	.169	1	.370**
4. Openness	.347**	.088	.370**	1

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

For further analysis both conscientiousness and openness were standardised to allow the effects to be easily compared. The standardised measures are referenced with a preceding 'Z' where results based on these are presented.

Splitting the personality profiles of the respondents by their respective industries revealed some interesting factors. Importantly respondents in construction had significantly lower scores on openness than their compatriots in either IT or advertising (based on t-tests at the 0.05 significance level). This provides evidence that certain industries attract individuals with different levels of openness.

In particular it appears that more dynamic industries attract entrepreneurs with a greater degree of openness which is consistent with hypothesis 3. This is important as it may mask some of the results with regard to openness.

Table 10: Mean personality scores by industry

Personality Dimension	Information Technology	Advertising	Construction
Agreeableness	1.80	1.88	1.83
Conscientiousness	1.43	1.63	1.68
Extraversion	1.92	1.89	1.90
Openness	2.11*	2.25*	1.84

* significantly different from construction at the 0.05 level

The advertising industry also attracts persons high in openness but this is more likely due to necessary industry attributes like appreciation for art and liberalism which form part of openness rather than the draw of industry uncertainty.

Perceived Uncertainty

The measures used for perceived uncertainty were derived from McKelvie et al (2009) and attempted to measure state, effect, response and total perceived uncertainty as shown below:

Table 11: Descriptive Statistics and Reliabilities of Uncertainty Measures

	N	Min	Max	Mean	Std. Dev	Reliability (Alpha)
State Uncertainty	102	1.00	5.00	2.77	1.002	.526*
Effect Uncertainty	102	1.00	4.50	2.20	.8795	.554*
Response Uncertainty	101	1.00	4.50	2.05	.8829	.722
Environmental Uncertainty	101	6.00	27.00	14.10	4.128	.564*

*The reliabilities reflected appear quite low – only response uncertainty offers good internal reliability. This may be a function of this particular sample but could also be attributed to the different ways entrepreneurs conceptualise and respond to different types of uncertainty (Lipshitz & Strauss, 1997; McKelvie, Haynie, & Gustavsson, 2009).

A principal components analysis (PCA) was run to determine if the response could be reduced to more basic constructs. Kaiser-Meyer-Olkin (KMO) and Bartlett scores were satisfactory and two factors were extracted accounting for 62% of the total variance in the responses. These factors appear to map to perceived ‘internal’ and ‘external’ uncertainties. External uncertainty accounts for things beyond the entrepreneur’s control i.e. the dynamism of the industry itself where as internal uncertainties seem to map onto the entrepreneur’s confidence / knowledge of the industry and combine both effect and response uncertainties. Both orthogonal and oblique rotations highlighted the same factors and it was decided to use these factors over planned perceived uncertainty constructs.

Table 12: Descriptive statistics of reduced dimensions of uncertainty

	N	Min	Max	Mean	Std. Deviation
Lack of Confidence / Understanding of the Industry	101	-1.79	3.132	.000	1.00
Perceived Dynamism	101	-2.08	2.220	.000	1.00

It is interesting to correlate readings of the perceived uncertainty with the industry in which the entrepreneur is working (see Table 13). As expected those in construction viewed their industry as the least dynamic, significantly less so than those in the advertising industry. Yet, those in construction have the highest reported lack of confidence / uncertainty of their ability to respond or predict the impact of changes in the industry on their business. The reasons for such differences are unclear but it does add colour to the complexities of uncertainty and the perceptions of uncertainty that play out in the minds of entrepreneurs. It might be argued that those in construction don't expect much don't plan for change and therefore find it hard to conceive what impact change might have or how they would respond to it. Those in advertising and IT may be more comfortable with and actually expecting changes in their industry – the very fact that they were prepared to open a business in a more dynamic industry may have been contingent on their believing in their own ability to understand predict and control the impact such dynamism might have on their business. This also support's Milken's (1987) proposition that effect and response uncertainties only become salient if there is a need.

Table 13: Mean perceived uncertainties by industry

	Information Technology	Advertising	Construction
Lack of Confidence	-.18800	-.18745	.32483
Perceived Dynamism	.10444	.33097	-.32759

*. The mean difference is significant at the 0.05 level.

Decision logic

The degree of causation and effectuation used by the sample entrepreneurs was measured using the instrument developed by Chandler et al. (2009)

The established factors were confirmed using exploratory factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was greater than 0.5 (.759) and Bartlett's test of Sphericity returned significant (Chi-Square 937.360; $p < 0.001$) for both the orthogonal and oblique rotations.

The addition of Chandler et al. (2009) alliances questions resulted in the development of an alliances component that did not include questions that were originally targeted at pre-commitments. Without the alliances questions the pre-commitments component re-emerged but had the lowest eigenvalue, suggesting it has the least overall impact on the variance seen in the responses.

"We had a clear and consistent vision for where we wanted to end up" also loaded strongly onto the alliances suggesting that this component may embody a long term perspective linking it to causation rather than the short-term risk aversion that would connect it with effectuation. This brings into question whether alliances should in fact be included as a sub-construct of effectuation.

Also of interest was the fact that "...avoided any courses of action that reduced our flexibility and adaptability" loaded onto Affordable Loss under the oblique rotation suggesting a construct that may be closely associated with risk aversion.

Regression based factor scores were calculated from both factor analyses but because of the questions above on the nature of the extracted factors it was decided to default to the average scale for each of the constructs identified by the Chandler et al. (2009)

measure. Average scores are acceptable in most circumstances and sometimes preferable (DiStefano, Zhu, & Mindrila, 2009). Reliabilities, means and standard deviations for the measures of causation and effectuation sub-constructs are shown in Table 14. A value for effectuation taken as the average of the four sub-constructs was also included.

Table 14: Descriptives and Reliabilities of decision logic constructs

Construct	N	Min	Max	Mean	Std. Dev	Reliability (Alpha)
Causation	102	-2.00	3.00	1.1303	1.087	.868
Experimentation	102	-2.25	2.50	-.1716	1.176	.716
Affordable Loss	102	-2.00	3.00	1.3775	1.439	.697*
Flexibility	102	-.25	3.00	1.8897	.801	.667*
Pre-Commitments	102	-2.00	2.83	1.3922	.989	.758
Effectuation	102	-.92	2.67	1.1219	.705	n/a

The reliabilities were acceptable but those for flexibility and affordable loss were quite low. No reliability was calculated for effectuation as it is considered a formative construct (Chandler, DeTienne, McKelvie, & Mumford, 2009) and therefore not suitable for traditional reliability analysis (Diamantopoulos, Riefler, & Roth, 2008).

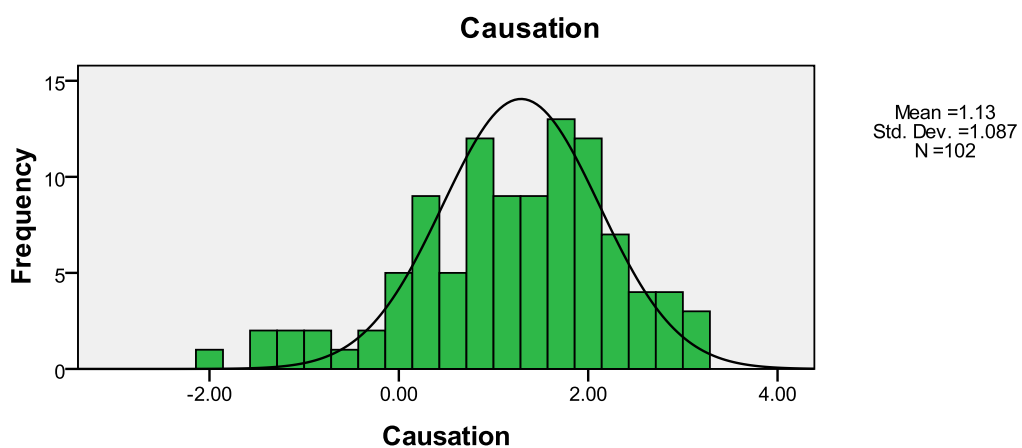


Figure 10: Frequency plot of causation across the sample

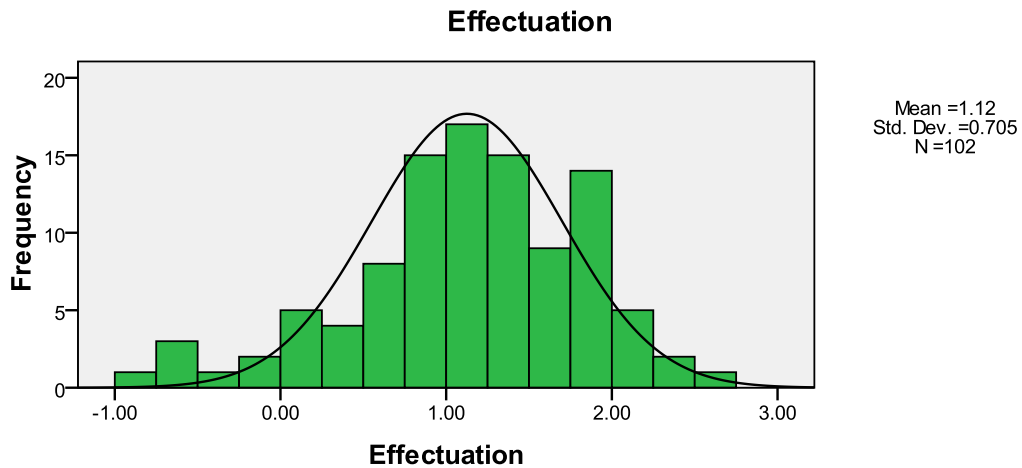


Figure 11: Frequency plot of effectuation across the sample

Analysis of the correlations between the various constructs provides some interesting results – similar to the results quoted by Chandler et al (2009) we find a statistically significant, moderate positive correlation between many of the dimensions of effectuation and general causation. As suggested by Chandler et al (2009), Pre-commitments loads heavily on to causation but affordable loss is also significant, only experimentation and flexibility are found to be unrelated.

Table 15: Correlations between Causation and Effectuation Measures

	1	2	3	4	5
1. Causation	1				
2. Experimentation	.117	1			
3. Affordable Loss	.295**	.023	1		
4. Flexibility	.131	.061	.430**	1	
5. Pre-Commitments	.514**	.216*	.300**	.213*	1

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

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

These correlations are interesting as effectuation and causation have long been proposed as two distinct and alternative decision processes (Saravathy, 2001c). As such we would expect at least some of the dimensions of effectuation to be negatively correlated with causation. The results show quite the opposite, an increase in causation is likely (but not guaranteed) to be matched with an *increase* in at least two dimensions of effectuation with no effect on the others suggesting that candidates

may be found to be causal or effectual or both causal and effectual or neither. This has interesting consequences for future research in this area that will be discussed later in this document.

