

# **Uncertainty and Resource Constraints in the Small Island Developing States**

**Essays in Entrepreneurial Cognition**

**Richard A. Martina**

**UNCERTAINTY AND RESOURCE CONSTRAINTS IN THE  
SMALL ISLAND DEVELOPING STATES**

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Richard A. Martina

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DISSERTATION

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## **LIST OF ACRONYMS**

API	Application Program Interface
CIE	Comparative International Entrepreneurship
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IE	International Entrepreneurship
IPTV	Internet Protocol television
NCSA	National Center for Supercomputing Applications
Ph.D.	Doctor of Philosophy
R&D	Research and Development
SEO	Search Engine Optimization
SIDS	Small Island Developing States
VoIP	Voice over IP
WWW	World Wide Web



# INTRODUCTION

## 1.1 The background of this study

This dissertation concerns the logic entrepreneurs use in decision-making throughout the entrepreneurial process; whether it be the process to supply market needs with innovative goods or services, or a combination of both. In particular, the dissertation is concerned with the entrepreneurial decision-making that takes place under uncertainty and resource constraints in the context of Small Island Developing States (SIDS). Three related entrepreneurial phenomena are singled out for study: 1. The emergence of the 'born-global' firms, 2. New-to-the-world innovations that emerge from penurious environments, and 3. The use of the affordable loss heuristic to make the entrepreneurial entry decision. Why is this topic interesting for research?

### 1.1.1 Technological advance and entrepreneurial opportunities

The importance of technological advances for economic development has been well documented in the literature (e.g. Fagerberg, Mowery, & Nelson, 2006; Solow, 1956). New breakthrough technologies<sup>1</sup>, e.g. the Internet, create ripple effects of entrepreneurial opportunities and new industries that have an impact on the long-term economic growth. The Internet is a global electronic communications network that connects billions of devices. It paved the way for several entrepreneurial opportunities such as web browsers, search engines and Search Engine Optimization (SEO) markets, to name just a few<sup>2</sup>.

### 1.1.2 The entrepreneurial actor and the new venture

A central actor in the commercialization of new technologies is the entrepreneurial firm. Research has found that entrepreneurial firms benefit from R&D spillovers from universities (Acs, Audretsch, & Feldman, 1994) and are found to be more innovative than larger firms in skill-intensive markets (Acs & Audretsch, 1988). A well-known example is Google, whose pioneered search algorithm was developed by its founders when they were Ph.D. students at Stanford University. Entrepreneurial firms are more successful in the commercialization of innovation compared to large firms (van Praag & Versloot, 2007). The reason is that large firms often create inertia that inhibits them to select, adopt and commercialize new technologies (Chandy & Tellis, 2000; Chesbrough, 2013).

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<sup>1</sup> I use breakthrough technologies interchangeably with radical innovation.

<sup>2</sup> Please see Appendix 1.1 for a review of how the Internet created multiple business opportunities.

The role of the entrepreneur in the development and commercialization of breakthrough technologies is vital (Acs et al., 1994; Acs & Audretsch, 1988). The entrepreneur uses, among others, new ventures as vehicles to organize resources and to develop and commercialize breakthrough technologies. It is the entrepreneur that is the main actor in the discovery, evaluation, and exploitation of opportunities.

### **1.1.3 Entrepreneurial decision-making under uncertainty and resource constraints**

Entrepreneurial decision-making is an integral part of the discovery, evaluation, and exploitations of entrepreneurial opportunities. It has received considerable attention among entrepreneurship scholars. The attention is especially the case with entrepreneurship scholars that study decision-making under uncertainty (Shepherd, Williams, & Patzelt, 2015) and resource constraints (e.g. Powell & Baker, 2011). Under these conditions, entrepreneurs turn to the rule of thumb to simplify their decision-making processes (Busenitz, 1999).

### **1.1.4 Problem**

Despite our growing understanding of the entrepreneurial decision-making under uncertainty and resource constraints, there is a lack of understanding in several areas. First, there is a lack of understanding regarding how entrepreneurs take decisions in the context of the Small Island Developing States. Entrepreneurs in SIDS also perceive uncertainty and resource constraints (Baldacchino & Fairbairn, 2006; Nurse, 2015; Serra & Theng, 2015). However, the uncertainties are augmented by the additional inaccurate information due to secrecy, and the open and vulnerable state of the SIDS. The resource constraints are augmented by the SIDS' small size and isolation.

In addition, small domestic markets are motives for entrepreneurial firms to become 'born-global' firms. Theories of entrepreneurial decision-making such as the effectuation theory (Sarasvathy, 2001) and entrepreneurial bricolage theory (Baker & Nelson, 2005) show promise to understand the decision logics associated with the process to internationalize rapidly. However, recent studies that apply the effectuation and entrepreneurial bricolage theory to understand the use of social networks in the process of becoming 'born-global' firms, show conflicting empirical results.

Furthermore, there is a lack of understanding of the decision logics involved in producing new-to-the-world innovations that emerge in resource constraint environments. The tradition is to focus on the firm as the creator of innovation (Schumpeter, 1947) of which science and R&D are essential elements (Sundbo, OrfilaSintes, & Sørensen, 2007), and that is most evident in developed countries (Boor, Oliveira, & Veloso, 2014). However, our current North-South diffusion

framework to understand new-to-the-world innovations cannot explain innovations that emerge from penurious countries.

Finally, a new proponent to explain the entrepreneurial investment decision is the affordable loss heuristic proposed by Sarasvathy (2001). The affordable loss heuristic is defined as the ability and preference of the entrepreneur to make an investment to enter the opportunity exploitation process. In the effectual literature, the affordable loss heuristic is treated as a black box; one of the five principles of the effectual approach. However, the entrepreneurial investment decision is a complex process that consists of multiple components and needs more theorization.

## **1.2 The research questions**

To address the problems discussed in the previous section, I have developed the following research questions. The overarching research question is:

*How does an entrepreneur in the SIDS context make decisions under uncertainty and resource constraints?*

Central to this dissertation were four sub-research questions:

*Which heuristics do the entrepreneurs use in the SIDS context?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?*

*How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*

In the remainder of this introduction, I will explore the importance of context to the study of entrepreneurship. I will elaborate on the uncertainty and resource constraints that are part of the context, and discuss in more detail how the SIDS-specific challenges increase the uncertainty and resource constraints experienced by the entrepreneurs operating in this context. I will also discuss the empirical background of the study and the choice for ICT entrepreneurs. Finally, I will present the outline of the dissertation and the contributions of chapters 4 to 7.

### **1.3 The entrepreneurial context**

For any research, it is important to take the context into consideration (Autio, Kenney, Mustar, Siegel, & Wright, 2014; Welter, 2011). Including the context in the theory development efforts, instead of developing general theories and treating the context as a control variable, can increase the explanatory power of a theory (Zahra & Wright, 2011). This holds for entrepreneurship theory as well for the reason that “all human action occurs in contexts: it is the context that regulates what individuals and teams get to see, what choices they are likely to make, and what the outcomes of those choices are likely to be” (Autio et al., 2014, p. 1099). The direct environment in which an entrepreneur operates influences the effectiveness of the chosen strategies (Read & Dolmans, 2014); it influences how the entrepreneur makes decisions (Murmah & Sardana, 2012); and the entrepreneur’s behavior (Saffu, 2003). In all, the “context is important for understanding when, how, and why entrepreneurship happens and who becomes involved” (Welter, 2011, p. 166).

Entrepreneurial context has been framed in several ways by entrepreneurship scholars (see Table 1.1). Zahra and Wright (2011) distinguished four dimensions: 1. Spatial, 2. Temporal, 3. Social, and 4. Institutional. The spatial dimension is the physical setting in which the entrepreneurial activities take place including the support mechanisms, social networks, resources, and institutions that are present in that geographical place. The temporal dimension signifies the sequence of the events that take place in the entrepreneurial process, and how these lend themselves to accumulated learning and successful management. The social dimension is that of ideas, values, and modes of operation. It embodies social capital. The institutional dimension is how institutions constrain entrepreneurs and also the process of giving new meanings to deployed concepts and the formation of new institutions.

Autio et al. (2014) distinguish six dimensions namely 1. Sectoral and Technological, 2. Organizational, 3. Institutional and policy, 4. Social, 5. Temporal, and 6. Spatial. The first four dimensions cut across the last two. The industry and technological dimension refer to the context of economic activities that take place and the architectural attributes of the technology that is the focus of entrepreneurial activities. The organizational dimension refers to the accumulated capabilities and experiences of entrepreneurs within or outside organizations. The institutional and policy dimension relates to the formal and informal rules and policies that influence the entrepreneurial activities. The social dimension refers to the networks between the entrepreneurs and other economic actors, such as suppliers, creditors, competitors or customers. The temporal dimension views the first four dimensions across time. With time, industries and technologies mature, organizations’ governance structures evolve, laws are adapted to include new economic activities, and social networks expand or contract. Finally, as with the temporal dimension, the spatial dimension cuts across the industry and technological, organizational,

institutional and policy, and social dimensions. It refers to the geographical location in which industries, organizations, institutions, and social networks are embedded.

**Table 1. 1 Dimensions of entrepreneurial context**

		Author(s)		
		Welter (2011)		Zahra and Wright (2011)
Dimensions	Spatial: physical setting/ geographical place	Where: location	When: changes over time	Industry/ technological: economic activities and architectural attributes of technology
	Time: sequence of events	Omnibus	Business: industry and market	Organizational: accumulated capabilities and experiences
	Social: ideas, values and modes		Social: networks, household and family	Institutional/ policy: formal and informal rules
	Institution: as constraints and formation of new ones		Spatial: geographical environments, industrial districts and clusters	Social: networks
			Institutional: culture, society, political and economic system	Temporal: changes over time
				Spatial: geographical location

Welter (2011) makes a distinction between the “where” and “when” dimensions. The “where” refers to the location of the entrepreneurial activities in different contexts: 1. Business, 2. Social, 3. Spatial, and 4. Institutional. The “when” dimension is the temporal dimension. It refers to changes over time. The business dimension is similar to the industry and technological dimension of Autio et al. (2014). An example is the industry life-cycle. The social, spatial, and institutional dimensions are also similar to the conceptualization of these contexts by Autio et al. (2014). A difference between Welter (2011) and Autio et al. (2014) is that Welter (2011) makes a further distinction between omnibus and discrete context dimensions. The omnibus context is when the context is used as a ‘lens’ of a study and the discrete context is when the context is considered as a variable. For instance is the study of how entrepreneurial networks are used for resource accumulation in families. The family is the omnibus context and the entrepreneurial network is the discrete context. This study focuses in particular on the spatial context in Small Island Developing States (SIDS), which will be examined further in the next section.

## 1.4 Uncertainty and resource constraints

### 1.4.1 Uncertainty in entrepreneurial opportunity exploitation

The entrepreneurial process of discovering, evaluating and exploiting opportunities (Shane & Venkataraman, 2000) and the innovation process<sup>3</sup> are subject to uncertainties (Johnson, Edquist, & Lundvall, 2004). Uncertainty is defined in several ways. For instance, Walker et al. (2003) defined three types of uncertainties with regards to the level of predictability of the future outcome of an expectation, namely: 1. An expectation with a known distribution, 2. An expectation whose distribution is unknown but can be estimated, and 3. An expectation whose distribution is unknown and cannot be estimated, thus making it unknowable (Sarasvathy & Kotha, 2001). The distinctions between the types of uncertainties can be illustrated with a draw of marbles from an urn. In the type 1 scenario of uncertainty, one knows that there are 10 black marbles in the urn. For each draw, one can precisely estimate the result of that draw. In the type 2 scenario of uncertainty, one knows that there are five black and five white marbles in the urn. The probability of drawing a black marble can be estimated, but one cannot precisely predict the outcome of each of the draws. In the type 3 scenario of uncertainty, one knows neither the colors nor the quantity of the marbles in the urn, or if there are any marbles at all. In this scenario one cannot calculate the probability of a draw of a marble with a specific color because the information is lacking, which makes the probability unknowable. The type 3 scenario of uncertainty is also known as true uncertainty, while type 2 refers to measurable risks (Knight, 2002).

It is important to draw attention to the notion of 'knowledge of the individual' and the distinction between objective and subjective uncertainty. There are different grounds for uncertainty. Uncertainty can be due to the inherent variability of the phenomenon being described (Walker et al., 2003). In the above illustration, this is the content of the urn. This has changed from 10 black marbles to five black and five white marbles, to an unknown number of marbles of any color. The more frequently the inherent characteristics of a phenomenon change over time, the higher the levels of the uncertainty, or the more characteristics of true Knightian uncertainty the entrepreneur might attribute to that phenomenon. This is a case for objective uncertainty.

On the other hand, uncertainty is also grounded in the knowledge that the individual has regarding the phenomenon being predicted. If the information is complete (and the inherent nature of the phenomenon is not susceptible to randomness), the decision-maker can accurately calculate an outcome (this is scenario 1). However, in cases of incomplete information, the decision-maker cannot

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<sup>3</sup> With the innovation process we focus on those that are carried forth by entrepreneurial companies.

accurately estimate an outcome (Walker et al., 2003). This is a case for subjective uncertainty.

In cases of subjective uncertainty, different individuals might have different information of the same phenomenon, which leads to different levels of uncertainty that are experienced. Thus, the uncertainty is subjective to the perception of the decision-maker. Using the above illustration of drawing marbles from an urn, the urn contains an equal number of black and white marbles. One individual may know that the urn consists of both black and white marbles, while another individual may know only that there are marbles in the urn. Both of these individuals experience uncertainty, but their perceived uncertainty is different.

Summing up, uncertainty is not grounded only in the objective or absolute reality faced by the decision-maker but more importantly, it is grounded as well in the information available to the decision-maker, his or her perceptions of the situation and the completeness of information encountered by different decision-makers.

Translating the types of uncertainties to an entrepreneurial setting, it points towards a view of uncertainty as a key element of the entrepreneurial process. The entrepreneurial process of discovering, evaluating and exploiting opportunities (Shane & Venkataraman, 2000) that leads to the commercialization of innovation is characterized by information asymmetries (Schumpeter, 1934; Shane, 2000). The incomplete information that are held by different individuals, lead these individuals to have different perceptions of the value of resources. This enables entrepreneurship. Eckhardt and Shane (2003, p. 341) explained this as follows:

*In what Venkataraman (1997) termed the strong form of entrepreneurship, Schumpeter (1934) held that periods of market efficiency are punctuated by periods of upheaval. Changes in technology, regulation, and other factors generate new information about how resources might be used differently. This information changes the price for resources, thereby allowing economic actors who have early access to the new information to purchase resources at low prices, use the information to create products or services and sell them at an entrepreneurial profit (Schumpeter, 1934; Shane & Venkataraman, 2000).*

The entrepreneur also experiences individual cognitive limitations (Sarasvathy, 2004). That is the inability to understand and process the complex situation. Due to the lack of complete information and the cognitive limitation, the entrepreneur forms a perception of the objective uncertainties involved in the entrepreneurial process. The decision-maker constructs an environment that is enacted (Weick, 1969).

In addition, individuals may have different levels of confidence in their abilities to estimate future events accurately (Duncan, 1972) which are influenced as

well by the individuals' own abilities (Wu & Knott, 2006) to deal with complex and uncertain situations. In these situations, individuals often turn to heuristics (i.e. simplifying strategies to make decisions) (Busenitz, 1999). One of these heuristics is the availability heuristic: individuals are likely to perceive what they are predisposed to see when presented with ambiguous information (Palich & Bagby, 1995). The decision-maker takes a perception of the uncertainty into account rather than the objective uncertainty. Thus, perception is vital in thinking about entrepreneurial uncertainty and in the remainder of this dissertation, I view uncertainty as a perception by an individual decision-maker, unless otherwise stated.

The perceived levels of uncertainty are not constant throughout the process of opportunity exploitation (Duncan, 1972; Seibert & Lumpkin, 2009). Using Roberts' (1991) stages of entrepreneurial development, in the seed phase (i.e. the initial process of innovation) uncertainty is large due to lack of information on which one can base one's decisions. As the entrepreneur goes through the start-up phase (i.e. the formation process) and the early growth phase (i.e. the scaling up of the new innovation) more information is gained and uncertainty is reduced. For example, as the technology develops (i.e. advance alongside the technology learning curve) and the entrepreneur gains experience with the technology, he or she becomes more knowledgeable about the technology's attributes, what it can and cannot do, and the degree of technological uncertainty is reduced. When the technology is introduced into the market, the entrepreneur begins collecting data on user's acceptance of the technology. As more information is acquired, market uncertainty is also reduced. In other words, a shift from true uncertainty to risk can be observed over time. As the incomplete knowledge that the entrepreneur has is reduced, situations, where expectations cannot be estimated, are transformed into expectations that can be predicted<sup>4</sup>.

Uncertainty manifests itself in different areas (Walker et al., 2003) e.g. behavioral (i.e. opportunistic behavior) (Alvarez & Barney, 2005), market (Ashill & Jobber, 2009), and technological (Alvarez & Barney, 2005; Johnson et al., 2004). Behavioral uncertainty is the unpredictability of the actions taken by individuals that the entrepreneur interacts with in the process of innovation. As entrepreneurs engage in partnerships and alliances, they will lose control and power over the innovation process (Christensen, 2006) and are subject to the opportunistic behavior of their partners. Market uncertainty is the unpredictability of the future market, its actors, structures, and mechanisms (Schillo & Walter, 2010). It has to do with the difficulty for the entrepreneur to identify potential market structure, customers,

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<sup>4</sup> I do not imply that the entrepreneur will only experience risks and not experience true uncertainty anymore as the entrepreneurial firm progresses along the stages of entrepreneurial development. As an entrepreneurial firm develops some uncertainty levels are reduced while new uncertainties come into existence.

competitors and prices, at which goods and services can be sold. Technological uncertainty has to do with the unpredictability of the future developments and uses of the technology, and the unexpected consequences of using the technology<sup>5</sup>.

#### **1.4.2 Resource constraints in entrepreneurial opportunity exploitation**

In addition to uncertainties, entrepreneurs also face severe resource constraints. In neoclassical economics resources are considered to be scarce per definition for the reason that there will never be enough resources to satisfy the demands of everyone. Thus, scarcity implies that humans need to make choices and tradeoffs (Heyne, Boettke, & Prychitko, 2014). However, in the entrepreneurship discipline, resource constraints are viewed differently. Resource constraints are viewed as “negative” slack (Powell & Baker, 2011). It is the opposite of “slack” which Nohria and Gulati (1996) define as “the pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output” (p. 1246). Thus “negative” slack is the shortage of resources that is minimally required to produce a given level of organizational output. Entrepreneurs often face “negative” slack. For instance, in the US most often firms start with less than five thousand US dollars in capital (Baker & Nelson, 2005) and with either no employee or with a family member (Ruef, Aldrich, & Carter, 2003). Being able to raise millions of dollars via angel and venture capital investors is uncommon, especially in countries without a well-developed capital market. In addition, venture capital is mostly available for entrepreneurial firms with a high-growth potential, the “gazelles”<sup>6</sup>, and not widely available to all firms (Holtz-Eakin, Joulfaian, & Rosen, 1994).

Resource constrained environments are also referred to as penurious environments by Baker and Nelson (2005). These authors define a penurious environment as one that “presents new challenges, whether opportunities or problems, without providing new resources” (p. 353). Thus, entrepreneurial firms in penurious environments face “negative” slack. Even when they grow they have the difficulty to attract resources (Penrose, 1959). Their small sizes and their young age increase the difficulty to do this (Zahra, 2005).

Moreover, concerning the discussion of the role of the entrepreneur in commercializing breakthrough technologies, and the uncertainty and resource constraints faced in this process, this dissertation will focus on the decision logics used by entrepreneurs in penurious circumstances.

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<sup>5</sup> Refer to Appendix 1.2 for an illustration of behavioral and market uncertainties in practice and Appendix 1.3 for an illustration of technological uncertainty in practice.

<sup>6</sup> See Henrekson and Johansson (2009) for an overview of the literature on “gazelles”.

## **1.5 The case for Small Island Developing States**

As I have discussed previously, this research studies entrepreneurial decision-making that takes place under uncertainty and resource constraints in the context of SIDS. Next, I will elaborate on the characteristics of SIDS. This is followed by an explanation of why spatial context in SIDS is vital for this study.

### **1.5.1 Who are the Small Island Developing States?**

The Small Island Developing States are recognized as a distinctive group of developing islands that share similar characteristics and a unique set of challenges. The characteristics of these islands can be grouped into five categories, each causing a set of disadvantages for the islands: 1. Small size, 2. Remoteness and insularity, 3. Disaster proneness, 4. Environmental fragility and 5. Other factors (Briguglio, 1995).

First, small size causes limitations in resource endowments (Dolman, 1985), high import content of production, and limited possibilities for import-substitution (Briguglio, 1995). Furthermore, the smallness increases the dependence on export markets (McGillivray, Naudé, & Santos-Paulino, 2010). The dependence on a very narrow range of products, in turn, produces limitations on domestic competition (Briguglio, 1995). Islands have diseconomies of scale (Dolman, 1985) and limited ability to influence domestic prices (Briguglio, 1995). Finally, the small size causes problems of public administration (Briguglio, 1995), weak governance and institutional structures (McGillivray et al., 2010).

Second, remoteness and insularity also cause a set of additional challenges for small islands (Briguglio, 1995; Dolman, 1985). The transportation cost per unit is higher and there are uncertainties of supply due such factors as delays and unreliable transportation services. Consequently, firms must order and store large stocks, with additional associated disadvantages such as higher carrying costs and tied-up capital.

Third, SIDS are prone to natural disasters (Dolman, 1985) such as earthquakes, landslides and hurricanes (Briguglio, 1995). In addition, environmental fragility is also a characteristic of small islands. They have highly fragile natural ecology and very vulnerable physical environment (Dolman, 1985). The fragility is mostly evident in economic development that is not sustainable due to resource depletion, e.g. oil extraction in Trinidad and Tobago (Briguglio, 1995).

Finally, other factors are serious balance of payments problems and dependence on foreign sources of institutions, aid (McGillivray et al., 2010), and financing such as remittances (Briguglio, 1995; Dolman, 1985). There are limited opportunities for specialization in the labor force which is conducive to a very narrow range of local skills (Dolman, 1985), brain drain, and limited access to capital markets.

As a result of the characteristics of the SIDS, economies of SIDS are fragile, open and vulnerable to natural and external economic shocks (Guillaumont, 2010). Consequences are instabilities such as political and trade instabilities, and obstruction to economic development. In such cases, the innovation-growth process is also vulnerable (Veugelers & Mrak, 2009).

According to the United Nations, the SIDS include a total of 39 islands in three geographic locations: 1. The Caribbean, 2. The Pacific, and 3. The Africa, Indian Ocean and South China Sea (United Nations, n.d.)<sup>7</sup>. Combined they have a population over 63 million and GDP over US\$ 575 billion (United Nations, n.d.)<sup>8</sup>. SIDS cover approximately 7% of the Earth's land surface (Baldacchino, 2008).

### **1.5.2 The spatial context of SIDS in this study**

As discussed previously, the spatial dimension cuts across the industrial and technological, organizational, institutional and policy, and social dimensions. These dimensions are intertwined and considering multiple dimensions in contextualizing entrepreneurship research is a challenge (Welter, 2011). Therefore, this study focuses primarily on the spatial dimension.

In addition, it is the spatial context that provides the underpinning for many of the vulnerabilities<sup>9</sup> experienced in the SIDS. The vulnerability to natural shocks cannot be isolated from the geographical location of the SIDS. Neither can the isolation experienced be separated from the physical location. Natural vulnerabilities, size and isolation, and limited resource endowments are all products of the geographical context in which the entrepreneurs operate. The additional 'handicaps' as Briguglio (1995) phrases this, occur due to "the interplay of such factors as smallness, remoteness, geographical, dispersion, vulnerability to natural disasters and a highly limited internal market" (p. 1615). Thus, to a certain extent, this also holds true for economic vulnerabilities. The geographic size of a country has a large explanatory power for the range of available local skills, the severity of brain drain, and the total size of the economy of that country. For these reasons, it is of special interest to study the spatial context of entrepreneurship in the SIDS.

### **1.5.3 Uncertainty in the SIDS context**

Entrepreneurs operating in the SIDS face uncertainty and resource constraints in the entrepreneurial process. This is exacerbated by the smallness of these islands. As discussed previously, uncertainty originates from the inherent variability of a

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<sup>7</sup> For an overview of the countries belonging to the SIDS according to the United Nations see <https://sustainabledevelopment.un.org/topics/sids/memberstates> (last retrieved December 30th, 2015).

<sup>8</sup> World Bank reports a total of 41 islands belonging to the SIDS, with a total population of 30.26 billion and GDP of US\$ 180.5 billion in 2014 (World Bank, n.d.)

<sup>9</sup> The SIDS face economic, environmental, social, climate change, trade and disaster vulnerabilities (Briguglio, 2003).

phenomenon and incomplete information (Walker et al., 2003). Due to incomplete information, an entrepreneur forms a perception of the uncertainty during the decision-making process. In the SIDS context the perceived uncertainty of the entrepreneur is augmented in at least three ways: 1. Secrecy, 2. Inaccurate information, and 3. External shocks.

First, due to tight kinship inhabitants of small islands often want secrecy. For example is the secrecy between (Fine & Holyfield, 1996) and among groups (Benedict, 1968). Information is not readily available and shared. This increases incomplete information and uncertainty.

Second, secrecy also creates inaccurate information (i.e. hearsay) that conflicts with the truth. Conflicting information is also a source of uncertainty (Lipshitz & Strauss, 1997). An analogy of how secrecy leads to inaccurate information is the children's game the Telephone (also called Chinese Whispers). A child whispers a message to another child, and this child repeats the message to another, which is continued through a line until the last child says the message out loud. Most times the messages at the start and the end of the game are very different. This is due to e.g. erroneous corrections, faulty interpretations, or someone deliberately altering the message. The message is treated secretly and not announced out loud at the start of the game which facilitates alterations of the message during the retelling. Similarly, when information is treated secretly, individuals will speculate. As this speculation moves through the grapevine; it alters to a form exceedingly dissimilar from the truth. The result is inaccurate information that increases uncertainty.

Finally, SIDS are vulnerable to external economic shocks (Guillaumont, 2010). The shocks affect the inherent variability of the phenomenon, that is also grounds for uncertainty according to Walker et al. (2003). The result is a rather complex scenario with ambiguous and inaccurate information that is influenced not only by the phenomenon itself but also external shocks that are often beyond the scope of the entrepreneur.

#### **1.5.4 Resource constraints in the SIDS context**

Entrepreneurs in SIDS also face resource constraints and these are enhanced by the small island context. SIDS are small and isolated from large markets, have limited access to capital markets, have a narrow range of local skills (Dolman, 1985; Serra & Theng, 2015) and suffer from brain drain. For example, Docquier, Lohest, and Marfouk (2007) report that brain drain in Grenada and Jamaica is larger than 85%. Limitation due to size is a structural constraint in small islands (Nurse, 2015). Furthermore, the capital market in small islands are underdeveloped and inefficient (Szirmai, Naudé, & Goedhuys, 2011). The entrepreneurs operating in SIDS also face the shortage of resources that is minimally required to produce a given level of

organizational output. This especially the case regarding skilled human resources and suitable financing (Baldacchino & Fairbairn, 2006).

## **1.6 Information and Communications Technology (ICT) entrepreneurs in SIDS context**

This dissertation focuses on Information and Communications Technology (ICT) entrepreneurs. The motivation for focusing on ICT entrepreneurs is twofold. First, ICT is an important avenue for sustainable economic development in SIDS. Historically, SIDS have relied on trade in agricultural commodities for economic growth, e.g. corn, sugar and tobacco. However due to challenges such as the diseconomies of scale, the distance to the large markets (and its relation to high cost of overseas shipping), proneness to natural disasters and a highly fragile ecology, trade in agricultural commodities could not form the basis for economic advance. Subsequently, during the last decades, trade in agricultural commodities has, to a large extent, been replaced by the service industries of tourism and international financial services. Some SIDS such as Singapore have been very successful in this transition<sup>10</sup>. In a modern economy, services are the most important industry for the SIDS especially services based on ICT because the integration of ICT with services increased the tradability of services (Petit & Soete, 2001a) and has made services more international (Miozzo & Soete, 2001).

Second, small and young technology-based entrepreneurial firms experience severe resource limitations (Luostarinen & Gabrielsson, 2004; Mudambi & Zahra, 2007). Aloisio (2015) reports that in the Maltese software industry constraints, poor access to finance and skills, limited access to markets and information, and low demand in domestic markets have to be confronted especially in the early stages of firm development. In particular, lack of finance is important because these firms often have multiple ongoing projects that require capital investment to be operational. Hence, young ICT entrepreneurial firms in SIDS are typically faced with “negative” slack and are thus an appropriate subject for this research.

## **1.7 The outline of this dissertation**

This dissertation is about entrepreneurial decision-making under uncertainty and resource constraints in the Small Island Developing States context.

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<sup>10</sup> In the second quarter of the year 2013 0.03 percent of Singapore’s GDP was comprised by agriculture, fishing and quarrying (Department of Statistics Singapore, 2013).

**Table 1. 2 Overview of empirical essays**

	<b>Chapter 4</b>	<b>Chapter 5</b>	<b>Chapter 6</b>	<b>Chapter 7</b>
<b>Topic</b>	Use of heuristics	Born-global' firms	New-to-the-world innovations	The Affordable loss as an investment decision
<b>Research question</b>	Which heuristics do the entrepreneurs use in the SIDS context?	How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?	How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?	How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?
<b>Research design</b>	Multiple-case study/ pattern-matching	Multiple-case study/ pattern-matching	Multiple-case study/ pattern-matching/ fsQCA	Multiple-case study/ pattern-matching
<b>Main contribution</b>	SIDS entrepreneurs use causal, effectual and bricolage logics	SIDS entrepreneurs use causal, effectual and bricolage logics to leverage networks in the internationalization process	The path towards novelty products for the world consists of effectuation, causation and bricolage	A process model of affordable loss
	SIDS entrepreneurs strive to remain flexible and apply the logic that they consider appropriate to the phases of the process to exploit opportunities	The gap between the technical expertise of the SIDS entrepreneur and the expertise required to develop the product is a determinant of which and how logics used lead to internationalization	Using only effectuation provides a too simplistic view	SIDS entrepreneurs invests sources that have been decoupled from payments and this is influenced by multiple sources and perishable income
	The use of logics is influenced by the small and resource constraint context			Their preference for the amount to invest is influenced by 'the rite of passage'
	The use of logics is influenced by the educational background of the SIDS entrepreneur			The entry decision is made in stages

Chapter 2 addresses the literature on the central question “*who is an entrepreneur?*” It reviews the theoretical shift from personality traits to cognition research in the efforts to understand who entrepreneurs are and how entrepreneurs are different from non-entrepreneurs (e.g. managers). The emergence of cognition and heuristics

research is also addressed. In particular, the chapter will review theories of effectuation (Sarasvathy, 2001) and entrepreneurial bricolage (Baker & Nelson, 2005), two of the most popular emerging theories in the entrepreneurship discipline (Fisher, 2012). It further elaborates on the validity of these theories in addressing entrepreneurial decision-making in uncertain and penurious environments. As Sarasvathy (2001) and several authors contrast effectuation with causal modes of risk management, the causal logic is also discussed in-depth. Chapter 2 closes with a discussion of how these theories complement each other and presents the efforts at synthesis by entrepreneurship scholars (e.g. Fisher (2012), Hindle and Senderovitz (2010), and Welter, Mauer, and Wuebker (2016).

Chapter 3 elaborates on the methodology chosen for this study. The motivation for studying multiple cases is provided. The selection criteria for our cases are presented and the selection procedures are discussed. The data was collected in Curacao and consists of four to seven cases. The chapter further elaborates on the procedure followed to develop the measurement indicators for the data collected and how these were administrated through semi-structured interviews. The procedure followed Reymen et al. (2015), and Baker and Nelson (2005). The analytical strategy, starting from a systematic review of the interview transcripts and archival documents, to the composition of matrices to facilitate within case and cross-case pattern matching, is discussed. Finally, Chapter 3 describes the context of Curaçao, followed by a discussion of the cases. I use micro and macro data obtained from the Ministry of Economic Development of Curaçao to describe the entrepreneurial context.

Chapters 4 through 7 presents the first empirical findings of this dissertation (see Table 1.2). Chapter 4 presents the descriptive data gathered during this study. It addresses the question *“which heuristics does an entrepreneur use in the SIDS context?”* To conclude, I discuss the three topics that will be addressed in Chapters 5, 6 and 7: 1. The emergence of the ‘born-global’ firms, 2. New-to-the-world innovations that emerge from penurious environments, and 3. The uses of the affordable loss heuristic to make the entrepreneurial entry decision.

Chapter 5 empirically examines how the application of logic influences the internationalization of firms. It advances our knowledge about the determinants of the phenomenon that some firms immediately start operating in international markets, rather than first gaining experience on domestic markets; the so-called ‘born-global’ phenomenon. It shows that the use of social networks to access resources and knowledge in the rapid internationalization process, there is no dominant use of any decision logic. SIDS entrepreneurs use causation, effectuation and bricolage in combination. However, the differences between the ‘born-global’ firms and the firms that internationalize incrementally have to do with the conditions under which the various logics are used; the gap between the technical expertise of the SIDS entrepreneur and the technical expertise required to develop

the product. When the gap is large, SIDS entrepreneurs become 'born-global' firms. When the gap is small the SIDS entrepreneurs internationalize incrementally.

Chapter 6 contributes to the knowledge on heuristics and their link to new-to-the-world innovations. Using the Fuzzy-Set Qualitative Comparative Analysis (fsQCA) in this chapter, I determined which heuristics are necessary in events of innovations that are new to the world. The findings indicate that a combination of decision logics composed of causation, effectuation and bricolage is necessary for successful new-to-the-world innovation.

Chapter 7 builds on studies of Dew, Sarasathy, Read, & Wiltbank (2009) and Sarasvathy (2015) to study how an individual makes use of the affordable loss heuristic to make the entrepreneurial entry decision<sup>11</sup>. It sets forth a process model of affordable loss that includes ability and preference components. The ability is how much the SIDS entrepreneur has at his or her disposal and the preference is the threshold of the investment. The ability influences the preference of the investment.

This dissertation contains some overlap between the chapters. Parts of Chapter 2's literature review and Chapter 3's methodology are repeated in the empirical essays. This is because these essays have been written as stand-alone chapters.

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<sup>11</sup> The entrepreneurial entry decision is the decision to make emotional, financial, mental, physical, and/or social investments to pursue an entrepreneurial opportunity.

## 2 LITERATURE REVIEW

### 2.1 Introduction

This research concerns decision logics that entrepreneurs use under uncertainty and in penurious environments. In particular, it addresses ICT entrepreneurs in the SIDS context. The entrepreneurial phenomenon has received interest from a wide variety of disciplines such as economics, strategic management, and psychology. In this chapter, the development of research focusing on understanding entrepreneurship, and in particular the entrepreneur is first discussed. Afterwards, the shift from researching the entrepreneurial traits to the cognition of the entrepreneur, which depends on the environment in which the entrepreneurial decision is made, is addressed. The theoretical framework of this study is based on an integration of causation and two prominent emerging theories in entrepreneurship (Fisher, 2012) namely effectuation (Sarasvathy, 2001) and entrepreneurial bricolage (Baker & Nelson, 2005). To explain the effectuation theory Sarasvathy contradicted the effectuation with its antonym rational decision-making (or planned decision-making), what she also called causation. For that reason, before the effectuation theory is discussed, the causation is addressed. Afterwards the bricolage is reviewed and ultimately how several scholars have integrated the three decision logics into a single framework is analyzed.

### 2.2 Who is an entrepreneur? is the wrong question

Entrepreneurship is a relatively new disciplinary field. The entrepreneurial phenomenon has received interest from other fields of research such as economics, strategic management, and psychology and it lacked a conceptual framework derived purely from its domain. The definitions of entrepreneurship are also as diverse as the fields of research that have shown interest in this topic (please see Table 2.1 for a non-exhaustive list of definitions of entrepreneurship). There are authors that focus on the bearing of risk and uncertainty (e.g. Dollinger, 2003; Knight, 1992), whereas other authors focus on the creation of organizations and products (e.g. Dollinger, 2003; Shane & Venkataraman, 2000; Gartner, 1985). And there are authors that focus on the creation of economic rent (e.g. Cole, 1959). For this reason, Shane and Venkataraman (2000) in their research note *'The promise of entrepreneurship as a field of research'* referred to the entrepreneurship field of research as "a hodgepodge of research" (p. 217).

However, 15 years after *'The promise'* has been published, we can see prominent emerging theories from the entrepreneurship discipline e.g. effectuation (Sarasvathy, 2001), entrepreneurial bricolage (Baker & Nelson, 2005), the creation

perspective (Alvarez & Barney, 2007), and user entrepreneurship (Fisher, 2012; Shah & Tripsas, 2007).

**Table 2.1 Overview of definitions of entrepreneurship**

Author(s)	Definition
Dollinger (2003)	The creation of an innovative economic organization for the purpose of gain and growth under risk and uncertainties
Shane and Venkataraman (2000)	The creation, discovery, evaluation, and exploitation of future goods and services
Hart, Stevenson, and Dial (1995)	The pursuit of opportunity without regard to resources currently controlled, but constrained by the founders' previous choices and industry-related experience
Knight (1992)	Profits from bearing uncertainty and risk
Stevenson, Roberts, and Grousbeck (1989)	The pursuit of opportunity without regard to resources currently controlled
Gartner (1985)	Creation of new organizations
Casson (1982)	Decisions and judgments about the coordination of scarce resources
McClelland (1961)	Moderate risk taking
Cole (1959)	Purposeful activity to initiate and develop a profit-oriented business
Hoselitz (1952)	Uncertainty bearing...coordination of productive resources...introduction of innovations and the provisions of capital
Schumpeter (1934)	Carrying out of new combinations of firm organization- new products, new services, new sources of raw materials, new methods of production, new markets, new forms of organization

### 2.2.1 Entrepreneurial traits

As the field of entrepreneurship has been maturing over the last two decades we have seen major debates that were important for establishing a research field of entrepreneurship. The main perspectives of entrepreneurship falls into two categories: 1. The individuals that exploit profitable opportunities, and 2. The characteristics of these opportunities (Gartner, 1988). The first perspective was concerned with the question '*who is an entrepreneur?*' Scholars focused on personality traits to understand who is an entrepreneur and how entrepreneurs are different from non-entrepreneurs (mostly managers and students). Examples of widely discussed traits are need for achievement (Bateman & Crant, 1993; Lee & Tsang, 2001; Lumpkin & Erdogan, 1999), internal locus of control (Boone, Brabander, & Witteloostuijn, 1996; Lee & Tsang, 2001; Lumpkin & Erdogan, 1999), self-reliance (Lee & Tsang, 2001), extroversion (BarNir & Smith, 2002; Van de Ven, 1984), proactiveness, creativity (Lumpkin & Erdogan, 1999; Verhees & Meulenberg, 2004; Wiklund & Shepherd, 2005), and risk-taking propensity (Baum & Locke, 2004). Although not classified as traits, experience (Dyke, Fischer, & Reuber, 1992; Lee & Tsang, 2001; Peña, 2002) and education (Douglass, 1976; Dyke et al., 1992; Lee & Tsang, 2001) are also often researched. The trait-based researched failed to produce adequate empirical support (Busenitz, 1999) e.g. trait-based reasoning assumed that the risk propensity of entrepreneurs is higher compared to non-entrepreneurs.

However, this hypothesis has received modest empirical support (Busenitz, 1999). Entrepreneurs are not more risky than non-entrepreneurs but evaluate opportunities differently (Keh, Foo, & Lim, 2002; Palich & Bagby, 1995). A study by Sarasvathy, Simon, and Lave (1998) found that entrepreneurs are even less prone to take risks than bankers.

According to Gartner (1988) this is because the question of '*who is an entrepreneur?*' and the trait approach, which determines how entrepreneurs are different from non-entrepreneurs, are fundamentally the wrong question and approach. Instead, entrepreneurship research should focus on the creation of organizations. Subsequently, the next decade of entrepreneurship research experienced a shift towards characteristics of profitable opportunities. Topics of interest were how entrepreneurial opportunities are exploited, the involvement of entrepreneurs, and the involvement of uniqueness in the exploitation of the opportunities. Shane and Venkataraman (2000) criticized Gartner's (1988) definition that it contains only one side of the entrepreneurship process (i.e. the organization) and exclude the individual. Instead, entrepreneurship is an individual-opportunity nexus (Shane & Eckhardt, 2003). Busenitz et al. (2003) expanded this to also include modes of organizing.

### **2.2.2 Entrepreneurial opportunities**

With '*The promise*', Shane and Venkataraman (2000) raised another significant debate within the field of entrepreneurship research: the debate about what entrepreneurial opportunities are and how these come into existence. This falls under the second category of the main perspectives of entrepreneurship, the characteristics of these opportunities (Gartner, 1988). There are two sides to this debate<sup>12</sup>. One the hand, opportunities are seen as passive in existence (i.e. opportunities are latent in the market and wait to be discovered), objective (i.e. all individuals can recognize all

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<sup>12</sup> Some authors consider the debate of objective versus subjective views of entrepreneurial opportunities to be of marginal utility in furthering our knowledge about entrepreneurship (Davidsson, 2015) for the reason that empirically it is very hard to make a distinction between objective and subjective opportunities (Dimov, 2011). In addition, "regardless of whether social environments are objective or subjective phenomena, the impact they have on individuals' intentions are real just the same" (McMullen & Shepherd, 2006, p. 149). I explicitly argue that I do not in any form assert there is a clearly defined boundary between the subjective versus subjective views and their application to the widely accepted types of entrepreneurial opportunities, recognition, discovery and creation (Sarasvathy et al., 2010), but the boundary is blurry. I argue that the objective and subjective views of entrepreneurial opportunity are useful to study the three types of opportunities. Elements of each opportunity type can be traced throughout each other and thus the opposing views do capture components among the types of opportunities. For instance it can be argued that recognition of opportunities is also subjective to the entrepreneur's prior knowledge (Shane, 2000). However, the above conceptualization serves as a valid starting point to assess the innovations and decision-making contexts that result from the types of opportunities.

opportunities) (McMullen, Plummer, & Acs, 2007) and inherently profitable (i.e. all opportunities lead to profit) (Shane & Venkataraman, 2000). Accordingly, Shane and Venkataraman (2000) defined entrepreneurship as “how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited (p. 218).

On the other hand, there is a subjective view of entrepreneurial opportunities that posits that opportunities are not objective phenomena but subject to the perception of an individual. Only those individuals that possess the right information will effectively see the opportunity. Due to differences in information that are created through a country’s division of labor and an individual’s social network (Baker, Gedajlovic, & Lubatkin, 2005), the individuals prior information related to opportunities (Shane & Venkataraman, 2000; Shane, 2000), and the individuals cognitive limitation, some might see an opportunity where others do not (Shane, 2000). As a consequence, opportunities are seen as subjective and dependent on the perception of the entrepreneur. Entrepreneurial opportunities are also subject to creation by the entrepreneur (Venkataraman & Sarasvathy, 2001). Subjectivists argue that an entrepreneur uses knowledge to create new opportunities that might otherwise have not existed (Sarasvathy, Dew, Velamuri, & Venkataraman, 2010). In the non-existence of either a supply and demand for a product, an opportunity is socially constructed through a creative prowess of the entrepreneur.