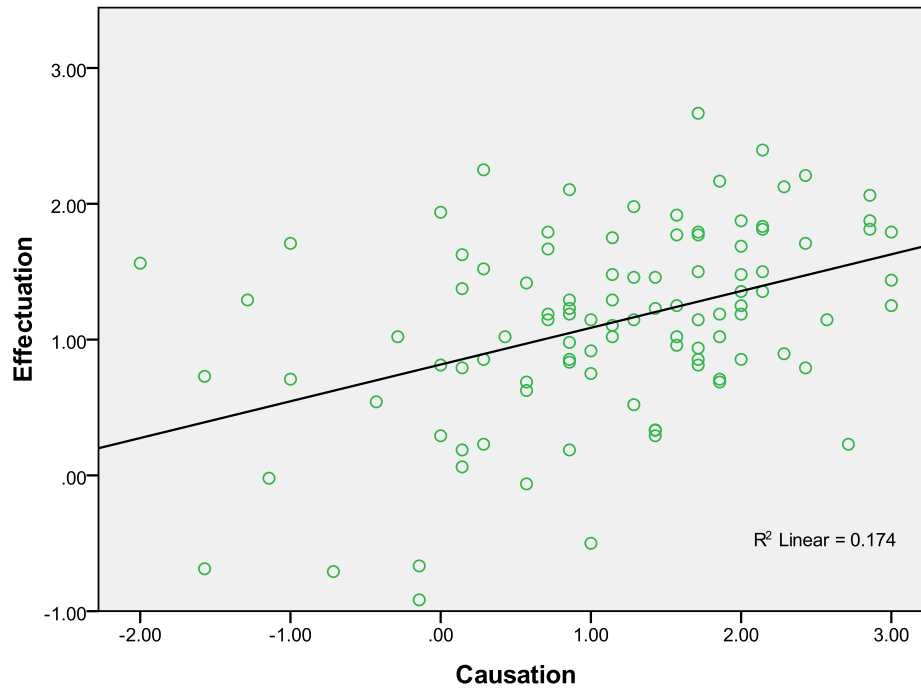


Figure 12: Plot of causation against effectuation showing a small positive correlation

Growth

Respondents were asked to self-report their previous year's revenue as falling into one of 10 ranges. The median values each range was taken to represent the company's revenue and the frequencies are shown below. (Companies that were older than the pre-specified 10 years were excluded from the sample.)

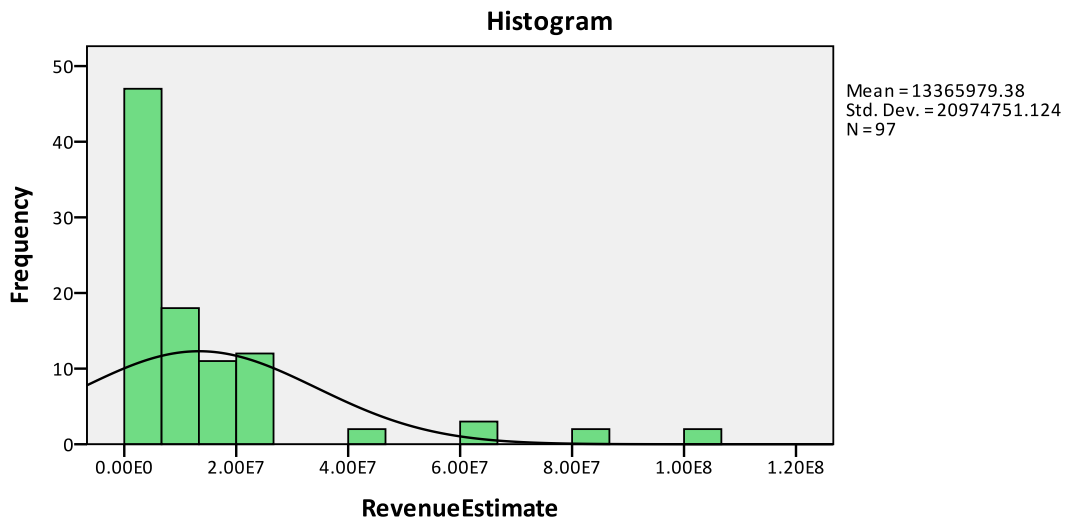


Figure 13: Frequencies of reported previous year's revenues

This shows yearly revenue predominantly falls below R 20 million which is not surprising for a sample of small South African businesses.

Naturally businesses that are older tend to have higher median revenues (See Figure 14). However, there are several companies under 5 years that appear to have almost reached the revenues of their best older counter parts. This suggests that while some companies perform very well in the short term but it is unclear what happens to them in the longer run. It may be that macro-economic conditions have been better for companies in the last 5 years than the 5 years prior or these top performing small companies may be bought by larger companies after about 5 years due to their outstanding performance. This is very interesting as it suggests that the survivor bias (created by failing companies being unavailable for research) often seen in entrepreneurship research may be complimented by a 'success' bias (created by outperforming companies being removed by mergers and acquisitions).

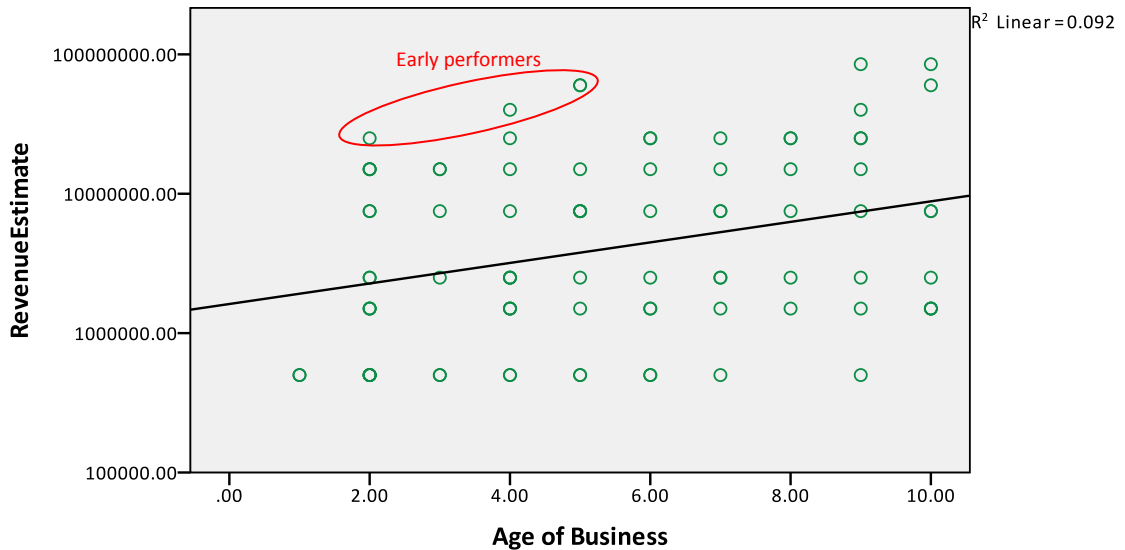


Figure 14: Revenue (logarithmic scale) plotted against the Age of the Business

In an attempt to control for the age of the business and get a reasonable basis for comparison it was assumed that company growth is exponential function of the number of years the company has been in business. By taking the natural logarithm of estimated revenue a linear relationship to the number of years in existence can be found (See the line-of-best-fit in Figure 14). The residuals from the line of best fit give an approximation for the performance of a company in relation to its peer group with the effect of age removed. As the rate of growth tends to taper off with age so there is still some bias in favour of younger companies but these are nominal and a residual plot shows little relationship with age suggesting that it is effectively controlled for.

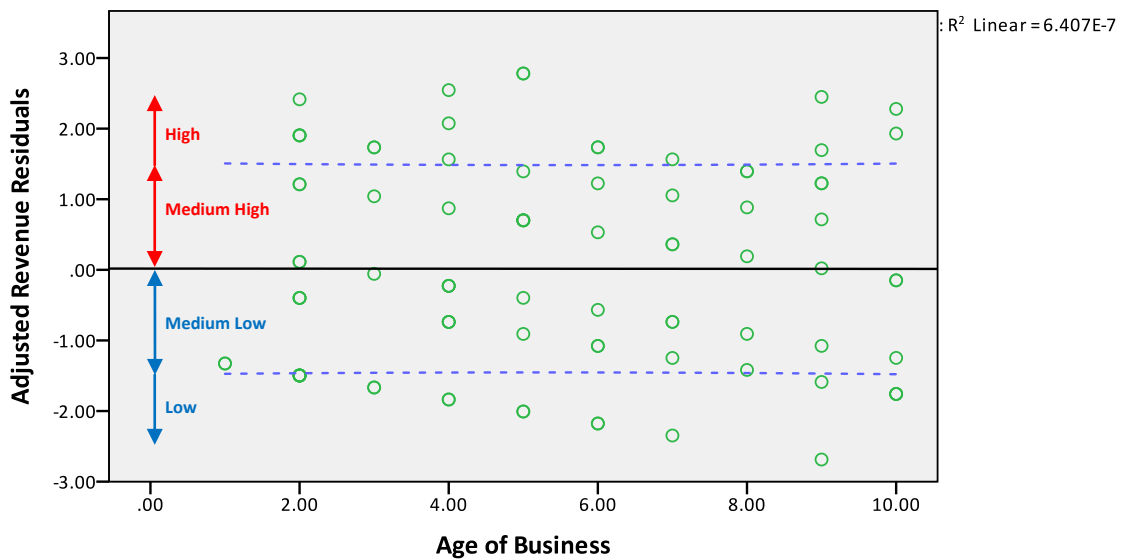


Figure 15: Residuals after the variance explained by age is removed

Using these residuals companies were then separated into four bins for analysis of growth. High growth companies were identified as those that fell above one standard deviation from the mean. Medium high for those that fell above the mean by less than one standard deviation; medium-low for those that fell below the mean but above one standard deviation below and low which fell below one standard deviation from the mean.

Construct interactions and Hypothesis Testing

Using the preliminary analysis above as a base the expected mediation and moderation effects are examined using causal steps analysis (R. M. Baron & Kenny, 1986). Causal steps analysis is usually concluded in 3 stages: Direct effects, First Stage and Mediation analysis and Final stage moderation analysis. The order is modified here to fully answer the proposed hypotheses and results in a combination of the causal steps and piecemeal approach (Edwards & Lambert, 2007).

Direct Effects

The first step in the causal steps approach is to show the direct effect between the independent and dependant variables (R. M. Baron & Kenny, 1986).

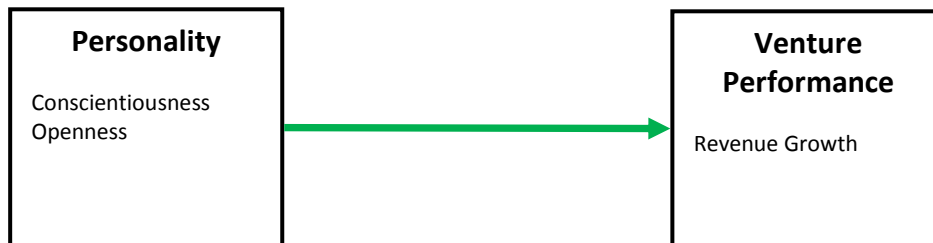


Figure 16: Direct effects between personality and venture performance

Regressing adjusted revenue growth on conscientiousness and openness provided no significant relationship. Although this is one of the steps in the causal steps analysis the result is not surprising – the link between personality and venture performance has generally been quite tenuous (Gartner, 1989) with small groups, even in far less diverse samples than that used in this study. Such tenuous relationships are clarified by moderation (R. M. Baron & Kenny, 1986) and the fragile nature of this link was part of the reason for motivating this study.

Edwards and Lambert (2007) pointed out that the requirement for a direct relationship between the independent and dependant variables was a weakness of the causal steps method. On this basis and given that meta-analysis studies have shown these relationships between both openness and conscientiousness exist it is argued that this step can be ignored for this study.

First Stage Effects

Following investigating the direct effects two stages in the proposed indirect relationship were examined.

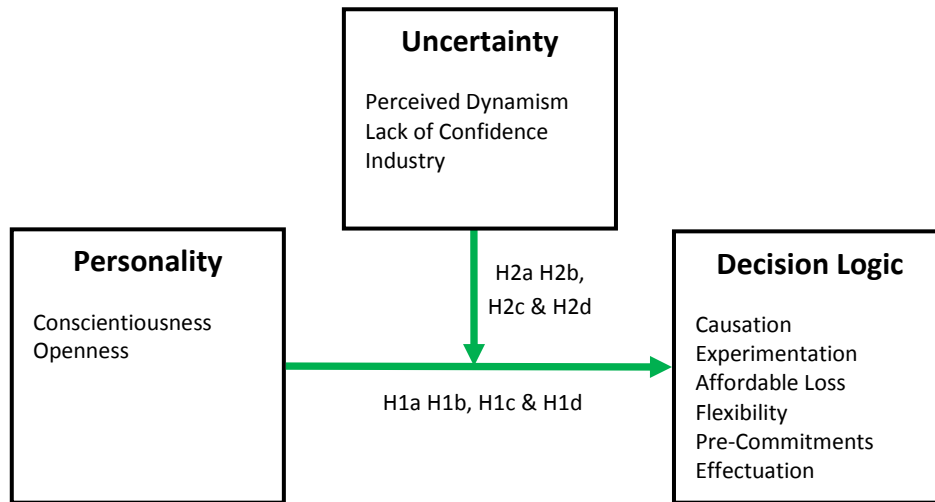


Figure 17: First stage effects and related hypotheses

Initially correlation of decision logic with a number of control variables was carried out:

Parametric correlations between decision logic average education and team size showed significant but weak correlation of causation and pre-commitments with all factors of personality and also the size of the founding team.

Affordable loss was correlated only to team size while Experimentation was correlated with openness and agreeableness flexibility was correlated with conscientiousness and openness. General effectuation was correlated with openness and team size. All reported interactions were weak but significant.

Table 16: Correlations with decision logic

	C	O	Industry	Team Size	Ave. Team Age
Causation	.339**	.215*	-.046	.273**	.166
Experimentation	.059	.255**	-.302**	.150	-.328**
Affordable Loss	.119	.105	.043	.259**	.197*
Flexibility	.275**	.195*	.108	.143	-.070
Pre-Commitments and Alliances	.161	.340**	.053	.190	.156
Effectuation	.220*	.335**	-.042	.302**	-.001

Taking this further several linear models were regressed on causation, the components of effectuation and effectuation as a whole.

The R^2 s of the models are not very large which suggests that there are other significant factors affecting causation that have not been considered in these models.

Table 17: Parameter estimates for linear effects on Causation

Parameter	Model 1	Model 2	Model 3
R^2	0.296	0.391	0.326
Intercept	-.275	-.227	-.324
[Industry=IT]	.083	.155	.048
[Industry=Advertising]	-.133	.018	-.093
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=Yes]	.137	-.015	.132
[PreviousFounder=No]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=Yes]	-.069	-.020	-.095
[HadWorkedInAStartup=No]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.047	-.072	-.056
TeamSize	.243 *	.271 *	.264 *
AveEducation	.072	.064	.056
AverageAge	.034 *	.032 *	.036 *
AgeOfBusiness	-.046	-.065 †	-.055
ZConscientiousness	.312 **	.439 **	.504 **
ZOpenness	.193 †	.151	.236
LackOfConfidence	-.201 †	-.158	-.176
PerceivedDynamism	-.049	-.057	-.063
ZConscientiousness x LackOfConfidence		.269 *	
ZOpenness x LackOfConfidence		-.162	
ZConscientiousness x PerceivedDynamism		-.027	
ZOpenness x PerceivedDynamism		-.065	
ZConscientiousness x ZOpenness		.041	-.006
ZConscientiousness x ZOpenness x LackOfConfidence		.155	
ZConscientiousness x ZOpenness x PerceivedDynamism		-.118	
[Industry=IT] x ZConscientiousness			-.426 †
[Industry=Advertising] x ZConscientiousness			-.123
[Industry=Construction] x ZConscientiousness			0 ^b
[Industry=IT] x ZOpenness			-.207
[Industry=Advertising] x ZOpenness			-.093
[Industry=Construction] x ZOpenness			0 ^b

** p < 0.01; * p < 0.05 ; † p < 0.1

Evidence supporting hypothesis 1a is showing in Table 17. As expected, conscientiousness (Model 1) is shown as a significant positive predictor of causation ($p < 0.01$).

Team size, one of the control variables in the model is also show as a significant predictor ($p < 0.01$). It may be that when there is a team of individuals that all need to know where the business is going there is a greater need for a causal approach in building the business. Smaller teams can permit a more effectual and less formalised approach in building the business. Previous research has shown team size to be a predictor of new venture success (Beckman, 2006; Haleblan & Finkelstein, 1993) and it appears from these results that causation be a mediating factor in this relationship.

Also of interest is that one of the measures of uncertainty, lack of confidence, demonstrated a weakly significant ($p < 0.1$) direct (but negative) effect on causation. Reasons are not clear but it may be that there is a feedback effect of from causation to confidence / knowledge. In other words those that have taken a very causal approach to building their businesses have, as a result of the associated planning and long-term vision, developed greater confidence in the their understanding of how environmental changes will affect their businesses and how they might be able to respond to such changes. Such feedback stands to confound attempts to use perceived uncertainty as a reliable moderator when performing a cross sectional study and so results should be treated with care.

That said, Model 2 in Table 17 which tests the second level moderating effects of the two measures of perceived uncertainty on the link between conscientiousness and causation is also interesting. Ideally there should be no link between the moderating variable and the dependant variable in the first stage (R. M. Baron & Kenny, 1986),

however the interaction ‘ZConscientiousness x LackOfConfidence’ shows significance ($p < 0.05$) and the sign is in the opposite direction to the first level interaction between confidence and causation. This suggests that lack of confidence *increases* causation for a given conscientiousness and this may be a response to the feedback on causation that is suggested by model 1.

The measure of perceived dynamism shows no significant link to causation either direct or through moderation of conscientiousness.

Model 3 which uses industry as an objective measure of uncertainty rather than perceived uncertainty was more conclusive. As predicted by hypothesis 2a in environments of higher uncertainty (IT industry) there is a tendency for lower levels of causation.

Openness to experience was shown to have a weak positive effect on causation in Model 1 but in general there was no effect of on causation even under moderation and as such there is no support for either hypothesis 1d or hypothesis 2d.

Table 18: Parameter estimates for linear effects on Effectuation

Parameter	Model 1	Model 2	Model 3
R ²	0.288	0.479	0.349
Intercept	1.021 *	1.259 **	1.021 *
[Industry=IT]	-.100	.034	-.020
[Industry=Advertising]	.221	.427 *	.400 †
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=No]	-.092	.025	-.020
[PreviousFounder=Yes]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=No]	-.140	-.283 †	-.164
[HadWorkedInAStartup=Yes]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.044	-.092 *	-.088 †
TeamSize	.154 *	.126 †	.154 *
AveEducation	.095 †	.071	.076
AverageAge	-.006	-.006	-.005
AgeOfBusiness	-.022	-.046 *	-.028
ZConscientiousness	.149 *	.223 **	.346 **

ZOpenness	.172 *	.105	-.020
LackOfConfidence	-.009	-.009	.000
PerceivedDynamism	.017	-.050	-.024
ZConscientiousness x LackOfConfidence		.295 **	
ZOpenness x LackOfConfidence		-.104	
ZConscientiousness x PerceivedDynamism		.072	
ZOpenness x PerceivedDynamism		.081	
ZConscientiousness x ZOpenness		-.080	-.007
ZConscientiousness x ZOpenness x LackOfConfidence		-.197 *	
ZConscientiousness x ZOpenness x PerceivedDynamism		.000	
[Industry=IT] x ZConscientiousness			-.225
[Industry=Advertising] x ZConscientiousness			-.207
[Industry=Construction] x ZConscientiousness			0b
[Industry=IT] x ZOpenness			.399 *
[Industry=Advertising] x ZOpenness			.073
[Industry=Construction] x ZOpenness			0b

** p < 0.01; * p < 0.05 ; † p < 0.1

With regard to the aggregate effectuation measure both conscientiousness and openness were found to be positive predictors of effectuation. While it was expected that openness would be a predictor of effectuation (hypothesis 1c) it was expected that conscientiousness would be negatively associated with effectuation (hypothesis 1b). It would appear that conscientiousness predicts using both causal and effectual decision logic – this is a surprising result which is discussed further later in this report.

Lack of confidence about the effects changes in the industry might have on the business increased the role conscientiousness played in predicting effectuation. This means that conscientious people are more likely to be effectual as their lack of confidence increases which supports hypothesis 2b.

The relationship between openness and effectual decision logic is moderated by industry. As hypothesised (hypothesis 2c) the higher uncertainty IT industry encourages higher levels of effectuation.

Because of the formative nature of the effectuation construct the sub-constructs are likely to vary independently with both personality and effectuation and it was decided to further investigate the how personality effected each of the sub-constructs.

Table 19: Parameter estimates for linear effects on Experimentation

Parameter	Model 1	Model 2	Model 3
R²	0.257	0.405	0.359
Intercept	1.481 *	1.870 **	1.424 *
[Industry=IT]	.366	.612 *	.600 †
[Industry=Advertising]	-.027	.125	.307
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=No]	-.278	-.122	-.116
[PreviousFounder=Yes]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=No]	-.261	-.478 †	-.351
[HadWorkedInAStartup=Yes]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.077	-.130 †	-.154 *
TeamSize	.079	.035	.094
AveEducation	-.005	-.052	-.072
AverageAge	-.049 **	-.048 **	-.046 **
AgeOfBusiness	-.004	-.040	-.019
ZConscientiousness	.133	.203 †	.483 *
ZOpenness	.102	-.002	-.347 †
LackOfConfidence	.012	-.008	.058
PerceivedDynamism	.179	.093	.092
ZConscientiousness x LackOfConfidence		.332 **	
ZOpenness x LackOfConfidence		-.247 †	
ZConscientiousness x PerceivedDynamism		.246 *	
ZOpenness x PerceivedDynamismm		.015	
ZConscientiousness x ZOpenness		-.176 †	.014
[Industry=IT] x ZConscientiousness			-.475 †
[Industry=Advertising] x ZConscientiousness			.017
[Industry=Construction] x ZConscientiousness			0 ^b
[Industry=IT] x ZOpenness			.815 **
[Industry=Advertising] x ZOpenness			.180
[Industry=Construction] x ZOpenness			0 ^b

** p < 0.01; * p < 0.05 ; † p < 0.1

Again there is an interesting interaction between some of the control variables. Younger teams were more likely to experiment than older teams, which is probably a question of life stage and therefore the additional risks that younger people are prepared to bear as opposed to their older counter parts.

Of further interest, Model 2 shows an interaction between perceived dynamism and conscientiousness which predicts experimentation ($p < 0.05$). However as neither conscientiousness nor dynamism displays a first level interaction this does not fit the typical predictor moderator pattern and it is difficult to explain the true operation of this relationship. Given a high score on either of the perceived uncertainty measures entrepreneurs high on conscientiousness will still work hard to make the business work and will experiment quite heavily.

With regard to the hypothesised positive relationship between openness and experimentation the regression offers little evidence of a direct relationship however a scatter plot of experimentation against openness is revealing.