### **2.2.3 Entrepreneurial cognition**

The individual is an important unit of analysis in the subjective view of entrepreneurial opportunity. This marked a return to the individual as a subject of inquiry to understand the entrepreneurial process, however this time focusing on entrepreneurial cognition (Mauer, 2015; Mitchell et al., 2002; Sarasvathy, Ramesh, & Forster, 2015). With the rise of entrepreneurial cognition research, the realization was that an entrepreneur’s traits are not different to a non-entrepreneur but the entrepreneur evaluates opportunities differently (Keh et al., 2002; Palich & Bagby, 1995).

Cognition is from the research field of cognitive psychology and is about individual perception, memory and thinking (Estes, 1975 as cited in Mitchell et al., 2002). It is concerned with how individuals gather information and use rules (i.e. cognition) to assimilate and process this information in a given situation. Mitchell et al. (2002) define entrepreneurial cognition as “the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation process, and growth” (p. 97). A situation that has been extensively studied is conditions of uncertainty (e.g. Busenitz & Barney, 1997; Palich & Bagby, 1995) as it is widely recognized that entrepreneurship occurs within the context of

true uncertainty. An example of true uncertainty is emerging (breakthrough) radical technologies. Emerging radical technologies are uncertain (Srinivasan, Lilien, & Rangaswamy, 2002) due to fundamental differences with existing paradigms (Ettlie, Bridges, & O’keefe, 1984). These usually lead to new opportunities that are difficult to predict (Spinardi & Williams, 2005). There is also a lack of information on the technological component leading to technological uncertainty, and on potential future market leading to market uncertainty (Herrmann, Tomczak, & Befurt, 2006).

A prominent theory that deals with decision-making cognition under uncertainty, or as Sarasvathy (2001) calls it, logic is the effectuation theory (Fisher, 2012). Effectuation theory posits that if the future is unpredictable entrepreneurs rather exercise control and shape the future than still trying to predict the future. Entrepreneurs exercise a control logic for decision-making. In doing this, entrepreneurs focus on their means and the possible effects that can be created with the set of means. To provide explanation for the principles of effectuation, Sarasvathy (2001; 2008) contrasts the effectuation with the rational<sup>13</sup> approach of planning, which she terms causation (see Table 2.2). I, therefore, examine causation in detail before directing our attention to effectuation.

**Table 2.2 Contrasting effectuation and causation**

Categories of differentiation	Effectuation	Causation
Investments	Affordable loss	Expected return
Starting position	Means-orientation	Goal-orientation
Partnerships	Pre-committed stakeholders	Competitive analysis
Contingencies	Leveraging contingencies	Hedging against contingencies

source: Sarasvathy (2001)

## 2.3 Causation

The causal approaches towards decision-making under uncertainty are based on neo-classical economics, the utility maximization and rational man (Chandler, DeTienne, McKelvie, & Mumford, 2011). It revolves around a rational, planning-based decision-making and risk-return analysis. It starts with the individual determining a goal followed by calculating the possibility to realize the goal and then he or she determines the necessary steps to realize the goal (Knight, 1921). To determine the probability of achieving the desired goal, the individual will gather as much additional information and understanding of the goal. This is followed by a process of quantification of the uncertainty. Finally, the information that is acquired and the quantified uncertainty are plugged into a model. This model treats the uncertainty as a factor, takes into account the opportunity costs, and computes a prediction based on set parameters. This process is called the Reduce, Quantify,

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<sup>13</sup> I make use of narrow view of rationality where the decision-making is goal-oriented, reflective and consistent.

Plug (RQP) rationality (Lipshitz & Strauss, 1997). Examples of more well-known concepts that follow this RQP process are the net present value (NPV), real options model, decision trees, net present value risk adjusted (NPVR), and stage-gate (Davis, 2003).

The perceived uncertainty requires different coping strategies (Miller, 2007). For instance, a study by Lipshitz and Strauss (1997) among officers in the Israel Defense Forces, showed that the participants selected among five type of strategies to cope with one of the three types of perceived uncertainty. The strategies are reducing uncertainty, assumption-based reasoning, weighing pros and cons of competing alternatives, suppressing uncertainty, and forestalling. The three types of perceived uncertainty are an inadequate understanding, incomplete information, and conflicting information. Furthermore, the study showed that the use of coping strategies is not exclusive but individuals often use a combination of strategies. For instance, the military officers used a combination of assumption-based reasoning and forestalling techniques to cope with lack of information. In the case of uncertainty due to conflict among undifferentiated alternatives, the participants used a combination of weighing pros and cons, and forestalling.

There are four basic principles to the causal approach: 1. Investment is based on expected return, 2. Goal-orientation, 3. Treatment of (potential) partners through a competitive analysis, and 4. Hedging against contingencies (Sarasvathy, 2001; 2008). These are logics that guide the entrepreneurial decision-making process and the choice on how to cope with the uncertainties. The expected financial return of a given goal determines if the entrepreneur will invest in realizing this goal. The expected financial return is exercised in combination with the individual threshold. This is “the level of expected performance required by the individual to trigger entry into the entrepreneurial process” (McCann & Folta, 2012, p. 782). The entrepreneur will invest if the expected financial return exceeds his or her threshold.

Second, the entrepreneur is goal-oriented. The entrepreneur will first select a goal and subsequently search for the means necessary to realize this goal. The rational approaches are rooted in the neoclassic economic principles that people are rational and utility maximizing individuals. Thus, after the entrepreneur sets the desired goal, he or she will determine the best alternatives to realize that goal (Knight, 1921; Mintzberg, Ahlstrand, & Lampel, 1998).

Third, (potential) partners are treated through competitive analysis. Entrepreneurs that use rational approaches will select partners based on the set goal. Entrepreneur will do strategic analysis to gain an understanding of actions that are required to realize his or her goal and do systematic search to find the ideal partners that can aid in this endeavor. These partnerships are created through arm’s length contractual agreements and the entrepreneur uses intellectual property rights and secrecy to protect his or her idea.

Finally, when entrepreneurs use the rational approach they protect their decisions by implementing risk management tools and techniques such as erecting hedges. For the reason that rational approaches are goal-oriented and entrepreneurs develop partnerships that can aid them specifically for the goal attainment, entrepreneurs that use these approaches will avoid unexpected events. It is the process to minimize the risk that any surprise can inhibit the entrepreneurs from obtaining their goals.

To illustrate the causal process, the analogy of a chef preparing a meal will be used (Sarasvathy, 2001). The causal chef will first look for a recipe and subsequently he or she will look in his or her cupboards and refrigerator for the available ingredients and cooking equipment (e.g. utensils, pans, and stoves) that are required to cook the meal according the recipe. Next, he or she will make a plan on how to proceed. If some ingredients or cooking equipment are missing, the causal chef will choose an option that he or she considers to be optimal to acquire the missing ingredients or cooking equipment. For example, the chef can go to a supermarket with a list, or he or she can contact his or her personal friends who he or she thinks has the highest probability to have those missing ingredients. The causal chef will then start cooking the meal with the friends that joined him or her. They will follow the instructions on the recipe until the meal is ready.

### **2.3.1 Applications and weaknesses of the causal approach**

In the causal approaches to decision-making, an entrepreneur tries to predict a (uncertain) future, calculate the associated risks and tries to limit these risks. The entrepreneur engages in a process of turning uncertainty into measurable risks. Because the causal approaches assume there is information available on the best alternative to realize a goal, these are best applicable to situations with no or low risk and no true uncertainty.

However, this task is difficult and in the context of uncertainty even unfeasible for the reason that human beings are rational only between certain bounds due to insufficient information and time, and cognitive inability (Simon, 1955). Rational and utility maximizing decision-making where historical information is lacking is improbable as information is a vital component of calculating probabilities of the occurrence of a future event. It is unfeasible to make predictions where both the supply and demand that constitute an entrepreneurial opportunity are created (Sarasvathy et al., 2010). In addition, there is a shortage of time prompting an entrepreneur to act quickly and the complexity of the problem surpasses the cognitive ability of the individual.

When an individual is rationally bound, he or she does not seek to maximize his or her utility but only to reach a desired level of satisfaction that is sufficient: satisficing (Simon, 1955). In other words, the lack of information inhibits an

individual to make decisions that are optimal. Under these conditions individuals will form aspirations with associated levels (i.e. threshold). In the individual decision-making, he or she seeks to arrive at a solution that meets the desired level (i.e. sufficient) and the desired requirements (i.e. satisfactory). Thus, in situations under uncertainty and bounded rationality an entrepreneur cannot take a rational decision but uses heuristics (Busenitz, 1999).

### **2.3.2 Heuristics**

Searching for additional information to reduce uncertainty may cause an entrepreneur to miss the opportunity. Instead of postponing a decision, the entrepreneur uses heuristics to assimilate and make sense of fragmented information to make decisions quickly (Busenitz, 1999). Heuristics are simplifying strategies used to make decisions in situations of complexity and uncertainty (Kahneman & Tversky, 1979) and are determined by the individual and the situation (Busenitz & Barney, 1997). Examples of decision-making heuristics that entrepreneurs use are representativeness (Busenitz, 1999) (i.e. generalization from small and non-random samples) and availability heuristic (i.e. individuals are likely to perceive what they are predisposed to see when presented with ambiguous information) (Palich & Bagby, 1995). As heuristics are shortcuts to make decisions where full rationality is not possible, the consequence is that the individual can experience cognitive biases. Cognitive biases are deviation in judgments that lead to incorrect conclusions. Examples of cognitive biases are overconfidence (not knowing the limit of one's knowledge (Busenitz, 1999), illusion of control (overly optimistic in estimation of one's abilities and leading to a flawed belief that one has control over external factors), belief in small numbers (drawing conclusions based on insufficient observations), and planning fallacy (isolating current situations from past experiences) (Keh et al., 2002).

Based on the insight that individuals are rationally bounded, scholars have developed new models to understand how entrepreneurs make decisions under uncertainty. Two prominent emerging theories in entrepreneurship (Fisher, 2012) are effectuation (Sarasvathy, 2001) and entrepreneurial bricolage (Baker & Nelson, 2005). Effectuation concerns decision-making under uncertainty in e.g. new market creation, while bricolage concerns decision-making in penurious environments. These are discussed in the following sections.

## **2.4 Effectuation**

Effectuation theory (Sarasvathy, 2001) is a cognition theory that focuses on entrepreneurial decision-making under uncertainty. It has been developed based on a think aloud experiment by Sarasvathy during her dissertation work. Sarasvathy

focused specifically on true uncertainty that is present in the process of new market creation. The uncertainties faced in these circumstances are often described as unknowable (Sarasvathy & Kotha, 2001). According to the effectuation approach, in this situation an entrepreneur uses the control logic for decision-making. Instead of trying to predict an uncertain future, he or she engages in controlling an unpredictable future.

The problem space of effectuation (Sarasvathy, 2008) includes entrepreneurial opportunities of the creative kind (Sarasvathy et al., 2010), true uncertainty (Knight, 1921), goal ambiguity (March, 1982) and isotropy (Weick, 1969). In the absence of either a supply or demand for a product, an opportunity is socially constructed by the entrepreneurs when they enact their environments. In this situation, the entrepreneurs are unsure of their own preferences when they have to deal with ambiguity (March, 1982) and will postpone goal-making until they have a better understanding of their preferences. Isotropy means that “in decisions and actions involving uncertain future consequences it is not always clear ex ante which pieces of information are worth paying attention to and which not (Sarasvathy, 2008, p. 69). The consequence is that the decisions of the entrepreneur can lead to many equally good outcomes (Weick, 1969) because “there may be no optimal entrepreneurial process, allowing for many equally effective approaches” (Shane, 2012, p. 14).

Effectuation is a model of expert entrepreneurs’ decision-making (Read & Sarasvathy, 2005; Sarasvathy, Dew, Read, & Wiltbank, 2007). There is a difference between experts and novices on how they make decisions (Simon, 2003). Experts acquire attributes that non-experts do not have during a relatively long period (Murmah & Sardana, 2012) that usually takes about 10 years (Sarasvathy et al., 2007). During this period, experts acquire abilities that set them apart from novices.

The effectuation comprises of a set of five heuristics or (decision-making) ‘principles’: 1. The affordable loss, 2. The bird-in-hand, 3. The crazy quilt, 4. The lemonade, and 5. The pilot-in-the-plane (Sarasvathy, 2008). In the first work of Sarasvathy (2001), the last principle of effectuation was referred to as a boundary condition. However, in her subsequent works, in particular ‘*Effectuation: Elements of Entrepreneurial Expertise*’ (Sarasvathy, 2008), the pilot-in-the-plane was added as a principle of effectuation. The pilot-in-the-plane principle refers to the control logic exerted by effectual entrepreneurs. Effectual entrepreneurs strive to influence or create the future instead of predict the future (Sarasvathy, 2001; Sarasvathy & Dew, 2003). When the effectual entrepreneurs exercise the control logic, these entrepreneurs also make investments based on what they are willing to lose. They focus on the resources they have available. They co-create with other stakeholders, and they are open to leverage surprises. The decision-making based on these principles leads to the creation of entrepreneurial opportunities that are actionable

(i.e. “an opportunity that the entrepreneur can immediately act upon” (Fisher, 2012, p. 1045).

Currently, there is no consensus as to which principles are necessary to constitute effectuation. However, most authors use a combination of the affordable loss, the bird-in-hand, the crazy quilt, and the lemonade e.g. Dew, Read, Sarasvathy, and Wiltbank (2010), Fisher (2012), Martina, Gabrielsson, and Yar Hamidi (2014), Read, Song, and Smit (2009), and Reymen et al. (2015). In addition, these four principles do not have to be simultaneously present in order to constitute an effectual process. The point of departure of this study is the four principles of effectuation; the affordable loss, the bird-in-hand, the crazy quilt, and the lemonade.

#### **2.4.1 The affordable loss principle**

The affordable loss posits that an expert entrepreneur focuses on the downside of an entrepreneurial opportunity rather than making an effort to predict an (often unpredictable) financial return (Sarasvathy, 2008). It is what an entrepreneur can afford and he or she is willing to lose in opportunity exploitation (Dew, Read, Sarasvathy, & Wiltbank, 2009). This is a preferred choice because the information of the down-side of the exploitation of an opportunity is easy accessible and controlling what one might lose is easier than predicting future financial gain. Furthermore, loss causes more pain than gain causes happiness (Kahneman & Tversky, 1979).

The affordable loss consists of two elements: 1. What an entrepreneur can afford to lose, and 2. What an entrepreneur is willing to lose in order to exploit an entrepreneurial opportunity (Dew et al., 2009) . The reason entrepreneurs prefer to focus on the down-side of the exploitation of the entrepreneurial opportunity is because information about this is easily accessible (Dew et al., 2009). In addition, it can be assumed that controlling what one loses is easier than controlling what one can gain from exploiting an opportunity. The up-side of a yet to be exploited entrepreneurial opportunity is uncertain and thus unpredictable. Entrepreneurs choose to focus on a few factors of the situation and use heuristics to make decisions (Busenitz, 1999). In the case of effectual entrepreneurs, it is to focus on limiting the capital that can be lost, while pursuing the opportunity.

#### **2.4.2 The bird-in-hand principle (means-orientation)**

In addition to the affordable loss, effectual entrepreneurs are means-oriented. This is based on March's (1982) work on exploration and exploitation, and the challenges these processes bring to pre-existing goals. When uncertainties are present, entrepreneurs do not set goals. The reason is that they have no insights of the decisions that will lead to more successful future outcomes and thus no assurance of their own preferences. Instead, entrepreneurs endogenously establish goals as the

entrepreneurs construct and exploit an opportunity. Thus, the decisions made are led by a focus on the availability of means.

### **2.4.3 The crazy quilt principle (pre-committed stakeholders)**

An effectual entrepreneur will use his or her identity to make potential partners self-select themselves into the partnership. As there is no set goal when the entrepreneur acquires commitment from potential partners, it is conceptualized as a pre-commitment from stakeholders (Sarasvathy, 2001); there is no set goal and the goal will be set endogenously during the process of the exploitation of the entrepreneurial opportunity. Stakeholders' pre-commitments are acquired based on their self-selection, meaning that there are no selection criteria based on capabilities required to realize a set goal. A stakeholder, for example, pre-commits resources and/ or expertise and his or her preferences, and other pre-committed stakeholders will permit themselves to adjust their own preferences (Sarasvathy & Dew, 2003). This is possible because individuals are considered to be docile human beings, meaning they are teachable, persuadable, adaptable, and manageable. When faced with lots of information from other individuals, individuals are willingly docile to accept and make decisions based upon this information. "Boundedly rational and docile process of discovery/formation of common motives based upon and leading to elements of group identification – that in turn spark the transformation of combined endowments into new economic value" (Sarasvathy & Dew, 2003, p. 12).

The pre-commitment of stakeholders has two important implications. First, it leads to a partnership that reduces false positives and negatives (Type I and II errors) in the selection of opportunities (Sarasvathy & Dew, 2003). By providing pre-commitments to an endeavor with only what the pre-committed stakeholders can afford to lose, they will guarantee an involvement if the endeavor leads to successful opportunity exploitation, and on the other hand limit their losses if the endeavor fails.

Second, the pre-commitment of stakeholders reduces behavioral uncertainty (Sarasvathy & Dew, 2003). Partners in the pre-committed partnership are subject to various opportunity costs, namely the opportunity costs of not participating in other partnerships with similar aims. However, due to lack of a goal, the entrepreneurs in the partnership cannot make a decision on which opportunity would be optimal. Thus, in this case the "the bird in the hand is always worth more than imagined birds in mythical bushes" (Sarasvathy & Dew, 2003, p. 24) and thus opportunity cost is irrelevant.

### **2.4.4 The lemonade principle (leveraging contingencies)**

The lemonade principle concerns how effectual entrepreneurs deal with contingencies (Read & Sarasvathy, 2005; Sarasvathy, 2001). The causal approaches

indicate that when entrepreneurs face uncertainty they will protect themselves as much as possible from the effects of non-expected factors on their chosen strategies because contingencies are considered as threats to the realization of their goals. According to the effectuation approach entrepreneurs do the opposite. When entrepreneurs cannot assess uncertainty, they will 'be open' to exploit any possible future alternative presented (Fisher, 2009; Sarasvathy, 2001) because any alternative can lead to a positive outcome. Keep in mind that there is no goal orientation and thus no chosen path that the entrepreneur must follow to realize his or her goal.

Embracing surprises is also a vital way to continue the development of an opportunity where the entrepreneur is continuously capable of acting. Evidently, during the entrepreneurial process, an entrepreneur can face unexpected events that can inhibit the realization of a possible outcome. In this situation, an entrepreneur must be open to changing his/ her direction. The entrepreneur is continually fixated on what he or she can do in every situation. Thus, instead of hedging against unexpected contingencies, the effectual entrepreneurs will embrace contingencies and incorporate these into their entrepreneurial decision-making process.

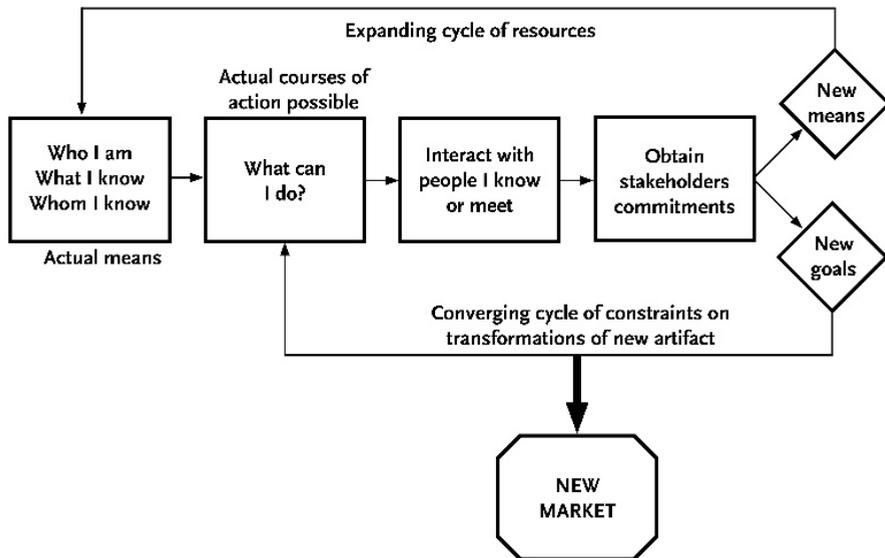
#### **2.4.5 The process model of effectuation**

The above described principles present a static view of effectuation. However, there is also a process view of effectuation<sup>14</sup> (Sarasvathy & Dew, 2005). It is described as a transformational process; an expanding cycle that increases the means available to the entrepreneur and his or her partnership of pre-committed stakeholders (see Figure 2.1). This process is started by the entrepreneur through a self-reflection; who he or she is, what he or she knows, and whom he or she knows. Through this reflection the entrepreneur determines his or her availability of resources and preferences and acquires pre-commitment from people he or she knows. The created partnership slowly progresses from no goals that are set towards a goal that constrains the stakeholders in the partnership to a certain future (Dew et al., 2010; Wiltbank, Dew, Read, & Sarasvathy, 2006). At a certain point in time, a goal will endogenously be created and the partnership of the entrepreneur and the pre-committed stakeholders will shift towards more causal logics.

In the process model of effectuation, the entrepreneur's social network is vital. Who the entrepreneur knows has an essential role in determining the resources that will become available to the entrepreneur and thus expanding the possible goals that can be released with the given means.

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<sup>14</sup> Sarasvathy and Dew (2005) refer to this as the dynamic model of effectual networks and the market as an effectual artifact



**Figure 2.1 A process model of effectuation**

Source: Sarasvathy and Dew (2005)

To illustrate the effectual process, I will use the same analogy of the chef preparing a meal that I used to illustrate to causal process. The effectual chef will first look in his or her cupboards and refrigerator for his or her availability of ingredients and cooking equipment (e.g. utensils, pans, and stoves). Subsequently, he or she will contact his or her personal friends to acquire more ingredients and cooking equipment. During the cooking process, the chef and his or her friends that joined the process will also evaluate themselves concerning their preferences, ingredients and cooking equipment, and friends. Based on this evaluation they can contact other friends that pre-commit their resources and knowledge to the cooking process. This cycle continues and the amount of available ingredients and cooking equipment will increase. Every time a pre-committed stakeholder adds an ingredient or cooking equipment to the process, the meal that is being cooked changes. At a certain point in time, the chef and all the pre-committed stakeholders will stop adding more ingredients and cooking equipment to the process and decide that the meal is finished.

## 2.5 Entrepreneurial bricolage

Thus far, the uncertain context has been discussed, but how are decisions made in resource constrained environments? A theory that lends itself well to the study of penurious environments is the theory of entrepreneurial bricolage (Baker & Nelson,

2005; Garud & Karnøe, 2003). As has been previously discussed throughout the introduction, entrepreneurs in the SIDS operate in a penurious environment (MacMaster, Archer, & Hirth, 2015) that “presents new challenges, whether opportunities or problems, without providing new resources” (Baker & Nelson, 2005, p. 353). When entrepreneurs are faced with these environments, they engage in bricolage to ‘stretch’ the available resources towards new uses; that is “creating something from nothing” (Baker & Nelson, 2005, p. 331). Entrepreneurs are able to do this because each entrepreneur has a unique relationship with his or her resource environment, different entrepreneurs will create different uses of the resources, and same resources might be viewed differently by different entrepreneurs. Thus, bricolage is a social constructivist theory indicating that resources are not objectively given but subjectively viewed and treated due to the entrepreneur’s idiosyncrasy (Penrose, 1959). It is about how to deal and operate under constraints. Scholars also refer to this as resourcefulness and it is defined by Powell and Baker (2011) as “patterned behaviors of making use of limited resources” (p. 382).

The accepted definition of bricolage is ‘making do by applying combinations of the resources at hand to new problems and opportunities’ (Baker & Nelson, 2005, p. 333). “*Making do*” refers to the active attitude of the entrepreneurs to create something from nothing, use discarded and unwanted resources for new purposes, and use untapped resources that other organizations failed to recognize (Di Domenico, Haugh, & Tracey, 2010). It is also the refusal to accept the limitations imposed by the resources according to ‘collective wisdom’ or routines that have been universally accepted. These routines are seen as industry normative recipes that “function as heuristics or cognitive shortcuts to reduce the likelihood ...to consider other [non-working] alternatives” (Steffens, Baker, & Senyard, 2010, p. 6). Entrepreneurs engaging in bricolage will try out new solutions to counteract limitations imposed by institutional/political settings, and challenge limitations imposed by available resource environments in their ability to create value (Di Domenico et al., 2010).

Resources at hand refer to the entrepreneur’s availability of resources and it also includes resources that are available for free or very cheaply. Considering that the entrepreneur operates in a constrained environment, he or she is unwilling or unable to acquire resources at market prices. Though the task of acquiring resources might be daunting, it is possible because the resources typically used in bricolage settings are unwanted by other actors.

Finally, the application of bricolage is not the use of resources to address existing challenges, but the application of the resources to new problems and opportunities that can lead to unique innovative products (Salunke, Weerawardena, & McColl-Kennedy, 2013). Research has shown that there is more innovation in exactly these resource constrained environments, but the result of the trial-and-error and improvised bricolage process is incremental rather than radical innovation

(Garud & Prasad, 2013). In the process of applying bricolage, discarded and unwanted resources are used creatively. Because these entrepreneurs challenge the limitations imposed by scarce resource environments, they ultimately develop novel products and solutions.

Senyard, Baker, Steffens, and Davidsson (2014) found a positive relationship between bricolage and innovation among nascent firms<sup>15</sup>. However, innovativeness negatively influences the positive effect of bricolage on performance of young firms (Senyard, Davidsson, Baker, and Steffens, 2010). A major difference between the nascent and young firms is the amount of resources firms have at their disposal: young firms have more resources. Another explanation for the difference in the effects of bricolage is that a young firm might already have a well-defined product and market. Using Roberts' (1991) stages of entrepreneurial development, young firms in the early growth phase (i.e. the scaling up of the new innovation) have already tested their product offering for a good product/ market fit, found some success with consumers, and show positive cash flows. At this stage the young firm has a successful business model and does not want to 'reinvent the wheel'. Experimentation and high levels of innovativeness put previous choices into question and hamper firm growth. Nascent firms in the seed phase (i.e. the initial process of innovation), on the other hand, are at the early stage of developing their customer offerings and a sound business model. It is usually these startups that are experiencing most negative 'slack' resources and can apply bricolage to develop innovations.

Making a distinction between types of innovation, Senyard, Davidsson, Baker, and Steffens (2011) found a positive effect of bricolage on product, sourcing/production, promotion and market innovation, both in nascent and young firms (with the exception of market innovation in nascent firms).

Entrepreneurs engage in bricolage through a trial-and-error and improvised process that is ambiguous, path-dependent, and socially complex (Steffens et al., 2010). The bricoleurs do not have a set goal for the resources, rather they permit the resources to shape new problems and opportunities that are addressed (Di Domenico et al., 2010).

Scholars have observed several areas in which bricolage has been applied by entrepreneurs: physical, labor, and skills inputs, customer/markets, and institutional and regulatory environment. Entrepreneurs either apply bricolage to all areas, or to one or a few areas. The application of bricolage to all areas is called parallel bricolage. The application of bricolage to only one or a few areas is called selective bricolage. Parallel bricolage can cause a variety of dysfunctional outcomes,

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<sup>15</sup> Nascent firms are those firms that are trying to start a new business or new venture by "undertaking some concrete "start-up" behavior such as such as looking for equipment or a location, organizing a new firm team, working on a business plan, etc., within the last 12 months" (Senyard et al, 2014, p. 217). Young firms are the firms that their "revenues had exceeded expenses for 6 of the last 12 months" (p. 217).

including lack of growth (Baker & Nelson, 2005) and low quality products and services (Steffens et al., 2010), due to high costs and inefficiencies created by excessive experimentation (Senyard et al., 2010).

### 2.5.1 The process model of entrepreneurial bricolage

Like effectuation, bricolage also has a process model (see Figure 2.2). Baker and Nelson (2005) present a process that starts with entrepreneurs in a penurious environment and ends with either growth or no growth. When entrepreneurs face resource limitations in penurious environments, they have three options: 1. Seek the required resources, 2. Avoid the new challenge by remaining inert, downsizing, or abandoning the challenge altogether, or 3. Apply bricolage by making do with resources at hand and those that can be acquired for free or very cheaply. Entrepreneurs that apply bricolage do this in five domains: 1. Physical input, 2. Labor input, 3. Skills input, 4. Regulatory and/ or institutional environment, and 5. Customers. Entrepreneurs that engage in parallel bricolage create a firm identity based on bricolage and become embedded in a community that limits their potential to generate profits within the community or exploit opportunities outside of this community. Entrepreneurs that engage in selective bricolage do not create a firm identity and do not become embedded in a community. These entrepreneurs create organizational routines that enable growth. They also pursue entrepreneurial opportunities outside of the community, in other broader, richer but more demanding markets. This leads to firm growth.

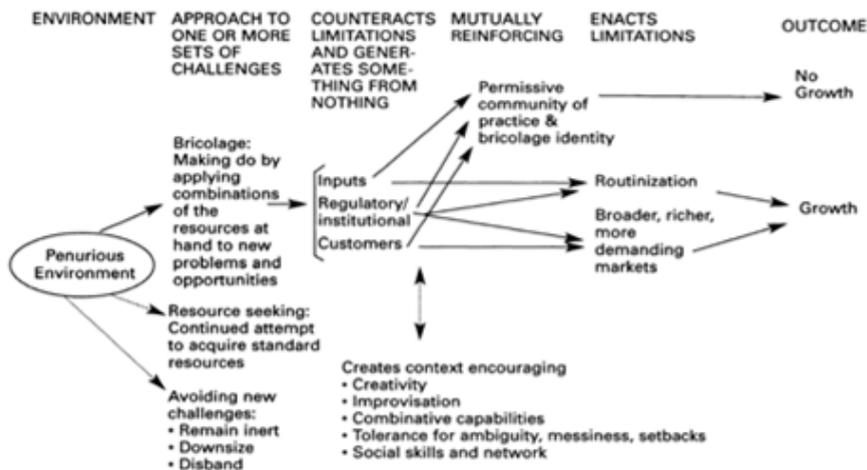


Figure 2.2 A process model of entrepreneurial bricolage

Source: Baker and Nelson (2005)

## 2.6 Integrating causation, effectuation and entrepreneurial bricolage

The theoretical framework of this study is based on an integration of causation, effectuation (Sarasvathy, 2001) and entrepreneurial bricolage (Baker & Nelson, 2005). As a starting point, both the effectuation and bricolage perspectives posit that an entrepreneur starts from whom he or she is and exercises introspection (MacMaster et al., 2015; Sarasvathy, 2001) and draw on very similar concepts, though effectuation and bricolage explain different phenomena of entrepreneurship (Fisher, 2012)<sup>16</sup>. Furthermore, uncertainty is a driver of the use of bricolage as well as of effectuation (Cunha, 2005). These similarities provide a fruitful ground for theory integration (Mayer & Sparrowe, 2013) as both perspectives use similar accounts to explain different phenomena, namely decision logics under uncertainty for the former and resource constraints for the latter. Known scholarly efforts to integrate effectuation, causation and bricolage are Hindle and Senderovitz (2010), Fisher (2012), and Welter et al. (2016).

Hindle and Senderovitz (2010) used eight concepts to compare causation, effectuation, and bricolage: 1. Goal-setting, 2. Planning, 3. Predictive/ non-predictive behavior, 4. Conducting internal and external analyses, 5. Using existing resources or seeking new resources, 6. Resources: defined or constructed, 7. Opportunities, and 8. Expertise. They posit that effectuation and bricolage are very similar on several accounts; both are in opposition to rational planning, focus on non-prediction and the control logic, there is no preference for strategic analyses, use existing resources, resources are constructed, and opportunities are created. Causation and bricolage have only two similarities namely that the use of pre-existing goals, and causation and bricolage are carried out by both experts and non-experts. Hindle and Senderovitz (2010) empirically tested their integrative framework through an analysis of Terry Allen's narrative account of 22 ventures he started or joined, and they concluded that principles of causation, effectuation, and bricolage are not mutually exclusive. Furthermore, they observed that a major difference between these concepts is goal-orientation. Effectuation is placed in a goal ambiguity context while causation similar to bricolage has a teleological account.

Fisher (2012) compared causation, effectuation, and bricolage along four questions: 1. What (factors are part of the explanation?), 2. How (are the factors identified related to outcomes of interest?), 3. Why (can we expect that the proposed relationships exist?), and 4. Who, where, when? (the assumptions and limitations underlying the theory (boundary conditions)). The empirical results of the case study among six consumer Internet ventures that Fisher (2012) conducted shows that effectuation and bricolage are similar on four counts: 1. Entrepreneurial

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<sup>16</sup> The effectuation explains the phenomenon of uncertainty and entrepreneurial bricolage explains the phenomenon of resource constraints.

opportunities are constructed via existing resources, 2. Takes action to overcome resource limitations, 3. Enacting partners is important, and 4. Resource limitation enhances creativity.

Differing from Hindle and Senderovitz (2010) and Fisher (2012), Welter et al. (2016) presents a conceptual paper that juxtapose effectuation and bricolage<sup>17</sup> along three dimensions: 1. Opportunity (discovery vs. creation), 2. Context (risk vs uncertainty), and 3. Actor (discoverer vs generator). Both effectuation and bricolage look at opportunity as unspecified and created by the entrepreneur. Further similarity between the two is the focus of the actor on the resources he or she has. However, the contexts are different. The context of effectuation is bounded rationality and the context of bricolage is resource scarcity.

In summation, the above review of the literature shows that effectuation and bricolage prescribe similar logics in how entrepreneurs view planning and strategic analyses, focus on non-prediction and controlling, use existing resources to create opportunities, and enact their networks in this process. Furthermore, their distinctive boundary conditions (i.e. bounded rationality due to uncertainty for effectuation and resource limitations<sup>18</sup> for bricolage) provide sufficient grounds to integrate effectuation and bricolage into a theoretical framework to study decision-making under uncertainty and resource constraints in the SIDS context.

In this research, I have based my qualitative study on the literature streams discussed in this chapter and the models of causation, effectuation, and entrepreneurial bricolage. These models informed the sub-research questions of this study. The first sub-research question is:

*Which heuristics do the entrepreneurs use in the SIDS context?*

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<sup>17</sup> These authors compare effectuation and bricolage with opportunity creation. For the reason that this study does not include opportunity creation only the comparisons of the former is reviewed.

<sup>18</sup> It is important to make explicit that resource limitation is not an assumption in effectuation but is a problem space for bricolage. Arend, Sarooghi, and Burkemper (2015) incorrectly posit that resource limitation is an assumption in effectuation. Entrepreneurs are required to access external resources due to constraints in their resources. However, resource limitation is a state that can be addressed by effectuation. Sarasvathy, Kumar, York and Bhagavatula (2014) argue that effectual entrepreneurs treat their resources as fungible for the reason that the entrepreneur focuses on the control he or she would like to exercise in shaping the future, and is open to the substitution of the resources as contingencies present themselves. In combination with the affordable loss mindset, an entrepreneur “with relatively limited access to resources, she [or he] should [emphasis added] consider effectuation process” Sarasvathy (2001, p. 633). Entrepreneurs do not need to have constraints in resources to apply effectuation. Entrepreneurs can also apply effectuation if they have slack resources. Thus the issue of resource limitation is not central in effectuation. Rather, it is that individuals can co-create successful ventures with nothing more than resources already within their control (Read, Sarasvathy, Dew, & Wiltbank, 2016). Resource limitation is an assumption in bricolage. The theory’s point of departure is that the entrepreneurs who engage in bricolage face penurious environments (Baker & Nelson, 2005).

The method used to conduct the research and the development of the remaining sub-research questions is discussed next.

## 3 METHODOLOGY

### 3.1 Introduction

This research is concerned with the use of decision logics when entrepreneurs face uncertainty and resource constraints. The overarching research question is:

*How does an entrepreneur in the SIDS context make decisions under uncertainty and resource constraints?*

The first sub research question is:

*Which heuristics do the entrepreneurs use in the SIDS context?*

When the data regarding this sub-research question was analyzed, three entrepreneurial phenomena emerged: 1. The emergence of the 'born-global' firm, 2. New-to-the-world innovations that emerge from penurious environments, and 3. The use of the affordable loss heuristic in the entrepreneurial entry decision. The three entrepreneurial phenomena form the foundation of three additional sub-research questions that were addressed in this dissertation:

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?*

*How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*

In the remainder of this chapter, the multiple-case research strategy used and the criteria that lead the selection of my cases are discussed. The main characteristics of the seven cases are discussed and the themes that I used to administrate the semi-structured interviews for the data collection efforts. Finally, the context of Curaçao, the process of coding the data, and the pattern matching analytical strategy are discussed.

### **3.2 Research strategy**

This research builds theory using a multiple-case research strategy (Eisenhardt, 1989; Yin, 2009). This is an ideal research strategy for addressing 'how' questions (Yin, 2009). Thus, a multiple-case research strategy is suitable to address the research questions of this study.

In addition, a multiple-case research strategy is also suitable to study contemporary life phenomena in which the researcher has no control over the events (Yin, 2009). In studying the above mentioned phenomena, there is no control over the events that take place. For this research context it is ideal to study multiple cases. Cases are used as the basis to develop theory inductively (Eisenhardt & Graebner, 2007). Though historical research also fits this purpose, the multiple-case research strategy is superior for the reason that data can be collected through both direct observation and systematic interviewing which increases the richness of the data pool and the validity of the study.

Furthermore, by using a multiple-case research strategy the problems of data collection on small islands are also addressed. One of the unique characteristics of SIDS is their smallness in terms of population (Dolman, 1985). The smallness of the SIDS creates the problems for data collection in the following ways (Briguglio, 2003): 1. Lack or shortage of data (i.e. data is not often collected and organized in databases), 2. Unwillingness to provide data (i.e. SIDS entrepreneurs often want secrecy due to tight kinship relationships), and 3. Deliberate misrepresentation or response and recall biases. By using a multiple-case research strategy these challenges for data collection can be mitigated. The lack or shortage of data can be overcome by using multiple sources of data. In particular, using in-depth interviews to collect primary data of the first-hand experience of a participant contributes to the richness of the data.

The collection of data from a variety of sources (i.e. primary, secondary and tertiary) also addresses the challenge of participants being unwilling to provide data. For example, a SIDS entrepreneur might be too busy to participate in several interviews. Instead of using only intrusive data collection techniques where the participants need to take part, multiple non-intrusive sources (e.g. media coverage, press releases, and websites) can be added (Pollock & Lashley, 2014).

Last, by triangulating data from multiple sources, the misrepresentation and response and recall biases are addressed. In addition, non-compete and non-disclose agreements between the researcher and participants can build a bridge of trust, which in turn positively influence the participants' willingness to provide accurate data.

### 3.3 Case selection criteria

The purpose of this research is to inductively develop theory. It is not to test theory. Hence, an adequate method to select cases is criteria sampling<sup>19</sup> (Eisenhardt & Graebner, 2007). The selection criteria are deduced from the theories of concern for this study. In developing these the following aspects proposed by Miles and Huberman (1994), as cited in Curtis, Gesler, Smith and Washburn (2000), were taken into consideration: 1. Is there a relevance to the theories and research questions? 2. Can the cases generate rich information on the phenomenon to be studied? 3. Can the cases enhance theoretical generalizability of the findings?

The procedure to develop the case selection criteria followed four steps that are presented in Table 3.1. In the first step, the criteria from the causation, effectuation and entrepreneurial bricolage theories were deduced. In the second step, the sub-research questions of this study were reviewed and the relevant criteria were added to the list of criteria from step 1. In the third step, the list of criteria was further developed to be able to generate rich information for the phenomena concerned in this study. Zahra and Wright's (2011) contextualization of the entrepreneurial dimensions was used. For the reason that entrepreneurship is broad and heterogeneous, and contains several activities, the contextualization of the entrepreneurial dimensions is useful to understand key indicators on which the acts of entrepreneurs differ. The entrepreneurial context contains: 1. A rate (i.e. the number of entrepreneurial activities undertaken over a period of time), 2. A magnitude of novelty (i.e. the extent to which the entrepreneurial activity is new) and 3. A variety of exploitation techniques (i.e. the variability of the entrepreneurial activities across actions, initiatives, and ventures) (Zahra & Wright, 2011). This enhances the opportunity to have transparent observations, and the variation will increase the richness of the data to be collected (Eisenhardt, 1989). In the fourth and final step, the selection criteria were further developed to provide additional cross-case variation that is useful for theory building and ultimately enhances the generalizability of the findings.

The implementation of the four steps followed a specific order. I first applied the four steps only to the sub-question:

*Which heuristics do the entrepreneurs use in the SIDS context?*

I provide elaboration on how I developed the selection criteria for this sub-question in the Section 3.3.1. I selected two cases, MusicCo and PostCo, that met the criteria. In Section 3.4, I will present further elaboration of these cases.

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<sup>19</sup> This is akin to purposive sampling. The name 'sampling' is misleading as there is no effort to test theory based on a sample that represents a bigger population of which assumptions are made.

After I collected and analyzed the data from the sub-question, the three entrepreneurial phenomena emerged. I further developed the selection criteria taking into account the additional sub-research questions (see Sections 3.3.2, 3.3.3, and 3.3.4):

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?*

*How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*

Given that the three sub-research questions address different entrepreneurial phenomena, the selection criteria that emerged for each sub-research question are not identical. In the following sections, I will separately discuss the development of the selection criteria for each sub-question. I will first discuss the use of heuristics in the SIDS context. Because I use an integrative theoretical framework to study the three entrepreneurial phenomena and their respective sub-questions, when I discuss the development of the selection criteria for these phenomena, I will only discuss the selection criteria that are different.

### **3.3.1 Use of heuristics in the SIDS context**

Step 1: Relevance of the theories

This research draws upon the theories of causation, effectuation, and entrepreneurial bricolage<sup>20</sup>. The premise is that entrepreneurs face uncertainty and resource constraints when they embark on the entrepreneurial journey. The uncertainty and resource constraint are amplified in the SIDS context. Hence, I selected cases on the basis of the following criteria:

*Criterion: entrepreneurs experience uncertainty*

*Criterion: entrepreneurs experience resource constraints*

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<sup>20</sup> Please refer to Chapter 2 for an elaborate review of the causation, effectuation and entrepreneurial bricolage theories.