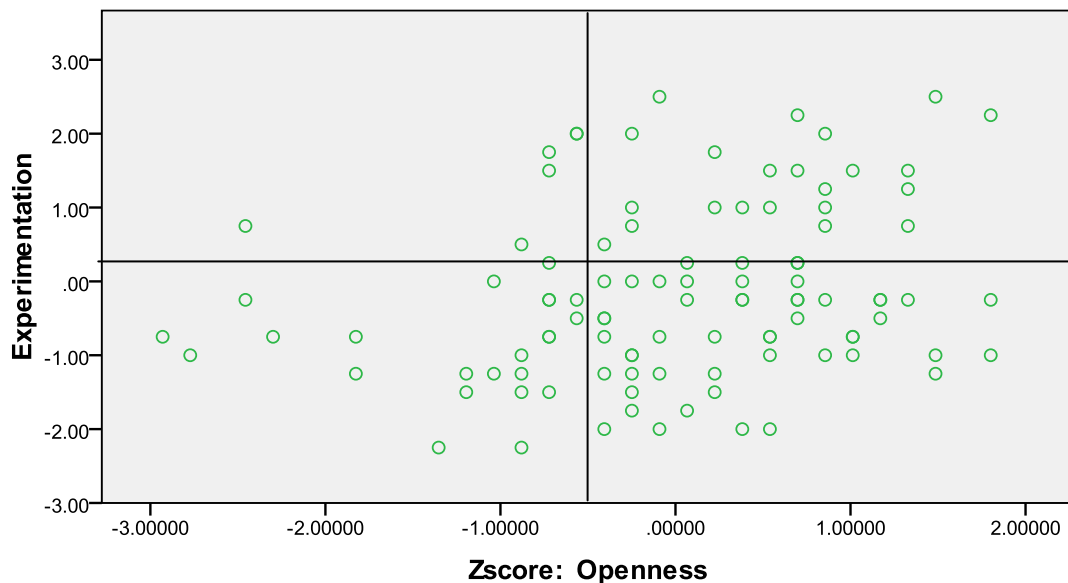


Figure 18: Scatter plot of the entrepreneur's openness against the level of experimentation used

The top left quadrant is relatively clear suggesting that high experimentation generally occurs only with high openness while low experimentation can occur with low or high openness. By separating experimentation into bins above and below one standard deviation from the mean and running a One-Way anova followed by a post hoc Tamhanes T2 (t-test) test of means; it was found that cases exhibiting high

experimentation have a significantly higher mean openness than those exhibiting low experimentation. This provides some indication that experimentation plays a role in the link between openness and effectuation.

Table 20: Comparisons of mean openness at varying levels of experimentation

(I) Experimentation (Binned)	(J) Experimentation (Binned)	Mean Difference (I-J)	Sig.
Low	Medium Low	-.14551	.764
	Medium High	-.18961	.507
	High	-.40759*	.020
Medium Low	Low	.14551	.764
	Medium High	-.04409	.999
	High	-.26207	.245
Medium High	Low	.18961	.507
	Medium Low	.04409	.999
	High	-.21798	.456
High	Low	.40759*	.020
	Medium Low	.26207	.245
	Medium High	.21798	.456

Model 3 in Table 19 shows that relationships between experimentation and both conscientiousness and openness have been masked by interactions in the other direction (Edwards & Lambert, 2007). Conscientiousness is a positive predictor of experimentation but in high uncertainty environments (IT) becomes negatively related. Openness is shown as a weak negative predictor that becomes a very significant, positive predictor in the high uncertainty IT industry. Although this provides some support of hypothesis 2d and fails to support hypothesis 2b the relationship appears more complicated than hypothesised.

Table 21: Parameter estimates for linear effects on Affordable Loss

Parameter	Model 1	Model 2	Model 3
R ²	0.224	0.347	0.289
Intercept	-.643	-.534	-.604

[Industry=IT]	-.098	-.085	-.283
[Industry=Advertising]	.796 †	1.143 **	1.060 *
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=No]	-.319	-.163	-.262
[PreviousFounder=Yes]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=No]	.020	-.130	.086
[HadWorkedInAStartup=Yes]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.024	-.086	-.083
TeamSize	.292 †	.292 †	.314 †
AveEducation	.255 *	.251 *	.283 *
AverageAge	.030	.031	.027
AgeOfBusiness	-.026	-.050	-.030
ZConscientiousness	.132	.243	.434
ZOpenness	.000	-.034	-.026
LackOfConfidence	-.107	-.031	-.112
PerceivedDynamism	-.034	-.170	-.089
ZConscientiousness x LackOfConfidence		.510 **	
ZOpenness x LackOfConfidence		-.131	
ZConscientiousness x PerceivedDynamism		-.066	
ZOpenness x PerceivedDynamism		.188	
ZConscientiousness x ZOpenness		.048	-.191
ZConscientiousness x ZOpenness x LackOfConfidence		-.115	
ZConscientiousness x ZOpenness x PerceivedDynamism		.000	
[Industry=IT] x ZConscientiousness			-.342
[Industry=Advertising] x ZConscientiousness			-.758
[Industry=Construction] x ZConscientiousness			0 ^b
[Industry=IT] x ZOpenness			.280
[Industry=Advertising] x ZOpenness			-.106
[Industry=Construction] x ZOpenness			0 ^b

** p < 0.01; * p < 0.05 ; † p < 0.1

The next sub-construct of effectuation, affordable loss, demonstrates little interaction with personality traits only being predicted by the interaction of conscientiousness and lack of confidence.

Affordable loss had a statistically weakly significant regression coefficient for team size (See Table 21 Model 1). Larger teams are probably more accountable to one another, more stable and possibly take less extreme risks than single teams. Also there may be a greater sense of trust that the team will look after one another leading to a lower perception of potential loss.

Table 22: Parameter estimates for linear effects on Flexibility

Parameter	Model 1	Model 2	Model 3
R ²	0.263	0.333	0.291
Intercept	2.028 **	2.106 **	2.053 **
[Industry=IT]	-.250	-.185	-.138
[Industry=Advertising]	.117	.210	.096
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=No]	.040	.041	.053
[PreviousFounder=Yes]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=No]	.017	-.050	-.002
[HadWorkedInAStartup=Yes]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.041	-.076	-.044
TeamSize	.074	.034	.040
AveEducation	.076	.062	.069
AverageAge	-.017	-.014	-.016
AgeOfBusiness	.024	.017	.026
ZConscientiousness	.210 **	.214 **	.168
ZOpenness	.169 *	.140 †	.145
LackOfConfidence	.060	.031	.036
PerceivedDynamism	-.089	-.104	-.080
ZConscientiousness x LackOfConfidence		.050	
ZOpenness x LackOfConfidence		.011	
ZConscientiousness x PerceivedDynamism		-.025	
ZOpenness x PerceivedDynamism		.157 †	
ZConscientiousness x ZOpenness		-.122	.114
ZConscientiousness x ZOpenness x LackOfConfidence		-.202 *	
ZConscientiousness x ZOpenness x PerceivedDynamism		.000	
[Industry=IT] x ZConscientiousness			.138
[Industry=Advertising] x ZConscientiousness			.018
[Industry=Construction] x ZConscientiousness			0 ^b
[Industry=IT] x ZOpenness			.074
[Industry=Advertising] x ZOpenness			-.022
[Industry=Construction] x ZOpenness			0 ^b

** p < 0.01; * p < 0.05 ; † p < 0.1

Flexibility is predicted by conscientiousness (See Table 22 Model 1). The more conscientious the entrepreneur the more flexible the business they are likely to build. It may be that conscientiousness brings with it the commitment to continue innovating and evolving even when set-backs arise. Openness too was shown to be a predictor of this property of effectuation (See Table 22 Model 1) and there was weak evidence that it may be moderated by perceived dynamism (See Model 2).

Table 23: Parameter estimates for linear effects on Pre-commitments and alliances

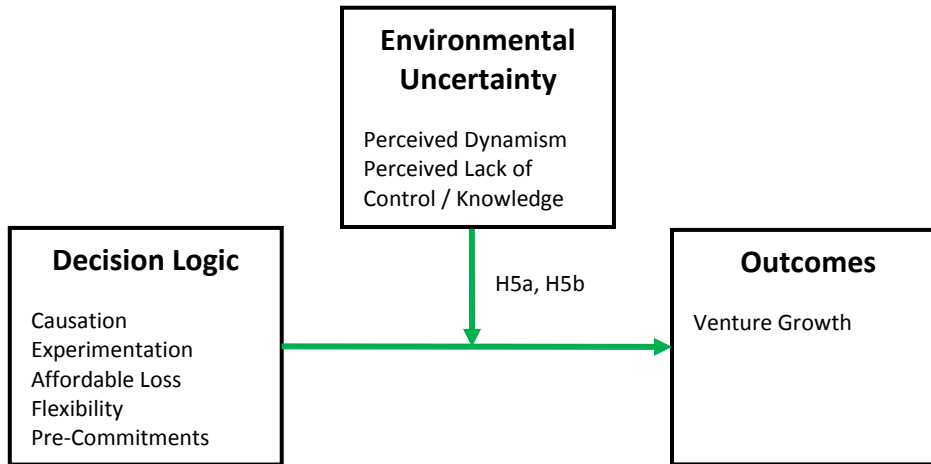
Parameter	Model 1	Model 2	Model 3
R ²	0.367	0.513	0.398
Intercept	1.216 *	1.592 **	1.211 *
[Industry=IT]	-.418 †	-.206	-.259
[Industry=Advertising]	-.004	.232	.135
[Industry=Construction]	0 ^b	0 ^b	0 ^b
[PreviousFounder=No]	.191	.342 †	.244
[PreviousFounder=Yes]	0 ^b	0 ^b	0 ^b
[HadWorkedInAStartup=No]	-.337	-.475 *	-.390 †
[HadWorkedInAStartup=Yes]	0 ^b	0 ^b	0 ^b
IndustryExperience	-.036	-.074	-.070
TeamSize	.169 †	.144	.168
AveEducation	.053	.023	.026
AverageAge	.013	.008	.013
AgeOfBusiness	-.081 *	-.111 **	-.088 **
ZConscientiousness	.123	.232 *	.300 †
ZOpenness	.417 **	.315 **	.150
LackOfConfidence	-.002	-.028	.015
PerceivedDynamism	.010	-.018	-.020
ZConscientiousness x LackOfConfidence		.288 **	
ZOpenness x LackOfConfidence		-.050	
ZConscientiousness x PerceivedDynamism		.133	
ZOpenness x PerceivedDynamism		-.038	
ZConscientiousness x ZOpenness		-.072	.037
ZConscientiousness x ZOpenness x LackOfConfidence		-.374 **	
ZConscientiousness x ZOpenness x PerceivedDynamism		.000	
[Industry=IT] x ZConscientiousness			-.219
[Industry=Advertising] x ZConscientiousness			-.107
[Industry=Construction] x ZConscientiousness			0 ^b
[Industry=IT] x ZOpenness			.426 †
[Industry=Advertising] x ZOpenness			.242
[Industry=Construction] x ZOpenness			0 ^b

** p < 0.01; * p < 0.05 ; † p < 0.1

Pre-commitments and alliances are predicted by openness. This may be because people that are open to experience are more liberal and more adventurous and therefore more likely to say yes to proposed partnerships or give potential alliances a chance. At the same time the age of the business was a predictor suggesting that companies rely less on pre-commitments as they grow.

Second Stage Effects

The second stage of analysis considers the relationship between decision logic and venture performance in the presence of uncertainty.



Some basic correlations between focus variables and adjusted revenue growth are shown in the table below.

Table 24: Correlations with Adjusted Revenue

	Adjusted Revenue	Adjusted Revenue (Binned)
Causation	.267**	.213*
Effectuation	.134	.076
Experimentation	.127	.128
Affordable Loss	-.019	-.075
Flexibility	.113	.100
Pre-Commitments and Alliances	.164	.077
Lack of Confidence	-.184	-.227*
Perceived Dynamism	-.220*	-.249*
Industry	.034	.017

Causation is shown to be correlated with revenue growth but effectuation and none of the effectuation sub-constructs show any correlation. Both of the perceived uncertainty constructs also appear negatively correlated with the categorised (binned) measure of revenue growth but not the objective measure of uncertainty - it may well be that poor growth due to negative experiences of uncertainty would result in a bias in reported perceptions of uncertainty.

A plot of revenue growth (controlled for the exponential effects of age) shows a weak positive correlation between causation and revenue growth ($R^2 < 0.1$).

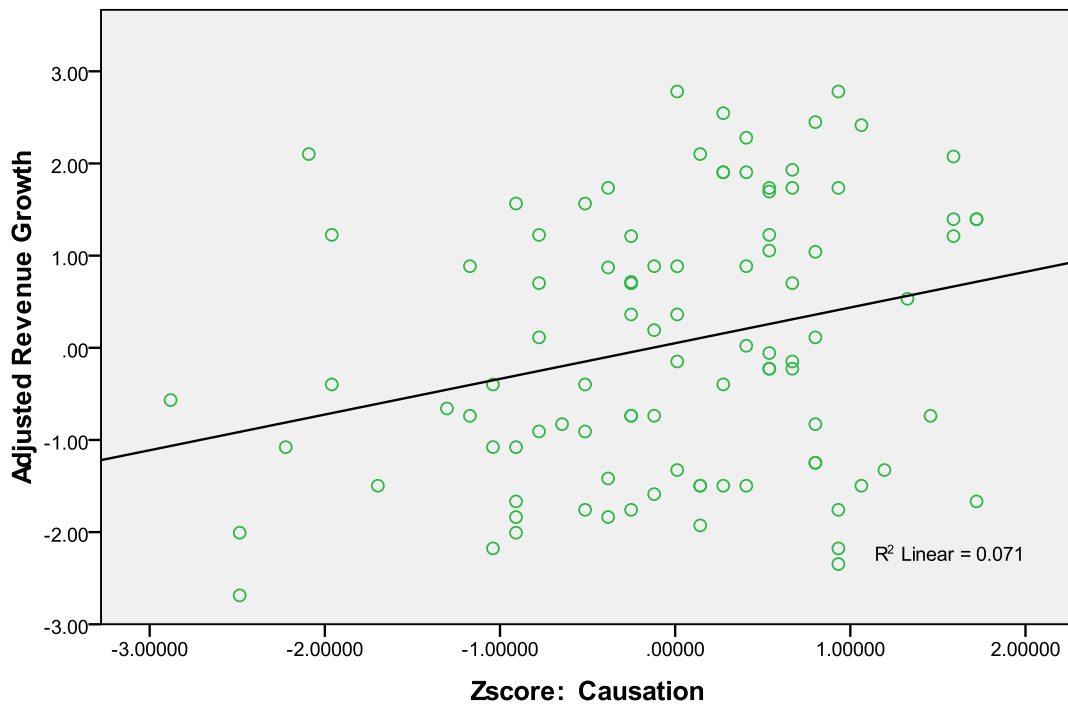


Figure 19: A scatter plot of the relationship between Adjusted Revenue Growth and Causation

Hypothesis 4a predicted that in environments of low uncertainty causal decision logic would be a more important predictor of growth than in high uncertainty environments. Under the assumption that Information technology represents an environment which is highly dynamic in comparison to construction which is an industry prone to less rapid innovation and changes; the relationship between causation and success was re-examined by separating the data into these two industries.

Evaluation of the effect of causation on venture performance in the construction (low uncertainty) industry shows a significant and strong positive relationship between causation and venture performance (See Figure 20). R^2 in the relationship is 0.34 which given the complexity both of measurement and external interactions is good.

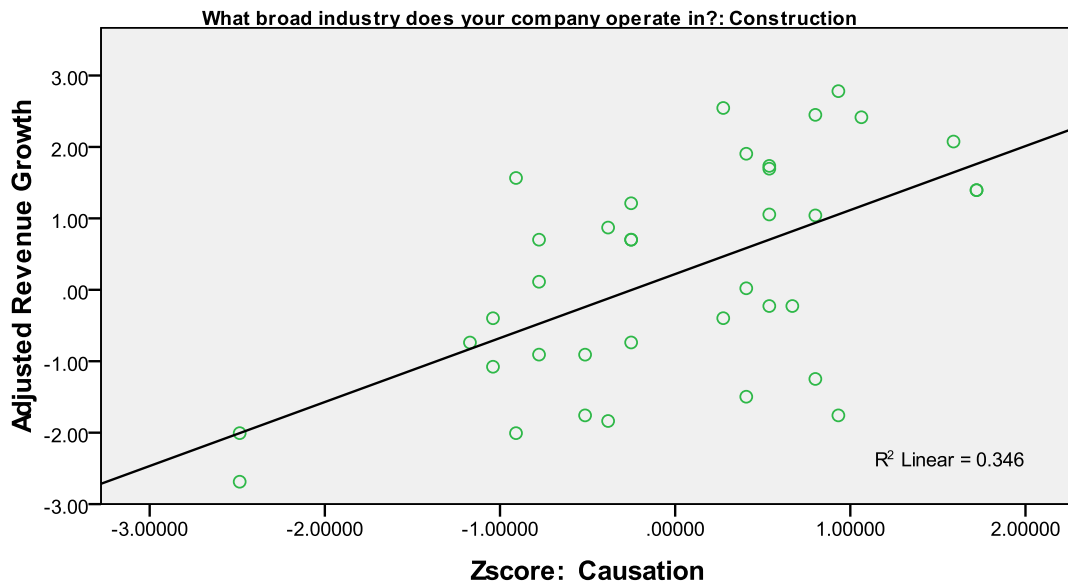


Figure 20: A scatter plot of the relationship between Adjusted Revenue Growth and Causation in the Construction Industry

On the other hand examination of companies in the highly uncertain information technology industry shows a slightly negative (although not statistically significant) relationship between causation and venture performance. (See Figure 21). R^2 in this case suggests that causation only explains 2% of the total variance and is not a good predictor of venture performance.

This supports the predictions of hypothesis 4a.

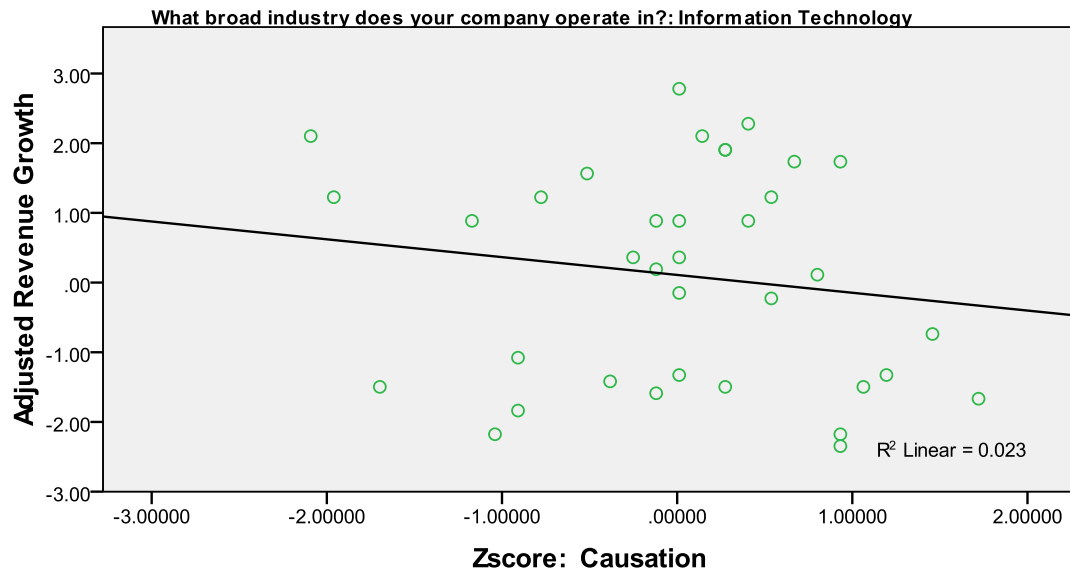


Figure 21: Scatter plot of venture performance against causation in the Information Technohnology Industry

Analysis effectuation proves less inspiring. In general little or no relationship between effectuation or its sub-constructs and revenue growth was found, an exception is pre-commitments and alliances which provides similar results to those of causation above and may be due to the fact that pre-commitments and alliances is a predictor of causation.

Affordable loss showed a weak positive correlation link with venture performance in the construction industry which actually runs counter to the result predicted by Hypothesis 4b but the relationship was not significant.

The advertising industry showed a strong positive relationship between experimentation and venture performance and negative correlation between affordable loss and venture performance but this is most likely due to the necessity for creativity for success in this industry rather than the moderating effect of industry uncertainty on decision logic (See Figure 21 and Figure 22).



Figure 22: Scatter plot of venture performance against experimentation in the Advertising Industry



Figure 23: Scatter plot of venture performance against Affordable Loss in the Advertising Industry

These results were confirmed using linear modeling.

Table 25: Parameter estimates for linear effects on Adjusted Revenue

	Model 1	Model 2	Model 3
R ²	0.18	0.266	0.36
Intercept	.182	-1.317	.218
[PreviousFounder=No]	.063	.065	.059
[PreviousFounder=Yes]	0a	0a	0a
[HadWorkedInAStartup=No]	.018	.000	-.086
[HadWorkedInAStartup=Yes]	0a	0a	0a

[Industry=IT]	-.454	3.475 *	3.370 *
[Industry=Construction]	0a	0a	0a
IndustryExperience	.027	.080	.102
AgeOfBusiness	.043	.023	.007
AveEducation	.024	-.051	-.060
AverageAge	-.011	-.005	.002
TeamSize	.180	.235	.171
ExternalCapital	.000	.000	.000
Conscientiousness	-.330 †	-.430	-1.204
Openness	-.182	.654	-.239
Causation	.380 *	.264	.915 *
Effectuation	.140	.275	.016
[Industry=IT] x Conscientiousness		-.261	.078
[Industry=Construction] x Conscientiousness		0a	0a
[Industry=IT] x Openness		-1.791 *	-1.361 †
[Industry=Construction] x Openness		0a	0a
Conscientiousness x Openness			.310
Causation x Effectuation			-.033
[Industry=IT] x Causation			-1.123 **
[Industry=Construction] x Causation			0a
[Industry=IT] x Effectuation			.201
[Industry=Construction] x Effectuation			0a

** p < 0.01; * p < 0.05 ; † p < 0.1

Table 25 confirms the mediating role of causation in the overall model with causation showing a significant effect in both Model 1 and Model 3 with no effect of conscientiousness evident in Model 3.

Model 3 also shows the moderating effect of objective (industry related) uncertainty on the secondary effect of causation. In the high uncertainty IT industry revenue growth is moderated down severely for the same level of causation.

No relationship between openness or effectuation and revenue growth is evident offering no support to either hypothesis 4b or hypothesis 5b.

The interaction between openness and conscientiousness is also not significant providing no evidence for hypothesis 6a that the combination of traits would perform better than either one on its own.

Discussion of Results

The proposed model was only partially verified for South African entrepreneurs within the IT and construction industries. Never-the-less, the empirical results presented above provide an interesting platform for discussion, further theoretical development and suggestions for future research.

Firstly, a statistically significant relationship was found between conscientiousness and causation. As hypothesised, this means that entrepreneurs that have a high level of conscientiousness are more likely to reflect causal thinking than those that do not. This also makes intuitive sense in that the effort required for detailed causal planning would require a person with a conscientious, hard-working, 'get things done' personality and may prove useful in selecting entrepreneurs for tasks or matching them with funders who prefer a more structured causal approach to business development.