Entrepreneurs can apply several logics when making a decision, and there is a difference between experts and novices on how they make decisions (Simon, 2003). According to the effectuation theory, expert entrepreneurs apply the effectuation logics when they are faced with uncertainty (Sarasvathy, 2001). Following this rationale, I selected cases that involved:

*Criterion: expert entrepreneurs*

Furthermore, the outcome of the application of effectuation can be an innovative product (Sarasvathy, 2001). Using the RealNetworks as a case, Sarasvathy and Kotha (2001) showed how the effectual process led to the creation of innovative broadcasting technologies. In addition, Brettel, Mauer, Engelen, and Küpper (2012) found a positive link between the affordable loss, pre-committed stakeholders and leveraging of contingencies and highly innovative R&D projects. Taken this into consideration, I selected cases that:

*Criterion: introduced innovative products*

Step 2: Relevance of the research question

The research question regards the use of heuristics in the SIDS context. In the previous step, I discussed the heuristics I used to developed criteria for the study. No further criteria were added at this step.

Step 3: Rich information of the phenomena

To generate rich information on the use of heuristics in the SIDS context and to develop additional criteria to guide the case selection, I used the contextualization of the entrepreneurial process developed by Zahra and Wright (2011). Regarding the dimension 'rate' of the entrepreneurial activity, as discussed previously, the effectuation theory is a theory of expert entrepreneurs (Sarasvathy, 2008). Regarding the dimension 'magnitude of novelty' of the entrepreneurial activity, this study is positioned to research entrepreneurial cognition that leads to the introduction of innovative products. Finally, regarding the dimension 'variety of exploitation techniques', this research studies SIDS entrepreneurs that rely on teams in the entrepreneurial process. Key decisions in most entrepreneurial firms are made by a team (West, 2007). The individual decisions by the founding entrepreneurs are not neglected but it is the collective decisions made by a team that are implemented. For that reason, a valid unit of analysis in this research is entrepreneurial teams. For this reason, I selected cases that involved:

*Criterion: entrepreneurial team*

#### Step 4: Enhance the generalizability of the findings

In order to further increase the variance among the cases to enhance the generalizability of the findings, I introduced polarity among the cases (Eisenhardt & Graebner, 2007). The following changes were introduced:

<i>Old criteria:</i>	<i>New criteria</i>
<i>Expert entrepreneurs</i>	<i>Expert and novice entrepreneurs</i>
<i>Introduced innovative products</i>	<i>Introduced innovative or non-innovative products</i>
<i>Entrepreneurial team</i>	<i>Solo and team entrepreneurs</i>

In this step, I also added two selection criteria. First, one important element of an innovation is the economic impact it has created (Edquist, 2001). In other words, innovation implicitly means that the product or process was successfully introduced in the market or an organization. The effectuation theory and the use of control logic also implicitly assume that the transformative effectual cycle leads to success. However, to avoid a case selection bias where only successful innovations are selected, the distinction between the successful and unsuccessful innovations is made ex-ante. Following this reasoning, I selected cases that showed:

*Criterion: successful or unsuccessful results*

Second, the stages of entrepreneurial development (Politis, Gabrielsson, & Shveykina, 2012; Roberts, 1991) were taken into consideration because the perceived levels of uncertainty are not constant throughout the process of opportunity exploitation (Duncan, 1972; Seibert & Lumpkin, 2009). The more frequently an uncertainty changes over time, the higher the levels of the uncertainty, or the more characteristics of true uncertainty might be attributed towards the phenomenon. The stages of entrepreneurial development that were taken into consideration are 1. The seed phase (i.e. the initial process of innovation) where the uncertainty is large due to lack of information on which one can base their decisions, 2. The start-up phase (i.e. the formation process) and 3. The early growth phase (i.e. the scaling of the new innovation). As the entrepreneur moves along these stages, more information is gained and the uncertainty is reduced. For example, as the technology develops along the stages and the entrepreneur gains experience with the technology (i.e. advances along the technology learning curve), he or she becomes more knowledgeable of the technology's attributes, what it can and cannot do, and the technological uncertainty is reduced. When the technology is introduced into the

market, the entrepreneur collects data on the user acceptance of the technology and subsequently the market uncertainty is also reduced. I selected cases on the basis of the following criterion:

*Criterion: different stages of the entrepreneurial development*

**Table 3. 1 Steps in developing selection criteria**

<b>Step 1: relevance theories</b>				
<b>Selection criteria</b>	Research question: Which heuristics do the entrepreneurs use in the SIDS context?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?	Research question: How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?
<b>Entrepreneurs face uncertainty</b>	X	X	X	X
<b>Entrepreneurs face resource constraints</b>	X	X	X	X
<b>Expert entrepreneurs</b>	X	X	X	X
<b>Introduced innovative products</b>	X	X	X	X

<b>Step 2: relevance research questions</b>				
	Research question: Which heuristics do the entrepreneurs use in the SIDS context?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?	Research question: How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?
<b>Entrepreneurs face uncertainty</b>	X	X	X	X
<b>Entrepreneurs face resource constraints</b>	X	X	X	X
<b>Effectuation theory</b>				
<b>Expert entrepreneurs</b>	X	X	X	X
<b>Introduced innovative products</b>	X	X		X
<b>'Born-global' firm</b>		X		
<b>Introduced innovations that are new to the world</b>			X	
<b>The use of the affordable loss principle</b>				X

<b>Step 3: rich information on the phenomena</b>				
	Research question: Which heuristics do the entrepreneurs use in the SIDS context?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?	Research question: How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?
<b>Entrepreneurs face uncertainty</b>	X	X	X	X
<b>Entrepreneurs face resource constraints</b>	X	X	X	X
<b>Effectuation theory</b>				
<b>Expert entrepreneurs</b>	X	X	X	X
<b>Introduced innovative products</b>	X	X		X
<b>'Born-global' firm</b>		X		
<b>Introduced innovations that are new to the world</b>			X	
<b>The use of the affordable loss principle</b>				X
<b>Entrepreneurial team</b>	X	X	X	X

**Step 4: generalizability of the findings**

	Research question: Which heuristics do the entrepreneurs use in the SIDS context?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?	Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?	Research question: How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?
<b>Entrepreneurs face uncertainty</b>	X	X	X	X
<b>Entrepreneurs face resource constraints</b>	X	X	X	X
<b>Effectuation theory</b>				
<b>Expert and novice entrepreneurs</b>	X	X	X	X
<b>Introduced innovative or non-innovative products</b>	X	X		X
<b>'Born-global' and firms that internationalized incrementally</b>		X		
<b>Introduced and did not introduce innovations that are new to the world</b>			X	
<b>The use of the affordable loss principle</b>				X
<b>Solo and team-entrepreneurs</b>	X	X	X	X
<b>Successful and unsuccessful results</b>	X	X	X	X
<b>Different stages of entrepreneurial development*</b>	X	X	X	X
<b>Variance in domain expertise of the founders**</b>		X		

A criterion is *Italics* when it is first added to the list  
 \* Robert's (1991) three phases of entrepreneurial development  
 \*\* This criterion was added after the analysis of the data gather from the first four selected cases

### **3.3.2 Born-global firms**

The sub-research question to study the phenomenon of the fast internationalization of entrepreneurial firms is “how do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a ‘born-global’ firm?” Two additional criteria were used to select cases for this study. First, to take into account ‘step 2 relevance of the research question’, I selected cases on the basis of the following criterion:

*Criterion: ‘born-global’ firm*

Second, to further enhance the generalizability of the findings (i.e. step 4), I also selected cases that did not show signs of being a ‘born-global’ firm but internationalized at an incremental pace. Thus, I did not only select ‘born-global’ firms but I selected cases that reflected:

*Criterion: ‘born-global’ and firms that internationalized incrementally*

During the analysis of the data, I observed the beginnings of a pattern where the domain of expertise of the SIDS entrepreneurs and their early committed stakeholders influenced the degree of internationalization of the firms. To further explore the effect of this construct, I made a distinction between cases where the participants have technical backgrounds that are similar to the technical domain of the products they developed, versus cases where this similarity was less evident. Thus, I further added cases on the basis of the criteria:

*Criterion: variance in domain expertise of the founders*

### **3.3.3 New-to-the-world innovations**

The sub-research question to study the phenomenon of new-to-the-world innovations is “how do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?” Two modifications were made in the selection criteria to study new-to-the-world innovations. First, to take into account the sub-research question (step 2), I selected cases where the SIDS entrepreneurs:

*Criterion: introduced innovations that are new to the world*

Second, to increase the generalizability of the findings, during step 4, the selection criteria were modified to be able to select cases that:

*Criterion: introduced and did not introduce innovations that are new to the world*

### **3.3.4 Affordable loss investment decisions**

The final sub-research question is “how do an entrepreneur’s ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?” As the affordable loss is a construct of the effectuation theory (Sarasvathy, 2001; 2008), I selected cases that showed:

*Criterion: the use of the affordable loss principle*

In Table 3.2, I present an overview of all the cases and the selection criteria that are applicable to that specific case. In Section 3.4, I will present additional in-depth information about the cases.

**Table 3. 2 Selection criteria and the applicable case**

<b>Research question: Which heuristics do the entrepreneurs use in the SIDS context?</b>							
	BudgetCo	GameCo	MusicCo	PaymentCo	PostCo	SecurityCo	TransactionCo
Entrepreneurs face uncertainty	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entrepreneurs face resource constraints	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expert and novice entrepreneurs	Expert: four co-founders ranging between 1 and 3 venture experience	Intermediate: one founder with 7 years venture experience (2nd venture)	Novice: two co-founders, one still in university and the other graduated 2 years before, both with 1 venture experience	Intermediate: one founder with several years of venture experience (2nd venture)	Intermediate: one founder with several years of venture experience (2nd venture)	Novice: one founder with only a few years of venture experience (1st venture)	Intermediate: two co-founders both with 14 years of venture experience (1st venture)
Introduced innovative or non-innovative products	New market innovation	No innovation	New product innovation	New product innovation	New product innovation	New market innovation	New product innovation
Solo and team-entrepreneurs	Team	Solo	Team	Team	Solo	Solo	Team
Successful and unsuccessful results	Unsuccessful	Unsuccessful	Successful	Too early to determine	Unsuccessful	Unsuccessful	Successful
Different stages of entrepreneurial development*	Seed	Post entrepreneurial stage	Startup	Seed	Seed	Early growth	Post entrepreneurial stage

<b>Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?</b>				
	GameCo	MusicCo	SecurityCo	TransactionCo
Entrepreneurs face uncertainty	Yes	Yes	Yes	Yes
Entrepreneurs face resource constraints	Yes	Yes	Yes	Yes
Expert and novice entrepreneurs	Intermediate: one founder with 7 years venture experience (2nd venture)	Novice: two co-founders, one still in university and the other graduated 2 years before, both with 1 venture experience	Novice: one founder with only a few years of venture experience (1st venture)	Intermediate: two co-founders both with 14 years of venture experience (1st venture)
Introduced innovative or non-innovative products	No innovation	New product	New market	New product
'Born-global' and firms that internationalized incrementally	Born-global' firm	Born-global' firm	Internationalized incrementally	Internationalized incrementally
Solo and team-entrepreneurs	Solo	Team	Solo	Team
Successful and unsuccessful results	Unsuccessful	Successful	Unsuccessful	Successful
Different stages of entrepreneurial development*	Post entrepreneurial stage	Startup	Early growth	Post entrepreneurial stage
Variance in domain expertise of the founders	Design	International business, strategic management, innovation management	IT/ICT, general management	Data communication, IT/ICT, accounting/finance, marketing

<b>Research question: How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?</b>							
	BudgetCo	GameCo	MusicCo	PaymentCo	PostCo	SecurityCo	TransactionCo
Entrepreneurs face uncertainty	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entrepreneurs face resource constraints	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Effectuation theory</b>							
Expert and novice entrepreneurs	Expert: four co-founders ranging between 1 and 3 venture experience	Intermediate: one founder with 7 years venture experience (2nd venture)	Novice: two co-founders, one still in university and the other graduated 2 years before, both with 1 venture experience	Intermediate: one founder with several years of venture experience (2nd venture)	Intermediate: one founder with several years of venture experience (2nd venture)	Novice: one founder with only a few years of venture experience (1st venture)	Intermediate: two co-founders both with 14 years of venture experience (1st venture)
Introduced and did not introduce innovations that are new to the world	Not new to the world	Not new to the world	New to the world	Not new to the world	Not new to the world	Not new to the world	New to the world
Solo and team-entrepreneurs	Team	Solo	Team	Team	Solo	Solo	Team
Successful and unsuccessful results	Unsuccessful	Unsuccessful	Successful	Too early to determine	Unsuccessful	Unsuccessful	Successful
Different stages of entrepreneurial development*	Seed	Post entrepreneurial stage	Startup	Seed	Seed	Early growth	Post entrepreneurial stage

<b>Research question: How does an entrepreneur's ability and preference independently or interactively influence the process to invest in the exploitation of an entrepreneurial opportunity?</b>							
	BudgetCo	GameCo	MusicCo	PaymentCo	PostCo	SecurityCo	TransactionCo
Entrepreneurs face uncertainty	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entrepreneurs face resource constraints	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Effectuation theory</b>							
Expert and novice entrepreneurs	Expert: four co-founders ranging between 1 and 3 venture experience	Intermediate: one founder with 7 years venture experience (2nd venture)	Novice: two co-founders, one still in university and the other graduated 2 years before, both with 1 venture experience	Intermediate: one founder with several years of venture experience (2nd venture)	Intermediate: one founder with several years of venture experience (2nd venture)	Novice: one founder with only a few years of venture experience (1st venture)	Intermediate: two co-founders both with 14 years of venture experience (1st venture)
Introduced innovative or non-innovative products	New market innovation	No innovation	New product innovation	New product innovation	New product innovation	New market innovation	New product innovation
The use of the affordable loss principle	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Solo and team-entrepreneurs	Team	Solo	Team	Team	Solo	Solo	Team
Successful and unsuccessful results	Unsuccessful	Unsuccessful	Successful	Too early to determine	Unsuccessful	Unsuccessful	Successful
Different stages of entrepreneurial development*	Seed	Post entrepreneurial stage	Startup	Seed	Seed	Early growth	Post entrepreneurial stage
* Robert's (1991) three phases of entrepreneurial development							

### **3.4 Selecting case participants**

To start the selection process, local communities of SIDS entrepreneurs and professionals in the Information and Communications Technology sector were contacted. The local Chamber of Commerce was also approached to provide a database of prospective SIDS entrepreneurs for this study. Subsequently, SIDS entrepreneurs that matched the criteria for the case selection were contacted via telephone to establish initial contact and to inform them of this research. Afterwards, the SIDS entrepreneurs who agreed to receive additional information about the research were emailed. This email also further inquired about their willingness to participate. For those SIDS entrepreneurs that finally agreed to take part in the research, non-compete and –non-disclosure agreements were signed.

I relied on the snowball sampling method for two purposes. First, SIDS entrepreneurs that were initially contacted were asked to provide references of potential SIDS entrepreneurs whom they thought might be interesting for this research. Once the contact details of these SIDS entrepreneurs were received they were approached for an informal interview to review the fit with the selection criteria. For those SIDS entrepreneurs who fit the selection criteria, a request to officially participate in this research was submitted via email.

Snowball sampling was also used to expand the number of participants to be interviewed for each case. Each SIDS entrepreneur was asked to provide the contact details of the first three stakeholders that had pre-committed and were considered to be instrumental towards the development of the product. These stakeholders were contacted and requested to participate in this research. The motivation behind this procedure was to identify the team that was crucial for the development of the product and business. Taking the case selection criteria as discussed in Section 3.3, resulted in seven cases.

#### **3.4.1 Ethical considerations**

The most important matter concerning ethics is to guarantee the SIDS entrepreneurs some degree of anonymity and confidentiality because much of the information they share and the data collected from direct observations are very delicate information that these SIDS entrepreneurs might consider to be among their sources of competitive strategic advantage. In order to safeguard the privacy of the participants, I use pseudonyms in this study. Furthermore, non-disclosure and non-compete agreements were signed with all participants. The participants were also provided with the transcripts of their interviews to correct for factual inaccuracies.

### 3.5 The cases

Data was collected on the small Caribbean island of Curaçao that is an Overseas Country & Territory belonging the Kingdom of the Netherlands. The official languages are Papiamentu, Dutch and English and its population is 156,971 (January 1, 2015). Curaçao has an open economy that relies primarily on three sectors. The three sectors are financial intermediation (USD 349.4 million (11.24% of GDP) in 2014), manufacturing (USD 348.6 million (11.22% of GDP) in 2014), and transport, storage & communication (USD 343.0 million (11.04% of GDP) in 2014).

**Table 3. 3 Case overview**

<b>Case</b>	<b>Industry</b>	<b>Product</b>	<b>Number of employees</b>
<i><b>BudgetCo</b></i>	Information Technology	Combination budget management and mobile payment	4
<i><b>GameCo</b></i>	Entertainment	iPad game	1
<i><b>MusicCo</b></i>	Entertainment	Online music streaming service for only Dutch Caribbean music	7
<i><b>PaymentCo</b></i>	Information Technology	Online and mobile payment solution	1
<i><b>PostCo</b></i>	Communications electronics	SMS notification of delivery to P.O. Box	1
<i><b>SecurityCo</b></i>	Consulting of security services	Storage Area Network/ Mobile security trailer	1
<i><b>TransactionCo</b></i>	Information & Data Processing Services and Consultancy	Unique automated transactions processing system	22

Tourism and the oil refinery are also considered to be important economic drivers. As of 2014, Curaçao entered a recession as it was the third consecutive year that the economy experienced negative growth (-0.1% in 2012, -0.8% in 2013 and -1.1% in 2014). The income per capita in 2011 was USD 16,882.60 (see Appendix 3.2). For more information about Curaçao see Appendix 3.3.

The study consisted of seven cases in several industries in the sector of Information Technology, namely information technology, entertainment, communications electronics, consulting of security services, and information & data processing services and consultancy (see Table 3.3). Table 3.2 presents an overview of the selection criteria and to which cases these are applicable. The selection criteria are presented per sub-research question. For instance, in answering the use of heuristics in the SIDS context, the table shows that GameCo faced uncertainty and resource constraints, has an intermediate level of entrepreneurial expertise, did not introduce an innovative product, the product was not successful, and GameCo was in the seed stage of the entrepreneurial development. In answering the question concerning the fast internationalization of the entrepreneurial firms, MusicCo faced both uncertainty and resource constraints, the level of the entrepreneurial expertise was novice, the innovation was a new product and the firm is a 'born-global' firm,

an entrepreneurial team was used, the founders had a successful product, and the domain expertise of the founders was international business, strategic and innovation management. The only constant through all cases is that the SIDS entrepreneurs are operational in the sector Information Technology, and all faced uncertainty and resource constraints. For an overview of the case descriptions see Table 3.4 (in Appendix 3.4 a detailed and chronological description is presented of the cases. The descriptions discuss five elements namely 1. How the SIDS entrepreneurs came to the idea, 2. How they acquired human capital, 3. Financing of the operations, 4. If the case is a success or failure, and 5. Their future plans).

**Table 3. 4 Case descriptions**

<p><i>BudgetCo:</i> The idea for a mobile platform that helps users to make more informed decisions in terms of purchases to manage their budgets came to the founder of BudgetCo in 2012. After developing an initial concept of the idea the founder approached 3 close friends to be part of the founding team and the product concept expanded to also include mobile payments. In 2014 the group came to the conclusion that a large investment was required to make the mobile app a reality. The group decided to venture with another project with the aspiration to raise the capital required.</p>
<p><i>GameCo:</i> With the introduction of the iPad in 2010 the creator of GameCo started the development of this iPad game. With support of outsourced iOS developers, the game was launched in the Apple's Appstore in 2011. Despite being launched on the market, the GameCo did not meet the expectations of the creator and is not successful. For this reason, the creator started working in 2011 with a different outsourced software developer with the intention to relaunch.</p>
<p><i>MusicCo:</i> In February 2012 two friends co-founded the online music streaming service. The beta of MusicCo was launched on the October 1, 2013. The launch did not proceed without any challenges mainly due to challenges of finding software developers. In its 2 years of existence MusicCo has collected over 20 thousand songs in its database. The future plans of MusicCo are to open the platform to public, index their content in the Google search engine and also introduce a mobile version of the service.</p>
<p><i>PaymentCo:</i> the idea for a new mobile and online payment solution came to the founder of PaymentCo in 2008 but it was not till 2012 that he started with the design and development of the product. The product is mainly designed by only the founder and he uses one person to test for bugs. A patent has been applied for and granted, and at the moment the founder is pitching his product to banks with the hope to go live in 2015. The vision is to make position this product as the main online and mobile payment solution in the world.</p>
<p><i>PostCo:</i> In 2007 PostCo was developed from a personal experience in a post office. It is a system that sends notification via SMS to mobile phones or emails to inboxes of users. A working prototype was developed and a patent has been granted. However, the product was not further developed since 2009, neither introduced in the market, for the reason that a postal multinational introduced a competing product on the market.</p>
<p><i>SecurityCo:</i> The founder of SecurityCo started in 2009 by a happy mistake. As he was repurposing the use of storage area networks as data storage for large companies such as banks and casino's, he was overwhelmed with the request for these systems for security purposes. In 2010 he completed his first major project for security. However, mainly due failing to create a sustainable competitive advantage SecurityCo was leapfrogged by its competitors. As of 2015 SecurityCo is developing new products with its international partners.</p>
<p><i>TransactionCo:</i> In 2000 TransactionCo was funded as a consultant's bureau for the banking industry. With their experience in this industry, the two co-founders pitched a new automated transaction processing system that became the flagship product of TransactionCo. During the years they have grown the company to include mostly international clients; they have added additional features and functionalities; and have released two additional automated transaction processing system for other sectors.</p>

### 3.6 Themes for data collection

I use the empirical indicators of causation and effectuation developed by Reymen et al. (2015). These authors relied on Chandler et al. (2011), Fisher (2012) and Read, Song, and Smit (2009) to develop 18-item measurement for causation and 18-item measurement for effectuation at the team-level and not the individual level. As I discussed in the Section 3.3, research shows that most often entrepreneurial endeavors are pursued in a team context (West, 2007). Thus, the decision-making that drives the entrepreneurial action of the venture is usually not a solo-effort of individual entrepreneurs but often a harmonized combined effort by a team of entrepreneurs. Reymen et al. (2015) treated causation and effectuation as independent constructs, each consisting of four dimensions. For each dimension they created empirical indicators based mainly on Read, Dew, Sarasvathy, Song, and Wiltbank (2009), Sarasvathy (2008), Dew et al. (2009), and their empirical data.

The empirical indicators developed by Reymen et al. (2015) were further modified to fit my empirical data. I dropped indicators for which I could not find evidence in the cases. I included new indicators from our coding of the empirical data (see Table 3.5 and Table 3.6)<sup>21</sup>.

Indicators for causation that were inspired by the data are: 1. Makes forecasts on expected market return, 2. Expects a return on a competence/ personal satisfaction, 3. Active attempt to raise external funds (e.g. capital investors), 4. Does research to define opportunities, requirements and needs, and 5. Has a long term vision.

The first three are empirical indicators of the 'expected return'. Entrepreneurs that make investment decisions on expected return make forecasts of the market. Furthermore, although financial investment is an important component of the entrepreneurial process, entrepreneurs also invest non-financial resources such as emotion and time (Daniel, Domenico, & Sharma, 2014). Hence, entrepreneurs also expect non-financial return such as improving a competence and personal satisfaction. In addition, entrepreneurs that make investment decisions on expected return also actively attempt to raise external investment from among other capital investors.

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<sup>21</sup> For the construct of causation, effectuation, and bricolage, I use a reflective measurement model meaning that the construct influences the measurement indicators (and not vice versa), and there is high correlation between the measurement indicators. This means that as I drop measurement indicators from the authors and add measurement indicators inspired by the data, the construct will remain the same and no part of the construct is left without being measured. The reasons I used the reflective model is that the measurement indicators are not distinctive from each other, and I used the construct, namely effectuation, causation and bricolage, to develop these indicators to lead the data collection efforts.

**Table 3. 5 Indicators for causation**

<b>Dimensions</b>	<b>Empirical indicator</b>
<b>Expected returns</b>	Makes financial forecasts of required funds.
	<i>Makes forecasts on expected market return.</i>
	<i>Expects a return on competence/ personal satisfaction.</i>
	<i>Active attempt to raise external funds (e.g. capital investors).</i>
<b>Goal-orientation</b>	Takes action on a clearly defined course of action (i.e. goal).
	Defines a clear course of action (i.e. goal).
	<i>Does research to define opportunities, requirements and needs.</i>
	<i>Has a long term vision.</i>
<b>Competitive analysis</b>	Acquires resources through arm's length contractual assignments.
	Makes use of property rights protection.
	Develops a competitor's analysis.
	Does systematic research.
<b>Hedging against contingencies</b>	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).
	Not open to act upon requests that will change the company.
	Stops a project due to unforeseen events.

Note: Italics are self-developed

The fourth and the fifth indicators of causation that I added based on the analysis of our data pertain to the dimension of 'goal-orientation'. Goal setting is a "rational, analytic, cause-and-effect-oriented process" (Bird, 1988, p. 443). Research to define opportunities, requirements and needs precede the goal-setting process. Moreover, entrepreneurs develop visions which guide the decision-making and for what purposes resources are used. It guides the choices and the actions (Baum, Locke, & Kirkpatrick, 1998).

For effectuation I specifically added: 1. The initial product idea is seen as interesting and feasible, 2. Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty, 3. Investment is seen as a first necessity to create an opportunity to start the development of a product, and 4. Does not focus on the future 'problems' but deals with them in near-present.

**Table 3. 6 Indicators for effectuation**

<b>Dimensions</b>	<b>Empirical indicator</b>
<b>Affordable loss</b>	Finding unused resources in local environment (including subsidies).
	Investing limited, small amounts of personal/company money, time and effort.
	Willingness to make sacrifices.
	The initial product idea is seen as interesting and worth exploring
	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.
<b>Means-orientation</b>	Investment is seen as a first necessity to create an opportunity to start the development of a product.
	Makes use of own knowledge, resources, or network of stakeholders.
	Identifies opportunities based on network of stakeholders.
	Has an undefined desired idea.
<b>Pre-committed stakeholders</b>	Does not focus on future 'problems' but deals with them in near-present.
	Reaching trust-based flexible stakeholder agreements and commitments.
	Co-create with stakeholders.
<b>Leveraging contingencies</b>	Approaches potential client with a prototype early in the development process.
	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.
	Does not develop concept in detail but leaves room for unexpected events.
	Open to change strategy based on unexpected events.

Note: Italics are self-developed

The first three are empirical indicators of '*affordable loss*'. As I discussed in Chapter 2, the affordable loss represents the logic entrepreneurs use to make investments. The effectual entrepreneur makes small investments based on what he or she can afford and is willing to lose (Dew et al., 2009). When the entrepreneur has an initial idea, though the feasibility of this initial idea is questionable and thus uncertain, this idea is seen as interesting and the entrepreneur thinks it is worth exploring, and due to this he or she is willing to invest. The entrepreneur invests his or her means to attain still uncertain multiple ends. Furthermore, not only the feasibility of the idea is uncertain but also the investment required to ultimately produce one of the several ends. In other words, the processes, actions and resources required in realizing a still vague and ambiguous goal are uncertain. In response to this uncertainty an entrepreneur makes small investments. These small investments also serve as a purpose to '*jump on the bandwagon*', a '*buy in*', and create the opportunity to start the product development process. In addition, the data shows that entrepreneurs using a means orientation for taking action do not focus on potential future problems but rather deals with these as they arise.

To measure bricolage, I took inspiration from Baker and Nelson (2005), Senyard (2015), and Senyard et al. (2014) to develop a 14-item measurement (see Table 3.7). These measurements were supplemented with indicators that emerged during our coding of the data.

**Table 3. 7 Indicators for bricolage**

<b>Dimensions</b>	<b>Empirical indicator</b>
<b>Making do</b>	Uses an existing resource in a new way.
	Uses untapped/ unwanted resources to create something new.
<b>Resources at hand</b>	Gives ownership in the product/ company.
	Licenses a resource instead of buying.
	Compensates with non-monetary resources (e.g. be part of a disruptive innovation).
	Compensates with other (employment) opportunities.
	Executes parts of the tasks him-/herself.
	Makes use of barter deals.
	Makes use of royalty deals.
	Asks for a favor.
<b>New problem/ Solution</b>	New problem/ challenge.
	New opportunity.
	New solution/ technology/ organizational process.
	New product/ service.

As I have previously discussed in Chapter 2, bricolage consists of three dimensions namely ‘*making do*’, ‘*resources at hand*’, and ‘*new problems or solutions*’. Making do refers to the active attitude of the entrepreneur to use existing resources in a new way (Baker & Nelson, 2005); use discarded or unwanted resources for new purposes (Di Domenico et al., 2010). Resources at hand refers to the resources the entrepreneur can acquire for free or very cheaply (Baker & Nelson, 2005). From the data collected, I have noted several methods entrepreneurs use to acquire resources for free or very cheaply. Physical inputs can be acquired through e.g. licenses; labor through compensation with non-monetary resources by example giving someone an opportunity to be part of a disruptive innovation, and compensating with other (employment) opportunities; skills by self-taught to execute tasks him-/ herself. Customers are involved in making do through e.g. by offering them a barter deal. Finally, bricolage entails the application of resources to new problems and/ or opportunities (Salunke et al., 2013) these entrepreneurs try to solve (Di Domenico et al., 2010).

### **3.7 Instruments and procedure for collecting data**

Data was collected from multiple sources namely documentation (e.g. business plans, strategic plans, memos, etc.), semi-structured and closed interviews and site visits (e.g. sitting in meetings) were possible (see Table 3.8). In this manner the validity of the study was enhanced. In addition, the coding measurements developed and the coding deduced from these take into account previous research on the topic of effectuation and entrepreneurial bricolage, as examples Reymen et al. (2015) and Senyard et al. (2014).

To enhance the reliability of this study, an electronic case study database is implemented. All archival documents, notes taken of the participative observations, and the recorded interviews with their transcription, and email communication with participants are available in digital format. This study also corroborated the data and used triangulation to minimize possible response/ recall biases.

Appointments were made with the participants for the data collection. First, a face-to-face interview was conducted with each participant. These interviews took place at the office of the researcher, and in three instances the interviews were conducted through Skype for the reason that the interviewees did not live in Curaçao at the time of the interview. I used two interview instruments. The face-to-face and Skype interviews were in the form of semi-structured interviews. The interview questions are listed in the Appendix 3.5.

The interview questions were derived from the literature and deviations from the answers lead to new themes concerning the logics of causation, effectuation, and bricolage, as presented in Section 3.5. The semi-structured interview served the purpose to capture the thought processes and decision logics that preceded the SIDS entrepreneurs' actions. The interviews were on average one hour and were conducted in Dutch, English or Papiamentu, depending on the preference of the interviewee. The original quotes that were used as exemplary statements were translated into English.

Second, I also used a closed question interview to collect additional background and demographic information about the participants (see Appendix 3.6). The questionnaire was distributed at the beginning of each interview and was returned after the interview or emailed on a later date. Before each interview the participant's permission was asked to record the interview. The recorded interviews are available in an electronic database. Third, additional data were collected from secondary documents (e.g. business plans, strategic plans, memos, etc.).

**Table 3. 8 Overview of the data**

Company Name	Face-to-face / Skype Interviews	Telephone Interview	Closed Interview	Emails	Who was interviewed	Site Visits	Archival Documentation	Period covered
BudgetCo	2		2	1	Two co-founders		5 Business Plans (multiple iterations), Certificate of Registration Chamber of Commerce Curacao	2012 - 2014
GameCo	1		1	1	Founder		12 Certificate of Registration Chamber of Commerce Curacao, Online Promotion, Sketches, Third Party Reviews, Website	2010 - 2015
MusicCo	4	1	4	4	Two co-founders, two early employees	2	31 Certificate of Registration Chamber of Commerce UK, Email communication, Presentation Slides to Artists, Press Releases, Published Interviews,	2012 - 2014
PaymentCo	2		2	1	Founder, external partner		1 Certificate of Registration Chamber of Commerce Curacao	2008 - 2015
PostCo	1		1	3	Founder		2 Patent, Press Release	2007 - 2009
SecurityCo	1		1	1	Founder		4 Certificate of Registration Chamber of Commerce Curacao, Establishment Permit, Facebook Page	2009 - 2014
TransactionCo	3		3	1	Two co-founders, partner	1	17 Certificate of Registration Chamber of Commerce Curacao, Job Advertisements, Newsletters, Press Releases, Social Media Pages, Third Party Websites	2000 - 2014

### **3.8 Coding and analytical strategy**

In this study, I applied a pattern-matching analytical strategy (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Trochim, 1989; Yin, 2009) to match the themes and data. Following Eisenhardt (1989), throughout the analysis the constructs of this study were refined (i.e. the definitions of the constructs) and evidence from the case studies were built to support the constructs considering that "the theory is emergent in the sense that it is situated in and developed by recognizing patterns of relationships among constructs within and across cases and their underlying logical arguments" (Eisenhardt & Graebner, 2007, p. 25). I also performed a Fuzzy-Set Qualitative Comparative Analysis (fsQCA) for chapter 6.

The coding and analysis of the data was done at four levels: 1. The three decision logics (i.e. causation, effectuation, and entrepreneurial bricolage), 2. The eleven dimensions for the decision logics (see Tables 3.5, 3.6, and 3.7), 3. The empirical indicators for the dimensions (see Tables 3.5, 3.6, and 3.7), and 4. The quotes for the empirical indicators (see Appendices 3.7.1 for causation, 3.7.2 for effectuation, and 3.7.3 for bricolage).

#### **3.8.1 Level four: the quotes for the empirical indicators**

I first transcribed the interviews and the transcriptions were emailed to the interviewees to correct for factual inaccuracies. In total, I gathered 173 A4 pages of interview data (including telephone and emails). I read through the data from the interviews and other documents collected repetitively to code the data. First, I used "open coding" (Locke, 2001) to capture thought processes and decision logics. Open coding is the process to compare incidents from the collected data with the objective to capture emerging themes without linking these with theory (Holton, 2007). Incidents are events of decision-making in the data that has been collected. In this coding process, I developed tables that contained quotes of incidents and the decision logics derived from these (see Table 3.9 for an example).

**Table 3. 9 Example open coding for dimension ‘expected return’ TransactionCo**

Examples quotes of incidents	Examples of decision logics
"The thought process, the how much, the why, the how that we invest is based on the potential market. Things in which we see future business".	A lot of investment decisions are based on the potential market.
"Thus the budget are calculations that we make based on experience, based on models that we develop, based on objective that we set".	How the budget is made.
"[The product] is something we presented and the folks reacted enthusiastically. Thus we than said we have to invest there".	Invest based on expectations and based on response receive from potential clients.
"Those are investments you do in order to have a return in 2 or 3 years because you will acquire clients".	Invest with the expectation to earn it back in the future.
"First thing is you look at what your clients want. Or you look at what you can sell to your clients".	Investment is based on the demand of the customer.
"That is a budget. What does the system need to do? How many people do I have to put on the project to develop that? And then I calculate this to hours-men-days".	Make use of budget to have an indication how much to invest.
"Thus it is about sales. With so many prospects we have to come into contact. With so many that we have get into contact via cold calling or an appointment there is only a x-ration that is interested".	Make use of budget to have an indication how much to invest.
"You budget it in advance... it will cost 80 days, 100 days. This person you will let work on it. That's how you budget it".	Make use of budget to predict how much it will take in investment (man hours) to produce a product.
"We made a budget. We made a budget of how much it will cost".	Makes budget to know how much they should invest.
"What gave some security that we could offer some service and thus my decision [to start the company] became easier".	Started the company with the knowledge that there is a need and they can provide their services successfully.
"It is not always like that but we try to do that".	They try to let the customer pay before developing a module.
"It is a product that I have already tested with my existing clients outside of Curacao more than 10 times if there is interest to justify my investment".	Will look if there is interest before starting development and investing.
"Let's say our goal is to acquire one or two clients in a period of two years. Than we know based on the conversion ratios that we need to talk to 100 clients".	Calculates what is required based on forecasts

### 3.8.2 Level three: the empirical indicators for the dimensions

A second step was to convert the decision logics into indicators for the dimensions of causation, effectuation, and bricolage, as described in Section 3.5 (see Table 3.10 for an example). Subsequently, for each case I made matrices that show the indicators and exemplary quotes of incidents (see Appendices 3.7.1 for causation, 3.7.2 for effectuation, and 3.7.3 for bricolage). In this process, I omitted all decision logics that captured the same incidents. The reason was to avoid overrepresentation of an incident by measuring the same incident more than once.

**Table 3. 10 Example from decision logic to indicator ‘expected return’ TransactionCo**

Examples of decision logics	Measurement indicators
Invest based on expectations and based on response receive from potential clients.	Makes forecasts on expected market return.
Invest with the expectation to earn it back in the future.	Makes forecasts on expected market return.
Make use of budget to predict how much it will take in investment (man hours) to produce a product.	Makes financial forecasts of required funds.
Started the company with the knowledge that there is a need and they can provide their services successfully.	Makes forecasts on expected market return.
Calculates what is required based on forecasts	Makes financial forecasts of required funds.

The next step was to determine the fit between the incidents and the indicators. The fit represents how well the observed incidents matched the indicators. To determine the fit, I counted the number of times a specific indicator was observed. I used qualitative scores; weak, medium and strong. 1 count was coded as weak, 2 counts as medium, and 3 or more counts as strong. For example, using the Table 3.10, I counted the indicator ‘*makes forecasts on expected market return*’ three times and thus I scored this indicator as strong. I counted the indicator ‘*makes financial forecasts of required funds*’ two times and thus I scored this indicator as medium (see Table 3.11). A weak fit represents a decision logic that is not frequently observed in a specific case, whereas a strong fit represents a decision logic that is frequently observed. In Appendices 3.8.1, 3.8.2, and 3.8.3, I present the fit between the incidents and the indicators of the dimensions of causation, effectuation and bricolage respectively.

**Table 3. 11 Example fit indicators of ‘expected return’ TransactionCo**

Measurement indicators	Strength
Makes financial forecasts of required funds.	Medium
Makes forecasts on expected market return.	Strong

I used colored patterns to indicate the strength of the fit. Weak, medium and strong are represented by the color gradients of the rectangles; from light colored rectangles

indicating weak fits to darker gradients indicating strong fits. The white colored rectangles indicate that no incidents were observed for that respective indicator.

### 3.8.3 Level two: the eleven dimensions for the decision logics

In the subsequent step, I determined the fit for each of the eleven dimensions of causation, effectuation and bricolage. For each dimension, I counted the number of times a quote/ example of decision logic that represented an indicator belonging to the dimension, had been observed for a case. I used qualitative scores; weak, medium and strong. 1 count was coded as weak, 2 counts as medium, and 3 or more counts as strong. For example, Table 3.10 shows five counts of quotes/ examples of decision logics for TransactionCo, that belong to the dimension of 'expected return' (three for the indicator 'makes forecasts on expected market return', and two for the indicator 'makes financial forecasts of required funds'. Hence, I scored this dimension as strong (see Table 3.12). Please consult the Appendices 3.9.1a, 3.9.2a, and 3.9.3a for the fit for the dimensions of causation, effectuation, and entrepreneurial bricolage.

**Table 3. 12 Example fit for dimensions of TransactionCo**

Dimension	Strength
Expected return	Strong

I also assigned quantitative scores to the dimensions of causation, effectuation, and bricolage to facilitate the comparison of these. The scores are quantitative representations of the fit. To calculate the quantitative scores, I first quantified the fit; weak, medium and strong fit received scores of 0.33 (i.e. 1/3), 0.67 (i.e. 2/3), and 1.00 (i.e. 3/3) respectively. A score cannot be smaller than zero (i.e. 0) or larger than one (i.e. 1). Indicators for which it was not possible to find incidents in the data received scores of zero (i.e. 0). Table 3.13 provides an example of the quantitative scores for the dimensions of causation. Please consult the Appendices 3.9.1b, 3.9.2b, and 3.9.3b for the quantitative scores.

**Table 3. 13 Example calculation scores dimensions of causation**

	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
BudgetCo	1.00	1.00	1.00	0.33
GameCo	1.00	0.67	0.67	0.33
MusicCo	0.67	1.00	1.00	0.00
PaymentCo	1.00	1.00	0.67	0.33
PostCo	0.00	1.00	1.00	0.67
SecurityCo	0.67	1.00	1.00	0.00
TransactionCo	1.00	1.00	1.00	0.33

### 3.8.4 Level one: the decision logics causation, effectuation and entrepreneurial bricolage

The scores of the decision logics causation, effectuation, and bricolage of a case were determined by calculating the average score of the dimensions for that respective case. Table 3.14 provides an overview of the scores of causation, effectuation and bricolage per case.

**Table 3. 14 Final scores of causation, effectuation and bricolage per case**

<b>Score causation</b>					
	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies	Score
BudgetCo	1.00	1.00	1.00	0.33	0.83
GameCo	1.00	0.67	0.67	0.33	0.67
MusicCo	0.67	1.00	1.00	0.00	0.67
PaymentCo	1.00	1.00	0.67	0.33	0.75
PostCo	0.00	1.00	1.00	0.67	0.67
SecurityCo	0.67	1.00	1.00	0.00	0.67
TransactionCo	1.00	1.00	1.00	0.33	0.83
<b>Score effectuation</b>					
	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies	Score
BudgetCo	0.67	1.00	0.67	0.33	0.67
GameCo	0.33	1.00	0.33	0.67	0.58
MusicCo	0.33	1.00	0.33	1.00	0.67
PaymentCo	1.00	1.00	1.00	1.00	1.00
PostCo	0.33	0.67	0.00	0.00	0.25
SecurityCo	0.33	0.33	0.33	1.00	0.50
TransactionCo	0.67	1.00	1.00	1.00	0.92
<b>Score bricolage</b>					
	Making do	Resources at hand	New problem/solutions	Score	
BudgetCo	0.00	0.67	0.67	0.44	
GameCo	0.33	0.33	0.33	0.33	
MusicCo	0.33	1.00	0.33	0.56	
PaymentCo	0.33	0.00	0.33	0.22	
PostCo	0.33	0.67	0.33	0.44	
SecurityCo	0.67	0.33	0.33	0.44	
TransactionCo	0.67	0.67	0.67	0.67	

### 3.8.5 Cross-case comparisons

Finally, I also conducted cross-case comparisons (Eisenhardt, 1989). I did cross-case comparisons at the levels of indicators, dimensions and logics (see Tables 3.15 and 3.16 for examples at the indicator, dimension and logic levels respectively). To calculate the score for the cross-case comparison at the level of the indicators, I calculated the average among the cases of each indicator. To calculate the score for the cross-case comparison at the level of the dimensions, I calculated the average

score among the cases of each dimension. The scores for the cross-case comparisons at the level of the logics were determined by calculating the average of the cross-case comparison scores of the dimensions of the respective logic.