The hypothesis that the relationship between conscientiousness and causation would be reduced by uncertainty was supported. It was predicted that increased perceived uncertainty would result in a lower reliance on causal decision logic - as the future becomes more difficult to predict it was expected that entrepreneurs would make less effort to do so and instead switch to a more effectual based approach. Using industry as a proxy for uncertainty the relationship between conscientiousness and casual logic was drastically reduced in the IT industry while the correlation remained strong in the more stable construction industry. It is concluded that causation becomes more impractical and more difficult as the level of uncertainty in the environment increases.

Whether this is a linear degradation or rather a relationship determined by a threshold remains for future research.

Interestingly, measures of perceived uncertainty failed to produce a similar result despite the clear suggestion in the literature (Duncan, 1972; Lipshitz & Strauss, 1997) that perceptions of uncertainty should be better predictors of actual behaviour than objective measures.

This discrepancy may most likely be attributed to a degree of measurement bias. For one, there is a challenge insuring that respondents after several years in the business are able to correctly remember and the level of uncertainty they experienced in setting up their business. In addition, self-report measures tend to be biased towards events that have occurred in the recent past and so measures of perceived uncertainty may report more severe levels of uncertainty where negative 'chance' outcomes have been recently experienced. Such problems are far less likely in longitudinal study when the measurement of perceived uncertainty could be done closer to the point of the actual decision.

In retrospect the author is also cognisant of the absence of a distinction between risk and uncertainty (Knight, 1921) in the measure of perceived uncertainty used in this study which may have served to further confound results. As risk may be understood as a probability distribution, it could be that increased risk may drive causal logic as the entrepreneur attempts to get a better understanding of the risk they face by planning. Exactly the opposite is expected for uncertainty for which additional planning serves little purpose. This might explain why a positive correlation between causation and lack of confidence was found.

It is recommended that careful consideration be given to measurements of uncertainty in future research in this area. Different types, sources and levels of risk, uncertainty and ambiguity may all affect decision logic in different ways and further research quantifying these differences will be invaluable in improving the understanding of the role uncertainty plays in entrepreneurship.

It also remains unclear as to the effect risk-tolerance; tolerance for uncertainty or cognitive ability might have on reported uncertainty faced by an entrepreneur. Studies on more homogenous samples of entrepreneurs may shed some light on any potential interactions.

It was also shown that the founding team composition has a significant impact on the use of a causal approach. In particular larger teams and teams with a higher average age were found to be more causal.

Founding teams with more members were found to exhibit a significantly more causation based approach to building their businesses most probably due to the need to formalise the plan of where the business is headed so that all the members are able to work toward that in unison. Under a causal approach it is likely that teams are able to assign tasks and to make decisions faster. With regard to average team age it is likely that causation may be linked either to generational theory or life stage of the entrepreneurs concerned.

Although the effects of team structure on venture success have been well documented (Eisenhardt & Schoonhoven, 1990; Halebian & Finkelstein, 1993; Song, Podoyntsyna, Bij, & Halman, 2008) the possible mediating effects on decision logic do not appear to

have been thoroughly considered, this may prove an interesting area for future research.

It was hypothesised that openness to experience would be negatively associated with causal decision logic because the sub-traits of openness were intuitively linked effectuation the ‘opposite’ of causation. However, this relationship was not supported empirically. To the contrary, both conscientiousness and openness were found to be predictors of causal and effectual logic (See Table 17 and Table 18). In addition, two of the sub-constructs of the effectuation were found to be positively correlated with causation.

This introduces another interesting question raised by our results – causation and effectuation are conceptualised as ‘opposite’ approaches to decision making and hence often evaluated on a continuum from ‘highly causal’ to ‘highly effectual’ (i.e. Garonne, Davidsson, & Steffens, 2010). However, given the strong correlations between the sub-constructs of effectuation and causation (See Table 15) and that overall effectuation was shown to be correlated with causation (See Figure 12), how can this be the case? The correlation between causation and effectuation appears counter intuitive when considering Sarasvathy’s clear conceptualisation of effectuation and causation as opposing approaches (Sarasvathy, 2001; Sarasvathy & Dew, 2005a; Sarasvathy & Dew, 2005b).

The solution to this dilemma is not immediately apparent. It may be that current measures of effectuation are flawed – the construct of effectuation is complex and differs subtly from constructs such as exploration (March, 1991). Sarasvathy herself has criticised several researchers for published misinterpretations of her construct (Sarasvathy & Dew, 2008a; 2008b). Chandler et al. (2009) did describe several

challenges in developing their operationalisation and recommend further work on the measurement of effectuation, it is possible that they may not have adequately isolated the subtly inherent in the effectuation construct.

At the same time it is perhaps not impossible to imagine how individuals might possibly rate highly on both effectuation and causation – opposite though they might be. Launching a business is a process that requires the entrepreneur or founding team to make many decisions over the lifetime of their business. Each of these decisions may be accompanied by a different level of risk and uncertainty. Some researchers have commented on the possibility of entrepreneurs switching between causal or effectual decision approaches depending on the decision to be made; as part of a meta-cognitive strategy (Haynie, Shepherd, Mosakowski, & Earley, 2010).

Intuitively this view is supported by two simple thought experiments: After an effectual product transformation (Sarasvathy & Dew, 2005c) has taken place the entrepreneur / founding team may plan quite deliberately about how to exploit the position they then find themselves in and reach new customers for the previously unplanned product or deliberate on similar markets that might be reached by a similar evolution. Conversely, an entrepreneur having developed a causal plan for a particular product and market may be approached unexpectedly by a client offering an opportunity to adapt the product to a previously unnoticed market. In both cases the founding team would need to switch strategies as the situation or environment changes. For the entrepreneur to remain too attached to his first decisioning stance might prove quite negative for venture success. It is proposed that in many businesses the ability to switch between and exercise both effectual and causal processing may be vital to venture success.

Effort should be made in developing instruments that do not treat causation and effectuation as opposing traits of the entrepreneur but rather as skills or abilities that the entrepreneur may call on when necessary to solve challenges and make decisions to effectively build a business.

Analysis of the effectuation also proved informative. As predicted, openness was found to be a significant predictor of effectuation. Entrepreneurs with a greater openness use more effectual logic in the development of their businesses and openness might be a desired characteristic in entrepreneurs if effectuation is correlated with venture success. Although this was not the conclusion of this study previous work has found positive correlations between aspects of effectuation and business performance (Read, Song, & Smit, 2009).

It was also predicted that causation and effectuation would be differentially effective proponents of new venture outcomes under varying degrees of environmental uncertainty. Using the industry as a proxy for uncertainty, some evidence of such effects was evident. Causation offered the better result with strong returns to causation in the stable construction industry which were completely absent in than in the dynamic IT industry.

The results for effectuation were less satisfactory – no relationship was found between effectuation and revenue growth even when considering the moderating effect of uncertainty. This suggests that there is no advantage to following effectual decision logic in the development of new ventures and runs contrary to previous findings on the subject (Read, Song, & Smit, 2009). The reason for conflicting results may be on account of specific attributes of the sample. The variance for effectuation across the sample was quite low and may have been insufficient for statistical inferences to be

drawn. Also, as a formative construct not all of the sub-constructs of effectuation may be related to venture success and so persons with different amounts of these constructs may achieve different results even though they appear to have a similar level of effectuation.

With regard to the causation and effectuation acting as mediating processes between personality and venture success there was again insufficient statistical evidence for significant conclusions to be drawn. The results allude to the fact that causation acts as a mediator to conscientiousness in venture success given the fact that conscientiousness was found to predict causation which in turn was found to predict venture success. However, the direct effect of conscientiousness on venture success, a pre-requisite for the moderated causal steps approach, was not evident. Previous research has found the link between personality and venture success to be tenuous except under the large sample sets of meta-data studies the fact that no link was found in this study is not surprising. By making the assumption that recent meta-studies are correct in attributing positive growth to conscientiousness it can be concluded that this study supports the mediation hypothesis. In addition it should be pointed out that causation is not expected to be a pure mediator of venture success as conscientiousness is likely to contribute to venture success along many paths as conscientiousness its underlying achievement motive and general effort that it might be expected to resonate with any action that contribute toward venture success.

Neither openness nor effectuation was found to predict success in this study resulting in no conclusion for the predicted mediation of openness by effectuation in contributing to new venture success.

Returns to effectuation were significant in the advertising industry but here the results are confounded by the necessity for openness a predictor of effectuation and for the advertising task.

Limitations and Considerations

This study is subject to several limitations discussed below:

Generalisation

The study is conducted on a snowballed sample of South African entrepreneurs in the IT, Advertising and Construction Industries. Although there is no reason to suspect that the actions of South African entrepreneurs with relation to their broad personality domain should differ from entrepreneurs in general there may be cultural differences in the interpretation of personality and care should be taken in generalising results beyond the South African context. Further than this, there may be macro-economic factors and industry idiosyncrasies unique to South African IT, construction or advertising companies and care should be taken in generalising to their equivalents in other countries, especially in respect of revenue growth.

Further, although no significant reasons were found to suspect that the sample is not representative, non-random sampling techniques like snowball sampling may be subject to sampling bias especially given that the sample was in general seeded through the researcher's personal networks. It was noted that the sample was of predominantly white, male entrepreneurs living in Gauteng. The businesses were all between 2 and 10 years old.

Significant differences noted between industries studied show that care must be taken in generalising these results to the broad field of entrepreneurship. In particular

industries that have a strong direct effect of personality types on success, such as creativity / openness in advertising may confound results that would treat decision logic as a pure mediator of personality in business success. In short it would not be advisable to blindly assume that the personality types that generally improve business performance should be the sole concerns in determining who to invest in or what type of business to start.

Sample Bias

As in many entrepreneurial studies the sample is likely to have been effected by survivor bias as the companies interviewed were those still in operation when many of their peers may have failed and therefore be unavailable for feedback.

A bias toward companies that are unattractive merger or acquisition targets was also suggested due to the possibility of companies that perform very well or form good alliances falling prey to mergers or acquisitions and therefore becoming unavailable for sampling.

Measurement Error

Challenges in linking the personality traits of a single individual to the actions of a founding team have been discussed elsewhere in this document. Although some efforts were made to control for the dilution effect of team members it remains unclear how personalities are expressed in larger teams. This has interesting implications for the conclusions of this study and any other research into the personality of entrepreneurs, further study of personality interactions in founding teams is needed. (Chandler, Honig, & Wiklund, 2005)

As a formative construct effectuation remains difficult to operationalise. In this study we chose to use an average value of the four constructs as an approximation for effectuation. This may incorporate some measurement error and possibly increase the chances of Type 2 errors. Chandler et al. (2007) have suggested the use of MIMIC analysis as a way to reduce measurement error of effectuation but this requires adding additional questions to the questionnaire and the length of the questionnaire was already an issue with this study. The instrument designed by Chandler et al. (2007) is still relatively new and will no doubt become more refined by researchers over the coming years.

The data was collected in the form of a cross sectional study and most measures are post hoc perceptions of what has happened in the past. Some of the respondents especially those that with older businesses (six to ten years old) may struggle to remember and correctly report what happened in the early stages of founding their ventures and may exhibit a bias to more recent experiences or particularly memorable events. In particular the report of perceived uncertainty may be subject to significant bias when considered post hoc; this is an unfortunate side-effect in retrospective studies. This may be partially mitigated as the founding of their business would have been an event of some significance in the life of the entrepreneur and they therefore should have better recollections of its circumstances.

Causality

This research is a cross-sectional study of the magnitude and significance of the relationships between variables only and does not attempt to prove causality.

Because of the genetic (Jang, Livesley, & Vernon, 1996) and stable nature of personality (Roberts & DelVecchio, 2000) it is expected that personality would precede

entrepreneurial decision logic employed but some feedback cannot be ruled out. It may be that the choice of decision logic over some time may influence the personality's expression by the same mechanism which situational variables influence the expression of personality.