**Table 3. 15 Example cross-case score indicators of expected return**

Expected return				
	Indicators			
	Makes financial forecasts of required funds.	Makes forecasts on expected market return.	Expects a return on competence/ personal satisfaction.	Active attempt to raise external funds (e.g. capital investors).
<b>BudgetCo</b>	0.33	0.67	0.00	0.00
<b>GameCo</b>	0.00	0.00	1.00	0.00
<b>MusicCo</b>	0.33	0.00	0.00	0.33
<b>PaymentCo</b>	0.00	0.00	0.67	0.33
<b>PostCo</b>	0.00	0.00	0.00	0.00
<b>SecurityCo</b>	0.00	0.33	0.00	0.33
<b>TransactionCo</b>	0.67	1.00	0.00	0.00
<b>Score (avg)</b>	0.19	0.29	0.24	0.14

**Table 3. 16 Example cross-case score of causation and its dimensions**

Causation; score = 0.73				
	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
<b>BudgetCo</b>	1.00	1.00	1.00	0.33
<b>GameCo</b>	1.00	0.67	0.67	0.33
<b>MusicCo</b>	0.67	1.00	1.00	0.00
<b>PaymentCo</b>	1.00	1.00	0.67	0.33
<b>PostCo</b>	0.00	1.00	1.00	0.67
<b>SecurityCo</b>	0.67	1.00	1.00	0.00
<b>TransactionCo</b>	1.00	1.00	1.00	0.33
<b>Score (avg)</b>	0.76	0.95	0.90	0.29

This analysis provides the information of how much do the participants<sup>22</sup> rely on displaying the logics causation, effectuation and bricolage (the results are shown in Appendix 3.10a for the indicators and 3.10b for the dimensions and logics).

### 3.8.6 Fuzzy-Set Qualitative Comparative Analysis

For Chapter 6, an additional analysis was performed using the technique Fuzzy-Set Qualitative Comparative Analysis (fsQCA) (Ragin, 2000). The motivation for using the fsQCA is that it is a technique that aids in the comparison of only a few cases; ‘small-*N*’ (Rihoux, 2006), and it facilitates the comparison of cases that are in-depth and complex (Ragin, 2000). By using the fsQCA, I am able to reduce the complexity of the cases to a combination of heuristics that are necessary to develop new-to-the-

<sup>22</sup> The generalization is towards the cases of this study.

world innovations from penurious environments. The fsQCA lends itself well to explore new ideas that are not embodied in existing theory (Rihoux, 2006).

The strengths of the fsQCA are that the technique allows for the combination of qualitative and quantitative research; the complex configuration of causal factors in cases and the systematic comparison of the causal factors across cases (Greckhamer, Misangyi, Elms, & Lacey, 2007). Furthermore, the fsQCA treats the cases holistically; the complexity of the cases are not reduced (Ragin, 1987). Consequently, the fsQCA adopts the concept of multiple conjunctural causation (Rihoux, 2006). The concept means that:

1. most often, it is a combination of conditions (independent variables) that eventually produces a phenomenon – the outcome (dependent variable);
2. several different combinations of conditions may produce the same outcome; and
3. depending on the context, on the conjuncture, a given condition may very well have a different impact on the outcome (p. 682).

The fsQCA uses Boolean algebra to apply logic of minimization and it reduces the complexity to a set of combinations that are necessary or sufficient (Ragin, 2000; Ragin, Drass, & Davey, 2006). In the Boolean algebra, expressions denote truth values and binary digits are used; 0 for 'false' and 1 for 'truth'. The fsQCA differs from statistical analyses based in linear algebra (Greckhamer et al., 2007). Statistical analyses based in linear algebra seek to estimate the contribution of an independent variable in explaining the dependent variable, whereas the fsQCA seeks to systematically compare cases with similar outcome to identify the common causal factors among the cases (Greckhamer et al., 2007). The logic of the fsQCA is based on Mill's method of difference and agreement (Fiss, 2011).

The fsQCA analysis consists of three phases (Greckhamer et al., 2007): 1. The creation of a configuration and selection of the cases for the configuration, 2. The analysis, and 3. The evaluation and interpretation of results. To conduct the fsQCA analysis, I first was required to develop configurations that were the basis for the fsQCA analysis. A configuration is a solution that consists of a combination of causal conditions and an outcome (Rihoux, 2006). To use the linear algebra as an analogy, a configuration is a multiple regression that consists of independent variables (i.e. causal combination) and dependent variables (i.e. outcome). For example, I developed a configuration CAUSATION. The causal conditions of this configuration are the dimensions of the causal logic: '*expected return*', '*goal-orientation*', '*competitive analysis*', and '*hedging against contingencies*'. The outcome for the configuration CAUSATION is '*new-to-the-world innovation*'. For each configuration, I had to develop a dataset (see Table 3.17 for dataset of CAUSATION). "The researcher must first produce a raw data table, in which each case displays a specific combination of conditions ... and an outcome (with 0 or 1 values)" (Rihoux,

2006, p. 683). The datasets contain the scores proceeding from my coding and analysis of the data (see Appendices 3.8.1, 3.8.2, and 3.8.3). The scores for the new-to-the-world innovations were binary: 0 for false and 1 for true. I used a four value fuzzy sets (i.e. a score had the value of 0, 0.333, 0.667 or 1; in terms of membership this means that a score of 0 equals fully out, 0.25 equals more out than in, 0.75 equals more in than out, and 1 equals fully in).

**Table 3. 17 Dataset configuration CAUSATION**

caseid	Expected return	Goal-orientation	Competitive analysis	Hedging contingencies	New-to-the-world Innovation
<b>BudgetCo</b>	1.000	1.000	1.000	0.333	0.000
<b>GameCo</b>	1.000	0.667	0.667	0.333	0.000
<b>MusicCo</b>	0.667	1.000	1.000	0.000	1.000
<b>PaymentCo</b>	1.000	1.000	0.667	0.333	0.000
<b>PostCo</b>	0.000	1.000	1.000	0.667	0.000
<b>SecurityCo</b>	0.667	1.000	1.000	0.000	0.000
<b>TransactionCo</b>	1.000	1.000	1.000	0.333	1.000

The second phase of the fsQCA is the analysis (Greckhamer et al., 2007). The fsQCA uses the Boolean methods to determine the causal combinations that are necessary and/ or sufficient to produce the outcome (Greckhamer et al., 2007). A causal combination is a group of causal conditions that are necessary/ and or sufficient to produce the outcome (Rihoux, 2006). I made use of the fsQCA 2.0 software (Ragin et al., 2006) for the analysis. For each configuration that needed to be analyzed, I entered the quantitative scores of its respective dataset into the fsQCA software (Ragin et al., 2006). For instance, to analyze the configuration CAUSATION, I entered the scores (see Table 3.17) into the fsQCA software. The fsQCA software permits to make a distinction between the causal conditions and the outcome during the data entry.

In the next step of the analysis, truth tables were produced. The truth tables are automatically generated by the fsQCA software. The truth table is viewed as the vital component for the analysis because “it lists all the logically possible combinations of causal conditions (i.e. configurations) and sorts the cases according to these logically possible combinations” (Verweij, Klijn, Edelenbos, & Van Buuren, 2013, p. 1041). The researcher is required to edit the truth table. The researcher should carefully consider the frequency cutoff. The frequency cutoff “specifies the minimum acceptable level to which a combination of causal conditions is considered reliably associated with each of the outcomes” (Muñoz & Dimov, 2014, p. 644). As suggested by Ragin et al. (2006), I choose the frequency cutoff of 1 to retain all possible combinations where a minimum of one case is part of the combination.

The last step of the analysis is to choose a type of solution. The fsQCA software produces three solutions: 1. Complex, 2. Parsimonious, and 3. Intermediary

(Ragin et al., 2006). The complex solution strives to include as many combinations in the configurations as possible. The remainders are set to false and it allows no counterfactuals. The parsimonious solution searches for the logically simpler solution. The intermediate solution generates remainders that are easy counterfactual cases. I choose the intermediate solution because only in cases that it does not provide configurations that can be substantiated by theory, it is advised to use the complex or parsimonious solutions (Ragin et al., 2006).

The final phase of the fsQCA is the evaluation and interpretation of the results (Greckhamer et al., 2007). The output of the fsQCA software is the causal combinations that are necessary for an outcome, and scores for the consistency, the solution consistency, the solution coverage, the raw coverage, and the unique coverage (Ragin et al., 2006). It is possible to have more than one set of causal combinations (for instance in this study the configuration of EFFECTUATION that I will discuss in Chapter 6). The consistency measures the degree that all the sets of the causal combinations are jointly subsets of the outcome. The solution consistency measures the degree that a set of a causal combination is a subset of the outcome. The solution coverage measures the proportion of the outcome that is jointly explained by all the sets of the causal combinations. The raw coverage measures the proportion of the outcome that is explained by a component of a causal combination. The unique coverage measures the proportion of the outcome that is explained by each unique component of a combination that does not form part of another combination (Ragin et al., 2006). If a configuration shows only one set of causal combinations, the consistency and solution consistency are identical, and the solution, raw and unique coverage are also identical<sup>23</sup>.

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<sup>23</sup> As an extra measure for robustness of the study a fsQCA analysis was also performed for the effects of causal, effectual, and entrepreneurial bricolage logics on the process for the entrepreneurial firms of becoming 'born-global' firms (see Appendix 3.11). The results are different to the fsQCA of the effects of causal, effectual, and bricolage logics on the process for the entrepreneurial firms to develop innovations that are new to the world.

## **4 THE USE OF HEURISTICS IN SMALL ISLAND DEVELOPING STATES CONTEXT**

### **Abstract**

The importance of innovation and entrepreneurship for economic development has been well documented in the academic literature, and scholars are concerned with entrepreneurial actions that lead to economic development. Scholars also recognize that the entrepreneurial actions take place under conditions of uncertainty and resource limitations, and under these circumstances, entrepreneurs turn to heuristics to simplify their decision-making process. However, less is understood about the heuristics entrepreneurs use in the SIDS context. By studying seven cases this research addresses which heuristics entrepreneurs use in the SIDS context. This study uses a cognitive framework consisting of causation, effectuation and entrepreneurial bricolage heuristics and with-in case and cross-case pattern-matching approaches. The analysis reveals that SIDS entrepreneurs use the causal, effectual and entrepreneurial bricolage heuristics in combination but have a strong inclination to the causal rationality. However, the SIDS entrepreneurs favor leveraging contingencies versus building hedges to protect against unexpected events. The results can be explained by SIDS entrepreneurs striving to remain flexible and applying the logic that they consider appropriate to the phases of the process to exploit opportunities, by the influence of the small and resource constraint context, and by the educational background of the SIDS entrepreneur.

### **Keywords**

decision-making, heuristics, causation, effectuation, entrepreneurial bricolage, uncertainty, resource limitation

### **4.1 Introduction**

The importance of technological advance for economic development has been well documented in the literature (e.g. Fagerberg et al., 2006; Solow, 1956). A central actor in the commercialization of new technologies is the entrepreneur and his or her firm. Entrepreneurial firms are more innovative than larger firms in skill-intensive markets (Acs & Audretsch, 1988) and are more successful in commercialization of innovation compared to large firms (van Praag & Versloot, 2007).

It is widely accepted among scholars that the entrepreneurial process of discovery, evaluation and exploitation of opportunities (Shane & Venkataraman, 2000) takes place under uncertainty and resource constraints. Under these circumstances entrepreneurs turn to heuristics to simplify their decision-making process (Busenitz, 1999). The presence of uncertainties and resource constraints in

the entrepreneurial process is a universal phenomenon. It comes as no surprise that the topic received a lot of attention among entrepreneurship scholars (Shepherd et al., 2015). However, less is understood about the use of heuristics in the context of the Small Island Developing States (SIDS). The SIDS are a group of island with unique characteristics that cause these islands to be fragile, open and vulnerable to natural and economic shocks (Guillaumont, 2010). This unique context cannot be overlooked because the context influences how the entrepreneur makes decisions (Murmah & Sardana, 2012) and the entrepreneur's behavior (Saffu, 2003). "All human action occurs in contexts: it is the context that regulates what individuals and teams get to see, what choices they are likely to make, and what the outcomes of those choices are likely to be" (Autio et al., 2014, p. 1099).

The unique context of the SIDS also exacerbates the uncertainty and resource constraints experienced by SIDS entrepreneurs operating on these islands. Uncertainties are augmented by the additional inaccurate information due to secrecy, and the open and vulnerable state of the SIDS. The resource constraints are augmented by the SIDS' small size and isolation. To gain an understanding of the decision-making process the SIDS entrepreneurs use, this chapter addresses the question:

*Which heuristics does an entrepreneur use in the SIDS context?*

To study this question, I combine the causation, effectuation and the entrepreneurial bricolage theories into a single framework. Effectuation and bricolage are two prominent and emerging theories of entrepreneurial decision-making (Fisher, 2012). Causation is often used as a contrast to the effectuation theory to explain what the effectuation theory is. The study contributes to existing research by showing that entrepreneurs in the SIDS use the causal, effectual and entrepreneurial bricolage logics in combination but have a strong inclination to causal rationality. However, the SIDS entrepreneurs favor the effectual principle '*leveraging contingencies*' versus causal principle '*building hedges to protect against unexpected events*'. The results can be explained by the SIDS entrepreneurs striving to remain flexible and applying the logic that they consider appropriate to different kinds of activities in the exploitation of entrepreneurial opportunities, by the influence of the small and resource constraint context, and by the gap between the technical expertise of the SIDS entrepreneur and the expertise required to develop the respective product.

This chapter is organized as follows. In the next section, I will discuss the Small Island Developing States. In section three, I will discuss the causation, effectuation (Saravathy, 2001) and bricolage (Baker & Nelson, 2005; Garud & Karnøe, 2003) theories and present the integrative framework. Subsequently, I will discuss the methodology of this study. I used a multiple-case study (Eisenhardt &

Graebner, 2007; Yin, 2009) consisting of seven cases. In section five, I will discuss the main findings. Finally, this chapter concludes with the limitations and the topics of the subsequent chapters in the dissertation.

## **4.2 Literature review**

### **4.2.1 The Small Island Developing States**

The Small Island Developing States is a special group of 39 developing islands that share similar characteristics and a unique set of challenges according to the United Nations. The SIDS are located in three geographic locations; the Caribbean, the Pacific, and the Africa, Indian Ocean and South China Sea. Combined the SIDS have a population over 63 million and GDP over US\$ 575 billion (United Nations, n.d.).

The characteristics of the SIDS are its small size, remoteness and insularity, disaster proneness, and environmental fragility (Briguglio, 1995). Each of these characteristics create a set of disadvantages for the islands such as limitations in resource endowments (Dolman, 1985), high import content of production, and limited possibilities for import-substitution (Briguglio, 1995). Other challenges faced by SIDS are the dependence on export markets (McGillivray et al., 2010), diseconomies of scale (Dolman, 1985), limited ability to influence domestic prices (Briguglio, 1995), and high transportation cost per unit. SIDS are fragile islands with weak governance and institutional structures (McGillivray et al., 2010), fragile and open to natural disasters (Dolman, 1985) and external economic shocks (Guillaumont, 2010).

### **4.2.2 Uncertainties and resource constraints in the Small Island Developing States**

The entrepreneurial process of discovery, evaluation and exploitation of opportunities is subject to uncertainties also in the context of the SIDS. A key element of uncertainty is the impossibility to estimate probabilities (Walker et al., 2003). The uncertainty originates from the inherent variability of a phenomenon and incomplete information (Walker et al., 2003). Particular to the SIDS context is the incomplete information that augments the uncertainty that the SIDS entrepreneur experiences in three different ways. First, inhabitants of SIDS often want secrecy due to tight kinship. Information is not readily available and shared. This increases the incomplete information and subsequently the uncertainty. Second, the secrecy creates inaccurate information (i.e. hearsay) that conflicts with the truth, and this is also a source of uncertainty (Lipshitz & Strauss, 1997). Finally, SIDS are vulnerable to external economic shocks (Guillaumont, 2010). Because of the shocks, SIDS become inherently variable, which is also grounds for uncertainty according to Walker et al. (2003).

Entrepreneurs also in SIDS face resource constraints that are enhanced by the smallness and isolation. SIDS are small and isolated from large markets, have limited access to capital markets, and have a narrow range of local skills (Dolman, 1985; Serra & Theng, 2015). Limitation due to size is a structural constraint in the SIDS (Nurse, 2015). The entrepreneurs operating in SIDS also face the shortage of resources that is minimally required to produce a given level of organizational output. This especially in skilled human resources and suitable financing (Baldacchino & Fairbairn, 2006). For example, Docquier, Lohest, and Marfouk (2007) report that brain drain in Grenada and Jamaica is larger than 85%. Due to smallness the capital market in small islands are underdeveloped and inefficient (Szirmai et al., 2011).

### **4.3 Theoretical background**

How do entrepreneurs make decisions under uncertainty and resource constraints? Two prominent and emerging theories that deal with the entrepreneurial decision-making are Sarasvathy's (2001; 2008) effectuation theory, and Baker and Nelson's (2005) entrepreneurial bricolage theory (Fisher, 2012). I will discuss these theories in the next section. However, before I do, I will also discuss the causation for the reason that Sarasvathy (2001) contrasts the effectuation theory against the causation to explain what the effectuation theory is.

Reymen et al. (2015) shows, among nine technology-based ventures, that entrepreneurs apply both effectuation and causation logics depending on the situation and the venture scoping decisions. Venture scoping is defined as "the set of technologies, product offerings, or markets that the entrepreneurs consider or target at a particular moment in time" (2015, p. 3). If the entrepreneurs' environmental uncertainty increases or there is a decreased venture resource position, entrepreneurs that apply a widening venture scoping use effectual logics. In situations that the environment uncertainty decreases or there is an increase in stakeholder pressures, entrepreneurs that apply a narrowing venture scoping use causal logics.

In addition, Hindle and Senderovitz (2010) showed that both the effectuation and bricolage theories draw on very similar heuristics of decision-making e.g. both posit that an entrepreneur starts from whom he or she is and exercises introspection (MacMaster et al., 2015; Sarasvathy, 2001). Furthermore, uncertainty is a driver of the use of bricolage as well as of effectuation (Cunha, 2005). These similarities provide a fruitful ground for theory integration (Mayer & Sparrowe, 2013) as both perspectives use similar accounts.

### **4.3.1 Causation**

Causation puts forth the traditional risk management philosophy of a planned-based approach that assumes that individuals are goal-oriented and methodological. An individual first makes a plan and afterwards he or she determines the necessary steps to implement the plan (Knight, 1921). Sarasvathy (2001) lays out four basic principles for causation; the investment is based on expected return (i.e. the individual will invest if the expected financial return exceeds his or her threshold), the goal-orientation (i.e. the individual will first select a goal and subsequently search for the means necessary to realize this goal), the treatment of (potential) partners through a competitive analysis (i.e. the entrepreneur will select partners based on the set goal), and finally, the hedging against contingencies (i.e. the entrepreneur will minimize the possibility that unexpected events can influence his or her actions to realize the goal).

A weakness of the causal approaches is that these fail to take into account that in situations of uncertainty individuals are rationally bounded (Simon, 1955). Entrepreneurs cannot take rational decisions but use heuristics to assimilate and make sense of fragmented information to make fast decisions (Busenitz, 1999).

### **4.3.2 Effectuation**

A theory that considers heuristics as the logic for decision-making is the effectuation theory. The effectuation theory is based on the logic that “to the extent we can control the future, we do not need to predict it” (Sarasvathy, 2001, p. 251)<sup>24</sup>. Effectuation logic is a decision-making mode most applicable to expert entrepreneurs (Read & Sarasvathy, 2005; Sarasvathy et al., 2007).

There are four principles to the effectuation theory (Sarasvathy, 2008); the affordable loss (i.e. what an entrepreneur can afford and he or she is willing to lose in opportunity exploitation (Dew et al., 2009), the means-orientation (i.e. the starting point where an entrepreneur evaluates his or her personal identity and resources in possession (Sarasvathy & Dew, 2005), the pre-committed stakeholders (i.e. the stakeholders that willingly self-select themselves into to alliances with the entrepreneur even before there is a clear goal), and finally, the leveraging of contingencies (i.e. the entrepreneur will ‘be open’ to exploit any possible future alternative presented) (Read & Sarasvathy, 2005).

### **4.3.3 Bricolage**

The entrepreneurial bricolage theory (Baker & Nelson, 2005; Garud & Karnøe, 2003) addresses the entrepreneurial cognition in penurious environments (Baker &

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<sup>24</sup> see Mauer (2015) and Sarasvathy et al. (2015) for recent reviews of the effectuation literature.

Nelson, 2005)<sup>25</sup>. In environments that “present new challenges, whether opportunities or problems, without providing new resources” (Baker & Nelson, 2005, p. 353), the entrepreneur engages in bricolage to ‘stretch’ the available resources towards new uses (Baker & Nelson, 2005). Due to resource idiosyncrasy, entrepreneurs use similar resources differently (Penrose, 1959).

Bricolage is defined as “making do by applying combinations of the resources at hand to new problems and opportunities” (Baker & Nelson, 2005, p. 6). Making do refers to the active attitude of an entrepreneur to create something from nothing. Entrepreneurs transform discarded and unwanted resources that other organizations failed to recognize, to new purposes (Di Domenico et al., 2010). It is also the refusal to accept the limitations imposed by the resources according to ‘collective wisdom’ or routines that have been universally accepted (Steffens et al., 2010, p. 6). Resources refer to both the resources that the entrepreneur has at hand and also includes resources that are available for free or very cheaply.

#### **4.3.4 Integrating causation, effectuation and entrepreneurial bricolage**

A few scholars have attempted to integrate causation, effectuation and bricolage. Examples are Hindle and Senderovitz (2010), Fisher (2012), and Welter et al. (2016). According to Hindle and Senderovitz (2010), both effectuation and bricolage are in opposition to rational planning. Other similarities include non-predictive and control logic, no preference for strategic analyses, the use of existing resources, social construction of resources and opportunities. Causation and bricolage have only two similarities namely the use of pre-existing goals and no restriction to only expert entrepreneurs. Fisher (2012) argues that effectuation and bricolage are similar on four counts. First, there is a social construction of the entrepreneurial opportunities through existing resources. Second, entrepreneurs take action to overcome resource limitations. Third, entrepreneurs take proactive action to acquire commitment from partners. Finally, resource limitation enhances creativity. According to Welter et al. (2016) both effectuation and bricolage look at opportunity as unspecified and created by the entrepreneur. In addition, vital for both theories is the nexus between the actor and his or her resources. Please refer to Chapter 2 an elaborate discussion of the integrated theoretical framework.

## **4.4 Methods**

The research question addressed in this chapter is “*which heuristics does an entrepreneur use in the SIDS context?*”. The study was exploratory and seven cases were studied. Table 3.1 summarizes the case selection criteria.

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<sup>25</sup> see MacMaster, Archer, & Hirth (2015) for a review of the bricolage literature.

I contacted the local communities of SIDS entrepreneurs and professionals in the Information and Communications Technology sector. Subsequently, I used the snowball sampling to expand the number of participants to be interviewed for each case.

The data was collected on the small Caribbean island of Curaçao that is an Overseas Country & Territory that belongs to the Kingdom of the Netherlands. I selected seven cases in several industries in the sector Information Technology namely information technology, entertainment, communications electronics, consulting of security services, and information & data processing services and consultancy. Please refer to Table 3.2 for an overview of all the cases and the selection criteria that is applicable to that specific case.

I used the empirical indicators of causation and effectuation developed by Reymen et al. (2015), and inspiration from Baker and Nelson (2005), Senyard (2015), and Senyard et al. (2014) for bricolage. The data was collected primarily through interviews and archival documents (see Table 3.8).

The coding and analysis consisted of a pattern-matching approach (Yin, 2009) and four levels: the three decision logics (i.e. causation, effectuation, and entrepreneurial bricolage), the eleven dimensions for the decision logics (see Tables 3.5, 3.6, and 3.7), the empirical indicators for the dimensions (see Tables 3.5, 3.6, and 3.7), and the quotes for the empirical indicators (see Appendices 3.7.1 for causation, 3.7.2 for effectuation, and 3.7.3 for bricolage). Please see Chapter 3 for an elaborate discussion on the methodology used in this study.

## 4.5 Results and discussion

A first analysis of the data about the use of causation, effectuation, and bricolage among the SIDS entrepreneurs across the cases shows a clear tendency towards the use of causation decision logics. The cross-case analysis revealed a score of 0.73 for causation followed by 0.65 for effectuation and 0.44 for bricolage 0.44 (see Table 4.1 for the summary of the cross-case analysis and Appendix 3.10 for the detailed version). Thus, there is a strong inclination towards a rational risk management approach and this is especially visible in the uses of '*goal-orientation*' (score: 0.95), '*competitive analysis*' (score: 0.90), and '*expected return*' (score: 0.76). On the other hand, '*hedging against contingencies*' (score: 0.29) has a low score. It is worth noting that although causation is the most used among the SIDS entrepreneurs, the '*hedging against contingencies*' received overall the lowest score among the dimensions of causation, effectuation, and bricolage.

**Table 4. 1 Cross-case comparison logics and their dimensions**

<b>Causation; score = 0.73</b>				
	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
<b>Score</b>	0.76	0.95	0.90	0.29
<b>Effectuation; score = 0.65</b>				
	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies
<b>Score</b>	0.52	0.86	0.52	0.71
<b>Bricolage; score = 0.44</b>				
	Making do	Resources at hand	New problem/solutions	
<b>Score</b>	0.38	0.52	0.43	

I found less evidence of the use of effectuation heuristics compared to causation, although the use of effectuation is also clearly observable in the data. The data shows that the *'affordable loss'* (score: 0.52) and the *'pre-committed stakeholders'* (score: 0.52) are the least used heuristics among the effectuation. The most used effectual heuristic is the *'means-orientation'* (score: 0.86).

The data about the use of bricolage heuristics in the cases shows that generally there is not much use of these heuristics among the SIDS entrepreneurs. The bricolage heuristic that scored the highest is *'resources at hand'* (score: 0.52) and the lowest is *'making do'* (score: 0.38).

#### **4.5.1 The use of causation**

The four dimensions of causation are *'expected return'*, *'goal-orientation'*, *'competitive analysis'*, and *'hedging against contingencies'*. The results of the uses of causation and its dimensions for each case are presented in Table 4.2. The analysis shows that the score of causation between the cases do not vary significantly. The variance between the largest score (i.e. 0.83 for BudgetCo and TransactionCo) and the lowest score (i.e. 0.67 for GameCo, MusicCo, PostCo and SecurityCo) is 0.16.

**Table 4. 2 Scores of causation per case**

	Dimensions				Score causation
	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies	
<b>BudgetCo</b>	1.00	1.00	1.00	0.33	0.83
<b>GameCo</b>	1.00	0.67	0.67	0.33	0.67
<b>MusicCo</b>	0.67	1.00	1.00	0.00	0.67
<b>PaymentCo</b>	1.00	1.00	0.67	0.33	0.75
<b>PostCo</b>	0.00	1.00	1.00	0.67	0.67
<b>SecurityCo</b>	0.67	1.00	1.00	0.00	0.67
<b>TransactionCo</b>	1.00	1.00	1.00	0.33	0.83

The cross-case analysis of the indicators of the dimensions of causation revealed the following (see Table 4.3). *Expected return*: making financial forecasts of required funds, defining course of action, actively implementing these and making attempts to raise funds from external parties are behaviors that are mentioned by respondents. The indicators of the dimension ‘*expected return*’ that also scored the highest are ‘*makes forecasts on expected market return*’ (score: 0.29) and ‘*expects a return on competence/ personal satisfaction*’ (score: 0.24). The indicator ‘*active attempt to raise external funds (e.g. capital investors)*’ scored the lowest (score: 0.14). Examples to illustrate the above are BudgetCo and MusicCo. BudgetCo made a business plan and forecasted the operational expenses for six months. Based on this exercise they attempted to raise funds from external parties. An exemplary statement is:

*“In the summarized business plan we calculated more or less our operational costs for 6 months ...based on that we also came to the amount that we need to invest”.*

MusicCo made a forecast of their profit and loss. Afterwards, they spoke with several venture capital investors for financing. And SecurityCo even financed the entire first project with a bank loan:

*“The first project was a pre-financing ... they signed the formal contract and subsequently I went to a bank ... and so I received my pre-financing”.*

**Table 4. 3 Scores of the indicators of causation across cases**

Causation				
Expected return				
	Indicators			
	Makes financial forecasts of required funds.	Makes forecasts on expected market return.	Expects a return on competence/ personal satisfaction.	Active attempt to raise external funds (e.g. capital investors).
<b>Score (avg)</b>	0.19	0.29	0.24	0.14
Goal-orientation				
	Indicators			
	Defines a clear course of action (i.e. goal).	Does research to define opportunities, requirements and needs.	Takes action on a clearly defined course of action (i.e. goal).	Has a long term vision.
<b>Score (avg)</b>	0.62	0.57	0.48	0.14
Competitive analysis				
	Indicators			
	Acquires resources through arm's length contractual assignments.	Develops a competitor's analysis.	Makes use of property rights protection.	Does systematic research.
<b>Score (avg)</b>	0.43	0.29	0.14	0.14
Hedging against contingencies				
	Indicators			
	Stops a project due to unforeseen events.	Not open to act upon requests that will change the company.	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).	
<b>Score (avg)</b>	0.10	0.10	0.10	

*Goal-orientation*: the indicators that scored the highest are ‘*defines a clear course of action (i.e. goal)*’ (score: 0.62) and ‘*does research to define opportunities, requirements and needs*’ (score: 0.57). For example, BudgetCo defined a clear course of action to determine required funds. An exemplary quote is:

*“Money resources also play a role. For that we decided to write business cases and business plan and see if we can find funds for that”...“Define those things that we see as essential” (BudgetCo).*

An example to show the research process to define needs is PaymentCo. Before starting the development of the project the founder did research to set objectives.

*"Before I start I did a lot of research to look what is on the market, how those work, why there are some that fail" (PaymentCo).*

The indicator *'takes action on a clearly defined course of action (i.e. goal)'* also scored high (score: 0.48). MusicCo searched for freelance developers on an online platform because "very often you think let's find cheap developers [in Asia via freelance platforms]"

*Competitive analysis:* the indicator that scored the highest is *'acquires resources through arm's length contractual assignments'* (score: 0.43). BudgetCo, GameCo, MusicCo, PostCo, and TransactionCo made use of among others arm's length contractual agreements. For instance, GameCo contracted a software developer agency in the US who the founder found in an advertisement in a technology magazine. GameCo also outsourced the illustration and the music production of the game using assignments. MusicCo contracted a software developer by paying an hourly rate for the development services. Intellectual property rights protection was also used by BudgetCo, PaymentCo, and PostCo. The indicators that scored the lowest are *'makes use of property rights protection'* (score: 0.14) and *'does systematic research'* (score: 0.14).

*Hedging against contingencies:* all indicators for this dimension have similar scores (score: 0.10). The SIDS entrepreneurs did not protect themselves from surprises too often. PaymentCo and PostCo were secretive about their entrepreneurial pursuit. For example, PaymentCo stated:

*"There are some key persons with whom I have spoken. Just to receive some feedback. But even in that case, I did not give them to entire solution I was working on. I just gave them the part that I wanted to receive feedback".*

#### **4.5.2 The use of effectuation**

The dimensions of effectuation are *'affordable loss'*, *'means-orientation'*, *'pre-committed stakeholders'*, and *'leveraging contingencies'*. The results of the uses of effectuation and its dimensions for each case are presented in Table 4.4. The analysis shows that the score of effectuation between the cases vary significantly. The variance between the largest score (i.e. 1.00 for PaymentCo) and the lowest score (i.e. 0.25 for PostCo) is 0.75.

**Table 4. 4 Scores of effectuation per case**

	Dimensions				Score effectuation
	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies	
<b>BudgetCo</b>	0.67	1.00	0.67	0.33	0.67
<b>GameCo</b>	0.33	1.00	0.33	0.67	0.58
<b>MusicCo</b>	0.33	1.00	0.33	1.00	0.67
<b>PaymentCo</b>	1.00	1.00	1.00	1.00	1.00
<b>PostCo</b>	0.33	0.67	0.00	0.00	0.25
<b>SecurityCo</b>	0.33	0.33	0.33	1.00	0.50
<b>TransactionCo</b>	0.67	1.00	1.00	1.00	0.92

The cross-case analysis of the indicators of the dimensions of effectuation revealed the following (see Table 4.5). *Affordable loss*: we can observe that at startup the SIDS entrepreneurs generally invest and make use of their own personal knowledge and resources. The indicator *‘investment is seen as a first necessity to create an opportunity to start the development of a product’* scored the highest (score: 0.14) among the indicators of the dimension *‘affordable loss’*. SIDS entrepreneurs do not often acquire resources from their environments. The indicator *‘finding unused resources in local environment (including subsidies)’* of the dimension *‘affordable loss’* marginally scored 0.05. For instance, TransactionCo included their own cars as capital and never made bank loans to start the organization. An exemplary quote to illustrate this is “we included our cars as capital and that is it. We do not have a financier and we did not loan money from the bank”. They incrementally invested in the development of TransactionCo and these funds proceeded from sales of their product. For instance, TransactionCo informed that “along the way [they] invest”. BudgetCo, GameCo, MusicCo, and PaymentCo made use of their own resources, especially their own funds, to initially invest in the developments of their products. The sources of the funds of BudgetCo, GameCo and PaymentCo are other entrepreneurial endeavors. The source of the funds of MusicCo is personal savings. For example, one of the co-founders expressed that as they grew it was not possible anymore for them to cover the expenses using their own savings. GameCo also relied on his own knowledge to design the game. For example, GameCo stated:

*“I am actually a graphic designer which is nowadays more and more apps and websites and so actually it falls a little under this”.*

*Means-orientation*: the indicator that scored the highest is *‘makes use of own knowledge, resources, or network of stakeholders’* (score: 0.81). The indicators that scored the lowest are *‘does not focus on future ‘problems’ but deals with them in near-present’* and *‘has an undefined desired idea’* (score: 0.10). The difference between the highest and lowest scores is significant (i.e. 0.71).

The SIDS entrepreneurs acquire resources through their networks of stakeholders. For example, TransactionCo borrowed two laptops from friends. BudgetCo’s founder reported the following about the use of network during the interview:

*“Seeing that they have more experience with me in development, they have more experience in interfacing with other systems. I did not have the knowledge so I asked if we would like to interface with a bank, what are the things that we have to take into consideration... I do not have all knowledge so I have to approach those that do have the knowledge so I can finalize my final product”.*

*“Based on this I worked out some ideas, put it on paper, and share this with a couple of friends, and we arrived at a technical concept that must be feasible”.*

The exemplary quote demonstrates how the founder of BudgetCo used his network of friends, who later became co-founders, to acquire the knowledge he did not have.

*Pre-committed stakeholders:* the pre-committed stakeholders are also important for co-creation of the product. The indicator ‘*co-create with stakeholders*’ received the highest score (score: 0.29). For instance, when the co-founder of MusicCo came to the idea he immediately contacted a very good friend. MusicCo stated: “I already knew [the other co-founder] would be a good partner”. Together they share the main decision responsibilities for MusicCo and lead the development.

**Table 4. 5 Scores of the indicators of effectuation across cases**

Affordable loss						
	Indicators					
	Investment is seen as a first necessity to create an opportunity to start the development of a product.	The initial product idea is seen as interesting and feasible.	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	Willingness to make sacrifices.	Investing limited, small amounts of personal/company money, time and effort.	Finding unused resources in local environment (including subsidies).
BudgetCo	0.33	0.33	0.00	0.00	0.00	0.00
GameCo	0.00	0.00	0.33	0.00	0.00	0.00
MusicCo	0.00	0.00	0.33	0.00	0.00	0.00
PaymentCo	0.33	0.00	0.00	0.67	0.33	0.00
PostCo	0.00	0.00	0.00	0.00	0.00	0.33
SecurityCo	0.33	0.00	0.00	0.00	0.00	0.00
TransactionCo	0.00	0.00	0.00	0.00	0.67	0.00
Score (avg)	0.14	0.05	0.10	0.10	0.14	0.05

<b>Means-orientation</b>				
	<b>Indicators</b>			
	Makes use of own knowledge, resources, or network of stakeholders.	Does not focus on future 'problems' but deals with them in near-present.	Has an undefined desired idea.	Identifies opportunities based on network of stakeholders.
BudgetCo	0.67	0.00	0.33	0.00
GameCo	1.00	0.67	0.33	0.00
MusicCo	1.00	0.00	0.00	0.00
PaymentCo	1.00	0.00	0.00	0.33
PostCo	0.67	0.00	0.00	0.00
SecurityCo	0.33	0.00	0.00	0.00
TransactionCo	1.00	0.00	0.00	1.00
Score (avg)	0.81	0.10	0.10	0.19
<b>Pre-committed stakeholders</b>				
	<b>Indicators</b>			
	Approaches potential client with a prototype early in the development process.	Co-create with stakeholders.	Reaching trust-based flexible stakeholder agreements and commitments.	
BudgetCo	0.33	0.33	0.00	
GameCo	0.00	0.33	0.00	
MusicCo	0.00	0.33	0.00	
PaymentCo	0.33	0.33	0.33	
PostCo	0.00	0.00	0.00	
SecurityCo	0.00	0.33	0.00	
TransactionCo	0.33	0.33	0.33	
Score (avg)	0.14	0.29	0.10	
<b>Leveraging contingencies</b>				
	<b>Indicators</b>			
	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	Does not develop concept in detail but leaves room for unexpected events.	Open to change strategy based on unexpected events.	
BudgetCo	0.33	0.00	0.00	
GameCo	0.67	0.00	0.00	
MusicCo	1.00	0.00	0.00	
PaymentCo	0.33	0.33	1.00	
PostCo	0.00	0.00	0.00	
SecurityCo	-0.33	0.00	0.67	
TransactionCo	0.00	0.67	0.67	
Score (avg)	<b>0.29</b>	<b>0.14</b>	<b>0.33</b>	

Another example to illustrate how SIDS entrepreneurs make use of pre-committed stakeholders for co-creation is PaymentCo. The founder of PaymentCo came to an idea to develop a mobile payment system. The founder approached a high school friend to acquire input on the development. The friend stated during the interview:

*"I know 'the founder' since I was in middle school... [the founder] always contacts me when [the founder] has an idea or a project and needs to know something about testing. [The founder] contacts me to pick my brain but not to form an official partnership".*

*"I said that I was immediately on board. It is a very interesting project; big project".*

The founder further indicated that they are co-creating the product. "It is true that I am working with a tester. He has broad knowledge so I can throw ideas at him to receive feedback".

The data shows that the stakeholders that pre-commit and the SIDS entrepreneur who initially came up with the idea are not always in close physical proximity. In a few cases the stakeholders were local. For instance, in the case of TransactionCo both co-founders were residents in the same country. As a matter of fact, the co-founders used to be colleagues. The first customer that pre-committed to their automated transaction processing product, or as one of the co-founder stated "an early adopter", was a local bank. And the co-founders hired a local small software development firm to program the software. On the other hand, we can observe in some cases that the geographical distance between the SIDS entrepreneur and the stakeholders that pre-committed was large. For instance, the idea generator of MusicCo, who resided in Curaçao, contacted a friend that was resident in the Netherlands. GameCo works with Portugal-based software development firm. PaymentCo works with a tester that is based in the Netherlands.

*Leveraging contingencies:* the SIDS entrepreneurs are also very open for new ideas and opportunities thus they leverage contingencies. A method to leverage any surprises is just by being open to leverage unexpected events. The indicator that scored the highest is 'open to change strategy based on unexpected events' (score: 0.33). For example, PaymentCo stated that:

*"At that time, I had an idea of how I will do my acquisition, which marketing I will do, etc. But afterwards, when I acquired my first client through my network, the necessity for that changed because other clients also came through my network".*

#### **4.5.3 The use of bricolage and its dimensions**

The dimensions of bricolage are 'making do', 'resources at hand', and 'new problem/solutions'. The results of the uses of bricolage and its dimensions for each case are presented in Table 4.6. The analysis shows that the scores of bricolage between the cases do not vary that much. The variance between the largest score (i.e. 0.67 for TransactionCo) and the lowest score (i.e. 0.22 for PaymentCo) is 0.45.

**Table 4. 6 Scores of entrepreneurial bricolage per case**

	Dimensions			
	Making do	Resources at hand	New problem/ solutions	Score bricolage
<b>BudgetCo</b>	0.00	0.67	0.67	0.44
<b>GameCo</b>	0.33	0.33	0.33	0.33
<b>MusicCo</b>	0.33	1.00	0.33	0.56
<b>PaymentCo</b>	0.33	0.00	0.33	0.22
<b>PostCo</b>	0.33	0.67	0.33	0.44
<b>SecurityCo</b>	0.67	0.33	0.33	0.44
<b>TransactionCo</b>	0.67	0.67	0.67	0.67

The cross-case analysis of the indicators of the dimensions of bricolage revealed the following (see Table 4.7). *Making do*: SIDS entrepreneurs do use their existing resources in new ways, and it is also indicator that scored the highest (score: 0.24). For example, PaymentCo in the past has made an administration module for a customer and informed us that “[he is] using [this administration module] also for the product”.

*Resources at hand*: the indicators that scored the highest are ‘gives ownership in the product company’ (scored: 0.14), ‘makes use of royalty deals’ (score: 0.14), and ‘compensates with other (employment) opportunities’ (score: 0.14)<sup>26</sup>. For example, BudgetCo provided the co-founders used equity to acquire resources:

*“From outset I told them that if we are going to work on this I do not have the money to pay them but eventually we will partner. Everyone will receive shares. We put different things on paper to guarantee that the moment this becomes something they are also guaranteed that they will benefit and receive from the revenue stream”.*

And GameCo and MusicCo used royalty deals to acquire resources:

*“I have not [a relationship based only on paying fees] with the Portuguese developer. They said that “We will also invest in it. We will not charge you the normal price. We will charge you something but much lower than you would normally pay” (GameCo).*

*“They talked about a mutually beneficial partnership: costless development in return for a recurring piece of the pie from all subscriptions” (MusicCo).*

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<sup>26</sup> Resource acquisition using owner’s equity and barter deals are considered cheap or free for the reason that at the time of acquiring the resources the entrepreneurial ventures usually have low value and a royalty only has value for the seller if the product reaches the market and is sold.

*New problem/ solutions*: the indicator *'new solution/ technology/ organizational process'* scored the highest (score: 0.24) and *'new product/ service'* scored the lowest (score: 0.19). The data also shows a variance across firms between the level of novelty of the new products/ services and processes, whether it is new to the world or not. In the case of MusicCo, PaymentCo, PostCo, and TransactionCo, the products/ services and processes of these entrepreneurial ventures are new to the world, while the outputs of BudgetCo and SecurityCo are not new to the world but only new to the market of Curaçao. GameCo is not new to the world nor either Curaçao market but new only to GameCo.