Similarly, the questions on decision logic focused on describing how the business was started which precedes the entrepreneurial outcomes reported, however it is possible that answers in this section could be influenced by the entrepreneurs current perceptions and feelings based on the results.

Finally while industry uncertainty is certainly causal in new venture success, the perception of uncertainty is difficult to place in time and is likely to be heavily influenced by experience and current thinking of the entrepreneur.

Ultimately, it must be left to longitudinal studies to draw relevant conclusions on the causal direction of these relationships.

Further research

Entrepreneurship is a growing and interesting body of research and throughout this study recommendations have been given of areas for further research. In particular the following areas are reiterated:

This study focused on two of the broad domains of personality Conscientiousness and Openness to experience. It has been suggested that specific personality traits may provide more significant relationships because it is likely that some traits in a larger dimension may have no effect (Rauch & Frese, 2007) and hence increase the likelihood of Type II errors. The decision to work with broad domain traits was considered a logical pre-cursor to measuring the effects of specific traits and it is hoped that this

study may survey as a platform for further more specific examination of the role of personality in the entrepreneurial process.

There also remain challenges in understanding and operationalising measures for uncertainty that properly incorporate all the necessary aspects of this complicated but important construct. Objective measures of uncertainty remain complicated and most studies currently default to measures of industry 'dynamism' but struggle to interpret the difference between things like risk and pure uncertainty.

In the same vein perceptive measures of uncertainty appear fraught with their own challenges, in particular recency bias adds to measurement errors; studies that measure perceived uncertainty nearer to the moment of actual decision will shed more light on how an entrepreneurs decisions are affected by his/her perception of uncertainty.

Conclusion

A model linking the personality of entrepreneurs to the success of the ventures they create was tested using causal and effectual decision logic as mediators and environmental uncertainty as a moderator.

Using causal steps analysis it was shown that personality does indeed predict the way that entrepreneurs go about making decisions in the course of building their businesses and that this may affect the level of success they achieve. In particular it was demonstrated that conscientiousness is a predictor of the both effectual and causal decision processes with causal logic being favoured in more stable environments and effectual logic in more uncertain environments. Openness to experience was also shown to predict effectual decisioning in highly uncertain environments. Finally, mediation was demonstrated for causation which predicted revenue growth in the sampled South African firms although this effect was strongly moderated by environmental uncertainty.

This paper joins a growing body of research responding to recent calls for further investigation in to the mediating and moderating variables in the role of personality in entrepreneurship and contributes by providing empirical evidence supporting models that incorporate decision logic as a mediating variable in this process. However, the entrepreneurial process is far more complicated than can be summarised with a few simple interactions and much research is still needed to develop models of the entrepreneurial mindset to help clarify how and why businesses develop the way they do; and what in this process we can attribute to the entrepreneur, competitors, the industry or random chance.

While some of the relationships found were predicted using previous theory others provided challenging information that must reframe the current thinking. Where possible, areas for future research have been suggested.

In particular measures of perceived uncertainty provided far less useful results than the simple objective proxy of industry, this is troubling and it is felt that there are some complex cognitive-affective process that affect the type, level and focus of this construct and revising the operationalisation of perceived uncertainty will be a key to gaining a deeper understanding of the entrepreneurial process.

Even more important the results do not sit comfortably with current approaches that place causation and effectuation as to opposite and exclusive processes to business decision making. In contrast it appears that conscientious entrepreneurs will make use of both processes, most probably switching frequently depending on the nature of the decision that needs to be taken. While it was possible to show that lower levels of causation in highly uncertainty environments improved revenue growth; these situations were not matched with a corresponding increases in effectuation. Only future research into a broader range of industries with better understandings of other relevant factors will help to solve this dilemma.

As researchers continue to expand knowledge on how entrepreneurs build successful businesses; how, why and when entrepreneurs make decisions remains an interesting part of this research with many questions still to be answered.

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Appendix 1: Research Questionnaire

INFORMATION SHEET DOCUMENT

"Entrepreneurship Survey"

RESEARCHERS' STATEMENT

We are asking you to complete a survey as part of a research study. The purpose of this information sheet is to give you the information you will need to help you decide whether to be in the study or not. **It IS NOT part of the actual study.** This process is called "informed consent." Please read the form carefully.

DESCRIPTION/PURPOSE OF RESEARCH

The purpose of this study is to assess how the personal characteristics of entrepreneurs are related to the approach that they take in launching a building a new business.

You have been selected to participate in this study because of you have launched a business in South Africa in the last 10 years.

DATA COLLECTION AND ANALYSIS

All data collected as part of this research will remain confidential. Matching of data will occur through the use of a confidential number. No one but the researchers will see your individual data and the researchers will not be able to associate the data with a specific individual.

RISKS OR DISCOMFORTS

There are no foreseeable risks or discomforts associated with completing this survey.

ALTERNATIVES TO PARTICIPATION

You may choose not to participate in this study. You may withdraw from the study at any point. You are not obliged to answer all the questions.

BENEFITS OF PARTICIPATION

There are no direct benefits to you from participating in this study

CONSENT

By marking that you agree to participate, you give your permission for information gained from your participation in this study to be published in scholarly management literature, discussed for educational purposes, and used generally to further management science. You will not be personally identified; all information was presented as anonymous data.

- I agree and choose to participate in this study.
- I do not agree and choose NOT to participate.

This survey is divided into 4 sections. Each section contains questions and exercises that will aid us to get a deeper insight into the role that individuals play in the process of launching a new venture.

Please answer the questions in each section as thoroughly and conscientiously as possible.

The four areas that was examined in this research study are as follows:

SECTION 1: FOUNDER CHARACTERISTICS

SECTION 2: APPROACH TO LAUNCHING AND BUILDING THE BUSINESS

SECTION 3: CURRENT PERCEPTIONS AND PRACTICES

SECTION 4: THE BUSINESS

SECTION 1: FOUNDER CHARACTERISTICS

Personality (Written response)

This section of the questionnaire will gather information about your natural behaviors and actions.

Please evaluate how closely the following statement represent you by selecting between disagree for items that do not describe you at all to strongly agree for items that do effectively describe you.

	Disagree	Neutral	Some-what Agree	Agree	Strongly Agree
I feel comfortable around people.	1	2	3	4	5
I am always prepared.	1	2	3	4	5
I am interested in people.	1	2	3	4	5
I have a rich vocabulary.	1	2	3	4	5
I have a vivid imagination.	1	2	3	4	5
I pay attention to details.	1	2	3	4	5
I believe in the importance of art.	1	2	3	4	5
I start conversations.	1	2	3	4	5
I take time out for others.	1	2	3	4	5
I feel others' emotions.	1	2	3	4	5
I enjoy hearing new ideas.	1	2	3	4	5
I get chores done right away.	1	2	3	4	5
I spend time reflecting on things.	1	2	3	4	5
I talk to a lot of different people at parties.	1	2	3	4	5
I am full of ideas.	1	2	3	4	5
I am good at many things.	1	2	3	4	5
I do things according to a plan.	1	2	3	4	5
I know how to comfort others.	1	2	3	4	5
I make friends easily.	1	2	3	4	5
I carry the conversation to a higher level.	1	2	3	4	5
I have a good word for everyone.	1	2	3	4	5
I often forget to put things back in their proper place.	1	2	3	4	5
I enjoy wild flights of fantasy.	1	2	3	4	5
I take charge.	1	2	3	4	5
I catch on to things quickly.	1	2	3	4	5
I know how to captivate people.	1	2	3	4	5
I avoid philosophical discussions	1	2	3	4	5
I make plans and stick to them.	1	2	3	4	5
I show my gratitude.	1	2	3	4	5
I am skilled in handling social situations.	1	2	3	4	5
I can handle a lot of information.	1	2	3	4	5
I like to tidy up.	1	2	3	4	5
I love to help others.	1	2	3	4	5
I am hard to get to know.	1	2	3	4	5
I don't like to draw attention to myself.	1	2	3	4	5
I love to think up new ways of doing things.	1	2	3	4	5
I love to read challenging material.	1	2	3	4	5

Personal Values (Written response)

This section of the survey will gather information about your values – the things that are really important to you. How important are the following values to you? To what extent does each of these values represent your guiding principles in life.

	Opposed to my principles	Not important	Little importance	Some what important	Important	Highly Important	Supreme -ly Important
Power – that is social power, authority, and wealth.	1	2	3	4	5	6	7
Achievement – that is success, capability, ambition, and influence on people and events.	1	2	3	4	5	6	7
Pleasure – that is gratification of desires, enjoyment in life, and self-indulgence.	1	2	3	4	5	6	7
Stimulation – that is daring, a varied and challenging life, and an exciting life.	1	2	3	4	5	6	7
Self-direction – that is creativity, freedom, curiosity, independence and, choosing one’s own goals.	1	2	3	4	5	6	7
Universalism – that is broad-mindedness, beauty of nature and arts, social justice, a world at peace, equality, wisdom, unity with nature, and environmental protection.	1	2	3	4	5	6	7
Benevolence – that is helpfulness, honesty, forgiveness, loyalty, and responsibility.	1	2	3	4	5	6	7
Tradition - that is respect for tradition, humbleness, accepting one’s portion in life, devotion, and modesty	1	2	3	4	5	6	7
Conformity – that is obedience, honoring parents and elders, self-discipline, and politeness..	1	2	3	4	5	6	7
Security – that is national security, family security, social security, social order, cleanliness, and reciprocation of favors.	1	2	3	4	5	6	7

Pre Entry Knowledge (Ask)

This section of the survey will gather information about your work experience prior to launching the business venture that is being examined as part of this research.

	Disagree	Neutral	Somewhat agree	Agree	Strongly agree
My business is related to my previous work experience	1	2	3	4	5
My previous work experience was important in my decision to pursue this business opportunity	1	2	3	4	5
Had you founded a venture prior to launching this venture?	Yes / No				
Had you worked in a start up venture prior to launching this venture?	Yes / No				

Founding Team Demographics (Ask)

This section of the questionnaire will gather information about team that founded the business being examined as part of this research.

How many people were in the team that founded the business?		
To which ethnic group do the members of the founding team belong? <i>Insert the number of founders from each ethic group next to the ethnic group name</i>	A. Indian []	
	B. Coloured []	
	C. Black []	
	D. White []	
	E. Other []	
What is the ethnic group of the interviewee?		
What was the gender mix of them members of the founding team?	A. Male []	
	B. Female []	
What is the gender of the interviewee	Male	Female
What education (level and area) did the members of the founding team have at the time of founding the business? <i>One response for each member of the founding team. Insert the education and level of the interviewee first</i>	Level (High school, certificate, bachelors, honors, masters, doctorate)	Area (engineering, medicine, art, business, science etc.)
What were the ages of the members of the founding team at the time of founding the business <i>Fill in the age in years of each member of the founding team. Insert the age of the interviewee first</i>		

SECTION 2: APPROACH TO LAUNCHING AND BUILDING THE BUSINESS

Business Planning (Written response)

This section of the questionnaire will examine some of the actions employed in the process of launching the business.