**Table 4. 7 Scores of the indicators of entrepreneurial bricolage across cases**

<b>Entrepreneurial bricolage</b>				
<b>Making do</b>				
	<b>Indicators</b>			
	Uses an existing resource in a new way.	Uses untapped/ unwanted resources to create something new.		
BudgetCo	0.00	0.00		
GameCo	0.33	0.00		
MusicCo	0.00	0.33		
PaymentCo	0.33	0.00		
PostCo	0.00	0.33		
SecurityCo	0.33	0.33		
TransactionCo	0.67	0.00		
Score (avg)	0.24	0.14		
<b>Resources at hand</b>				
	<b>Indicators</b>			
	Gives ownership in the product/ company.	Licenses a resource instead of buying.	Makes use of royalty deals.	Compensates with non-monetary resources (e.g. be part of a disruptive innovation).
BudgetCo	0.33	0.33	0.00	0.00
GameCo	0.00	0.00	0.33	0.00
MusicCo	0.33	0.00	0.33	0.33
PaymentCo	0.00	0.00	0.00	0.00
PostCo	0.00	0.00	0.33	0.00
SecurityCo	0.00	0.00	0.00	0.00
TransactionCo	0.33	0.00	0.00	0.00
Score (avg)	0.14	0.05	0.14	0.05
	<b>Indicators</b>			
	Compensates with other (employment) opportunities.	Executes parts of the tasks himself.	Makes use of barter deals.	Asks for a favor.
BudgetCo	0.00	0.00	0.00	0.00
GameCo	0.00	0.00	0.00	0.00
MusicCo	0.67	0.33	0.33	0.00
PaymentCo	0.00	0.00	0.00	0.00
PostCo	0.00	0.00	0.00	0.33
SecurityCo	0.33	0.00	0.00	0.00
TransactionCo	0.00	0.00	0.00	0.00

Entrepreneurial bricolage				
Making do				
Score (avg)	0.14	0.05	0.05	0.05
New problem/ solutions				
	Indicators			
	New product/ service.	New solution/ technology/ organizational process.		
BudgetCo	0.33	0.33		
GameCo	0.00	0.33		
MusicCo	0.00	0.33		
PaymentCo	0.00	0.33		
PostCo	0.33	0.00		
SecurityCo	0.33	0.00		
TransactionCo	0.33	0.33		
Score (avg)	0.19	0.24		

## 4.6 Explaining the use of causation, effectuation and entrepreneurial bricolage

The analysis regarding the use of causation, effectuation, and bricolage among the SIDS entrepreneurs shows that causation and effectuation are the most often used logics when these are compared to the use of bricolage. In addition, causation logics are used more often compared to effectuation logics.

These results are supported by Hindle and Senderovitz (2010). They showed that the application of effectual heuristics does not exclude causation. Berends, Jelinek, Reymen, and Stultiëns (2014) found that both effectual and causal logic were used in the innovation process in small firms. Entrepreneurs vary their decision-making styles depending on the situation they are faced with (Murmann & Sardana, 2012). A study performed by Reymen et al. (2015) among nine technology-based ventures showed that the entrepreneurs apply both effectuation and causation logics in different situations of uncertainty, resource position, and stakeholder pressure.

I offer three explanations for the observed use of a mix of causation, effectuation, and bricolage, their dimensions and indicators. An initial explanation is that a SIDS entrepreneur strives to remain flexible and apply logic that he or she deems appropriate to a kind of activity in the exploitation of an entrepreneurial opportunity. A second explanation is the influence of the small and resource constrained context. A final explanation is the gap between technical expertise of the SIDS entrepreneur and the knowledge required in developing the product.

### 4.6.1 Flexibility and the activities during the exploitation of an entrepreneurial opportunity

The exploitation of an entrepreneurial opportunity is very complex and consists of several kinds of activities, each containing their own processes and requiring their

own specific decision logics. Each decision also has its specific uncertainty. Therefore, there are different degrees of uncertainty simultaneously present (Nummela, Saarenketo, Jokela, & Loane, 2014) in the exploitation of an entrepreneurial opportunity. For example, what might look like a simple opportunity for selling a new type of designer chair, looking under the surface will reveal complex processes, decisions, and uncertainties. A SIDS entrepreneur has to consider the design/engineering of the chair, manufacturing decisions, customer requirements, and government safety regulations, to just name a few. Thus, there is a multiplicity of decisions on different kinds of activities during the opportunity exploitation.

In addition to the multiplicity of activities and decisions, decisions that are taken for a specific activity are also not one-time events but recur over the lifetime of the exploitation process. For example, the design of the chair and the type of material are evaluated iteratively as the boundaries are explored of what types of materials permit different types of innovative designs. Thus, there are multiple cycles that each precede several decisions related the exploitation of the opportunity.

We have seen that during the entire process of opportunity exploitation the SIDS entrepreneur simultaneously makes use of causation, effectuation, and bricolage decision logics. This is because the SIDS entrepreneur evaluates each kind of activity and the stage in which the respective activity takes place, and uses the logic he or she deems appropriate. For example, the founder of GameCo used effectual logics when making the decision about who will design the game. Specifically, he made use of his own knowledge. He is a graphic designer and considers designing for apps and website a part of his core capabilities. During the interview GameCo stated that “[he] also designed the game [him]self”. However, when making the decision about who will illustrate and produce the music for the game, he outsourced these through assignments and thus effectively made use of competitive analysis. An exemplary statement from GameCo is “For them [the illustrator and musician] I just made an assignment”.

For the same kinds of activities, the logics used also changed with time. At first the founder of GameCo searched among his friends for software developers, but could not acquire pre-commitment from anyone. Subsequently he contracted a US-based software developer through an arm’s length contract. Together with this developer they have been able to publish a first release of the game. Subsequently, GameCo came in contact with another software developer in Portugal through a friend. With the Portuguese developer GameCo is co-creating the next release of the game. In this example a shift from effectuation, to causation, and afterwards back to effectuation can be noticed, and this progression is for the same activity of programming the software.

The flexibility exhibited by the SIDS entrepreneurs can also be portrayed as the use of a toolbox consisting of causation, effectuation, and bricolage logics. The logics are chosen based on the kind of activity in the opportunity exploitation and the stage of the respective activity in which the SIDS entrepreneur encounters him or herself. This is corroborated by Chandler (1990) who shows that entrepreneurs apply different strategies in the different stages of the firm's existence.

The observed flexibility of the SIDS entrepreneurs is also consistent with prospect theory (Kahneman & Tversky, 1979). Individuals show certainty effects i.e. individuals overweigh outcomes that are certain more compared to uncertain outcomes. In other words, when making decisions involving outcomes that are considered uncertain, this is made with docility (Sarasvathy, 2004; Sarasvathy & Dew, 2003; Sarasvathy & Dew, 2005a) and sensitivity<sup>27</sup>. SIDS entrepreneurs are docile in terms of being open to influences from others. They are aware that the situation is uncertain and will not bet all their money on that particular decision. Thus the flexibility that the SIDS entrepreneurs in our cases display explains the use of various strategies at different stages of the entrepreneurial life cycle<sup>28</sup>.

#### **4.6.2 Small and penurious environments**

Small and penurious environments also play a central role in the decision logics used by SIDS entrepreneurs. In these societies, there are often limited competing products on the market and resulting in monopolistic economies. Small islands typically can sustain a small product range due to diseconomies of scale. In addition, these environments have limited resources (Dolman, 1985). To deal with these limitations SIDS entrepreneurs first rely on their own resources and knowledge and the recombination of these to develop new products and solutions. However, for the reason that the SIDS entrepreneurs face 'negative' slack, they make use of their network of close friends and stakeholders to acquire their pre-commitment and in the end additional resources. In small communities, informal social structures, nepotism among close friends<sup>29</sup> and reciprocal benefits are often present. In this setting, networks of close ties and pre-committed stakeholders are vital to function as gateways to expand the pool of resources available to the SIDS entrepreneur. Thus SIDS entrepreneurs operating in small uncertain and penurious environments

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<sup>27</sup> I am not suggesting that entrepreneurs that exhibit flexibility conduct sensitivity analyses when faced with uncertain outcomes. I am suggesting that these entrepreneurs will not hold steadfast to their decisions but be open for changes.

<sup>28</sup> In the literature the importance of flexibility is recognized and extended beyond entrepreneurial attitude to also include flexible technical platform (Boor et al., 2014). Technology can be considered to be an institution (Pinch, 2008) as it can constrain an entrepreneur. The entrepreneur also influences institutions (Battilana, Leca, & Boxenbaum, 2009) and thus purposively embeds flexibility within the technical platforms.

<sup>29</sup> Nepotism is used synonymously with cronyism.

use their networks to acquire resources. If a SIDS entrepreneur does not belong to a network the probability of acquiring resources is a severely decreased, especially free or cheaply available resource.

In addition to acquisition of resources, these networks of close ties are also used to gain capabilities. Pre-committed stakeholders are also acquired to strengthen the development capabilities of the entrepreneurial team and to co-create the product. There is a rich research tradition on the importance of networks for the survival of entrepreneurs as these are used to link with the external environment (Billström, Politis, & Gabrielsson, 2014). Entrepreneurs organize their resources and capabilities to respond and/or anticipate new opportunities (Vanhaverbeke & Cloudt, 2006).

There are two main strategies the SIDS entrepreneurs use to gain pre-commitment from stakeholders. First, when it comes to a potential customer as the stakeholder to pre-commit, the customer is approached early in the development of the product. BudgetCo stated for example:

*"He [the founder] brought forward [the potential client] to see if it could be a partner because we said we wanted a target group. Seeing that [the potential client] has members it would be ideal to introduce this product for them. It was a membership organization...and they were a bank. We wanted them to be the trusted party...We went to give a presentation to [the potential client] and its team. We presented some of the products we can develop".*

By approaching the client early on, the SIDS entrepreneur can receive validation of the product and also financial resources that are invested in the development.

Second, the SIDS entrepreneur will co-create the product with other stakeholders. TransactionCo informed that:

*"By coincidence we came in contact with a big trust company and we invited them to visit us and together we brainstormed to verify what we can help them with based on our expertise".*

In this co-creation process each stakeholder will carry some responsibility for the creation of the product and also brings to the relationship his or her expertise and additional resources.

Nepotism and a closed circle of friends do not always lead to an abundant resource pool. SIDS entrepreneurs may still lack adequate resources such as funds and thus will actively engage in raising external funds. For example, to raise funds the SIDS entrepreneur uses formal arm's length relationships based on budgets and profit and loss forecasts to estimate the necessary funds. An example is MusicCo. After using savings to fund the first expenses, it was not possible anymore to cover

the expenses using their own savings. Hence they decided to raise funds elsewhere. MusicCo stated that "[they] made the P&L when [they] had already started" and "[they] are busy with looking into finding a capital investor to invest in the platform for 4-5 years, 2-3 years". This is supported in the literature. For example, a study by Manigart and Struyf (1997) among Belgium high-tech startups revealed that most startups finance themselves or acquire capital from banks.

In addition to managing a loose network to acquire funds, external fundraising in itself also influences the SIDS entrepreneur's choice to use both effectual and causal logics. On the one hand, most financial institutions, especially commercial banks, do not provide 100% financing but require the SIDS entrepreneur to also invest in the endeavor. Thus SIDS entrepreneurs first invest their own resources in order to be eligible for a bank loan. For example, SecurityCo informed us that he first had to "go to the notary and that [was] NAF two thousand".

This can be considered as a 'rite of passage' to enter the entrepreneurial process<sup>30</sup>. Van Gennep (2011) observed that role transitions that are important go through three phases namely 1. Separation (an individual separates himself from current roles), 2. Transition (an individual takes on new roles), and 3. Incorporation (the new roles become part of the individual's self-identity). Turner (1974) identified the transition phase as the liminal phase where the individual faces personal ambiguity. In the postindustrial societies, individuals in this phase cope with personal ambiguity by creating personal rites of passages through symbolic acts. A SIDS entrepreneur also faces these three phases as he or she transitions into the entrepreneurial process. At first, the SIDS entrepreneur disengages him or herself from his or her current role as a passive observer of an opportunity. In the transition phase, the SIDS entrepreneur takes on an entrepreneurial role and in the final incorporation phase the new role will become part of the SIDS entrepreneur's self-identity. In the transition phase the SIDS entrepreneur will have various options of roles he or she can take and thus faces ambiguity towards which role is preferred. To cope with this ambiguity, the SIDS entrepreneur makes an investment to reinforce his or her new role and personal identity. The SIDS entrepreneur's choice is also partially influenced by the loan requirements of banks. Thus the SIDS entrepreneur's step towards external fundraising also influences the SIDS entrepreneur to make use of effectual logics.

On the other hand, in the process to acquire funds from most financial institutions such as banks, SIDS entrepreneurs must submit a business plan. Critical components of the business plan are a financial forecast and a competitor's analysis that argues the position of the SIDS entrepreneur against that of the established incumbent firms. These two components are part of the causal planning approach

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<sup>30</sup> There are no scholarly articles in the entrepreneurship discipline I could find that incorporates the 'rite of passage' to explain entrepreneurial entry. However, this has been applied in the management discipline to other areas such as consultancy (e.g. Czarniawska & Mazza, 2003).

to decision-making. In addition, banks exercise control on the SIDS entrepreneur and hold him or her accountable for execution of the plans and leave little room for deviation. The SIDS entrepreneurs are pressured to apply a causally linear process of decision-making. This is corroborated by prior research among the entrepreneurs that show that search for venture capital made entrepreneurs oscillate towards causal logics (Nummela et al., 2014).

The limitation of product varieties on small markets also influence the decision logics used by the SIDS entrepreneurs. Small islands typically can only sustain a small product range due to diseconomies of scale. Niche markets that usually are pursued by product differentiation (Porter, 1980) are often too small to sustain a profitable entrepreneurial venture. Consequently, SIDS entrepreneurs exhibit high levels of goal-orientation to avoid pitfalls of the niche markets. Vast research goes into defining opportunities as these are created and the requirements and needs to successfully exploit these opportunities. A clear course of action is defined and SIDS entrepreneurs take action based on this. Thus limitations in the small market forces the SIDS entrepreneur to be goal-oriented.

The problem of limited numbers is also expressed in limited resources (Dolman, 1985) to be distributed among those entitled. If resources are distributed equally among those entitled, none of them will receive resources beyond the threshold needed for them to 'survive'. This creates a mechanism where the entitled will compete to receive a greater share of the resources to guarantee their 'survival'. An analogy to illustrate this mechanism is a famous game played by children and adults alike; the musical chairs. There is a group of individuals dancing in circles around chairs to often an upbeat music. Once the music stops, everyone needs to find and sit in a chair and is not allowed to share seats. There is always scarcity in the chairs resulting in one, two or more individuals without a seat when the music is stopped. A method to guarantee survival under conditions of scarcity is to use arm's length contracts. In these contracts the guarantee acquisition of a resource is arranged either it being monetary funds or tangible resources, and are evident in entrepreneurial processes in small communities.

The SIDS entrepreneurs in this study are also bricoleurs. They make use of their own resources and recombine these to develop new product/ services and solutions. An interesting observation, however, is that bricolage is not strongly applied. This for the reason that small and penurious environment enhances the problem of limited numbers and severe resource scarcity. In these circumstances it is difficult to acquire resources for free or cheaply because there are not sufficient resources for the survival of everyone. In this context resources are preferably sold at a fair market value and through arm's length contracts. Therefore, we also observe that the tactics for acquisition of resources at hand that are most used by SIDS entrepreneurs to acquire resources for free or cheaply are those that offer the seller the opportunity to recoup their lost revenue due to selling or giving away their

resources for under market prices. The indicators in question are 'gives ownership in the company/ product' (score: 0.14), 'make use of royalty deals' (score: 0.14), and 'compensates with other (employment) opportunities' (score: 0.14).

#### **4.6.3 The gap between technical expertise of the SIDS entrepreneur and the knowledge required to develop the product**

During the analysis of the data, I also observed that the SIDS entrepreneur's technical expertise, formed mostly by his or her education and work experience, plays a major role in determining the use of the decision logics. The SIDS entrepreneur's education and work experience are important to determine the SIDS entrepreneur's social network. A social network consists mainly of friendships and acquaintanceships formed during university education and firm-related work experience. Both of these settings are characterized by high concentration of similar technical expertise. A country's division of labor and the social structure in which a SIDS entrepreneur is embedded, influences who the SIDS entrepreneur knows and ultimately the resources that can be acquired through this network ((Baker et al., 2005). In other words, the technical expertise of the SIDS entrepreneur determines who the SIDS entrepreneur knows and what resources he or she can acquire.

In cases that there is a bad fit between the SIDS entrepreneur's technical expertise and the technical domain of the product that is being developed, the opportunities to acquire resources through the SIDS entrepreneur's close ties are worst compared in cases that SIDS entrepreneur experiences a good fit. For example, in our cases, the founders of GameCo and MusicCo do not have software development background, which are key skills to the development of their products. They searched effectually among their close ties for stakeholders to commit but they could not find anyone. As example GameCo reported:

*"I looked for people who could develop it because as I said, I do not write much code... In the first instance I also looked for a developer in Curaçao [among my friends] but then there was none for iPad and iOS development. There was no one in Curaçao who could. In 2010 we already started thus that was not there."*

The partners that GameCo and MusicCo finally contracted to work on the development were in both cases selected using causal logics, specifically competitive analysis. GameCo found an advertisement in the WIRED magazine and contracted the development firm in the US. Their working relationship was based on an arm's length agreement which cause frustration for GameCo:

*"They did exactly what I said and there was a price tag for everything. I ask clear questions of what they think of something and if they can share their opinion. They did not react".*

MusicCo also faced similar struggles to find resources to develop their idea in the startup phase. Initially they contacted their friends but working with them these did not produce any results. Having difficulties to find software developers through their social network they settled on using an online freelance platform (i.e. oDesk.com) to search for software developers. Here is where they found their first Chief Technology Officer.

On the other hand, the SIDS entrepreneurs that had a small gap between technical expertise and the technical domain of the product that was being developed, experienced less difficulty in finding the resources through their social networks. These SIDS entrepreneurs successfully applied effectuation to enlarge their resources pool. For example, the co-founders of TransactionCo both have educational backgrounds in data communication and ICT, and worked in ICT roles in their former jobs. When TransactionCo wanted to acquire software developers they contacted a small office whom they have worked with in their previous jobs. Finally, SecurityCo reported that "I already knew them. I knew their work and I told them to come help me in certain projects".

#### **4.6.4 The cooking analogy**

If I use the cooking analogy that I have used previously to explain effectuation, causation and bricolage, the process of cooking in SIDS proceeds as follows. First, the chef will look in the cupboards for the ingredients and cooking equipment that he or she has to his or her disposal. As the chef starts cooking, he or she will contact close friends to acquire commitment from these friends to help in the cooking process and also provide ingredients and cooking equipment that can facilitate the process. These ingredients and equipment are also acquired for free or cheaply from other individuals with whom the chef and his or her friends come in contact. As the chef and the friends that have committed to cooking together are preparing the meal, for a certain kind of activity (e.g. making a sauce) the team might look for ingredients and tools they have available, while for another kind of activity (e.g. controlling for potential food poisoning) the team might search for a specific individual with the right knowledge and tools. A chef with the technical expertise required to cook the meal will find it easier to find someone to aid in controlling for food poisoning, compared with someone without this background.

## 4.7 Conclusion

### 4.7.1 Contribution

In this chapter I addressed the question “*which heuristics does an entrepreneur use in the SIDS context?*”. I contribute to our knowledge about this matter by showing that SIDS entrepreneurs use the causal, effectual and entrepreneurial bricolage logics in combination but have a strong inclination towards causal rationality. Despite this preference, the SIDS entrepreneurs favor the effectual principle ‘*leveraging contingencies*’ above the causal principle ‘*hedging against contingencies*’. I provided three explanations for these results. First, the SIDS entrepreneurs strive to remain flexible and apply the logic that they consider appropriate to different kinds of activities in the exploitation of entrepreneurial opportunities. Second, the small and resource constrained context also influences SIDS entrepreneurs to use the causation, effectuation and bricolage logics in combination. Finally, the gap between the technical expertise of the SIDS entrepreneur and the expertise required to develop the respective product plays a vital role in determining which logic is used to acquire the right expertise to develop the aspired product.

### 4.7.2 Limitations

This study is not without its limitations. The main limitation is that the data collected in the multiple-case study is not coded by independent coders and thus susceptible for researcher’s bias.

### 4.7.3 Subsequent chapters of the dissertation

In this chapter, we gained the understanding of which heuristics SIDS entrepreneurs use in uncertainty and resource constraints environments. Subsequent chapters will address how the heuristics that I identified in this study affect entrepreneurial phenomena that originate from the SIDS context. I identified three such phenomena. First, in the startup process the entrepreneurs use networks that are international and thus show signs of being ‘born-global’ firms. These are firms that internationalize from inception or very rapidly (Knight & Cavusgil, 2004). Traditional models e.g. Uppsala- model (Johanson & Vahlne, 1977) that explained the internationalization of firms as slow and gradual cannot explain the ‘born-global’ phenomena (Cavusgil & Knight, 2015) that are mostly evident in small economies (Cavusgil & Knight, 2015; Terjesen, 2015).

As with other entrepreneurial firms, a firm that is born globally also experiences uncertainty and resource constraints that stem from liability of newness, size and foreignness (Zahra, 2005). The credibility of the ‘born-global’ firm is in question and the resource limitation raises doubt about the ability to cope with

challenges in the internationalization process. According to Zander, McDougall-Covin, & Rose (2015) “a solid understanding of ‘born-global’ firms and their dynamics requires in-depth insights into the entrepreneur’s logic and reasoning” (p. 29) and the causation, effectuation, and bricolage theories are pathways to acquire this understanding. Chapter 5 addresses the question *“how do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a ‘born-global’ firm?”*

Second, my data shows that a few of the SIDS entrepreneurs developed innovations that were new to the world. Literature in innovation shows that most theories of innovation fail to explain this phenomenon. The tradition is to focus on the firm as the creator of innovation (Schumpeter, 1947). Central are science and R&D (Sundbo et al., 2007) that is most evident in developed countries (Boor et al., 2014).

Following this rationale, the diffusion of innovation takes a North-South path where innovation is first diffused in developed countries followed by the developing countries that do not possess the advanced knowledge stock. This North-South diffusion framework fails to explain new-to-the-world innovations that emerge from penurious countries such as mobile banking in Philippines (Boor et al., 2014). Chapter 6 addresses the question *“how do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?”*

Finally, a topic in the entrepreneurship research that has received a lot of attention is what determines why some entrepreneurs make the entry decision<sup>31</sup> while others under the same circumstances do not (Shane & Venkataraman, 2000). Expected financial return is widely considered as a dominant determinant of entrepreneurial entry. However, at startup SIDS entrepreneurs only invest their own resources that they are willing to put at risk. The effectuation literature refers to this logic as the affordable loss and it is defined as what an entrepreneur can afford and he or she is willing to lose in opportunity exploitation (Dewet al., 2009). Chapter 7 addresses the question *“how do an entrepreneur’s ability and preferences independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?”*

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<sup>31</sup> The entrepreneurial entry decision is the decision to make emotional, financial, mental, physical, and/or social investments to pursue an entrepreneurial opportunity.

# 5 WHEN YOUR WORLD IS AN ISLAND: COGNITION IN INTERNATIONAL ENTREPRENEURSHIP

## Abstract

The question of how firms internationalize has been at the heart of the international entrepreneurship (IE) research stream. Incremental models have been weak in explaining the 'born-global' phenomenon: firms that internationalize at their inception or very rapidly afterwards. A review of prior literature shows that entrepreneurial firms leverage their social networks in the internationalization process. However, there is conflicting results of the logics applied in this process. In this study I research this problem in the SIDS context because entrepreneurial firms that originate from this unique context experiences the challenges that makes firms become 'born-global' firms. Using a multiple-case study, I explore this phenomenon and show that during the internationalization process firms use the causal, effectual and bricolage logics in combination. I also show that despite the evidence from previous research indicate that the unique challenges in the SIDS context make SIDS entrepreneurs become 'born-global' firms, this is not the case. It is actually the gap between the entrepreneur's technical expertise and the technical expertise required to develop the firm's products.

## Keywords

Born-global, cognition, resource constraints, uncertainty

## 5.1 Introduction

How do entrepreneurial firms internationalize? This question is at the heart of international entrepreneurship (IE)<sup>32</sup>. Earlier internationalization theories described the internationalization process as slow and gradual (Johanson & Vahlne, 2009), a playing field of large established enterprises with slack resources (Cavusgil & Knight, 2015). These theories were weak in explaining the 'born-global' phenomenon: firms that show signs of early and rapid internationalization (Knight & Cavusgil, 2004). Despite being resource constrained these early internationalizing firms that originate mostly from small economies (Cavusgil & Knight, 2015; Terjesen, 2015) leverage social networks to enter international markets (Ellis, 2000)<sup>33</sup>.

The internationalization process can be conceptualized as an opportunity exploitation (Andersson, 2011; Harms & Schiele, 2012; Mainela, Puhakka, & Servais,

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<sup>32</sup> For extended review of the IE literature see Cavusgil and Knight (2015), Terjesen (2015) and Zander et al. (2015).

<sup>33</sup> The Uppsala model has been updated to respond to these criticism (Knight & Liesch, 2015) and to include elements of entrepreneurship (Harms & Schiele, 2012)

2014)<sup>34</sup> and is considered to be a problem space of decision-making (Jones & Coviello, 2005). Thus, a call was made to turn to entrepreneurial cognition theories as “there is a need to probe managerial cognition and psychological dispositions as we examine the determinants of the decision to internationalize a new venture's operations at inception” (Zahra, 2005, p.23). In addition, the study of the ‘born-global’ phenomenon would need integrated theories from international business and entrepreneurship (Keupp & Gassmann, 2009)<sup>35</sup>.

Two prominent and emerging cognition theories in entrepreneurship research (Fisher, 2012) that can aid our understanding of the ‘born-global’ phenomenon are effectuation theory (Sarasvathy, 2001) and entrepreneurial bricolage theory (Baker & Nelson, 2005)<sup>36</sup>. Studies that applied these theories to examine how entrepreneurial cognition can explain the leverage of social networks in the rapid internationalization show conflicting empirical results<sup>37</sup>. For instance, Kalinic, Sarasvathy, and Forza (2014) found that the switch to effectual logics helped the entrepreneurs to leverage their social networks to deal with liability of foreignness, whereas Su (2013) found that entrepreneurs used causal and entrepreneurial bricolage logics in parallel.

To study this problem, I turn to the context of the Small Island Developing States (SIDS). The SIDS are a group of developing islands that share similar characteristics and a unique set of challenges e.g. small size (Briguglio, 1995), dependence on export markets (McGillivray et al., 2010) and narrow range of skills (Dolman, 1985). It is these challenges that make firms be born global (Crick & Jones, 2000; Kalinic et al., 2014). Thus there are vital lessons to learn from how SIDS entrepreneurs leverage social networks to become ‘born-global’ firms. I combine causation, effectuation and bricolage into an integrative framework for the reason that the ‘born-global’ firm is characterized by both uncertainty and resource

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<sup>34</sup> The opportunity is considered essential in the internationalization process (Andersson & Evangelista, 2006). Zahra and George (2002) defined internationalizing entrepreneurship as “the process of creatively discovering and exploiting opportunities that lie outside a firm's domestic markets in the pursuit of competitive advantage.” Oviatt and McDougall (2005, p. 540) proposed definition is “the discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services.”

<sup>35</sup> Numerous scholarly works followed in the subsequent years (see Milanov and Maissenhalter (2014) for a recent review of the literature). However, after a decade “there remains, of course, a long way to go, in terms of truly understanding these firms” (Zander et al., 2015, p. 30).

<sup>36</sup> Effectuation theory is influenced by psychology and organizational studies, and the entrepreneurial bricolage theory is borrowed from the French anthropologist Levi-Strauss (Baker & Nelson, 2005; Stinchfield, Nelson, & Wood, 2013). Researchers have used effectuation to model entrepreneurial decision-making under uncertainty (e.g. Reymen et al. (2015) and the bricolage for resource constraints environments (e.g. Senyard, 2014).

<sup>37</sup> Examples are Kalinic et al. (2014); Nummela et al. (2014) Sarasvathy et al. (2014); Gabriellsson and Gabriellsson (2013); Desa (2012); Su (2013); Harms and Schiele (2012); Lesage and Ronteau (2012); Autio et al.(2011); Mort and Weerawardena (2006); and Andersson (2011). This is not an exhaustive list.

constraints (Zahra, Korri, & Yu, 2005). The research question addressed in this chapter is:

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?*

The study contributes to existing research in two major ways. First, by using an integrative framework I show how SIDS entrepreneurs use causation, effectuation and bricolage logics in combination to leverage existing and create new social networks to facilitate the process to internationalize at inception. Second, I show that despite the evidence from previous research indicate that the unique challenges in the SIDS context make SIDS entrepreneurs become 'born-global' firms, this is not the case. It is actually the gap between the entrepreneur's technical expertise and the technical expertise required to develop the firm's products.

This chapter is organized as follows. In the next section the literature on the 'born-global' firm is reviewed and I will present an overview of how entrepreneurial cognition influences the leveraging of social networks to internationalize. In section three I will discuss the effectuation (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005; Garud & Karnøe, 2003) theories and present the integrative framework. Subsequently, in section four I will discuss the methodology of this study. I used a multiple-case study (Eisenhardt & Graebner, 2007; Yin, 2009) consisting of four cases to explore the influence of the heuristics on the entrepreneurs to born globally. In section five I will discuss the main findings. Finally, this chapter concludes with the limitations and areas for future research in section six.

## **5.2 Literature review**

### **5.2.1 Defining the 'born global' firm**

The 'born-global' firm has received considerable attention in IE research. Its origin dates back to the work of Rennie (1993) (as cited in Coviello, McDougall, & Oviatt, 2011; Cavusgil & Knight, 2015). Several definitions of rapidly internationalizing firms have been proposed. Cavusgil and Knight (2015, p. 4) define the 'born-global' firm as "entrepreneurial start-ups that, from or near their founding, seek to derive a substantial proportion of their revenue from the sale of products in international markets". On the other hand, Oviatt and McDougall (1994) in their seminal article used the concept 'international new venture' (INV)<sup>38</sup> and defined this as "a business

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<sup>38</sup> The 'born-global' is often incorrectly used interchangeably with the international new ventures (INV).

organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries “ (p. 49). The definitions can be divided between those that focus mostly on the sales expansion to international markets through e.g. export (e.g. Cavusgil & Knight, 2015) and those that also include the sourcing of products internationally and thus participate in the globalization of production (e.g. McDougall & Oviatt, 2000)<sup>39</sup>.

In the remainder of this study, I define a ‘born-global’ firm as entrepreneurial start-ups that, from their founding, seek to derive significant competitive advantage from the use of resources and/ or the sale of outputs in international markets. I use to this definition for the reason that prior literature shows that the ‘born-global’ firm uses its social networks to also gain access to resources and capabilities (Coviello, 2006). Furthermore, these international entrepreneurial firms are mostly found in knowledge-intensive industries (Autio, Sapienza, & Almeida, 2000). It is easier for a knowledge-intensive firm that develops intangible products (e.g. software) to internationalize at inception (Kotha, Rindova, & Roethermel, 2001; Zander et al., 2015). The firm’s capacity to produce products in high volumes is vital to fulfill the new market demand (Fan & Phan, 2007) and this is easier for knowledge-intensive firms.

### **5.2.2 What we know about the ‘born global’ firm**

Two decades of research on ‘born-global’ firm has produced many insights<sup>40</sup>. What do we know about the ‘born-global’ firm? The ‘born-global’ firm experiences at least three types of liabilities. First is the liability of newness. This involves limitations in the resources and social networks these firms can access (Aspelund, Madsen, & Moen, 2007; Zahra, 2005). The credibility of the ‘born-global’ firm is in question and the resource limitations raise doubt about the ability to cope with challenges in the internationalization process. Second, the liability due to small size is also a characteristic of the ‘born-global’ firm. This involves the limitation of slack resources these firms possess and lack of a physical local presence (Zahra, 2005) and the psychic distance (Aspelund et al., 2007). Slack resources are defined as “the pool of resources in an organization that is in excess of the minimum necessary to produce

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Coviello et al. (2011) strives to bring clarity by reserving ‘born-global’ for firms that enter many countries and ‘international’ for firms that enter a single or few countries.

<sup>39</sup> A temporal dimension of the ‘born-global’ firm is disputed in the literature. How long is the period between establishment and entry in a foreign market? McDougall and Oviatt (2000) and Rennie (1993) argue that it is three years or less. Whereas Rialp, Rialp, and Knight (2005) argue that this period is even shorter; less than one year. Furthermore, the export intensity and the number of countries the firm has entered are also dimensions in the definitions of the ‘born-global’ firm (see Fan and Phan (2007) and Hashai (2011) for an overview). However, these are omitted in my definition in order to avoid problems of data collection in Small Island Developing States as I will discuss in Section 5.4.1.

<sup>40</sup> See Knight and Liesch (2015) for an extensive review of the literature.

a given level of organizational output” (Nohria & Gulati, 1996 p. 1246). The physical distance is the geographical distance between the ‘born-global’ firm and its foreign partners. The psychic distance refers to the linguistic, cultural, economic and political/legal factors that prevent or disturb the flow of information between the ‘born-global’ firm and its foreign partners (Nordstrom & Vahlne, 1992). The physical (Zahra, 2005; Coviello & Munro, 1997) and psychic distance (Aspelund et al., 2007; Fan & Phan, 2007; Sarasvathy et al., 2014) are sources of uncertainty that the ‘born-global’ firm experiences. A final characteristic is the liability of foreignness. The ‘born-global’ firm needs to create legitimacy among its foreign suppliers and customers (Zahra, 2005) in order to reduce its failure rates (Barkema & Drogendijk, 2007).

Despite these liabilities the ‘born-global’ firm embarks on an international path. The effects of these liabilities are profound for it is precisely the constraints in the home country of the ‘born-global’ firm and the availability of resources in foreign markets that make a ‘born-global’ firm internationalize (Mathews & Zander, 2007). Small domestic market size (Crick & Jones, 2000) and domestic competition influence the internationalization of the entrepreneurial firms (Oesterle, 1997). The ‘born-global’ firm might first pursue an internationalization strategy as a path to increase its product capabilities in a new market and afterwards use this new operation to also sell its products in that respective market (Kalinic et al., 2014)<sup>41</sup>.

The liabilities experienced by the ‘born-global’ firm also influence its internationalization strategies. The ‘born-global’ firm pursues a differentiation strategy in various market niches (Aspelund et al., 2007; Knight & Cavusgil, 2004; McDougall, Oviatt, & Shrader, 2003). Because of its liability of newness and small size a ‘born-global’ firm makes use of low commitment strategies that are based on its resource availability (Burgel & Murray, 2000; Crick & Jones, 2000). Because its resources are scarce and the entry mode is irreversible (Morschett, Schramm-Klein, & Swoboda, 2010), the preferred internationalization strategy is exporting (Cavusgil & Knight, 2015). The capabilities required for exporting do not need resource intensity (Keupp & Gassmann, 2009); the ‘born-global’ firm does not need to own its resources to embark on the internationalization path (Zahra, 2005). This makes exporting a viable entry mode. In doing this the ‘born-global’ firm shows resourcefulness.

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<sup>41</sup> Knight and Cavusgil (2004) posit that the early internationalization of the ‘born-global’ firm is made possible by two key developments in international business: 1. The globalization of production and markets, and 2. The advances in information and communication technologies, transportation technologies, logistics and methods of production.

### **5.2.3 Social networks as a path to internationalization**

In Section 5.2.2, I have discussed how a 'born-global' firm is resourceful in its internationalization path. An important strategy to offset the limitation in resources is the use of social networks (Mort & Weerawardena, 2006).

The literature defines the social network as a set of individuals (or organizations) and the link between these (Hoang & Antoncic, 2003). Its main task is to facilitate the flow of knowledge and information; knowledge that can induce to new capabilities and information about new opportunities. The manner that this flow takes place is influenced by the content of the relationships, the governance, and the structure of the social network (Powell, Koput, Smith-Doerr, & Owen-Smith, 1999).

The 'born-global' firm uses social networks to access knowledge (Kogut, 2000), to learn and create new capabilities (Anand & Khanna, 2000), and enter international markets (Ellis, 2000). Through social networks the 'born-global' firm can also gain access to resources and capabilities that are required for the internationalization process (Coviello, 2006). Social networks are also used to offset the lack of a close proximity and psychic distance (Coviello & Munro, 1997). It provides reputational meaning (Elfring & Hulsink, 2003; Higgins & Gulati, 2003), referral trust and solidarity (Zhou, Wu, & Luo, 2007).

The 'born-global' firm's position in its social network influences to which extent it can leverage its social network to discover, enact, evaluate, and exploit international opportunities. Its centrality within the social network and its ability to bridge structural holes (i.e. absent links between actors), determine the type of knowledge, information and resources the 'born-global' firm can access (Hoang & Antoncic, 2003) and ultimately its expansion across national borders.

An entrepreneur's position in the social stratification, the division of labor of a country, and ultimately his or her expertise have to a large extent to do with the entrepreneur's ability to leverage his or social network (Baker et al., 2005) in the international opportunity exploitation. The social stratification influences the information and knowledge that flows through the social network. The expertise that the entrepreneur has gained in a particular activity will aid him or her to see value whereas others will disregard that information and/ or resource. Thus the entrepreneur is idiosyncratic towards the value he or she associated with a particular information (Penrose, 1959).

While a social network is an information gateway that enables an entrepreneur to exploit international opportunities, it also functions as a funnel that limits the entrepreneur to the exploitation of opportunities with regard to which he or she has developed an expertise. Thus the position of the entrepreneur in the social strata and the division of labor act as 'knowledge corridor' (Baker et al., 2005). The entrepreneur's expertise is of limited use outside that corridor. Prior research shows that entrepreneurs are more prone to start companies in the same industries and

sectors in which they have built their expertise (Stam & Bosma, 2015). Thus the entrepreneur's expertise is vital in him or her using his or her social network to its full potential in international opportunity exploitation.

#### **5.2.4 Social networks and cognition**

The cognition is vital in the process of internationalization of the 'born-global' firm through social network formation. The cognition is the origin of a competitive advantage for these entrepreneurial firms (Zahra, 2005) and explains why these firms internationalize from inception (Bloodgood, Sapienza, & Almeida, 1996; Oviatt & McDougall, 1994).

A review of the literature shows there are conflicting views on how cognitions influence the use of social networks in the process of internationalization.<sup>42</sup> Using a case study Andersson (2011) explored how a Swedish firm used the social networks of its employees in an effectual manner to expand across borders. Gabrielsson and Gabrielsson (2013) also illustrated how Finnish firms effectually leveraged their social networks in the early internationalization. In a study of 65 fast growing firms, Harms and Schiele (2012) found that entrepreneurs who have proclivity towards causation are more likely to use export as an entry mode whereas experienced entrepreneurs are more inclined to use internationalization strategies that require leveraging social networks<sup>43</sup>. Kalinic et al. (2014) showed that a switch from causal to effectual logic helped the entrepreneurs to leverage their existing and new social networks to deal with liability of foreignness in the unplanned internationalization. Furthermore, Galkina and Chetty (2015) show that effectual social networks determine the market selection. Lesage and Ronteau (2012) extended the study of social networks in the internationalization process to also include bricolage. In a single case study of a Japanese entrepreneur in the 'wagasa'<sup>44</sup> industry, these authors found the use of both effectuation and bricolage to leverage social networks. In opposition to these studies, Su (2013) shows that Chinese IT service suppliers use causation and bricolage in combination as they expand their operations to Japan and the USA. Nummela et al. (2014) found that there are entrepreneurial firms that early on in the internationalization process already show a strong preference for causation when they leverage their social networks to internationalize. Finally, Desa (2012) using only the bricolage decision logics found that internationalizing firms that are influenced by weak or emergent institutions will engage in bricolage.

In summation, my short review of the literature shows there are conflicting views concerning the logics used to leverage social networks in the internationalization process.

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<sup>42</sup> See Nummela et al. (2014) for a recent review of effectuation studies in internationalization.

<sup>43</sup> They also show that psychic distance has positive relationship with the causation.

<sup>44</sup> Wagasa is the Japanese traditional umbrellas.

## 5.3 Theoretical framework

### 5.3.1 Causation

The causal approaches towards decision-making assume that individuals are goal-oriented and methodological. An individual will first set a goal and afterwards he or she determines the steps necessary to realize the goal (Knight, 1921). Sarasvathy (2001) lays out four basic principles for causation. First is the investment based on expected return (i.e. the individual will invest if the expected financial return exceeds his or her threshold). Second is the goal-orientation (i.e. the individual will first select a goal and subsequently search for the means necessary to realize this goal). Third is the treatment of (potential) partners through a competitive analysis (i.e. the entrepreneur will select partners based on the set goal). The fourth and final is the hedging against contingencies (i.e. the entrepreneur will minimize the possibility that unexpected events can influence his or her actions to realize the goal).

### 5.3.2 Effectuation

Effectuation posits that an entrepreneur engages in controlling an unpredictable future (Sarasvathy, 2001; 2008)<sup>45</sup> and is a decision-making mode most applicable to expert entrepreneurs (Read & Sarasvathy, 2005; Sarasvathy et al., (2007). Entrepreneurs that use the effectual logic make use of four heuristics in their decision-making (Sarasvathy, 2008). First is the affordable loss (i.e. what an entrepreneur can afford and he or she is willing to lose in opportunity exploitation (Dew et al., 2009). Second is the means-orientation (i.e. the starting point where an entrepreneur evaluates who he or she is, what he or she knows, and whom he or she knows (Sarasvathy & Dew, 2005). It is the evaluation of his or her personal identity and resources in possession. Third is the pre-committed stakeholders (i.e. the stakeholders that are willing to pre-commit to the effort of the entrepreneur even before there is a clear goal. The fourth and final is the leveraging of contingencies (i.e. the entrepreneur will 'be open' to exploit any possible future alternative presented (Read & Sarasvathy, 2005).

### 5.3.3 Bricolage

The entrepreneurial bricolage theory (Baker & Nelson, 2005; Garud & Karnøe, 2003) addresses the entrepreneurial cognition in penurious environments (Baker & Nelson, 2005)<sup>46</sup>. When an entrepreneur is faced with these environments, he or she

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<sup>45</sup> see Mauer (2015) and Sarasvathy et al. (2015) for recent reviews of the effectuation literature.

<sup>46</sup> see MacMaster, Archer, and Hirth (2015) for a review of the bricolage literature.

engages in bricolage to 'stretch' the available resources towards new uses (Baker & Nelson, 2005). An entrepreneur is able to do this because each entrepreneur has a unique relationship with his or her resource environment (Penrose, 1959), and thus different entrepreneurs will create different uses of the resources, and same resources might be viewed differently by entrepreneurs.

The accepted definition of bricolage is "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson, 2005, p. 6). Making do refers to the active attitude of an entrepreneur to create something from nothing, use discarded and unwanted resources for new purposes, and use untapped resources that other organizations failed to recognize (Di Domenico et al., 2010). It is also the refusal to accept the limitations imposed by the resources according to 'collective wisdom' or routines that have been universally accepted (Steffens et al., 2010, p. 6). Resources refer to both the resources that the entrepreneur has at hand and also includes resources that are available for free or very cheaply.

#### **5.3.4 Integrating causation, effectuation and entrepreneurial bricolage**

The theoretical framework of this study is based on an integration of causation, effectuation (Sarasvathy, 2001) and entrepreneurial bricolage (Baker & Nelson, 2005). This integration is because the effectuation and bricolage perspectives posit that an entrepreneur starts from whom he or she is and exercises introspection (MacMaster et al., 2015; Sarasvathy, 2001) and draw on very similar concepts, though both focus on different aspects of the entrepreneurial process (Fisher, 2012). Furthermore, uncertainty is a driver of the use of bricolage as well as of effectuation (Cunha, 2005). These similarities provide a fruitful ground for theory integration (Mayer & Sparrowe, 2013) as both perspectives use similar accounts to explain different phenomena, namely decision logics under uncertainty for the former and resource constraints for the latter.