Prior to launching the business I or we ...	Disagree	Neutral	Some-what Agree	Agree	Strongly Agree
Did a six to twelve month forecast on the future economic and business conditions within my industry and assessing their possible impact on sales	1	2	3	4	5
Analysed the possible changes that may take place within a year among my target customers	1	2	3	4	5
Analysed my potential competitive advantage over the competition	1	2	3	4	5
Did a three to five year financial forecast of the proposed business (i.e. income statement, balance sheet, cash flow statement)	1	2	3	4	5
Estimated the sales volumes and the Rand sales the company expected to reach in a period of six to twelve months	1	2	3	4	5
Determined the sales volume required to break even	1	2	3	4	5
Estimated the total annual compensation and the cost of other employee benefits	1	2	3	4	5
When launching my business I.....					
	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Followed my original business plan for a period of six to twelve months	1	2	3	4	5
Occasionally referred to my business plan	1	2	3	4	5
Did not follow my business plan and instead used a trial and error approach	1	2	3	4	5
Prepared a full written business plan	1	2	3	4	5
Does your business still have a written business plan in place	Yes / No				
How important do you think the prior planning was to your business?	Not important at all	Not very important	Somewhat important	Very important	Extremely important

Strategic Legitimization (Written response)

The following statements describe some of the actions that you may have taken in the early phases of launching and building your business. Please evaluate how closely the following statement describe the actions you took in launching and building your business by selecting between disagree for items that do not describe what you did to strongly agree for items that do effectively describe what you did.

When launching and building my business I or we.....	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Consciously established a high profile board of advisors, board of directors and/or made use of a high profile figurehead	1	2	3	4	5
Actively tried to develop a professional perception of the business (including, for example, creating a professional website, logo, business cards, establishing a dress code)	1	2	3	4	5
Actively tried to get the business mentioned in the media	1	2	3	4	5
Purposely told stories about my business	1	2	3	4	5

Decision Logic in Launching and Building the Business (Written response)

Please answer the following questions about the early days (first 3 years) of your business by rating your agreement with the statement from Disagree to Strongly Agree. NOTE: Some of these questions may seem like a repeat of prior questions but is important that you answer them as vigilantly and carefully as possible. Sorry for any apparent repetition in this line of questioning.

In launching and building the business ...	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
We analysed the long run opportunities and selected what we thought would provide the best returns	1	2	3	4	5
We developed a strategy to best take advantage of resources and capabilities.	1	2	3	4	5
We designed and planned business strategies.	1	2	3	4	5
We organised and implemented control processes to make sure we met objectives.	1	2	3	4	5
We researched and selected target markets and did meaningful competitive analysis.	1	2	3	4	5
We had a clear and consistent vision for where we wanted to end up.	1	2	3	4	5
We designed and planned production and marketing efforts.	1	2	3	4	5
We experimented with different products and/or business models.	1	2	3	4	5
The product/service that we now provide is essentially the same as originally conceptualised.	1	2	3	4	5
The product/service that we now provide is substantially different than we first imagined.	1	2	3	4	5
We tried a number of different approaches until we found a business model that worked.	1	2	3	4	5
We were careful not to commit more resources than we could afford to lose.	1	2	3	4	5
We were careful not to risk so much money that the company would be in real trouble financially if things didn't work out.	1	2	3	4	5
We allowed the business to evolve as opportunities emerged.	1	2	3	4	5



In launching and building the business ...	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
We adapted what we were doing to the resources we had	1	2	3	4	5
We were flexible and took advantage of opportunities as they arose.	1	2	3	4	5
We avoided any courses of action that reduced our flexibility and adaptability.	1	2	3	4	5
We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty.	1	2	3	4	5
Network contacts provided low cost resources.	1	2	3	4	5
We used pre-commitments from customers and suppliers as often as possible.	1	2	3	4	5
By working closely with people outside our organisation we have been able to greatly expand our capabilities.	1	2	3	4	5
We have focused on developing alliances with other people and organizations.	1	2	3	4	5
Our partnerships with outside organisations and people play a key role in our ability to provide our product/service.	1	2	3	4	5

SECTION 3: CURRENT PERCEPTIONS AND PRACTICES

Environmental Scanning (Written response)

The following statements describe different aspects of scanning the environment (i.e. gathering information). Please read each statement **carefully** and then **circle/highlight** your chosen number to indicate the extent to which you agree or disagree with each statement.

I scan the environment for the following:	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Competitors' prices	1	2	3	4	5
Competitors' introduction of new products	1	2	3	4	5
Competitors' advertising / promotional programs	1	2	3	4	5
Competitors' entry into new markets	1	2	3	4	5
New product technologies	1	2	3	4	5
Customers' buying habits	1	2	3	4	5
Customers' product preferences	1	2	3	4	5
Customers' demands and desires	1	2	3	4	5
The company's advertising and promotions resources relative to competitors	1	2	3	4	5
The company's sales capabilities / resources relative to competitors	1	2	3	4	5
Local economic conditions	1	2	3	4	5
National economic conditions	1	2	3	4	5
National political conditions	1	2	3	4	5

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Sources of information in environmental scanning	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
I use <u>written sources</u> of information from <u>outside</u> the organization to scan the environment e.g. Finweek, newspapers, journals, internet, television,	1	2	3	4	5
I use <u>written sources</u> of information from <u>inside</u> the organization to scan the environment e.g. special studies, reports, memos, management information systems	1	2	3	4	5
I use <u>personal contacts</u> from <u>outside</u> the organisation to scan the environment e.g. business associates, officials, customers, trips	1	2	3	4	5
I use <u>personal contacts</u> from <u>inside</u> the organisation to scan the environment e.g. Subordinates, salespeople, staff	1	2	3	4	5



Uncertainty (Written response)

Below are some questions about the uncertainty that exists in the context in which you operate. Please respond to each question on the 5-point scale provided.

How certain are you about demand for your product or service?

1 = The demand for your product or service fluctuates, but the rate of change is moderate and steady.

5 = The rate of demand for your product or service fluctuates significantly and fluctuations are difficult to predict.

1	2	3	4	5

How likely is it that future innovations will radically disrupt your product or service?

1 = Future technological innovations affecting the viability of the product or service occur, but they are in incremental (not discontinuous).

5 = Future technological innovations affecting the viability of the product or service are frequent and/or major.

1	2	3	4	5

How certain are you about customers' preferences with regard to your product or service?

1 = You have a strong idea of your customers' preferences and demands with regard to your product, and these are predictable over time.

5 = It is not possible to predict in advance demand changes affecting the viability of the product.

1	2	3	4	5

How effectively are you able to predict innovations in your industry?

1 = You are in a strong position to predict the nature and source of innovations that affect the viability of the product or service.

5 = It is not possible to predict with any certainty the kinds or timing of future technological innovations that will affect the viability of the product or service.

1	2	3	4	5

How certain are you about the ongoing viability of your product or service?

1 = You have tangible reasons to believe that your firm has the ability to sustain viability in its current market through further radical and/or incremental innovations.

5 = It is not possible to foresee the ability of your firm to sustain viability in its current market through further radical and/ or incremental innovations.

1	2	3	4	5

How certain were you about your ability to respond to competition?

1 = By taking appropriate action your product or service will enjoy advantages long enough to realize worthy entrepreneurial returns.

5 = You cannot predict how long your product or service will enjoy advantages before a competitive response erodes profits.

1	2	3	4	5

How do you tend to launch new products or services?

1 = You tend to launch new products or services on a small scale, to a limited number of customers.

5 = You tend to launch new products or services on a large scale, to the national market immediately.

1	2	3	4	5



SECTION 4: THE BUSINESS

Organizational Culture - Competing Values Framework (Written response)

In this portion of the questionnaire we will gather information about your current organization.

Please distribute 100 points for each section. The 100 points must be distributed according to the extent to which you agree with each statement. The higher the points allocated to a statement, the more you agree with that statement.

1. Organizational Characteristics (Please distribute 100 points)

- The Organization is a very personal place. It is like an extended family. People seek to share a lot of themselves.
- The Organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks
- The Organization is a very formalized and structured place. Bureaucratic procedures generally govern what people do.
- The Organization is very production oriented. A major concern is with getting the job done. People aren't very personally involved.

2. Self Evaluation of Organizational Leader (Please distribute 100 points)

- Being the head of the Organization I consider myself to be a mentor, a sage, or a father or mother figure.
- Being the head of the Organization I consider myself to be an entrepreneur, an innovator, or a risk taker.
- Being the head of the Organization I consider myself to be a coordinator, an organizer, or an administrator.
- Being the head of the Organization I consider myself to be a producer, a technician, or a hard driver.

3. Organizational "Glue" (Please distribute 100 points)

- The glue that holds the Organization together is loyalty and tradition. Commitment to this Organization runs high.
- The glue that holds the Organization together is a commitment to innovation and development. There is an emphasis on being first.
- The glue that holds the Organization together is formal rules and policies. Maintaining a smooth-running Organization is important here.
- The glue that holds the Organization together is the emphasis on tasks and goal accomplishment. A production orientation is commonly shared.

4. Organizational Emphases (Please distributed 100 points)

- The Organization emphasizes human resources. High cohesion and morale in the Organization are important.
- The Organization emphasizes growth and acquiring new resources. Readiness to meet new challenges is important.
- The Organization emphasizes permanence and stability. Efficient, smooth operations are important.
- The Organization emphasizes competitive actions, and achievement. Measurable goals are important.

Business Domain and Growth (Ask)

This portion of the questionnaire will gather data on the area of business in which you operate and on the growth trajectory of the business.

What broad industry does your company operate in?	Information Technology / Advertising / Construction
If possible, please Indicate a sub-industry or specialization area in which your company operates.	
Please provide a brief description of your company's core function/s. What is the essence of your company? <i>E.g. This company buys media space in advance and then sells it to corporations and/or agencies as and when they need it for specific advertising campaigns OR This company seeks to work with large corporations to reduce their IT expenses by incorporating open source software into their IT operating environment</i>	
In which year was your business founded?	
How many people did you employ in the business at the end of year 1 of operation (including the founders)?	
How many people do you currently employ in the business (including the founders)?	
How much external equity (capital) was invested in the business i.e. What is the total rand value of equity invested in the business?	
How much revenue did the business generate in the most recent financial year?	<ul style="list-style-type: none"> A. More than R100m B. R75m – R100m C. R50m – R75m D. R30m – R50m E. R20m – R30m F. R10m – R20m G. R5m – R10m H. R2m – R5m I. R1m – R2m J. Less than R1m



How would you describe the rate of revenue growth in your business over the past 3 years?	<ul style="list-style-type: none">A. Very high – annual increase in revenue of 50% or moreB. High – annual increase in revenue of 30% - 50%C. Moderate to high - annual increase in revenue of 20% - 30%D. Moderate - annual increase in revenue of 10% - 20%E. Moderate to low - annual increase in revenue of 5% - 10%F. Low - annual increase in revenue of 1% - 5%G. Stagnant – no increase in revenueH. Declining – revenue was declining over the past 3 years
In what range are your net profit margins?	<ul style="list-style-type: none">A. Very high – net profit margins of 50% or moreB. High – net profit margins of 30% - 50%C. Moderate to high - net profit margins of 20% - 30%D. Moderate - net profit margins of 10% - 20%E. Moderate to low - net profit margins of 5% - 10%F. Low - net profit margins of 1% - 5%G. Breakeven – not making profits but also not losingH. Losses – currently making losses
How many years did it take for the business reach breakeven i.e. begin making a profit?	



FOR RESEARCHER USE

The information in this block will NOT form part of the research study. This information is collected as a control mechanism to ensure that each person gathering data collects valid data from a legitimate business started in South Africa in the past 15 years.

RESPONDENT TELEPHONE NUMBER (Ask)

Please record a contact telephone number for the person that was interviewed to gather the data recorded in this questionnaire.

TELEPHONE NUMBER OF RESPONDENT:

This number will ONLY be used to follow up with the respondent to ensure that they actually completed the questionnaire under the guidance of a researcher.

RESEARCHER STATEMENT (Researcher to complete)

I certify that all the information in this questionnaire was gathered from a person who purports to have started a business in South Africa in the past 15 years.

RESEARCHER SIGNATURE:.....

RESEARCHER NAME:.....