Known scholarly efforts to integrate effectuation, causation and bricolage are Hindle and Senderovitz (2010), Fisher (2012), and Welter et al. (2016). Hindle and Senderovitz (2010) posit that effectuation and bricolage are very similar on several accounts; both are in opposition to rational planning; include non-predictive and control logic; have no preference for strategic analyses; focus on the use of existing resources; assumes a social construction of resources and opportunities. Causation and bricolage have only two similarities namely the use of pre-existing goals and that these decision logics can be carried out by both expert and non-expert entrepreneurs. Finally, effectuation is placed in a goal ambiguity context while causation similar to bricolage has a teleological context. Fisher (2012) showed that effectuation and bricolage are similar on four counts. First, the entrepreneurial opportunities are constructed via existing resources. Second, entrepreneurs take

action to overcome resource limitations. Third, there is proactive action to acquire commitment from partners. Finally, resource limitation enhances creativity. According to Welter et al. (2016) both effectuation and bricolage look at opportunity as unspecified and created by the entrepreneur. Further similarity between the two is focus of the actor on the resources he or she has. However, the contexts are different. The context of effectuation is bounded rationality and the context of bricolage is resource scarcity.

## 5.4 Methods

In this chapter, I set forth to understand how the application of heuristics by entrepreneurs influence them in becoming 'born-global' firms. I use an exploratory research strategy with multiple cases because case studies are adequate to research 'how' questions and a contemporary life phenomenon where the researcher does not have control over the events that will take place (Yin, 2009).

Data was collected on the small Caribbean island of Curaçao. For more information about Curaçao see Appendix 3.3. I approached the ICT community in Curaçao to identify the local ICT firms and SIDS entrepreneurs that fit the sampling criteria (see Table 3.1 and Table 3.2). In total, I selected four cases<sup>47</sup> (see Table 3.3 for the case characteristics and Table 3.4 for the case descriptions). Out of the four cases, two are 'born-global' firms namely GameCo and MusicCo.

I used the empirical indicators developed by Reymen et al. (2015) for causation (see Table 3.5) and effectuation (see Table 3.6), and inspiration from Baker and Nelson (2005), Senyard (2015), and Senyard et al. (2014) to develop empirical indicators for bricolage (see Table 3.7).

The data was collected through interviews and archival documents. The interviews lasted between 45 minutes and 1.5 hours. I used pseudonyms to maintain confidentiality of my participants. In addition, I signed non-disclose and non-compete agreements.

The coding and analysis consisted of a pattern-matching approach in the cases and across the cases (Yin, 2009). Please see Chapter 3 for a detailed explanation of methodology.

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<sup>47</sup> I started the study with seven cases. Three were dropped because these were still in the seed phase in the stages of entrepreneurial development and had no sales.

## 5.5 Results and discussion

### 5.5.1 Internationalization and the use of social networks

The analysis of the data reveals interesting results. GameCo and MusicCo were international from inception, and used a combination of effectual, causal and bricolage logics to leverage their social networks in the internationalization process.

#### *GameCo*

GameCo leveraged its social networks in several ways. GameCo used effectual logics when making the decision about who will design the game. GameCo is a graphic designer and considers designing for apps and website a part of its core capabilities. However, when making the decision about who will illustrate and produce the music for the game, GameCo searched through its established social network of professionals and friends, and outsourced the illustration and production of the game music through assignments. GameCo made use of both the causal and effectual logic in this process. GameCo first looked at the existing social network which is an indication of means-orientation, and afterwards established the partnership with an arm's length contractual agreement. The latter is a causal logic in how to deal with partnerships.

When it came to the programming of the game, GameCo also used its social network for it did not have the expertise to write the software for the product. GameCo said:

*"I am actually a graphic designer which is nowadays more and more apps and websites and so actually it falls a little under this. I do not do development and so forth. So no programming and stuff but design."*

At first instance, GameCo searched among its social network for software developers, but could not acquire pre-commitment from anyone. GameCo stated:

*"In the first instance I also looked for a developer in Curaçao [among my friends] but then there was none for iPad and iOS development. There was no one in Curaçao who could. In 2010 we already started thus that was not there."*

Subsequently GameCo contracted a US-based software developer through an arm's length contract. GameCo became aware of this software developer through an unexpected event. An exemplary statement to illustrate this is:

*"I looked for people who could develop it because as I said, I do not write much code. Then I saw in a magazine WIRED. It was an advertisement for the company. They are in America ... Then I approached them."*

This was the first step of GameCo towards internationalization. Another indication that GameCo approached this partnership causally is the type of relationship they built. This relationship was based on an arms' length contractual agreement where software developer would not co-create with GameCo. GameCo stated:

*"They did exactly what I said and there was a price tag for everything. I ask clear questions of what they think of something and if they can share their opinion. They did not react".*

Interestingly, when GameCo transferred its international operations to another country, this did take place effectually by leveraging its social network. GameCo was approached by a friend and the friend's business partner to work on another product. In development of this product GameCo was informed through this network of a software developer in Europe who could potentially collaborate on the product development. GameCo approached this developer and formed a co-creation relationship. GameCo expressed:

*"Now I got from the developer in [Europe] ... who did what I thought the first developer did not. They have even played it. They feel that this should change or that should change. They can be program so they know what can be done and they also said that if you do this that will happen, and that's nicer".*

As this narrative shows, GameCo used both effectual and causal logics to leverage its network in the internationalization process.

#### *MusicCo*

The second 'born-global' firm in my case is MusicCo. This entrepreneurial venture also leveraged its social network in the process to become a 'born-global' firm. It started with one of the co-founders receiving inspiration to make MusicCo's vast library of unique and difficult to acquire Dutch Antillean music available on the Internet. The first action that this co-founder took was to contact a very good friend. MusicCo said:

*"When I had the idea in my head, but very raw, I contacted [the other co-founder]. I already knew [the other co-founder] would be a good partner".*

The friend, who later became a co-founder in MusicCo, was living in a different country and thus this was the first step into cross-national operations for MusicCo. The first stakeholders who subsequently pre-committed to MusicCo were part of its social network thus MusicCo showed signs of effectuation by leveraging its existing social network. However, the MusicCo was dissatisfied with the progress. An exemplary statement to illustrate is:

*"[We] thought about needing to have someone with more technical expertise, and we also needed a designer".*

Consequently, MusicCo placed a job vacancy on a freelance platform to search for a computer engineer and as a result acquired a new stakeholder who resided in Eastern Europe. This was a very causal process with a clear predetermined goal. MusicCo furthermore stated:

*"Very often you think let's find cheap developers [in Asia via freelance platforms]"*.

MusicCo also used effectuation logics to expand its partners at this time. The current partners leverage their social network and introduced the founders of MusicCo to new stakeholders. This process was once more repeated when MusicCo was looking into expanding its human capital for the third time. Exemplary statements to illustrate this are the following:

*"We were working with a guy called [...] ... he referred us to [the current Head of Design]"*.

*"When [the Head of Design] got busy with school he needed some support and another guy [the assistant designer] joined" ... "I know [the assistant designer] from Curaçao, we used to compete in speed swimming together... So I see him at school every time... we took the same classes."*

This shows that in the first instance to cross borders MusicCo leveraged its network effectually. However, MusicCo approached its operational expansion into a third country causally, and also leveraged its own social network to expand its team.

MusicCo also used bricolage in its internationalization process. MusicCo acquired human capital very cheaply by compensating the partners with shares in MusicCo and other job opportunities. MusicCo creatively made use of other organizations in which they had decision-making authority to sign freelance jobs for MusicCo's partners.

The narratives of GameCo and MusicCo's internationalization process shows that effectual, causal and bricolage logics were used in combination as their

social networks were leveraged. To understand how the causal, effectual and bricolage heuristics used by these SIDS entrepreneurs independently or jointly influenced the process to become a 'born-global' firm, a comparison was made between the cases that were 'born-global' firms (i.e. GameCo and MusicCo) and the cases that were the firms internationalized incrementally (i.e. SecurityCo and TransactionCo). This comparison is illustrated in Table 5.1 and discussed in the next section.

**Table 5.1 Heuristics 'born-global' versus non 'born-global' firms**

		GameCo*	MusicCo*	Score(avg)	SecurityCo	TransactionCo	Score(avg)
Score causation	Expected return	1.00	0.67	0.83	0.67	1.00	0.83
	Goal-orientation	0.67	1.00	0.83	1.00	1.00	1.00
	Competitive analysis	0.67	1.00	0.83	1.00	1.00	1.00
	Hedging against contingencies	0.33	0.00	0.17	0.00	0.33	0.17
Score effectuation	Affordable loss	0.33	0.33	0.33	0.33	0.67	0.50
	Means-orientation	1.00	1.00	1.00	0.33	1.00	0.67
	Pre-committed stakeholders	0.33	0.33	0.33	0.33	1.00	0.67
	Leveraging contingencies	0.67	1.00	0.83	1.00	1.00	1.00
Score bricolage	Making do	0.33	0.33	0.33	0.67	0.67	0.67
	Resources at hand	0.33	1.00	0.67	0.33	0.67	0.50
	New problem/solutions	0.33	0.33	0.33	0.33	0.67	0.50

### 5.5.2 The gap between the entrepreneur's technical expertise and the expertise required to develop the product

The systematic analysis of the use of the causation, effectuation and bricolage logics by the cases revealed that there were no significant differences between the 'born-global' firms and the firms that internationalize incrementally. Both the 'born-global' firms and those that internationalized incrementally used these logics in

combination as they leveraged their social networks. These results were unexpected and prompted the search to find an explanation. One explanation is that the findings are due to the differences in the degrees of uncertainty which were left unaccounted. Nummela et al. (2014) suggests that the parallel use of causation and effectuation logic may be related to the different degrees of uncertainty in market and technology. However, a search into details of the data revealed that the striking similarities in the use of the logics between the 'born-global' firm and those that internationalize incrementally, is also in part due to the gap between the SIDS entrepreneur's technical<sup>48</sup> expertise and the technical expertise required to develop the product.

During the analysis, I observed that the gap between the SIDS entrepreneur's technical expertise and the technical expertise required to develop the product played a major role in determining the use of the decision logics in the leveraging of social networks and the extent to which these led to the firm become a 'born-global' firm. In cases of a large gap, leveraging one's network through effectual logics brings difficulties in the acquisition of resources. As examples in the cases, the SIDS entrepreneurs of GameCo and MusicCo did not have a software development background, which is a key technical expertise for the development of their products. These firms searched effectually among their close ties for stakeholders to commit but could not find anyone. Thus GameCo and MusicCo reverted to causal logics to acquire necessary resources. It is noticeable that when GameCo transferred its operations to a software developer in Europe, this time it did rely on effectual logics. Similarly, with MusicCo, in its second attempt to acquire human capital, it effectually used its social network to meet prospective partners to execute tasks for which the expertise already resided in its business, whereas it causally used an online freelance platform to acquire resources where there was a large gap between the SIDS entrepreneur's technical expertise and the technical expertise required to develop the product.

The SecurityCo and TransactionCo that did not show signs of becoming a 'born-global' firm also leveraged their networks. However, in both cases there was a small gap between the SIDS entrepreneur's technical expertise and the technical expertise required to develop the product. SecurityCo developed a new service in which it used a cheaper storage network for security surveillance purposes. SecurityCo's educational background is in Information and Communication Technologies and previous to starting this firm the founder worked for many years as a data engineer in several large enterprises. Thus there was a small gap. In developing its product SecurityCo made use of effectuation to acquire human capital. The founder said:

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<sup>48</sup> I use the word 'technical' (i.e. technology) as the process to develop a product.

*"I already knew them. I knew their work and I told them to come help me in certain projects".*

Thus, there was no need for SecurityCo to turn to causal logics and embark on an internationalization path to acquire production capabilities.

TransactionCo is the second case that did not become a 'born-global' firm. Both founders of TransactionCo have educational backgrounds in data communication and Information and Communication Technologies, and have built expertise in these areas while working in several ICT roles in their former jobs. Thus TransactionCo experienced a low gap. To develop their product TransactionCo was in need of software developers. To acquire resources TransactionCo relied on its social network. It contracted a small firm whom they have worked with in their previous jobs.

In summary, how the entrepreneur uses his or her social network in the internationalization at inception is also dependent on the gap between the entrepreneur's technical expertise and the technical expertise required to develop the product. If the gap between the technical expertise of the entrepreneur and the technical expertise required to develop the product is small, the entrepreneur will be able to leverage its social network to access knowledge and resources locally. On the other hand, if the gap is large, the entrepreneur will become a 'born-global' firm.

## **5.6 Conclusion**

### **5.6.1 Contribution**

In this chapter, I have provided two contributions to our understanding of cognition and the rapid internationalization process of the 'born-global' firm. First, I show that both a 'born-global' firm and a firm that internationalized incrementally use the causal, effectual and bricolage heuristics in combination as these leveraging their networks to acquire knowledge and resources. Flexible managerial attitudes and practices are important to deal with the challenges that are present in the internationalization process (Ganitsky, 1989). Thus the ability to use causal, effectual and bricolage logics simultaneously is an asset for the 'born-global' firm.

Second, the difference between the 'born-global' firm and firms that internationalized incrementally is under which conditions these logics are used. Through this study, I have shown that when the gap between the SIDS entrepreneur's technical expertise and the technical expertise required in developing the product is large, leveraging one's social network through effectual logics results in a futile exercise. In these situations, the SIDS entrepreneurs can turn to causal logics to acquire resources and embark on the internationalization path. In

situations of a small gap, SIDS entrepreneurs can successfully leverage their social networks through effectual logics and remain local.

### **5.6.2 Limitation**

This study has some limitations. First of all, there are limitations in the data. The data is not coded by more than one independent coder and thus may be subject to the researcher's biases. Furthermore, this research has a lack of generalizability. It is an explorative multiple-case study and the conclusions are drawn from a limited set of cases. In addition, all the cases of this study are knowledge-intensive firms and rely mostly on intangible resources. Thus insights gained from this study cannot be generalized to other industries. Finally, the data collected and conclusions drawn focus on the internationalization from the sourcing side i.e. the globalization of production. Including the demand side i.e. the globalization of markets can give more insights into the use of logics and social networks in the internationalization at inception.

### **5.6.3 Future research**

There are numerous opportunities for future research. An interesting question to ask is if there is a distinction between how entrepreneurs in small countries and small islands are born globally. The 'born-global' firm is mostly evident in small economies (Cavusgil & Knight, 2015; Terjesen, 2015) but in the literature no distinction is made between small countries and small islands. Small islands are recognized as a distinctive group of developing islands that share similar characteristics and a unique set of challenges<sup>49</sup>. Thus there is a distinctive context between these groups of small countries. How does the size of the island and its context influence do internationalization process?

A second topic that merits more attention is the internationalization to participate in the globalization of markets versus the globalization of production. In this research, the 'born-global' firms internationalized at inception to participate in the globalization of production. Due to restrictions to access domestic resources imposed on the SIDS entrepreneurs by a large gap between their technical expertise and the expertise required to develop the product, the SIDS entrepreneurs embarked on the internationalization path. But what about the SIDS entrepreneurs who embark on the internationalization path to take advantage of the globalization of markets? How do the gap and their social networks influence their process to become 'born-global' firms?

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<sup>49</sup> 1. Small size, 2. Remoteness and insularity, 3. Disaster proneness, 4. Environmental fragility and 5. Other factors (Briguglio, 1995).

A third topic that needs further research is the size of the gap between the entrepreneur's technical expertise and the technical expertise required to develop the product. I referred to small and large gaps in the cases but I treated these as binary, either there is a gap or there is none. However, in cases where a SIDS entrepreneur does not have the required skills to build the entire product but only a few components, will this SIDS entrepreneur be able to leverage his or her social networks with less effort? Future research should address this matter and study how a variety in the gap influences the use of social networks in the rapid internationalization process.

## 6 HEURISTICS AND THE NOVELTY OF INNOVATION IN PENURIOUS ENVIRONMENTS

### Abstract

The importance of technological advance and entrepreneurship for economic growth is well known. The tradition is to focus on the firm as the creator of innovation. Science and R&D activities are most evident in developed countries. Scholars tend to interpret the diffusion of innovation as a North-South phenomenon. However, this North-South diffusion framework fails to explain innovations that emerge from penurious countries and the role of the entrepreneur in such innovation processes. In addition, these approaches use the entrepreneurial traits. However, trait-based research finds marginal empirical support in the literature. Seven cases are studied and Fuzzy-Set Qualitative Comparative Analysis (fsQCA) is used to address these shortcomings, applying a cognitive framework consisting of causation, effectuation and entrepreneurial bricolage heuristics separately and jointly. The analysis reveals several paths that lead to innovations that are new to the world. The integrative framework of causation, effectuation and entrepreneurial bricolage is superior in explaining innovations from penurious environments that are novel to the world, compared to each of the three logics separately; effectuation provides a too simplistic view when considered independently.

### Keywords

Cognition, innovativeness, novelty

### 6.1 Introduction

The importance of technological advance (Heilbroner, 1998; Solow, 1956) and entrepreneurship for economic growth (Acs & Audretsch, 1988; Acs, Desai, & Hessels, 2008) is well known as the introductions of new radical advances in technologies create ripple effects of smaller incremental opportunities. Several theories and approaches have been developed to study innovation at the micro, meso and macro-levels of analyses and agree that the process is non-linear, uncertain (Alvarez & Barney, 2005) and influenced by its context e.g. institutions (Johnson et al., 2004). A popular approach at the macro-level among innovation scholars is the National System of Innovation (Edquist, 1997; Freeman, 1988; Lundvall, 1992). Within this approach the tradition is to focus on the firm as the creator of innovation (Schumpeter, 1947). Important factors are science and R&D (Sundbo et al., 2007) which are most evident in developed countries (Boor et al., 2014).

Following this rationale, the diffusion of innovation takes a North-South path where innovation is first diffused in developed countries followed by the

developing countries that do not possess the advanced knowledge-stock. However, this North-South diffusion framework poorly explains innovations that can emerge from penurious countries such as mobile banking in Philippines (Boor et al., 2014)<sup>50</sup>. In addition, though these theories recognize that change is brought by the entrepreneurial economic actors, trait-approaches are commonly used to compare entrepreneurs with non-entrepreneurs when discussing the individual (Szirmai et al., 2011)<sup>51</sup>. However, trait-based approaches find marginal empirical support in the literature (Busenitz, 1999). Instead, the analysis of entrepreneurial cognitions and decision-making heuristics proved to provide better explanations of entrepreneurial behavior.

This chapter addresses these shortcomings. It combines the theories of causation, effectuation (Sarasvathy, 2001), and entrepreneurial bricolage (Baker & Nelson, 2005) to understand the relationship between the applications of heuristics by entrepreneurs and new-to-the-world innovations that emerge from penurious environments. Effectuation and entrepreneurial bricolage are two prominent emerging entrepreneurship theories (Fisher, 2012)<sup>52</sup>. The research question addressed is:

*How do the causal, effectual and bricolage heuristics used by an entrepreneur in a penurious environment independently or jointly influence the process to develop innovations that are new to the world from the SIDS context?"*

I will discuss 'opportunities', one of the fundamental concepts in entrepreneurship research (Shane & Venkataraman, 2000) to explore how decision heuristics influence innovations, as the innovation process can also be conceptualized as a process to discover, evaluate, create and exploit entrepreneurial opportunities. The use of entrepreneurship theory to study an innovation phenomenon is not unusual since entrepreneurship and innovation are strongly linked (Landström, Harirchi, & Åström, 2012).

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<sup>50</sup> There is a marginal body of literature addressing innovations that are first diffused in developing countries, e.g. reverse innovation (Brown & Hegel, 2005; Immelt et al., 2009), frugal innovation (Bhatti, 2012) and innovations at the Bottom-Of-the-Pyramid (Prahalad, 2012). These are low-cost (and mostly low technical) innovations that emerge in developing countries and afterwards diffused in developed markets. These concepts imply a South-North diffusion path. This study adds value by researching the cognitions the entrepreneurs use in efforts to develop innovations that are new to the world.

<sup>51</sup> Some authors (e.g. Gustafsson and Autio, 2011) even argue that the National Systems of Innovation approach ignores agency and thus not provide adequate understanding of the micro-foundations of innovation.

<sup>52</sup> Effectuation theory is influenced by psychology and organizational studies, and the entrepreneurial bricolage theory is borrowed from the French anthropologist Levi-Strauss (Baker & Nelson, 2005; Stinchfield et al., 2013).

This chapter is organized as follows. In the next section, the literature regarding innovation and a few of its salient characteristics are discussed. I give particular attention to innovation that takes place in services because these are becoming a more essential contributor to the economy (Gallouj, 1998; Miles, 2004). In section three, I will present the theoretical background. I will revisit the salient characteristics of innovation using entrepreneurship theory. I will discuss entrepreneurial opportunity followed by its link with novelty. Subsequently the types of uncertainties that flow from the types of opportunities are reviewed. This is followed by a discussion of the decision-making tools that best fit each kind of opportunity and the context in which these emerge. I am especially interested in the context of uncertainty and resource constraints. In section four, the methodology is discussed. I seek to empirically find sets of configurations of factors that lead to innovation that is new to the world by conducting a Fuzzy-Set Qualitative Comparative Analysis (fsQCA) based on data collected from multiple cases. The main result indicates that a mix of causal, effectual and bricolage heuristics are necessary to produce innovations that are new to the world. This chapter concludes with the main contributions and limitations of this study in section six. The main contribution of the chapter is that a framework consisting of only effectual heuristics is too simplistic to explain innovations that are new to the world emerging from penurious environments. A single framework combining causal, effectual and bricolage heuristics is superior in explaining such innovations.

## **6.2 Literature review**

### **6.2.1 Defining innovation**

What is innovation? This question has received a lot of attention from both scholars and practitioners. Scholars from different fields such as economics, strategic management, sociology and psychology have shown interest in this topic (Damanpour & Schneider, 2006). Due to this there is a plurality of definitions for innovation (Baregheh, Rowley, & Sambrook, 2009; Garcia & Calantone, 2002). However, a generally accepted definition is the definition that Schumpeter put forward; namely new combinations of existing knowledge and resources (Fagerberg, Fosaas, & Sapprasert, 2012).

Innovation is a complex undertaking and has many important characteristics. In the context of this study, four salient characteristics are its sectoral nature, the importance of commercialization, its central notion of new combination of resources, and its inherent uncertainty. These salient characteristics of innovation point to a complex process where capabilities for learning and absorbing knowledge

are crucial in determining the success of the innovation (Fagerberg, Srholec, & Verspagen, 2010; Lundvall, 1992; Nelson & Nelson, 2002; Prahalad, 2004).

### **6.2.2 The sectoral nature of innovation**

A salient characteristic of innovation consists of the differences between sectors (Malerba & Mani, 2009; Malerba, 2002). Of particular interest for this study is innovation in the service sector, as services are increasingly becoming a more essential contributor to the economy (Gallouj, 1998; Miles, 2004). Innovation in services is confronted with several difficulties<sup>53</sup>. It is difficult to identify when innovation occurs in services and to distinguish between process and product innovations because services are often processes themselves (Tether & Metcalfe, 2004; Tether, 2005); differences between the objectives of the producer and co-producer can create difficulties for knowledge transfer (Bodas Freitas & Verspagen, 2009); innovations are difficult to protect through patents because most services are intangible (Gallouj, 1998; Miles, 2004); innovation in services does not lend itself well to experimentation due to its intangible and user-specific character (Nelson & Nelson, 2002); and it lacks standardization, such as present in R&D based firms, and thus learning often occurs ineffectively (Miles, 2004).

### **6.2.3 The importance of commercialization**

Innovation is the first commercialization of an idea. This is different from an invention which is the first occurrence of an idea. This distinction is important because successful innovations should deliver economic benefits, either in additional revenue or cost savings (Edquist, 2001) while inventions are not necessarily put in practice. Thus, central to innovations are entrepreneurial opportunities that are exploited. In addition, there is a time lag between when the invention is created and when it is introduced in a market (Rogers, 1995). This time

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<sup>53</sup> Considering these difficulties, innovation in services has three main views, the assimilation, demarcation, and synthesis approaches (Tether, 2005). The assimilation (technologist) approach applies a manufacturing based innovation model to innovation in services. A well-known assimilation model is the Reverse Product Cycle of (Barras, 1986). Based on the mode (Petit and Soete, 2001b) argue that process innovation precedes product innovation in services. Firms improve a process that usually results in a new service of lesser quality. To improve the quality of the service the firm subsequently moves to product innovation. Criticisms to this Reverse Product Cycle are that the innovations are not applicable for all services but only for those that are highly influenced by ICT (Gallouj, 1998) and that it is conceptual difficult to make a distinction between efficiency enhancements and product innovation (Miles, 2004). The demarcation (service-oriented) approach considers innovation in services to be a very dynamic and unique progress that combines both technological progress that is embedded in artifacts and the softer elements of organizational capabilities. The synthesis approach can be considered to be an integrative approach where reconciliation into a single theory that covers both technological and service based innovations is sought (Gallouj, 1998).

lag reflects among others that the inventor may not possess the required capabilities to commercialize the innovation (Fagerberg, 2004). For this reason, the process to commercialize an innovation is often described as an entrepreneurial process (or intrapreneurial if the commercialization takes place within an established enterprise).

#### **6.2.4 The central notion of new combination of resources**

Another vital characteristic of innovation is the new combination of existing resources as “every new innovation consists of a new combination of existing ideas, capabilities, skills, resources etc.” (Fagerberg, 2004, p. 7). However, an important question is: new to whom? (Roth, 2010) Is it new to the world, industry, scientific community, market, firm or customer? (Garcia & Calantone, 2002) The innovation research tradition has been to focus on new to the world and this is mostly associated with radical innovations (Johannessen, Olsen, & Lumpkin, 2001). It is a very appealing proposition for the reason that the variety in the resources and the degree of disconnection between these resources influence the novelty of the innovation. Radical innovations are based on a wider spectrum of knowledge domains and higher degree of disconnection between these domains (Schoenmakers & Duysters, 2010). Hence, there is a high probability that radical innovations are also new to the world. Thus the complexity of the new combinations of existing resources is a determinant of the novelty of the innovation.

Although innovations that are new to the world are mostly associated with radical innovations, this is not always the case, and often these are incorrectly classified (Garcia & Calantone, 2002). Examples are reverse innovation (Brown & Hegel, 2005; Immelt, Govindarajan, & Trimble, 2009), frugal innovation (Bhatti, 2012), and innovation at the Bottom-Of-the-Pyramid (Prahalad, 2012). These are low-cost innovations developed for the developing countries and subsequently diffused in the developed countries. These are mostly incremental and inferior compared to current products on the market. The functionalities of these innovations are “good enough” and provide minimum frills. Because these innovations are low cost, they have the potential to disrupt a market in a developed country (Agarwal & Brem, 2012).

#### **6.2.5 The inherent uncertainty**

Finally, innovation is fundamentally uncertain (Fagerberg, 2004). For instance, the future market, actors, structure and mechanisms can be unpredictable and thus uncertain (Schillo & Walter, 2010). The uncertainty is evident in the iterative development process. This process is non-linear (Alvarez & Barney, 2005). It contains many feedback and loops between the stages of the development process

(Fagerberg, 2004). Due to this uncertainty learning is a central activity in innovation (Lundvall, 1992).

### **6.2.6 New-to-the-world innovations**

In this chapter, I view new-to-the-world innovations as a combination of existing knowledge and resources, that is new to the world. The processes to develop the innovation is inherently uncertain. It is difficult to develop due to challenges of ineffective learning. It is difficult to protect with traditional IPR tools (e.g. patents). Finally, it exploits an entrepreneurial opportunity and delivers economic benefits.

## **6.3 Theoretical background**

### **6.3.1 Defining entrepreneurial opportunities**

In the remainder of this chapter, I will use the fundamental concept of entrepreneurial opportunities to explore the heuristics required in developing innovations that are new to the world. Entrepreneurship and innovation are strongly linked (Landström et al., 2012) and the concept of entrepreneurial opportunities is adequate to study the research question. As I previously discussed in the literature review, innovations have economic significance (Edquist, 2001) and thus at the core of each innovation is an opportunity that has been exploited by individual actors (entrepreneurs).

There is an intense debate among ‘entrepreneurship’ scholars about the nature of entrepreneurial opportunities and how these come into existence. The literature is split into two opposing views (Shane, 2012a; Venkataraman, Sarasvathy, Dew, & Forster, 2012), both of which, I argue, are useful to study different types of opportunities. On the one hand opportunities are seen as objective phenomena that exist in the market, are waiting to be discovered (McMullen et al., 2007) and are profitable (Shane & Venkataraman, 2000). This view posits three important characteristics. Opportunities are: 1. Passive in existence (i.e. opportunities are latent in the market and are waiting to be discovered), 2. Objective (i.e. all individuals can recognize all opportunities) and 3. Inherently profitable (i.e. all opportunities lead to profit). Aforementioned view defines entrepreneurial opportunities as “those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production” (Shane & Venkataraman, 2000, p. 220).

Considering opportunities as objective phenomena has received many critiques. There are many examples where entrepreneurs have been unsuccessful. Thus opportunities are not always profitable and certainly also lead to losses, due

to among others various types of mismanagement by the entrepreneur<sup>54</sup>. As a result, opposing the objective view there is a subjective perspective of entrepreneurial opportunities. The subjective view posits that opportunities are not objective phenomena but subject to the perception of an individual. Only those individuals that possess the right information may effectively see the opportunity. Due to differences in information that are created through a country's division of labor and differences in individuals' social networks (Baker et al., 2005), the individuals prior information related to opportunities differs (Shane & Venkataraman, 2000; Shane, 2000), and some individuals might see an opportunity where others do not (Shane, 2000). As a consequence, opportunities are seen as subjective and dependent on the perception of the entrepreneur.

According to the subjective view, entrepreneurial opportunities are also subject to creation by the entrepreneur (Venkataraman & Sarasvathy, 2001). Subjectivists argue that an entrepreneur uses knowledge to create new opportunities that might otherwise not have existed (Sarasvathy et al., 2010). In the non-existence of either a supply and demand for a product, an opportunity is socially constructed through the creative prowess of the entrepreneur<sup>55</sup>.

According to the Sarasvathy et al. (2010) framework, three views of entrepreneurial opportunity can be distinguished: 1. Recognition, 2. Discovery, and 3. Creation. At the core of these views are the differences in the assumptions about information. In the recognition of entrepreneurial opportunities, the supply and demand exist and exploitation is a matter of recognizing and connecting these. There is complete information about both the demand and supply. Thus an objective view of entrepreneurial opportunities relates well to the assumptions concerning information about the recognition type. These opportunities often concern imitation of already existing businesses (Alvarez & Barney, 2007) and thus the information of what 'works' is readily available. The business has already proven itself to be profitable and thus the opportunity is 'inherently' profitable when it is recognized and exploited.

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<sup>54</sup> In contest Shane (2012a) argues that the view of opportunities as objective phenomena is essential to point that opportunities do not always lead to success. If opportunities are only subjective creations of entrepreneurs, then no opportunity exist until it has been successfully exploited; "then unsuccessful entrepreneurship is a logical impossibility" (p. 16). In addition, if success is the only possible outcome of the exploitation of an opportunity, then the entrepreneurial process of exploitation is not of importance for the reason that any strategy will lead to success.

<sup>55</sup> Some authors consider the debate of objective versus subjective views of entrepreneurial opportunities to be of marginal utility in furthering our knowledge about entrepreneurship for the reason that empirically it is very hard to make a distinction between objective and subjective opportunities (Dimov, 2011). In addition, "regardless of whether social environments are objective or subjective phenomena, the impact they have on individuals' intentions are real just the same" (McMullen & Shepherd, 2006, p. 149).

However, for entrepreneurial opportunities that need to be discovered only one side of the supply and demand exists and the other side should be discovered and connected with the existing side (Sarasvathy et al., 2010). In this type of opportunity there is also complete information about the supply or demand sides. However, the exploitation is determined by those individuals who have access to this information. Access to information is a key factor for determining who exploits the opportunity (Kirzner, 1978). Sources of discovery of opportunities are usually technological advances (due to the application of technological advances new processes and products are created), political and regulatory changes (opportunities that come into existence with changes in government legislation and policy), and social and demographic changes (such as the baby boom after the World War II and the current ageing of world population) (Casson, 2005) and are exogenous shocks. The subjective view of the entrepreneurial opportunity provides a good account of the discovery perspective. One side of the opportunity is to be discovered and thus mostly the individuals with the right prior information can discover this. Furthermore, experimentation needs to take place to discover a right formula (i.e. the connection of the discovered with the existing side) and this process is inherently risky and misjudgments can lead to failure.

In the third type of entrepreneurial opportunities, of the creative kind, both the supply and demand sides do not exist and should be created and connected, and only partial information exists (Sarasvathy et al., 2010). Created opportunities are viewed as endogenously socially constructed by the actions of entrepreneurs, suppliers, customers, etc. (Alvarez & Barney, 2007). Due to the idiosyncratic nature of human beings, entrepreneurs use resources differently which may lead to diverse opportunities. Thus opportunities are subjective to the entrepreneur and his or her stakeholders that participate in the opportunity creation process. This account relates to the subjective view of entrepreneurial opportunities.

I do not assert in any way that there is a clearly defined boundary between the objective versus subjective views and their application to the recognition, discovery and creation types of opportunities. The boundary is blurry. Elements of each opportunity type can be traced throughout each other and thus the opposing views do capture components of the types of opportunities. For instance it can be argued that recognition of opportunities is also subjective to the entrepreneur's prior knowledge (Shane, 2000). However, the above conceptualization serves as a useful starting point to assess the innovations and decision-making contexts that result from the types of opportunities.

In this study, I define entrepreneurial opportunities as "being a set of environmental conditions that lead to the introduction of one or more new products or services in the marketplace by an entrepreneur or by an entrepreneurial team through either an existing venture or a newly created one" (Dutta & Crossan, 2005, p. 426). This definition acknowledges that for a number of opportunities either the

supply or demand side (or both) might exist in the market, while other opportunities are created through entrepreneurial action. It does not exclude any views of the entrepreneurial opportunity but is a broad definition that encompasses both objective and subjective views<sup>56</sup>.

### 6.3.2 Entrepreneurial opportunities and the novelty of innovation

In the literature review, I have also discussed how the central notion of innovation, i.e. new combinations of resources, leads to novel innovations. However, entrepreneurial opportunities also influence the novelty of innovation (see Table 6.1). How do opportunities determine the novelty of innovation? The differences in the completeness of information throughout the recognition, discovery and creation views of opportunities determine the type of innovation that corresponds to each kind. The less complete information there is, the more opportunity there is for novelty. When an opportunity is objective and a matter of recognition, there is little chance for novelty because the requirements on both sides of the opportunity exploitation are already known. However, when the supply or demand are not known and have to be created through an individual’s subjective construction there are higher probabilities that something new is created, something that is different to what already exists. In the creation type, opportunities are created that ex-ante could not have been known (Alvarez & Barney, 2007) and offer chances for truly unique innovations (Sarasvathy, 2001) that are new to the world. “In general, the more novel the opportunity ultimately formed, the more new knowledge and information needs to be created through a series of experimental actions” (Galbraith, 1977 as cited in Alvarez & Barney, 2014).

**Table 6.1 Opportunities, novelty, uncertainty and decision-making**

	<b>Recognition</b>	<b>Discovery</b>	<b>Creation</b>
<b>Objective/ subjective</b>	Objective	Objective and subjective	Subjective
<b>Complexity</b>	Low	Medium	High
<b>Novelty</b>	Low	Medium	High
<b>Uncertainty</b>	Known distribution	Risk (unknown distribution but can be estimated)	True (Knightian) uncertainty (unknown distribution and cannot be estimated)
<b>Decision-making</b>	Rational approach	Rational approach/ heuristics	Heuristics
Source: Alvarez and Barney (2007); Sarasvathy (2001)			

<sup>56</sup> While this definition is conceptually different compared to the framework presented by Davidsson (2015), this definition rest on the premise that new economic activity should be central at the notion of the entrepreneurial opportunity.

The complexity/ quality of the problem (Gallouj, 1998) that is at the core of the opportunity also influences the novelty of the innovation. If the opportunity is complex enough, it gives rise to a more novel innovation. The complexity is also related to the intersubjective knowledge. It is an individual's subjective knowledge that is similar with other individuals' subjective knowledge (Davidson, 2001). If there is a low intersubjective agreement between the actors (e.g. the entrepreneur, supplier and customer) involved in the opportunity exploitation, the result is a high level of complexity; and this can create difficulties for knowledge transfer (Freitas & Verspagen, 2009)<sup>57</sup>. To overcome this complexity more novelty is required to bridge and increase the low intersubjective agreement that is necessary to exploit the entrepreneurial opportunity (York & Venkataraman, 2010).

I argue that the levels of complexity differ between the recognition, discovery and creation views. Recognition and discovery opportunities are susceptible for imitation (Alvarez & Barney, 2014) and are not inherently complex. However, creation opportunities are complex because the uses of resources are dependent on the personal identity of the entrepreneur which leads to processes and routines that are difficult to imitate. As discussed previously this complexity increases the challenges to create novel innovations.

### **6.3.3 Entrepreneurial opportunities and uncertainty**

The three views of the entrepreneurial opportunity also have distinct characteristics regards to uncertainty. I make a difference between three levels of uncertainty: 1. An expectation with a known distribution, 2. An expectation whose distribution is unknown but can be estimated, and 3. An expectation whose distribution is unknown and cannot be estimated thus making it unknowable (Sarasvathy & Kotha, 2001, see also Chapter 1). The latter type of uncertainty is also known as true uncertainty while the former as measurable risks (Knight, 1921).

When an opportunity is subjected to recognition, the decision-making context is less risky (Alvarez & Barney, 2007). There is complete information on supply and demand sides of the opportunity and it is a matter of connecting these phenomena. These opportunities often include duplication of a business from one community to another (Alvarez & Barney, 2014). In the case of discovery where one of the sides of the opportunity does not yet exist and has to be created there is genuine risk involved (Sarasvathy et al., 2010). We can think of market uncertainties (Schillo & Walter, 2010) where customer preferences are not clear or technological uncertainties that are subject to unpredictability of the future uses of the technology. Opportunities of the creative kind are subjected to real Knightian uncertainty. These

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<sup>57</sup> In innovation studies this complexity is referred to as a mismatch between a producer and a consumer Petit and Soete (2001).

are unknowable due to the lack of information. There is no historical information available for the reason that the opportunity is unique.

#### **6.3.4 Risk, uncertainty and decision-making**

The entrepreneurial opportunities of recognition, discovery and creation also require different decision-making processes. Opportunities that are subject to recognition require risk-based decision tools (Alvarez & Barney, 2007) such as net present value (NPV), real options model, decision trees, net present value risk adjusted (NPVR), and stage-gate (Davis, 2003). Entrepreneurs that exploit these opportunities go through a rational process and risk-return analysis such as the Reduce, Quantify, Plug (RQP) rationality (Lipshitz & Strauss, 1997).

In the case of discovery opportunity both rational approaches to dealing with uncertainties and heuristics are applicable. In these opportunities only one side of the supply and demand exists and the other side has to be discovered. For the side that exists a rational approach for decision-making is applicable while for the non-existing side other decision-making processes are required. As the information about the non-existing side is unknowable, entrepreneurs use heuristics (Busenitz, 1999).

In the creative type of opportunity neither the demand or supply side exist. Both need to be created. Thus, rational approaches are not applicable. The creative opportunities are subject to an iterative, inductive, and incremental type of decision-making (Alvarez & Barney, 2007) and the uncertainty can be managed through effectuation (Sarasvathy et al., 2010).

#### **6.3.5 Causation**

To explain the effectuation theory, Sarasvathy (2001) contrasts effectuation with rational approaches to making decisions; what she terms causation. Therefore, before I discuss the effectuation theory, I will review causation.

There are four basic principles to the causal approach: 1. Investment is based on expected return, 2. Goal-orientation, 3. Treatment of (potential) partners through a competitive analysis, and 4. Hedging against contingencies (Sarasvathy, 2001; 2008). These are the “internally consistent set of ideas that form a clear basis (Sarasvathy, 2008, p. 17) to act rationally. The ‘*expected return*’ when a goal is realized determines if the entrepreneur will invest in pursuing this goal. A vital component of the ‘*expected return*’ is the individual’s threshold. The threshold is “the level of expected performance required by the individual to trigger entry into the entrepreneurial process” (McCann & Folta, 2012, p. 782). The entrepreneur will invest if the return he or she expects will exceed his or her threshold.

Second, an entrepreneur is goal-oriented. The rational approaches are rooted in the neoclassic economic principle that people are rational and utility

maximizing individuals. The entrepreneur sets a desired goal and subsequently he or she will determine the best alternatives to realize that goal (Knight, 1921; Mintzberg, Ahlstrand, & Lampel, 1998).

Third, potential partners are treated with a competitive attitude. Entrepreneurs engage in systematic search to find the ideal partners that can aid in the realization of a set goal. These partners are treated at arm's length and the entrepreneur uses intellectual property rights and secrecy to protect his or her ideas.

Finally, when entrepreneurs use the rational approach they protect their decisions by implementing risk management tools and techniques. Entrepreneurs that use these rational approaches will avoid unexpected events. It is the process to minimize the risk that any surprise can inhibit the entrepreneurs from realizing their goals.

### **6.3.6 Effectuation**

The effectual approach (Sarasvathy, 2001) is concerned with entrepreneurial decision-making under Knightian uncertainty such as opportunities of the creative kind. It posits that an entrepreneur uses the control logic for decision-making under uncertainty and the problem space relates to goal ambiguity and isotropy plays a role (Sarasvathy, 2008). Decision-makers are unsure of their own preferences (March, 1982) and decisions can lead to many equally good outcomes (Weick, 1969). Furthermore effectuation is most applicable to expert entrepreneurs (Read & Sarasvathy, 2005; Sarasvathy et al., 2007).

There are four heuristics in the effectual decision-making (Sarasvathy, 2008): 1. Affordable loss, 2. Means-orientation, 3. Pre-committed stakeholders, and 4. Leveraging of contingencies. These are contrasted rational approaches to decision-making: 1. Expected return, 2. Goal-orientation, 3. Competitive analysis, and 4. Hedging against contingencies.

The affordable loss is what an entrepreneur can afford and he or she is willing to lose in opportunity exploitation (Dew et al., 2009) and is contrasted with rational approaches. Affordable loss focus on the downside of the entrepreneurial opportunity, as there is no information about the upside. Rational approaches focus on the expected financial returns.

An entrepreneur using the effectual method bases his or her actions on his or her means. The entrepreneur evaluates who he or she is, what he or she knows, and whom he or she knows (Sarasvathy & Dew, 2005) and obtains an indication of the means at his or her disposal. Working from these means the entrepreneur will evaluate his or her possible outcomes (e.g. products, ideas, endeavors, goals). Actions based on rational approaches imply the reverse where an entrepreneur first evaluates his or her outcome and consequently searches for the necessary means to realize this outcome.

In addition, the effectual entrepreneur will acquire pre-commitments from his or her social network. These stakeholders will constrain themselves non-negotiable towards their future (Sarasvathy & Dew, 2003). This is in contrast with dealing with potential partners through competitive analysis.

Finally, when an entrepreneur is unsure of his or her own preferences he or she is open for surprises and will exploit any possible future alternative presented (Read & Sarasvathy, 2005). Thus, instead of protecting against contingencies to ensure that he or she does not deviate from his or her goal, an entrepreneur that acts effectually will embrace contingencies and incorporate these into his or her innovation process.

These are the four heuristics that collectively form effectuation. There is adequate empirical evidence that effectual decision-making is applied in cases of innovations that are new to the world. Sarasvathy and Kotha (2001) showed how RealNetworks used effectuation to create innovative broadcasting technologies. Brettel et al. (2012) found partial support for effectual heuristics (i.e. the affordable loss, pre-committed stakeholders and leveraging of contingencies) in highly innovative R&D projects. In addition, they also found support for causal logics (i.e. goal-driven and hedging against contingencies) in low innovative R&D projects. Berends et al. (2014) confirm effectuation in the product innovation process in small firms. In terms of innovation as a moderator for the gestation speed of nascent firms, Garonne and Davidsson (2010) found that effectuation is positively related to the gestation of nascent firms with novel innovation while causation is positively related to the gestation of nascent firms with incremental innovation.

### **6.3.7 Entrepreneurial bricolage**

Thus far, I have discussed the uncertainty context. But how are decisions made in resource constrained environments? A theory that lends itself well to the study of penurious environments is the entrepreneurial bricolage theory (Baker & Nelson, 2005; Garud & Karnøe, 2003). Baker and Nelson (2005, p.26) define this context as an environment that “presents new challenges, whether opportunities or problems, without providing new resources”. The theory puts forward that under these circumstances an entrepreneur is able to ‘stretch’ his or her available resources towards new uses which leads to innovation. Like the effectual approach, the entrepreneurial bricolage also relates to the creation opportunity. Resources are used differently because each entrepreneur has an unique relationship with the resource environment due to his or her personal identity (Penrose, 1959).

Bricolage has three logics: 1. Making do by applying combinations, 2. Resources at hand, and 3. New problems and opportunities (Baker & Nelson, 2005). First, an entrepreneur actively tries to use resources, that other actors discarded, in new ways (Di Domenico et al., 2010). In doing this the entrepreneur challenges

imposed limitations. This process is path-dependent, ambiguous and socially complex (Steffens et al., 2010).

Second, the resources used are acquired for free or at a very low cost. Because the entrepreneur operates in a constraint environment, he or she is unwilling to acquire resources at market fair prices. Though this task might be daunting it is possible because the resources typically used in bricolage settings are unwanted by other actors.

Finally, Salunke et al. (2013) argue that the bricolage is applied to new problems and opportunities that lead to innovation. This is supported by empirical evidence. Senyard et al. (2014) found a positive relationship between bricolage and innovation among nascent firms. However, innovativeness negatively influences the positive effect of bricolage on performance of young firms (Senyard et al., 2010). Making distinction in the type of innovation, Senyard et al. (2011) found a positive effect of bricolage on product, sourcing/ production, promotion and market innovation both in nascent and young firms (with the exception of market innovation in nascent firms).

### **6.3.8 The effects of digitization of innovation on the use of decision logics**

The digitization of innovation has increased the complexity of innovation and created more uncertainties (Yoo, Boland, Lyytinen, & Majchrzak, 2012). Services and multiple new user experiences have been encapsulated with physical goods (Howells, 2000). In addition, the technology is malleable, and new functions can be added in the later stages of the life cycle of the innovation (Yoo et al., 2012).

Yoo et al. (2012) argue that the digitization of innovation has brought three changes in the organization for innovation. First, organizations seek to build platforms to harness the new possibilities created by the digitization of innovation and provide support capabilities to stakeholders that are beyond the organization's boundaries. Second, the innovation is distributed to the peripherals of the organization and involves more heterogeneous knowledge resources. Finally, innovation is harnessed through the recombination of existing modules.

Yoo et al. (2012) furthermore argue that platforms lead to new organizational designs that require a delicate balance between the exploitation of the vast possibilities that the technology offers and the control for structure and quality. Distributed innovation leads to heterogeneous knowledge that on the one hand is dynamic, but on the other hand is unpredictable. Thus new forms of risks and uncertainties are created. Combinatorial innovation leads to the design of functions that are often integrated with another in retrospect. Combinatorial innovation also requires the support of new and spontaneous behaviour.

How do the new modes of organization of innovation influence the use of decision logics? I argue that the organization for innovation requires a combined use

of the causal, effectual and entrepreneurial bricolage logics. The reprogrammability of the technology leads to incremental experimentation of possible functions, and the need to be open to change strategies (i.e. effectuation).

A platform as an innovation strategy also requires the combined use of the causal, effectual and entrepreneurial bricolage logics. Because the platform connects multiple heterogeneous actors, the platform should be flexible. Thus the platform should be designed with a pre-determined goal (i.e. causation) of flexibility. In addition, multiple heterogeneous actors require a design process of the platform that has an inclusive approach. This is especially required for the reason that network effects play a role (Schilling, 2003) and the process to start connecting the designers of complementary services (e.g. video games for console and apps for smartphones) to the platform most often starts even before the innovation is diffused. Thus the platform should be built effectually through a coordination of the interest of pre-committed stakeholders, and also being open to connect unexpected new stakeholders. An effect of connecting multiple heterogeneous stakeholders are the stakeholders' pressure. The pressure creates the need for the goal-oriented approach (i.e. causation) (Reymen et al., 2015). Thus a delicate balance between the exploitation of the vast possibilities that the technology offers and the control that does not estrange the stakeholders, is the balance between effectually managing a docile interactive and co-creative process, and causally designing goals and implementing strategies to prevent derailment.

Distribution innovation also requires a combined use of the causal, effectual and entrepreneurial bricolage logics. On the one hand, causation is required to deal with stakeholders' pressure. On the other hand, the new heterogeneous knowledge that is created at the periphery implies that co-creation (i.e. effectuation) is vital. Effectual thinking is also required to deal with the unpredictability of the application of the new knowledge.

Last but not least, combinatorial innovation and the developments of modular functions for the largest part are entrepreneurial bricolage and effectual processes. Existing functions are recombined (i.e. means-orientation) towards new uses (i.e. entrepreneurial bricolage). In addition, the recombination takes place "without fully knowing the "whole" design of how each module will be integrated with another" (Yoo et al., 2012, p. 1402). The design should remain open to deal with different needs that can arise at a later stage of development. This requires openness towards new, unexpected uses (i.e. effectuation). Furthermore, that the boundary of a product remains unknowable because the product/ service remains incomplete (Yoo et al., 2012) are fundamental principles of the effectual thinking; the process to leave room for unexpected events. Last but not least, the support of new and spontaneous behaviour requires an open attitude towards future possibilities and also being supportive of stakeholders' involvement (i.e. effectuation).

## 6.4 Methods

In this chapter, I aim to understand how the application of logics by entrepreneurs influences innovations from penurious environments that are new to the world. The penurious context matters for determining the decision logics used by the SIDS entrepreneurs, and also for shaping the new-to-the-world innovation. I used Fuzzy-Set Qualitative Comparative Analysis (fsQCA) because it is suitable to study the cases where the context matters for what causal mechanisms operate and how they function (Cress & Snow, 2000). The fsQCA also assumes conjunctural logic (Cress & Snow, 2000). It examines the several ways which a set of factors interact and produce an outcome. In this study, the factors are the combinations of logics that lead to innovations from penurious environments that are new to the world. In addition, the fsQCA is helpful in making comparisons containing only a few cases (Ragin, 2000).

The cases were selected using theoretical sampling followed by snowball sampling (for a more extended discussion, see Chapter 3). The data for the fsQCA was gathered from multiple cases (Yin, 2009) in Curaçao, a small island in the Caribbean.

In the literature, I identified three logics that are of concern for this study, causation, effectuation and bricolage. The dimensions of these logics are; *'expected return'*, *'goal-orientation'*, *'competitive analysis'* and *'hedging against contingencies'* (grouped under CAUSATION); *'affordable loss'*, *'means-orientation'*, *'pre-committed stakeholders'* and *'leveraging contingencies'* (grouped under EFFECTUATION); *'making do'* and *'resources at hand'* (grouped under BRICOLAGE). I excluded the dimension *'new solutions/ problems'* for the reason that this entails innovation, which in this study is the phenomenon I explored. For the causation and effectuation logics, I used the conceptualization for empirical indicators developed by Reymen et al. (2015) (see Table 3.5 and 3.6). To measure bricolage, I use inspiration from Baker and Nelson (2005), Senyard (2015), and Senyard et al. (2014) to develop a 10-item measurement (see Table 3.7). These measurements were supplemented with indicators that emerged during my coding of the data.

To measure innovation, the SIDS entrepreneurs were asked to report what is innovative of their product and if this is on the domestic and/or international markets. Furthermore, if participants owned intellectual property rights these were accessed were possible.

My analysis occurred in two stages. The coding followed pattern-matching approach (Yin, 2009) and three levels; the eleven dimensions for the decision logics (see Tables 3.5, 3.6, and 3.7), the empirical indicators for the dimensions (see Tables 3.5, 3.6, and 3.7), and the quotes for the empirical indicators (see Appendices 3.7.1 for causation, 3.7.2 for effectuation, and 3.7.3 for bricolage).

In the second stage, I employed fsQCA. I first segregated the cases into two groups according to the novelty of the innovations. Group 1 is new-to-the-world

innovations, and group 2 is not new-to-the-world innovations. Subsequently, I scored the novelty of innovation of each case. The cases with a new-to-the-world innovation (i.e. group 1) I scored 1 and the remaining cases (i.e. group 2) with scored 0.

In the next step, I made datasets for each configuration to be tested. The datasets contained for each case the quantitative scores of the dimensions of causation, effectuation, and bricolage with their respective score for the novelty of the innovation (see Table 6.2 for an example). In the fsQCA, the scores of the variables should be calibrated (Ragin et al., 2006). The calibration is necessary when the data “shows positions of the cases relative to each other” (Ragin et al., 2006, p. 16). In this situation, the data should be calibrated to indicate the degree of membership in the constructed configurations. The raw scores should be converted into values of 0.0 (to indicate fully out of the membership) and 1 (to indicate fully membership of the set) (Ragin, 2008; Ragin et al., 2006). Furthermore, there are several values sets that can be used with the fsQCA, three, four, six and continuous. The higher the value, the more precise the analysis.

I calibrated the scores when I determined the fit between the incidents and the indicators. I counted the number of times that a specific indicator was observed. I used the qualitative scores (i.e. weak, medium and strong) and turned these to four value fuzzy sets; 0.33 (i.e. 1/3), 0.67 (i.e. 2/3), and 1.00 (i.e. 3/3) respectively. A score cannot be smaller than zero (i.e. 0) or larger than one (i.e. 1). The indicators for which it was not possible to find the incidents in the data received scores of zero (i.e. 0). Using this method, I made sure to calibrate the scores to conform to external standards.

I constructed in total six configurations<sup>58</sup> that are combinations of the dimensions of the logics: 1. CAUSATION, 2. EFFECTUATION, 3. BRICOLAGE, 4. CAUSATION-EFFECTUATION-BRICOLAGE, 5. CAUSATION-BRICOLAGE, and 6. EFFECTUATION-BRICOLAGE. I made use of the fsQCA 2.0 software (Ragin et al., 2006). For each configuration, I plugged the respective dataset as shown in Table 6.2, into the software. In the software, it is required to indicate the outcome and the causal conditions. In this study the outcome is the new-to-the-world innovation and the causal conditions are the dimensions of the logics. For instance, when I constructed the configuration CAUSATION-EFFECTUATION, the causal conditions chosen were the dimensions ‘*expected return*’, ‘*goal-orientation*’, ‘*competitive analysis*’, ‘*hedging contingencies*’, ‘*affordable loss*’, ‘*means-orientation*’, ‘*pre-committed stakeholders*’ and ‘*leveraging contingencies*’.

A truth table is automatically generated by the software (all truth tables are available upon request). The truth table represents all possible combinations of the

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<sup>58</sup> A configuration is a solution that consists of causal combinations and an outcome. It is akin to a multiple regression that consists of independent variables (i.e. causal combinations) and dependent variables (i.e. outcome).

causal conditions (i.e. of the dimensions of the logics) for the outcome (i.e. for new-to-the-world innovation) (Ragin et al., 2006). Subsequently, one needs to edit the truth table so that it consists of only the possible combinations in which a greater number of cases can be part of the respective combinations. Following Ragin et al. (2006), I retained all possible combinations where a minimum of one case is part of the combination, because I have only seven cases.

**Table 6. 2 Dataset configuration CAUSATION-EFFECTUATION**

<b>New-to-the-world Innovation</b>	0.000	0.000	1.000	0.000	0.000	0.000	1.000
<b>Leveraging contingencies</b>	0.333	0.667	1.000	1.000	0.000	1.000	1.000
<b>Pre-committed stakeholders</b>	0.667	0.333	0.333	1.000	0.000	0.333	1.000
<b>Means-orientation</b>	1.000	1.000	1.000	1.000	0.667	0.333	1.000
<b>Affordable loss</b>	0.667	0.333	0.333	1.000	0.333	0.333	0.667
<b>Hedging contingencies</b>	0.333	0.333	0.000	0.333	0.667	0.000	0.333
<b>Competitive analysis</b>	1.000	0.667	1.000	0.667	1.000	1.000	1.000
<b>Goal-orientation</b>	1.000	0.667	1.000	1.000	1.000	1.000	1.000
<b>Expected return</b>	1.000	1.000	0.667	1.000	0.000	0.667	1.000
<b>Caseid</b>	<b>BudgetCo</b>	<b>GameCo</b>	<b>MusicCo</b>	<b>PaymentCo</b>	<b>PostCo</b>	<b>SecurityCo</b>	<b>TransactionCo</b>

After the truth table is modified, the researcher must choose a frequency cutoff. I used the frequency cutoff of 1. The frequency cutoff “specifies the minimum acceptable level to which a combination of causal conditions is considered reliably associated with each of the outcomes” (Muñoz & Dimov, 2014, p. 644).

The last step in the fsQCA is to choose a type of solution. I choose the intermediate solution, because it is advised to use the complex or parsimonious solutions only in cases that the solutions do not provide configurations that can be substantiated by theory (Ragin et al., 2006).

First, I made the configurations for CAUSATION, EFFECTUATION and BRICOLAGE separately. With this analyses, I examined how the logics of causation, effectuation, and bricolage independently influenced the process of developing innovations that are new to the world. As causation, effectuation, and bricolage are not mutually exclusive (Hindle & Senderovitz, 2010). I next constructed the configuration EFFECTUATION-CAUSATION-BRICOLAGE. With this analysis, I researched how the logics of causation, effectuation, and bricolage jointly influenced the process to develop innovations that are new to the world.

The configuration of EFFECTUATION drastically changed when EFFECTUATION was combined with CAUSATION and BRICOLAGE (configuration four) as shown in Table 6.4. The necessary conditions of the dimensions '*means-orientation*' and '*pre-committed stakeholders*' were supplemented by '*affordable loss*' and '*leveraging contingencies*'. To find out if this effect is due to CAUSATION or BRICOLAGE, a fifth and sixth configurations were constructed as a control. The fifth configuration consisted of the dimensions in the combination of CAUSATION and EFFECTUATION and the sixth configuration consisted of the dimensions in the combination of EFFECTUATION and BRICOLAGE. Both the fifth and sixth configurations showed similar effects on the changes in the configurations compared to EFFECTUATION. From this analysis, I can conclude that as soon as effectuation is combined with either causation or bricolage, all dimensions of effectuation become necessary conditions for an innovation that is new to the world.

In the fsQCA, it is also important that the configurations are justified by the theory and supported by the cases. The configurations CAUSATION, BRICOLAGE, and CAUSATION-EFFECTUATION-BRICOLAGE are justified by the theories (see Table 6.3). The combined configuration CAUSATION-EFFECTUATION-BRICOLAGE receives the most support because research (e.g. Reymen et al., 2015; Hindle and Senderovitz, 2010) shows that entrepreneurs use the logics in combination. This configuration is also reflected in all cases except PostCo.

**Table 6.3 Support of fsQCA configurations by theory and cases**

Configuration	Condition	Support by theory	Reflection in cases							
			BudgetCo	GameCo	MusicCo	PaymentCo	PostCo	SecurityCo	TransactionCo	
CAUSATION	Expected return	●								
	Goal-orientation	●								
	Competitive analysis	●	Yes	Strong	Strong	Medium	Strong	Weak	Strong	Strong
	Hedging contingencies	○								
EFFECTUATION	Affordable loss	○								
	Means-orientation	●	No	Medium	Weak	Weak	Weak	Medium	Weak	Weak
	Pre-committed stakeholders	●								
	Leveraging contingencies	○								
BRICOLAGE	Making do	●	Yes	Medium	Weak	Strong	Weak	Medium	Medium	Strong
	Resources at hand	●								
	Expected return	●								
CAUSATION	Goal-orientation	●								
	Competitive analysis	●								
EFFECTUATION	Hedging contingencies	●								
	Affordable loss	○								
BRICOLAGE	Means-orientation	●	Yes	Strong	Medium	Strong	Medium	Weak	Strong	Strong
	Pre-committed stakeholders	●								
	Leveraging contingencies	●								
	Making do	●								
	Resources at hand	●								

## 6.5 Results and discussion

### 6.5.1 Uncertainty and penurious environments

Before discussing the configurations of causal combinations that lead to new-to-the-world innovations, I will review the uncertainties and resource constraints observed in the cases. In the case studies I identified several uncertainties that can have three sources: 1. The entrepreneur's ability, 2. Incomplete information, and 3. Inadequate understanding. The ability uncertainty is the uncertainty that arises from the entrepreneur's own ability to be entrepreneurial (Wu & Knott, 2006). The entrepreneurs have indicated that in several occasions they felt overwhelmed by the decisions because they did not know what to do. An exemplary statement to illustrate:

*I did not have the knowledge, thus I asked them if we would like to interface with a bank what are the things we have to take into consideration" (Budget, 2015).*

Two types of uncertainty relating to incomplete information were identified: 1. Information is partly lacking, and 2. Information is completely lacking. For instance, SecurityCo did not have all market information to be able to successfully commercialize its services. Hence, it organized information seminars to "receive signals from the market if there is demand for it [the service]" (SecurityCo, 2015). Concerning information that is completely lacking, an illustrative example is the case of GameCo. This firm was one of the first to develop iPad games. GameCo had no information concerning investment requirements as this statement illustrates:

*At that time, you could not find anywhere that information [funds required to develop an iPad game] so I had no idea how realistic everything was (GameCo, 2015).*

As to uncertainty due to an inadequate understanding, I observed two types: 1. Owing to novelty, and 2. Owing to instability. MusicCo developed a novel online music streaming service for Dutch Caribbean music. This was a novel concept as there was no other platform dedicated to Dutch Caribbean music. MusicCo experienced uncertainty among others about the availability of songs and the cooperation of the music industry. For example, MusicCo indicated that "we didn't know how things were going to evolve" (MusicCo, 2014). Thus novelty related to their product created an inadequate understanding of actions required.

Finally, instability can also create an inadequate understanding. A good example to illustrate this uncertainty in our cases is SecurityCo. It indicates that:

*The moment that the things went wrong I had about three assignments ready to sign, large projects. In the end, because it was the year of election in 2010, one way or another all projects were put on hold (SecurityCo, 2015).*

The state election of 2010 in Curaçao was during a moment of political instability. Curaçao was in the process of becoming an autonomous country within the Dutch Kingdom by October 10, 2010. To be able to complete this process, the new constitution of Curaçao needed to be approved by the island council. However, the new constitution did not receive enough support. For this reason, the parliament had to be dissolved and new elections were held in August 28, 2010. As indicated in the statement, this instability caused an inadequate understanding of the demand for SecurityCo's services.

I also observed three types of resource constraints that arise in penurious environments: 1. time, 2. human capital, and 3. financial capital. Though I make a distinction between financial capital and the other resource constraints, the lack of financial capital is intertwined with the human capital for the reason that money is a medium to acquire resources. Illustrative examples of these constraints are the following:

*Time constraints*

*Time is also a resource. And because you have to do everything; you are the managing director, you are the head of sales, marketing, and when you acquire a project and you have to implement, you are the project manager. Thus when you are in the field and implementing a project, you cannot do marketing and sales as well. And so other things, such as administration, are not done (SecurityCo, 2015).*

*Human capital constraints*

*In the first instance I also looked for a developer in Curaçao [among my friends] but then there was none for iPad and iOS development. There was no one in Curaçao who could. In 2010 we already started thus that was not there (GameCo, 2015).*

*Financial capital constraints*

*There are always problems with money (TransactionsCo, 2014).*

Throughout the cases I observed that the lack of a human capital is not only due to unavailability of this resource on the market but also due to the lack of financial capital to acquire it. For example, MusicCo (2014) did not have the technical expertise in the domain of the product and hence did a search. As illustrated through the quote below, the expertise was available but difficult to acquire:

*"Development skills were more difficult, not in the sense of finding the skills, but rather in the sense of having the funds to be able to pay the people who have the skills" (MusicCo, 2014).*

In this study, I choose to separate financial and human capital to be able to capture the constraints in human capital that were not a product of constraints in financial capital. In the next section, I will discuss the configurations of causal combinations that lead to new-to-the-world innovations.

### **6.5.2 Causal combinations**

I built four configurations (see Table 6.4) that explain the path towards innovations that are new to the world. All solutions with a coverage of 0.25 and over are considered to have sufficiently high coverage (Muñoz & Dimov, 2014). The purpose of first three configurations, CAUSATION, EFFECTUATION and BRICOLAGE separately, was to examine how the logics independently influenced the process of developing innovations that are new to the world. The fourth configuration consisting of CAUSATION-EFFECTUATION-BRICOLAGE, was to research how the logics of causation, effectuation, and bricolage jointly influenced the process to develop innovations that are new to the world.

The CAUSATION configuration (consistency: 0.333333; coverage: 0.667000) consisted of the causal combination *'expected return'*, *'goal-orientation'*, and *'competitive analysis'*. This causal combination is illustrated through TransactionCo. TransactionCo invested on several occasions based on the return expected from the investments as it developed and commercialized its product. For example, the firm was started with the expectation that it would be able to make a market return. One of the co-founders stated that "what gave some security [is] that we could offer some service and thus my decision [to start the company] became easier" (TransactionCo, 2015). Furthermore, its flagship product that was new to the world was developed based on calculation of the funds required. A statement to illustrate this is "you budget it in advance. It will cost 80 days, 100 days. This person you will let work on it. That's how you budget it" (TransactionCo, 2015). In the commercialization process it also invested based on the returns expected. An example of this is the calculation to determine customer acquisition. TransactionCo stated that "let's say our goal is to acquire one or two clients in a period of two years. Than we know based on the conversion ratios that we need to talk to 100 clients" (ibid, 2015). Thus making investment decisions based on the logic *'expected return'* is evident in TransactionCo.

**Table 6. 4 Causal combinations that lead to new-to-the-world innovations**

	Causal combinations					
	1	2	3	4	5	6
				CAUS	(control)	(control)
				EFFECT	CAUS	EFFECT
	CAUS	EFFECT	BRICO	BRICO	EFFECT	BRICO
Expected return	●			●	●	
Goal-orientation	●			●	●	
Competitive analysis	●			●	●	
Hedging contingencies	○			○	○	
Affordable loss		○		●	●	●
Means-orientation		●		●	●	●
Pre-committed stakeholders		●		●	●	●
Leveraging contingencies		○		●	●	●
Making do			●	●		●
Resources at hand			●	●		●
Frequency cutoff	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
Consistency	0.333333	0.333444	0.500250	0.600240	0.375094	0.60024
Raw/ unique coverage	0.667000	0.333500/ 0.167000	0.500000	0.500000	0.500000/ 0.333500	0.500000

Note: black circles indicate presence of conditions and white circles indicate their absence (Muñoz & Dimov, 2014)

TransactionCo also made decisions according to the logic of ‘*goal-orientation*’. It did research to define the opportunity, requirements and needs as illustrated by the statement “we analyzed what are the things that banks are currently doing wrong”. TransactionCo defined a clear course of action, as is illustrated by the statement “what we wanted was for the banks endorse the use of the product. And it happened”. TransactionCo also took action on defined goals. One co-founder stated that ‘at a certain moment we searched for a partner; a company in Holland which was an expert in that area’). Finally, TransactionCo also had a clear long-term vision of developing an international product, and this vision directed their actions.

‘*Competitive analysis*’ also formed part of the decision logics used by TransactionCo. It developed a competitor analysis to determine which markets to enter and when. It also hired a software development firm to develop the product and thus showed signs of acquiring resources through arm’s length contractual assignments. Finally, systematic research formed an essential part of the decisions made. TransactionCo stated that “when you are going to sell something

internationally in a sector, the first thing you do is to see which are the interest groups in that sector" (2015).

By using TransactionCo as an example I illustrated how the causal conditions of CAUSATION (i.e. *'expected return'*, *'goal-orientation'*, and *'competitive analysis'*) are used to develop products that are new to the world.

The second configuration I built is for EFFECTUATION. There are two causal combinations in this analysis. One contains all the dimensions of effectuation (consistency: 0.333444; raw coverage: 0.500000; unique coverage: 0.167000) and the other one consists of the dimensions *'means-orientation'* and *'pre-committed stakeholders'* (consistency: 0.333500; raw coverage: 0.333500; unique coverage: 0.167000). I chose the latter causal combination because it has the highest consistency among the two.

The causal combinations of EFFECTUATION are useful to explain my cases of innovations that are new to the world. An example to illustrate this point is TransactionCo. TransactionCo developed an innovation in data processing technology based on ideas and processes from another industry. This concept was first sold to a bank. This bank became a *'pre-committed stakeholder'* and contributed funds towards the development of the product.

In addition, the software development firm that was hired to develop the program is an illustration of *'means-orientation'*. The firm was already in the network of TransactionCo, even before this firm was contacted in search for an agreement. TransactionCo indicated that "when I used to work for the bank [former employer] they used to already develop things for us" (2015).

The BRICOLAGE configuration (consistency: 0.500250; coverage: 0.500000) consists of *'making do'* and *'resources at hand'*. As the well-known expression *'one man's trash is another man's treasure'*, I see that *'making do'* and the acquisition of resources that are very cheap or free is a necessary condition for innovation that is new to the world. The unwanted resources are conjointly used to create innovative products. For instance, MusicCo hired an employee that could not find a job. One of the co-founders indicated this employee approached MusicCo several times concerning not being able to find a job. The co-founder was compelled to help the employee and offered this employee a job.

Concerning *'resources at hand'*, the co-founders acquired resources very cheaply by compensating with non-monetary payments such as future employment opportunities, and barter and royalty deals.

Finally, I made a configuration containing of the dimensions of the logics; CAUSATION-EFFECTUATION-BRICOLAGE (consistency: 0.600240; coverage: 0.166750). The causal combination belonging to this configuration is *'expected return'*, *'goal-orientation'*, *'competitive analysis'*, *'affordable loss'*, *'means-orientation'*, *'pre-committed stakeholders'*, *'leveraging contingencies'*, *'making do'* and *'resources at hand'*. This configuration has the highest consistency among the six configurations that I

built in this study (see Table 6.4). An intriguing observation is that when effectuation, causation and bricolage are combined, the '*affordable loss*' and '*leveraging contingencies*' also form part of the causal combination.

### 6.5.3 Discussion

In this study I set out to examine how the causal, effectual and bricolage heuristics used by an entrepreneur in a penurious environment independently or jointly influence the process to develop innovations that are new to the world from the SIDS context. I built four configurations to study this problem. The configurations CAUSATION, EFFECTUATION and BRICOLAGE studied how the logics independently influenced the process to develop innovations that are new to the world. The configuration CAUSATION-EFFECTUATION-BRICOLAGE studied how the logics of causation, effectuation, and bricolage jointly influenced the process to develop innovations that are new to the world.

In the configuration of CAUSATION, the conditions that were present in developing innovations that are new to the world are '*expected return*', '*goal-orientation*', and '*competitive analysis*'. An explanation for this result is that in this uncertain and penurious environment, using only the causal logic requires that a SIDS entrepreneur has clear goals of products that he or she is able to develop with the existing resources available in the market. Thus the SIDS entrepreneur has a vision and the SIDS entrepreneur will go through an exploration process to find opportunities that are novel to the world.

Furthermore, the SIDS entrepreneur would not have all the resources required to execute his or her plans. Thus the acquisition of resources is goal-oriented for the SIDS entrepreneur has a clear vision and executes his or her strategies in alignment with that vision.

In doing this the SIDS entrepreneur needs to make a competitive analysis to determine who possesses the required resources and subsequently he or she needs to make use of arm's length contracts to acquire these resources.

When it relates to specifically financial resources, if the SIDS entrepreneur were to acquire these from a financial institution such as a bank, he or she would have to submit a business plan. Critical required components of the business plan are a financial forecast and a competitor's analysis that argues the position of the SIDS entrepreneur against that of the established incumbent firms. In these situations, the SIDS entrepreneur will need to use expected financial return to make financial forecasts and comply with the bank's requirements.

It does not seem necessary for the SIDS entrepreneur to hedge against contingencies as unexpected events can also help the SIDS entrepreneur realize her or her vision. The environment is penurious. Thus hedging against contingencies can influence the resources that can flow towards the SIDS entrepreneur. The logic

of protecting oneself against unexpected events is not necessary to develop innovations that are new to the world, when using only causal logics.

In the configuration of EFFECTUATION, the conditions that were present in developing innovations that are new to the world are '*means-orientation*' and '*pre-committed stakeholders*'. Previous studies found similar support for these heuristics (Brettel et al., 2012; Sarasvathy & Kotha, 2001). A logical explanation for this configuration is that the SIDS entrepreneur that only uses effectual logics needs to focus on his or her aspirations, the knowledge and resources he or she already has, and people he or she knows that are willing to commit with him or her to explore their aspirations and ultimately develop an innovative product (i.e. who he or she is, what he or she knows, and whom he or she knows). As discussed in the literature review, the more resources the entrepreneur has and the larger variety in these resources, the higher possibility that the entrepreneur can develop an innovation that is new to the world.

From this logic thus follows that it is vital for the SIDS entrepreneur to acquire resources. This is achieved through pre-commitments from stakeholders. According to Vanhaverbeke and Cloudt (2006), stakeholders are important to acquire necessary resources and also to anticipate new opportunities. Thus through and with the pre-committed stakeholders the SIDS entrepreneur has the possibility create opportunities that lead to innovations that are new to the world.

Whether the SIDS entrepreneur invests only what he or she is willing to loose, or takes bigger bets, is not relevant for the novelty of the innovation, as long as the SIDS entrepreneur is able to acquire sufficient resources from his or her stakeholders that pre-commit.

That '*leveraging contingencies*' is also not a necessary heuristic first comes as a surprise as one would expect that through these contingencies the SIDS entrepreneur comes in contact with prospective stakeholders with whom he or she will eventually form pre-commitments. This result implicitly assumes that the transformational and expanding cycle of resources (Sarasvathy & Dew, 2003) through the formation of pre-commitments by stakeholders whom the entrepreneur knows (the stakeholders that come on board doing the same with whom they know) is sufficient to access a large variety of resources that induces innovations that are new to the world. The importance of stakeholders for innovation is shown in previous research. Network formation is essential to remain open to new resources and knowledge and access capabilities that lead to innovations (Fagerberg, 2004).

The EFFECTUATION configuration is in reality not applicable. It would have been applicable only if the SIDS entrepreneur would have unlimited resources to his or her disposal. In this case, the sizes of the investments are immaterial and the affordable loss is irrelevant. However, this is not applicable in reality, especially to the penurious environment in which resources are limited.

In the configuration for BRICOLAGE both *'making do'* and *'resources at hand'* are necessary to develop innovations that are new to the world. This result follows the theory. The refusal to use the resources in a conventional manner and the ability to apply these in new formats is essential to produce innovation. The variety in resources that are essential to create novelty innovations are a combinations of resources the SIDS entrepreneur already has and newly but inexpensively acquired resources. As the acquired resources are unwanted or discarded by others, which means they are of low value, the SIDS entrepreneur's ability to use these resources in a new way is important.

Turning my attention to the combination of CAUSATION-EFFECTUATION-BRICOLAGE, which looks for causal combinations among all the dimensions of the causal, effectuation and bricolage logics, this configuration's path that leads to innovation that is new to the world consists of *'expected return'*, *'goal-orientation'*, *'competitive analysis'*, *'affordable loss'*, *'means-orientation'*, *'pre-committed stakeholders'*, *'leveraging contingencies'*, *'making do'* and *'resources at hand'*. This configuration presents the most realistic set of causal combination; a reality characterized by different levels of uncertainty and resource scarcity.

Developing innovation that is new to the world is complex. It is an iterative process containing feedback and loops. There are difficulties in conducting experimentation (Nelson & Nelson, 2002) and problems of ineffective learning (Miles, 2004). In this complexity the SIDS entrepreneur is definitely faced with uncertainty, but he or she also needs to make decisions to accommodate events that are less uncertain, risky, and even in some cases events that are certain. Focusing on the venture creation process, Reymen et al. (2015) present a detailed analysis of shifts that occur between causal and effectual logics as the entrepreneur navigates different levels of uncertainty through the ideation, pre start-up, start-up, post start-up phases.

The penurious environment and resource limitations are also contextual characteristics that have influence on the heuristics used. In particular, it explains the intriguing finding of the change in the causal combinations of dimensions of EFFECTUATION when EFFECTUATION is combined with CAUSATION and BRICOLAGE, compared to when EFFECTUATION is analyzed separately. The *'affordable loss'* and *'leveraging contingencies'* that were not necessary in the EFFECTUATION configuration turn into necessary conditions in the combined configuration. In the penurious environment, the SIDS entrepreneur does not have unlimited resources to his or her disposal. He or she will not be able to amass a large and diverse pool of resources, which are required to develop innovations that are new to the world, through only stakeholder pre-commitments. Hence, the SIDS entrepreneur needs to frugally treat his or her resources and apply the *'affordable loss'* heuristic. In addition, to be able to continuously expand the available resources,

the SIDS entrepreneur leverages contingencies that will improve his or her resource position.

## **6.6 Conclusion**

### **6.6.1 Contribution**

In this study, I set out to examine how the causal, effectual and bricolage heuristics used by an entrepreneur in a penurious environment independently or jointly influence the process of developing innovations that are new to the world from the SIDS context. I provide two contributions to the literature. First, a combination of causation, effectuation and entrepreneurial bricolage contains the causal combinations that can explain the emergence of innovations that are new to the world. This combination better explains the novel innovation that takes place in the uncertain and penurious context compared to causation, effectuation and bricolage separately. This further suggests that rather than interpreting effectuation and causation as opposites, it is useful to combine these theories of entrepreneurial cognition in a single framework, in conjunction with entrepreneurial bricolage, to study the entrepreneurial process and innovation. A theory integrating and combining these different logics, aids future to research to study how entrepreneurs complement different decision-making styles in tackling resource constraints without having to jeopardize the novelty of their innovations.

Second, effectuation alone is not sufficient to understand the heuristics required to develop innovations that are new to the world in a penurious environment. A view of only applying effectual logic and assuming that the entrepreneur can acquire all the required variety in resources to develop innovations that are new to the world, through pre-committed stakeholders is too simplistic.

These insights are also useful for the reason that these highlight the importance of context. The entrepreneur's context is considered to be important in studying the entrepreneurial process (Autio et al., 2014; Welter, 2011; Zahra & Wright, 2011) since entrepreneurial behavior is as a result of both the entrepreneur and his or her environment. Thus differences in environments lead to differences in entrepreneurial decision-making and as such the context cannot be ignored in our efforts to understand entrepreneurial cognition.

### **6.6.2 Limitations**

This study is not without its limitations. First, the data collected in the multiple-case study is not coded by independent coders and thus susceptible to researcher's bias.

In addition, I did not access expert reviewers for their expert judgment of the novelty of the innovation from my cases. Due to incomplete information, it is a challenge to assess the newness of the innovation on a world podium.

Finally, the interpretation of the results requires careful consideration for the reason that there is a large number of conditions in the configurations developed versus a small number of cases. This can result in 'garbage-can' models (Schneider & Wagemann, 2010). I took three steps to minimize the effects of a large number of conditions versus a small number of cases. First, I performed separate analyses of the causal, effectual and entrepreneurial bricolage logics. In these analyses, I included only a few conditions (causation: four; effectual: four; entrepreneurial bricolage: two). I also step-by-step increased the number of conditions that were included in the analysis. I compared the solution consistency and raw/ unique coverage of each configuration. The results show that the configuration with the highest number of conditions (i.e. CAUSATION-EFFECTUATION-BRICOLAGE) has also the highest solution consistency (i.e. 0.600240). However, the configuration 'CAUSATION' has the highest raw/ unique coverages (i.e. 0.667000) compared to 0.500000 for the configuration 'CAUSATION-EFFECTUATION-BRICOLAGE'. This leads to step two.

Second, I sought to justify the configurations by theory. Theory shows that entrepreneurs use the logics in combination. Thus, the configuration CAUSATION-EFFECTUATION-BRICOLAGE is better supported by theories compared to the configuration CAUSATION. In addition, there is an overlap between the necessary conditions between the configurations CAUSATION and CAUSATION-EFFECTUATION-BRICOLAGE. Both configurations indicate that '*expected return*,' '*goal-orientation*,' and '*competitive analysis*' are necessary conditions.

Finally, as indicated by Ragin et al. (2006), I used the frequency threshold of one because I had a small number of cases.

### **6.6.3 Future research**

This research showed when the configuration of EFFECTUATION is combined with CAUSATION and BRICOLAGE, the '*affordable loss*' and '*leveraging contingencies*' that are not necessary for the former configuration turn into necessary conditions in the latter. The explanation for this transition is that in the penurious environment, the SIDS entrepreneur does not have unlimited resources at his or her disposal and thus turns to the affordable loss heuristic to limit the invested capital. This implies that the financial position of the SIDS entrepreneur is important for the type of heuristics used. Future research should address this topic and study how the resource position of the entrepreneur influences the use of heuristics when entrepreneurs develop innovations that are new to the world.

Future research should also seek to increase the number of cases to include in the fsQCA analysis to avoid including too many conditions versus a low number of cases in the analysis.

# 7 TOWARDS A THEORY OF AFFORDABLE LOSS

## Abstract

Expected financial return has received much attention as a determinant of entrepreneurial entry. However, a weakness of the literature lies in explaining entry under conditions of uncertainty. The affordable loss heuristic has been used to study entrepreneurial entry under these conditions. Despite this increasing attention, it has been mostly applied as a black box, as one of the five principles of the effectual approach. This study builds on studies of Dew, Sarasathy, Read, & Wiltbank (2009) '*Affordable loss: behavioral economic aspects of the plunge decision*' and Sarasvathy (2015) '*The Downside of Entrepreneurial Opportunities*' to study how an entrepreneur uses the affordable loss heuristic to make the entry decision. Using an exploratory qualitative model, it develops new insights that are combined into a process model of affordable loss.

## Keywords

Affordable loss, effectuation, entrepreneurial entry

## 7.1 Introduction

A topic in the entrepreneurship literature that has garnered a lot of attention is what makes some individuals make the entrepreneurial entry decision<sup>59</sup> while others under the same circumstances do not (Shane & Venkataraman, 2000). Expected financial return is widely considered to be a dominant determinant of entrepreneurial entry. Each individual has a threshold related to his or her expected return. The threshold is "the level of expected performance required by the individual to trigger entry into the entrepreneurial process" (McCann & Folta, 2012, p. 782). An individual will enter the entrepreneurial process if the expected financial return exceeds the individual's threshold. If this is not the case the individual will not enter.

Research has shown that models based on expected return (e.g. Net Present Value and Real Options) are weak in cases of Knightian uncertainty as they depend on information that is not available, i.e. information on the upside of the exploitation of the opportunity (Dew, et al., 2009).

Recently, there has been a stream of research that focuses on the downside of the entrepreneurial opportunity instead of the expected financial return; that is the affordable loss heuristic (Dew et al., 2009). The affordable loss heuristic is one of the principles of the effectuation theory (Sarasvathy, 2001; 2008) and it posits that an

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<sup>59</sup> The entrepreneurial entry decision is the decision to make emotional, financial, mental, physical, and/or social investments to pursue an entrepreneurial opportunity.

expert entrepreneur focuses on the downside of an entrepreneurial opportunity rather than making an effort to predict an (often unpredictable) financial return<sup>60</sup>. It is what an entrepreneur can afford and what he or she is willing to lose in opportunity exploitation (Dew et al., 2009). This is a preferred choice because the information of the down-side of the exploitation of an opportunity is easily accessible and controlling what one loses is easier than controlling future financial gains. Furthermore, losses causes more pain than gain causes happiness (Kahneman & Tversky, 1979), and the affordable loss heuristic leads to lower levels of invested capital compared to investing based on expected returns (Dew et al., 2009; Read et al. , 2015).

The literature on the affordable loss heuristic has increased since its introduction by Sarasvathy in 2001. Review of the literature shows that scholars have predominantly treated this notion as a black box in the conceptualization as a sub construct of effectual decision-making (e.g. Chandra & Yang, 2011; Florin, Dino, & Huvaj, 2013; Perry, Chandler, & Markova, 2012), the empirical testing of this construct (e.g. Blauth, Mauer, & Brettel, 2014; Chandler et al., 2011; Read et al., 2009), and this mainly in economic terms (Daniel et al., 2014).

To my knowledge only a few authors have made an attempt to open the black box to study the inner workings and boundary conditions of the affordable loss heuristic namely Sarasvathy (2015) and Dew et al. (2009). The former author puts forward that there are two components to the affordable loss heuristic: the ability of the entrepreneur to take the plunge and the preference that determines the threshold of the investment. The latter authors used behavioral economics to develop a detailed analysis of the affordable loss heuristic. They posit that not all sources of financial payoffs positively affect the affordable loss threshold. Building on Dew et al. (2009) and Sarasvathy (2015), this chapter advances a theory of affordable loss and addresses the research question:

*How do an entrepreneur's abilities and preferences independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*

This research presents three contributions to our understanding of the investment decision. First, it contributes new insights in the components of the affordable loss heuristic and the relationship between these components. Second, it shows the multiple stages of the affordable loss heuristic. And finally, it puts forward a process model of the affordable loss heuristic.

In the next section, the literature concerning decision-making under risk and uncertainty is reviewed. This is followed by a discussion of the conceptual

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<sup>60</sup> see Mauer (2015) and Sarasvathy et al. (2015) for recent reviews of the effectuation literature.

works on the affordable loss heuristic. The methodology is presented and afterwards the results and theory elaboration are discussed. The chapter concludes with the limitations and areas for future research.

## 7.2 Literature review

### 7.2.1 Risk, uncertainty and decision-making

How do individuals make the entrepreneurial entry decision in uncertain environments? According to the neoclassical economic research tradition, the logics used by an individual to make a decision to enter the entrepreneurial process usually revolve around a rational process and risk-return analysis. It starts with the individual determining a goal followed by calculating the possibility to realize the goal (Knight, 1921). This can take place along the lines of the Reduce, Quantify, Plug (RQP) rationality (Lipshitz & Strauss, 1997). The individual will gather as much additional information and understanding to reduce the uncertainty related to the chosen goal. This is followed by a process of quantification of the uncertainty, and finally, the information that is acquired and the quantified uncertainty are plugged into a model. This model treats the uncertainty as a factor, takes into account the opportunity costs, and computes a prediction based on set parameters. Examples of more well-known concepts that follow this RQP process are the net present value (NPV), real options model, decision trees, net present value risk adjusted (NPVR), and stage-gate (Davis, 2003). After calculating the possibility to realize the goal the individual determines the steps necessary ( Knight, 1921).

The rational process is often difficult and in certain contexts, e.g. true uncertainty (Knight, 1921), even unfeasible because humans are rationally bounded (Simon, 1955). It is unfeasible to make predictions of the upside of the exploitation of the opportunity (Dew et al., 2009) where both the supply and demand that constitute an entrepreneurial opportunity have to be created (Sarasvathy et al., 2010). In such situations the historical information is lacking. In addition, there are restrictions of time, forcing an entrepreneur to act quickly (Busenitz, 1999)<sup>61</sup> and thus no time for lengthy information gathering<sup>62</sup>.

An example of an opportunity characterized by Knightian uncertainty is an emerging (breakthrough) radical technology. Emerging radical technologies are

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<sup>61</sup> I look at uncertainty as a perception by individuals. Due to the lack of complete information and inability to understand and process the complex situation (Duncan, 1972; Wu & Knott, 2006), an entrepreneur forms a perception of the objective uncertainty involved in the entrepreneurial process. The decision-maker enacts an environment (Weick, 1969), and use heuristics (Busenitz, 1999) such as the availability heuristic: individuals are likely to perceive what they are predisposed to see when presented with ambiguous information (Palich & Bagby, 1995).

<sup>62</sup> For more elaborate discussion on the weaknesses of investing based on expected return while under uncertainty, please see (Dew et al., 2009; Venkataraman & Sarasvathy, 2001)

uncertain (Srinivasan et al., 2002) due to fundamental differences with existing paradigms (Ettlie et al., 1984). These usually lead to new opportunities that are difficult to predict (Spinardi & Williams, 2005). There is also a lack of information on the technological component leading to technological uncertainty, and on potential future markets leading to market uncertainty (Herrmann et al., 2006).

Research on cognition and entrepreneurial decision-making revealed that an entrepreneur evaluates opportunities differently from non-entrepreneur (Keh et al., 2002; Palich & Bagby, 1995). He or she makes use of heuristics (Busenitz, 1999). Subsequently scholars engaged in developing cognitive theories to explain the entrepreneurial decision to enter a market. One of these is the theory of the affordable loss (Sarasvathy, 2001).

### **7.2.2 The affordable loss heuristic**

The affordable loss heuristic is one of the principles of the effectuation theory (Sarasvathy, 2001; 2008). Entrepreneurs that make use of the affordable loss heuristic, will likely manage the downside of an entrepreneurial opportunity instead of predicting a future financial return (Dew et al., 2009) in making the decision to enter the entrepreneurial process<sup>63</sup>.

*“The opportunities envisioned have to cross the higher threshold of loss aversion rather than the lower one of gain-seeking. The potential entrepreneur is no longer deducting the probability of failing from the expected gains, but examining the value of the venture in terms of certain failure and asking if it would still be worth attempting. The tough love embodied in this criterion has the opposite psychological effect of upside incentives. It cues in intrinsic motivation” (Sarasvathy, 2015, p. 313).*

The affordable loss heuristic is a preferred choice among entrepreneurs for the reason that the information of the down-side of the exploitation of an opportunity is easily accessible because the information is endogenous (Dew et al., 2009)<sup>64</sup>.

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<sup>63</sup> Conceptually the effectual problem space is related to entrepreneurial opportunities of the creative kind (Sarasvathy et al., 2010) in which Knightian uncertainty, goal ambiguity and isotropy play roles (Sarasvathy, 2008). However, this concept has been also applied to opportunity discovery in several contexts such as angel and venture capital investors, (MBA) students, executives, small and large organizations and has been linked with innovation, new product development, R&D, venture performance and success (see Mauer (2015) for a recent review of the literature).

<sup>64</sup> Though in the rational approaches there is an obvious effort to make a decision based on a predicted financial outcome, the downside of entering the entrepreneurial process is not completely ignored. The entrepreneur “deduct[s] [his] investment in the venture (which equals the cost of failure, should failure occur) from [his] calculations of expected return” (Dew et al., 2009, p. 107).

On the other hand, the upside is exogenous and beyond an entrepreneur's control. This is in line with the premise of Sarasvathy's (2001) effectuation theory about the nature of control logic. An entrepreneur strives to influence or create the future instead of predicting it. In addition, exogenous information is considered unreliable (Dew et al., 2009) and subject to uncertainty that is created due to among others incomplete information, or the "... inherent variability of the phenomena being described" (Walker et al., 2003). Excessive information that is conflicting (Lipshitz & Strauss, 1997) and the number of the factors that constitute the phenomenon and the frequent changes in these factors (Duncan, 1972) are also origins of uncertainty.

Furthermore, individuals show certainty effect i.e. individuals give higher weights to outcomes that are certain compared to uncertain outcomes (Kahneman & Tversky, 1979). In other words, when making decisions involving outcomes that are considered uncertain, individuals are less likely to take risks. In cases they do take risks, individuals are more cautious about the risks to be taken. In this scenario individuals avoid losses because these cause more pain than gain causes happiness (Kahneman & Tversky, 1979). Thus, it is for each entrepreneur to determine the levels of the affordable loss heuristic at which the entrepreneur feels comfortable.

### **7.2.3 The components of the affordable loss heuristic**

Sarasvathy (2015) identified at least two components of the affordable loss heuristic; the ability and the preference. The former is independent of an opportunity and the latter is closely intertwined with the person and the opportunity.

#### **7.2.3.1 The ability component**

The ability is the size of what an entrepreneur can put at risk (Dew et al., 2009). Individuals go through a mental process in which expected income is coupled to an expenditure (Thaler, 1999). For instance, income from the monthly salary is coupled with payments, such as monthly mortgage, household expenses, etc. The residual income that the individual does not couple with an expenditure, he or she can use to invest in pursuing an entrepreneurial opportunity. Thus, the residual income is the ability component of the affordable loss heuristic.

An individual can also choose not to couple the entire salary to an expenditure and 'save' this for investing in pursuing an entrepreneurial opportunity. Thus, the ability is influenced by the mental process to decouple income from payments that have to be made.

In addition, an entrepreneur is more willing to risk resources, e.g. lottery winnings, that he or she has not reserved to pay an expense. For example, a study by Manigart and Struyf (1997) among Belgium high-tech startups revealed that self-financing is a popular method for funding. Blanchflower and Oswald (1990) showed

that individuals who received inheritances or gifts were more likely to enter the entrepreneurial process. Financial payoffs, with the exception of the sources of retirement and college funds and housing equity, will increase the affordable loss heuristic.

The ability component of the affordable loss heuristic is also influenced by accounting in the unit 'time' (Dew et al., 2009). It is the sweat equity that an entrepreneur puts to use, as any loss in time is more tolerable than loss of money. One can think of an entrepreneur choosing to invest his or her time to carry out a task instead of paying someone else. Because time is perishable and the loss of time is tolerable, an entrepreneur is inclined to use his or her time to pursue an entrepreneurial opportunity.

### **7.2.3.2 The preference component**

The second component of the affordable loss heuristic is the preference of how much to risk when making the entrepreneurial entry decision. It is the willingness to lose a resource in the opportunity exploitation (Dew et al., 2009). This is closely intertwined with the opportunity for the reason that an entrepreneur engages his or her environment. He or she socially constructs an opportunity and also his or her perception of the associated uncertainty that is in line with his or her idiosyncrasy. This perception influences his or her preference for a certain affordable loss level for that respective opportunity. Thus an entrepreneur's preference for an accepted threshold of affordable loss heuristic is intertwined with the opportunity.

In summation, the affordable loss heuristic consists of two components; the ability and the preference. The ability and preference towards the affordable loss heuristic relate to two different aspects of the decision to enter. The ability is the 'size' of the 'resource pool' and determines how much the entrepreneur is able to invest. The ability is increased by the process to decouple income from payments and accounting in the unit 'time'. The preference relates to the investment threshold. It is how much he or she is willing to put at risk thus determining the depth of the plunge decision.

In the remainder of this chapter, I define the affordable loss heuristic as 'the ability and preference of the entrepreneur to make an investment to enter the opportunity exploitation process'.

## **7.3 Methods**

This study used an explorative research strategy and examines multiple cases (Yin, 2009). The data collection took place in Curaçao, a small island in the Caribbean situated north of Venezuela. For more information about Curaçao see Appendix 3.3.

A total of seven cases were selected in several industries of the sector Information Technology, namely information technology, entertainment, communications electronics, consulting of security services, and information & data processing services and consultancy (see Table 3.3 for the case characteristics and Table 3.4 for the case descriptions). The cases were selected using theoretical sampling. Please see Table 3.1 for the case selection criteria and Table 3.2 for the overview of all the cases and the selection criteria that is applicable to that specific case.

To collect data, I used the conceptualization for empirical indicators of the affordable loss heuristic developed by Reymen et al. (2015). These authors relied on Chandler et al. (2011), Fisher (2012) and Read et al. (2009) to develop a 5-item measurement. These measurements were modified with themes that emerged during my coding of the data that resulted into 6-items (see Table 7.1).

**Table 7. 1 Indicators for the affordable loss heuristic**

<b>Empirical indicator</b>
Finding unused resources in local environment (including subsidies).
Investing limited, small amounts of personal/company money, time and effort.
Willingness to make sacrifices.
<i>The initial product idea is seen as interesting and worth exploring</i>
<i>Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.</i>
<i>Investment is seen as a first necessity to create an opportunity to start the development of a product.</i>
Italics are self developed

The coding and analysis consisted of a pattern-matching approach (Yin, 2009) and the levels of the affordable loss heuristic (see Table 7.2), the empirical indicators (see Table 7.3), and the quotes for the empirical indicators (see Appendix 3.7.2). Please see Chapter 3 for a detailed explanation of the coding and analytical process.

## 7.4 Results and discussion

### 7.4.1 The use of the heuristics

During my analysis, interesting patterns emerged. Table 7.2 shows the scores of the affordable loss heuristic per case. GameCo, MusicCo, PostCo, and SecurityCo scored 0.33. Among all the cases of this study, these four cases scored the lowest for the affordable loss heuristic. BudgetCo and TransactionCo scored 0.67. The only case to score 1 was PaymentCo. Table 7.2 also shows the score of the cross-case comparison between the cases of the affordable loss heuristic. The score is 0.52.

**Table 7. 2 Scores of the affordable loss heuristic per case**

	Score
<b>BudgetCo</b>	0.67
<b>GameCo</b>	0.33
<b>MusicCo</b>	0.33
<b>PaymentCo</b>	1.00
<b>PostCo</b>	0.33
<b>SecurityCo</b>	0.33
<b>TransactionCo</b>	0.67
<b>Score cross-case</b>	0.52

Table 7.3 shows the scores of the indicator of the affordable loss heuristic per case and the cross-case comparison on the level of indicators. The highest scores of the cross-case comparison are for the indicators *‘investment is seen as a first necessity to create an opportunity to start the development of a product’* (score 0.14) and *‘investing limited small amounts of personal/ company money, time and effort’* (score 0.14). Participants indicated that an initial investment is necessary as a ‘rite of passage’ to enter the entrepreneurial process. An exemplary statement is:

*“It is not as the funds are not there. I see things [investments] are necessary to keep doing things as these have to be done. The notary expenses are indispensable. Without this you cannot open your business” (BudgetCo, 2015).*

This can be considered as a ‘rite of passage’ to enter the entrepreneurial process<sup>65</sup>. Van Gennep (2011) observed that role transitions that are important go through three phases. First, a separation (i.e. an individual separates himself from current roles). Second, a transition (i.e. an individual takes on new roles). Finally, an incorporation (i.e. the new roles become part of the individual’s self-identity). Turner (1974) identified the transition phase as the liminal phase where the individual faces personal ambiguity. In postindustrial societies, individuals in this phase cope with personal ambiguity by creating personal rites of passages through symbolic acts. A SIDS entrepreneur also faces these three phases as he or she transitions into the entrepreneurial process. At first, the SIDS entrepreneur disengages him or herself from his or her current role as a passive observer of an opportunity. In the transition phase, the SIDS entrepreneur takes on an entrepreneurial role and in the final incorporation phase the new role will become part of the SIDS entrepreneur’s self-identity. During the transition phase, the SIDS entrepreneur will have various options of roles he or she can take and thus faces

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<sup>65</sup> There are no scholarly articles in the entrepreneurship discipline I could find that incorporates the ‘rite of passage’ to explain entrepreneurial entry. However, this has been applied in the management discipline to other areas such as consultancy (e.g. Czarniawska & Mazza, 2003).

ambiguity towards which role is preferred. To cope with this ambiguity, the SIDS entrepreneur makes an investment to reinforce his new role and personal identity.

**Table 7.3 Scores indicators of the affordable loss heuristic per case**

Caseid	BudgetCo	GameCo	MusicCo	PaymentCo	PostCo	SecurityCo	TransactionCo	Score cross-case
Finding unused resources in local environment (including subsidies).	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.05
Investing limited, small amounts of personal/company money, time and effort.	0.00	0.00	0.00	0.33	0.00	0.00	0.67	0.14
Willingness to make sacrifices.	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.10
Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	0.00	0.33	0.33	0.00	0.00	0.00	0.00	0.10
The initial product idea is seen as interesting and feasible.	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Investment is seen as a first necessity to create an opportunity to start the development of a product.	0.33	0.00	0.00	0.33	0.00	0.33	0.00	0.14

The indicator *'investing limited, small amounts of personal/ company money, time and effort'* is also scored 0.14. This indicates the source of the investment. The sources of the funds of BudgetCo, GameCo and PaymentCo are other entrepreneurial endeavors. The source of the funds of MusicCo and TransactionCo are personal savings.

The use of *'investment requirements are seen as uncertain and there is a desire to minimize this uncertainty'* scored 0.10. For instance, GameCo (2015) stated "that [to determine how much to invest] was very difficult because I had no idea how much it should cost". He further stated that "at that time you could not find anywhere that information [funds required to develop an iPad game] so I had no idea how realistic everything was". As the exemplary statements show, GameCo had no information about funds necessary to develop an iPad game and consequently applied the affordable loss heuristic to minimize the uncertainty.

## 7.5 Theory building

### 7.5.1 The ability and preference components

From my findings, I deduced elements in what can be called a theory of affordable loss. My findings indicate that the affordable loss heuristic consists of two components; the ability and the preference. The ability is comprised from multiple sources. For instance, MusicCo used their savings to make the initial investments. BudgetCo and GameCo used corporate income from other businesses they operate to fund their investments. The use of multiple sources of income is a standard practice in online businesses. It is considered as a means to lower the pressure for financial gains (Daniel et al., 2014; Gelderen, Sayers, & Keen, 2013) and focus on the downside of the entrepreneurial opportunity. The sources of income for the above mentioned cases formed their ability of what they could risk to invest in the pursued of the entrepreneurial opportunity.

The second component, the preference that determines the size of the affordable loss heuristic (Dew et al., 2009), is also visible throughout the case study. Though having the ability to make an X amount of investment, the SIDS entrepreneurs have only invested a certain amount based on what they were willing to lose. However, these preferences had different origins. BudgetCo, PaymentCo and SecurityCo determined their affordable loss threshold based on the investment they considered to be necessary to guarantee having a 'rite of passage'. An example is the notary expenses required to formally start the firm. BudgetCo expressed this attitude explicitly as the "things [investments] [that] are necessary to keep doing things as these have to be done" (2015).

However, on the other hand, GameCo first tried to find information about investment requirements of iPad games but because this was a nascent market and the information was not available, GameCo determined a threshold based on what he thought would be sufficient and determined to be satisfactory. This is consistent with satisficing theories of decision-making (Simon, 1955). Satisficing is that a person searches through alternative options until he or she meets an alternative that is both sufficient to meet his or her threshold, and satisfies his or her wants.

### 7.5.2 Increasing the ability and preference components

The notion of decoupling of payments through a mental accounting process (Dew et al., 2009) is also seen throughout this study. The income i.e. savings and residual income from other businesses, are not coupled with making payments and such funds are used to invest in exploiting the entrepreneurial opportunity. For example, BudgetCo stated that he is fortunate to have a business that is successful and through this business has the funds to invest in exploring opportunities.

Another factor mentioned in the literature that influences the ability component of the affordable loss is accounting in the unit 'time' (Dew et al., 2009). According to the authors, time is among others perishable and due to the perishability the ability component is increased. However, my analysis revealed two important insights. First, the notion of perishability is not only applicable to time as an investible resource, but can also be applied to financial resources. Throughout this study, the results indicate that a SIDS entrepreneur would rather invest a financial resource than losing the financial resource to uses that do not directly benefit him or her (e.g. corporate tax). Thus, in essence, it is the diminishing value of a resource that determines if the resource is coupled to the affordable loss heuristic. For example, GameCo (2015) informed us that he financed the development of his product through corporate income from other businesses. If this income was not used to fund the development of his product, the largest part of that income would have been lost to corporate taxes.

Second, the notion of perishability does not influence the ability component of the affordable loss heuristic but the preference. Resources that are perishable or that diminish in value are already in the possession of the SIDS entrepreneur; thus form part of his or her ability. But because the resource is perishable or its value diminishes, the SIDS entrepreneur would rather invest this resource with the consequence that the investment threshold increases. In the example of GameCo (2015), the founder had the investment funds flowing from corporate income in his possession. However, he determined to invest these funds and by this size of the investment was increased.

### **7.5.3 The ability and preference components and their effects**

The findings also show a causal relationship between the ability and the preference components of the affordable loss heuristic. An increase in ability positively influences the threshold (Dew et al., 2009). In relation to this, an interesting new insight was gained. The causal positive relationship between the ability and the preference also implies that if the ability decreases the threshold will also decrease. My findings go beyond this association and also show that a severe decrease in the ability can cause the SIDS entrepreneur to not only decrease the threshold of the affordable loss heuristic but also stop using the affordable loss heuristic completely. When the two founders of MusicCo started, they funded the startup in line with the affordable loss heuristic. The founders invested their personal savings in the development of their products. They did not write a business plan, nor did they make a financial forecast. However, at a certain point their savings decreased to a level that they abandoned the use of the affordable loss heuristic, developed a profit & lost forecast, and actively engaged in raising external funds based on their forecast profit & lost statement.

#### **7.5.4 The stages of the affordable loss heuristic**

The affordable loss heuristic does not correspond with one investment decision, but with decisions made at different stages of the product development trajectory. There are multiple stages, each preceding several decisions related to the exploitation of the opportunity. In other words, the affordable loss heuristic occurs in stages. An example to illustrate this point I take SecurityCo (2015). The founder stated that an investment in foundation expenses was the first stage followed by seminars. That the entrepreneurial financing takes place in stages is also well established in the entrepreneurship literature. Entrepreneurs typically go through seed, startup, early development, later development, MBO and maturity stages and are financed through family and friends, retained profits and loans, BAs, VCTs and regional funds, classic venture capital and second tier stock market, private equity and MBO/I and ultimately main stock exchange (Wright & Desbrières, 2014).

#### **7.5.5 The process of affordable loss heuristic**

Building upon the previous insights in the components of the affordable loss heuristic, their relationships and effects, and the stages of the heuristic, Figure 7.1 presents a process model. The process starts from a SIDS entrepreneur evaluating an entrepreneurial opportunity in an environment perceived to be uncertain. It ends with the SIDS entrepreneur deciding to take the 'plunge' decision. Subsequently, the process restarts leading to more decisions. This is represented as well in the horizontal header in Figure 1. The main elements of the process model of the affordable loss that constitutes the mechanism are the approach and components. The environment and outcome (represented in black boxes) are the input and output of the affordable loss heuristic.

The starting point is an opportunity of which the SIDS entrepreneur perceives the exploitation to be uncertain. The exploitation of the opportunity is uncertain due to a combination of lack of information about market preferences and the SIDS entrepreneur's ability to develop and commercialize a product. When faced with an uncertain environment, expert SIDS entrepreneurs will acknowledge the uncertainty and use the affordable loss heuristic to invest only what they are comfortable to lose in the situation of a worst case scenario<sup>66</sup>.

A SIDS entrepreneur that chooses the affordable loss heuristic to make investments has two components which he or she considers; his or her ability and preference. His or her ability is influenced by income he or she has not reserved to pay an expense. The income comes from multiple sources.

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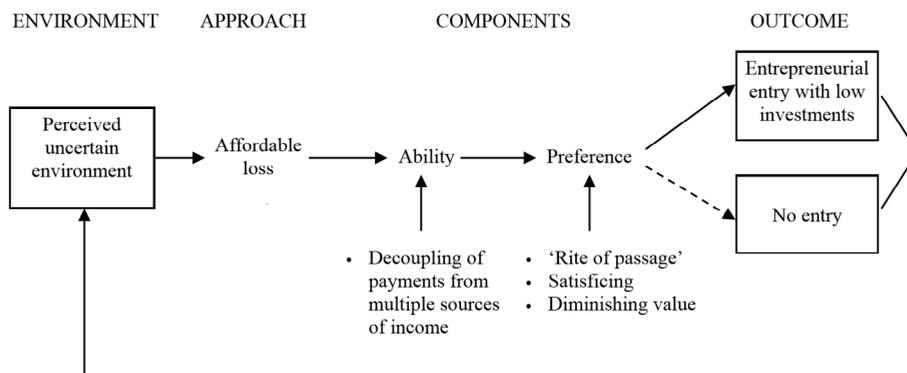
<sup>66</sup> Besides applying the affordable loss heuristic a SIDS entrepreneur can also alternately try to reduce or suppress the uncertainty (Lipshitz & Strauss, 1997). Some (mostly novice) SIDS entrepreneurs will try to reduce the uncertainty by collecting information and calculate expected financial returns. Others will suppress the uncertainty by e.g. completely ignoring this or take a gamble.

The ability of the affordable loss heuristic influences the preference and determines the level of the affordable loss threshold. There is a positive causal relationship between the ability and the preference. An increase in the ability results in an increase in the preference. The preference is also influenced by what a SIDS entrepreneur believes is a 'rite of passage', what a SIDS entrepreneur considers to be satisficing, and by resources a SIDS entrepreneur believes will diminish in value if the resources are not used.

There are two possible outcomes. First, an outcome of entrepreneurial entry where the invested amount is lower compared to an entrepreneur that makes use of prediction of expected financial returns (Dewet al., 2009; Read et al., 2015) (represented by the line). Second, a decrease in the ability causes a decrease in the preference that can result in no entry (represented by the dashed line).

Finally, after the SIDS entrepreneur has taken the decision to enter, the SIDS entrepreneur will proceed to the next stage of development and he or she will assess another investment decision. This is represented by the arrow that loops back to the perceived uncertain environment.

**Figure 7.1 A process model of affordable loss**



## 7.6 Conclusion

### 7.6.1 Contribution

In this chapter, I attempted to formulate a theory of affordable loss to address the question of *"how do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?"* The theories with reference to evaluation of an expected financial return were not sufficient to explain entrepreneurial entry under conditions of uncertainty. This weakness leaves a gap for theories that consider the cognitive

processes and heuristics of individuals. In this study an attempt was made to take the first step to develop such a theory; the process model of the affordable loss.

New insights that this study contributes to the literature are many fold. I posit that the decoupling of payments is not a simple process of mental accounting but is influenced by multiple sources of income of the entrepreneur. The preference component of the affordable loss heuristic is influenced by investments the SIDS entrepreneur considers satisficing, to be a 'rite of passage' as investments are seen as a necessity to confirm his or her new role in the exploitation process of the opportunity, and resources that the SIDS entrepreneurs considers to diminish in value if not used.

I further contribute the new insight that the affordable loss heuristic is not a single investment decision but operates in multiple stages that correspond to the different stages of opportunity exploitation.

Finally, I present a process model of the affordable loss. In this model, the SIDS entrepreneur starts with a decision in an environment that he or she perceives to be uncertain. When the SIDS entrepreneur makes use of the affordable loss heuristic his or her ability influences his or her preference. The outcome is an entrepreneurial entry with lower invested amounts compared to entries made according to rational approaches. However, efforts that do not result in an increase in the ability or efforts that decrease the ability can result in no entry. In other words, the ability is vital in ultimately determining the use of the affordable loss heuristic. Finally, the entrepreneur proceeds to a next stage along the development of his or her product in which he or she once more evaluates his or her investment decision.

Despite the contributions made with this study, I make no claims that I present a fully developed theory. This effort is an exploratory study that might provide useful relationships in developing a theory about the cognitive process that entrepreneurs go through when investing in exploiting entrepreneurial opportunities. However, in order for this to be a fully developed theory more work is necessary as I will address in the limitations of this study and suggestions for future research.

### **7.6.2 Limitations**

This study has several limitations. First of all, there are the issues concerning the data. It has been a challenge to collect data. Though providing the participants with the option for non-compete agreements, in which I am restricted in the use of the data for competitive purposes, the amount of data provided by the participants was limited. Although there are public records, the data found in these were limited. In addition to issues related to the availability of data, the data that was collected was not coded by independent coders and is thus subjective to possible researcher's bias.

This study also faces issues of external validity. The data was collected through a limited numbers of cases. Additional work is needed to test the relationships proposed in this study on a larger sample. In addition, the data was collected in Curaçao, a very small island with a population of only 150 thousand. As the context is very important to understand the entrepreneurial processes ( Zahra & Wright, 2011) the findings of this study cannot be generalized to other contexts other than small islands, small towns, and SIDS entrepreneur operating in the ICT industry.

Finally, this study focused only on the affordable loss heuristic and entrepreneurs that had made the entry/plunge decision. Thus this study susceptible to incorrectly accepting faulty explanations of the data collected (Type II errors). Studying cases of non-entry may generate new insights that were not possible to gain focusing only on the affordable loss heuristic and firms that had made the entry decision.

### **7.6.3 Future research**

The efforts of this study presents an initial indication of relationships about the cognitive process that entrepreneurs go through when investing in exploiting entrepreneurial opportunities. In order to develop a theory, constructs and a mechanism that relates the concepts to each other is required (Bacharach, 1989). Thus further work is required to establish all the constructs that are important for a theory of affordable loss heuristic, and the relationship among these. A framework that can be used to support this work is Arend, Sarooghi, and Burkemper's (2015) 3E framework (i.e. experience, explain, and establish). It builds on the five main criteria of Dubin (1969): 1. The units of the theory, 2. The laws of unit interaction, 3. The boundaries of applicability, 4. The operative system states, and 5. The logically resulting propositions. In addition, Arend et al. (2015) add two additional criteria to make the framework comprehensive: 1. The reasonableness of the model's assumptions, and 2. The soundness of the model's logic. Further research about the affordable loss heuristic using the proposed 3E framework can generate new knowledge that can lead to a fully developed process model of the affordable loss.

What are the kinds of questions that need to be answered in order to make progress in formulating a process model of affordable loss? According to Edmondson and McManus (2007) the type of questions relate to the maturity of the research. The work on the affordable loss heuristic is still in its infancy and the research is mainly qualitative, conceptual and exploratory. For this stage of the research open-ended questions are ideal (Edmondson & McManus, 2007). I have identified several open-ended research questions that add to a process model of affordable loss.

First, in this study, I have mainly focused on the financial resources of affordable loss heuristic, but entrepreneurs also invest other resources such as time (Fischer & Reuber, 2011) and emotions. Further studies need to go beyond economic loss and incorporate social and psychological losses (Daniel et al., 2014). How can my process model of the affordable loss help explain social and psychological investments?

In addition, what is the relationship between the ability component of the affordable loss heuristic and the preference? Is it U-shaped? Does the entrepreneur's financial starting position influence this relationship? How does an increase in ability influence the entrepreneur's propensity to make serial investments?

Furthermore, how is the affordable loss heuristic linked with the different stages of financing? Throughout this study I have seen that there are several stages of the entrepreneurial development (i.e. seed, startup, early development, later development, MBO and maturity stages) and these are linked to several sources of financing (i.e. family and friends, retained profits and loans, BAs, VCTs and regional funds, classic venture capital and second tier stock market, private equity and MBO/I and ultimately main stock exchange).

Another topic for future research is the types of entrepreneurial action to which the affordable loss heuristic is applied. There are several types of action in an opportunity exploration that have several levels of priority. There are actions that have high priority (e.g. payment of expenses of founding a firm) or have high necessity (e.g. acquiring machinery) and there are areas of lower priority (e.g. purchasing expensive perks for the personnel). How is the affordable loss heuristic applicable to these types of entrepreneurial action? Do entrepreneurs have preference for the use of affordable loss heuristic for highly necessary types of entrepreneurial action?

Finally, according to my proposed process model of the affordable loss, a decrease in the ability of the SIDS entrepreneur have the result that the SIDS entrepreneur forestalls the entrepreneurial entry. Under these circumstances, will the SIDS entrepreneur shift from the affordable loss heuristic to an investment decision based on the return expected? If this is the case, under which conditions will the shift occur? What is the role of the SIDS entrepreneur's self-efficacy in the shift?

## 8 CONCLUDING REMARKS

### 8.1 Introduction

In this dissertation I embarked on a journey to understand the logic entrepreneurs use in decision-making when they participate in advancing technologies and fostering economic development through their entrepreneurial activities. Prior literature has demonstrated that the exploitation of entrepreneurial opportunities is vital for economic development and is not without peril. The activities are particularly characterized by uncertainty (Johnson et al., 2004) and resource constraints (Powell & Baker, 2011). As the entrepreneurs navigate the uncertainties and constraints they use decision-making logics. Throughout this dissertation I explored these decision logics specifically in the context of Small Island Developing States (SIDS). I set out to answer the overarching research question:

*How does an entrepreneur in the SIDS context make decisions under uncertainty and resource constraints?*

However, why the Small Island Developing States? What makes the SIDS special that it required a dissertation devoted only to this group of islands? The SIDS are recognized as a distinctive group of developing islands that share similar characteristics and a unique set of challenges that can be grouped into five categories, each causing a set of disadvantages for the islands: 1. Small size, 2. Remoteness and insularity, 3. Disaster proneness, 4. Environmental fragility and 5. Some other factors (Briguglio, 1995). The uncertainty and constraints that entrepreneurs experience in general are augmented by the small island context. These are augmented due to secrecy (Briguglio, 2003), inaccurate information, and economic shocks (Guillaumont, 2010) that are inherently difficult to predict. The constraints are enhanced by brain drain (Docquier, Lohest, & Marfouk, 2007), isolation from large markets, and limited access to capital markets (Dolman, 1985; Serra & Theng, 2015) that are often inefficient (Szirmai et al., 2011). Despite such disadvantages, entrepreneurs in SIDS have been able to develop innovations that are new to the world and large multinational enterprises. This merits a scholarly investigation into the logics used by these small island entrepreneurs.

Central to this dissertation were four sub-research questions:

*Which heuristics do the entrepreneurs use in the SIDS context?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?*

*How do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious environment, independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?*

*How do an entrepreneur's ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*

In the following section, I will provide a short summary of the main contributions I aim to make with this dissertation. This is followed by the limitations of this study and finally I will share implications of this research.

## **8.2 Contributions**

### **8.2.1 The use of heuristics in the SIDS context**

In Chapter 4, I addressed the question of "*which heuristics do entrepreneurs use in the SIDS context?*" I collected data of seven cases to study this question. This research showed that the SIDS entrepreneurs are flexible in their use of the causal, effectual and bricolage logics but have a strong inclination to causal rationality. The parallel use of these logics in the SIDS context is in part explained by three factors. First, there are different kinds of activities in the entrepreneurial opportunity exploitation. The process of exploiting an entrepreneurial opportunity consists of several decisions that are characterized by different degrees of uncertainty. These decisions can occur at the same time but also during the entire process, which means that there is a temporal dimension. A SIDS entrepreneur oscillates between the logics as he or she determines which particular logic better fits the kind of entrepreneurial activity. Second, the SIDS entrepreneur switches between logics because he or she has to make decisions in the small and penurious context. On the one hand, effectual logic is used to leverage social networks to acquire resources and capabilities. He or she also needs to invest his or her own resources as a 'rite-of-passage' to take on a role of entrepreneur and create legitimacy for other stakeholders such as lenders. On the other hand, raising capital from financial institutions requires the SIDS entrepreneur to make use of causal logics. In addition, the penurious environment forces the SIDS entrepreneur to use causal logic to guarantee himself or herself survival in the midst of scarcity, comparable to what takes place in a game of musical chairs. Finally, the gap between the technical expertise of the SIDS entrepreneur and the expertise required to develop the respective product also influences the logics used by the SIDS entrepreneur. A large gap makes it difficult for an entrepreneur to leverage social networks and hence causal logic is more adequate. In situations with a low

gap the effectual logic is fruitful to acquire information and resources through social networks.

### **8.2.2 The 'born global' firm**

In Chapter 5, I formulated the research question "how do the causal, effectual, and bricolage heuristics used by an entrepreneur in the SIDS context, independently or jointly influence the process of becoming a 'born-global' firm?" The 'born-global' firm has received major attention in the international entrepreneurship (IE) research literature. The incremental models e.g. the Uppsala- model (Johanson & Vahlne, 2009) could not explain this phenomenon. 'Born-global' firms that are typically found in small economies showed early and rapid internationalization despite being resource constrained (Knight & Cavusgil, 2004). These early internationalizing firms leverage social networks to enter international markets (Ellis, 2000).

The internationalization process can also be conceptualized as a process of opportunity discovery, enactment, evaluation and exploitation (Grégoire, Cornelissen, Dimov, & van Burg, 2015; Katz & Shepherd, 2003) and thus a cognition framework is adequate to study the decision-making logics that leads to the leverage of social networks in the internationalization process. What confounded researchers is the conflicting empirical results concerning the use of logics in this process. I studied this question using a multiple-case study consisting of four cases; two 'born-global' firms (i.e. GameCo and MusicCo) versus two firms that internationalized incrementally (i.e. SecurityCo and TransactionCo). I collected the data from the SIDS for the reason that the challenges experienced in the SIDS context are those that induce firms to be born globally (Crick & Jones, 2000; Kalinic et al., 2014). Thus, there are vital lessons to learn from the practices of SIDS entrepreneurs.

This research provided two main contributions to our understanding of cognition and the rapid internationalization process of the 'born-global' firm. First, I showed that to leverage social networks a 'born-global' firm uses the causal, effectual and bricolage heuristics in similar fashion compared to the entrepreneurial firms that internationalized incrementally; that is in combination.

Second, I showed that the difference between the 'born-global' firm and firms that internationalized incrementally depends on the conditions in which these logics are used. The conditions include the gap between the SIDS entrepreneur's technical expertise and the technical expertise required to develop the product. When the gap is large SIDS entrepreneurs turn to causal logics to acquire resources and embark on the internationalization path. Furthermore, in situations of a small gap, the SIDS entrepreneurs can successfully leverage their social networks through effectual logics and remain local.

### **8.2.3 Novelty of innovations from penurious environments**

In Chapter 6, I addressed innovations that are new to the world from penurious environments. The question addressed was “how do the causal, effectual, and bricolage heuristics used by an entrepreneur in a penurious independently or jointly influence the process of developing innovations that are new to the world from the SIDS context?” Prior literature showed that technological advances and entrepreneurship are important for economic development. The tradition is to focus on the firm as the creator of innovation in which science and R&D are essential. These are also most evident in developed countries. According to this approach, the diffusion of innovation takes a North-South path. However, this North-South diffusion framework failed to explain innovations that emerge from penurious countries (i.e. South-North path) and the role of the entrepreneur in this innovation process. In addition, this research could benefit from using cognition to understand how decisions lead to new-to-the-world innovations from penurious environments. I used multiple-case study consisting of seven cases and the Fuzzy-Set Qualitative Comparative Analysis (fsQCA) to study these shortcomings.

I have provided two contributions. First, using an integrative framework of causation, effectuation and entrepreneurial bricolage provides better explanations of how the combinations of these logics lead to innovations that new to the world from the uncertain and penurious context. It is better compared to causation, effectuation and bricolage separately.

Second, using only effectuation is not sufficient. It provides a too simplistic view on how the heuristics lead to the development of innovations that are new to the world from a penurious environment. Using effectuation alone assumes that the SIDS entrepreneur is able to acquire all the required variety in resources to develop innovations that are new to the world through pre-committed stakeholders. In addition, it assumes that the SIDS entrepreneur does not leverage contingency or make use of the affordable loss heuristics. However, implementing an innovation on a large scale and on a global platform requires a large amount of resources that surpasses what an ordinary SIDS entrepreneur is able to acquire effectually. Thus these SIDS entrepreneurs need to make use of the affordable loss to minimize their risks in investments.

### **8.2.4 The affordable loss**

In Chapter 7, I laid the ground work for a process model of the affordable loss. Prior literature showed that the expected financial return was a dominant consideration to explain entrepreneurial entry. However, this fails to explain entry in conditions of uncertainty. Effectual scholars have proposed the affordable loss heuristic as an alternative decision logic that guides investments under uncertainty. Despite the increased use of the affordable loss heuristic in the entrepreneurship literature, it

has been mostly applied as a black box. In Chapter 7, I studied the question “*how do an entrepreneur’s ability and preference independently or jointly influence the process of investing in the exploitation of an entrepreneurial opportunity in the SIDS context?*” The chapter built on studies of Dew et al (2009) and Sarasvathy (2015) and made use of an explorative multiple-case study to create new insights into how an entrepreneur uses the affordable loss heuristic to make the entry decision.

Chapter 7 contributed the following towards our knowledge about this concept. First, the affordable loss consists of the ability and preference components. The SIDS entrepreneurs go through a process of decoupling of income from accounts reserved for making payments. This decoupling activity increases the ability component of the affordable loss heuristic. This is not a simple process of mental accounting but is influenced by multiple sources of income of the entrepreneur. The preference component of the affordable loss heuristic is influenced by what an entrepreneur considers is both satisfactory and sufficient. This is also a ‘rite of passage’ as investments are seen as a necessity to confirm his or her new role in the exploitation process of the opportunity. Finally, the resources that the SIDS entrepreneur considers to diminish in value, if it is not used, influences the preference component of the affordable loss heuristic.

Second, the affordable loss heuristic is not applied to a single investment decision but applied in multiple stages of decision-making throughout the opportunity exploitation.

Finally, I presented a process model of the affordable loss. The entrepreneur starts with a decision in an environment that he or she perceives to be uncertain. In the case the entrepreneur makes use of the affordable loss heuristic he or she considers his or her ability and preference. There are two outcomes to the process; an entrepreneurial entry with lower invested amounts compared to entries made according to rational approaches and no entry. No entry can occur if the SIDS entrepreneur regards his or her resources as of no value (i.e. low ability). Lastly, the SIDS entrepreneur proceeds to a next stage along the development of his or her product in which he or she once more evaluates an investment decision.

### **8.3 Generalizability of this study**

The premise of this study has been to explore the entrepreneurial decision-making in the context of the Small Island Developing States. These small territories are very different to other countries regarding e.g. their sizes, remoteness and insularities, and environmental fragility (Briguglio, 1995). The uncertainties and resource constraints that are part of any entrepreneurial process are enhanced by the characteristics of the SIDS. The study is not to test hypotheses and search for statistical generalization. The only generalization that is possible in an exploratory study is the theoretical generalization. This is defined as those studies where “the

theory itself indicates that it would be applicable in a particular situation” (Meredith, 1998, pp. 450). Taking the theoretical generalization into consideration, I would like to reflect on the following situations. First, in this study, I viewed the SIDS as a homogenous group and thus would like to generalize the findings to the SIDS population. However, one has to take into consideration that the SIDS is a heterogeneous group. For example, although Singapore is a SIDS, it should be considered as an outlier. It has a vast population (+/- 5.6 million according to the Department of Statistics Singapore) and thus does not experience all of the unique challenges (e.g. small domestic market) as other SIDS. One has to be careful with the generalization of the findings to all the SIDS.

Second, despite this study’s focus on the SIDS, the findings can be generalized to the context of small, isolated and peripheral towns in non-SIDS. Small towns share many of the characteristics of SIDS. For example, small towns also have a narrow range of products and limitations of domestic competition. Despite that these small towns form parts of larger domestic markets, the towns are isolated, and transportation to and from these towns are limited and expensive. Consequently, the surrounding market remains small, and there are limitations in the supply of resources. Furthermore, there are limited opportunities for specialization in the labor force. The limitations for specialization in labor leads to a very narrow range of local skills, brain drain, and limited access to capital markets.

Entrepreneurs in small towns can also be expected to make use of the causal, effectual, and bricolage logics in combination, for example, to tackle different kinds of activities that are present in the opportunity exploitation. Or to deal with their small and constraint environments. In addition, the gap between their knowledge and the knowledge required in producing their products also influences the choice of logics and the extent these entrepreneurs become ‘born-global’ firms. One can think of a small town that is in proximity to the neighboring country. The closest larger city might not be in the same country, but in the neighboring country.

Third, the focus of this study is on ICT entrepreneurs. This choice partially reduces the effects of the SIDS characteristics of isolation and small domestic market. ICT and digital companies show larger tendencies to escape the unique environment of the SIDS and become ‘born-global’ firms. However, this is only valid for the supply-side (i.e. finding product markets). The strategies of the entrepreneurs on the demand-side are different. My findings show that the entrepreneurs first search locally for human capital. Only when the entrepreneurs have difficulty sourcing human capital locally, the entrepreneurs will choose to participate in the globalization of production. In addition, though ICT not being the main sector for all SIDS, the same patterns are visible in other major sectors such as the international financial and the hotel industries. Furthermore, the argument for the minimization of the effects of the isolation and small domestic market by the digitalization of firms

is only valid for ICT services and not physical products that have large ICT components. Examples are smart phones, security cameras, and PostCo.

Finally, uncertainty and resource constraints are pertinent to many new ventures. The SIDS are not fundamentally different but only to a degree. What makes SIDS different are the additional inaccurate information due to secrecy, and the open and vulnerable state of the SIDS. These enhance the uncertainty and resource constraints experienced by entrepreneurs operating in the SIDS context. Furthermore, the small context creates constraints not only on the supply-side but also on the demand-side.

## **8.4 Implications**

### **8.4.1 Theoretical implications**

The findings present several theoretical implications. Factors that have been found to influence the combined use of causal, effectual and entrepreneurial bricolage logics in general are the entrepreneurial experience, his or her network and resource position, the search for venture capital, pressures from stakeholders, new experienced member in top management that makes the decisions, accessible information, and information processing capabilities. This study shows that the factors for the combined use of the causal, effectual and entrepreneurial bricolage logics, in general, are also evident in the SIDS context. Entrepreneurs in the SIDS also are influenced by among others their resource positions, the search for venture capital and pressures from stakeholders.

In addition, a general theoretical implication for the effectuation theory is the process to make investments. Investments made using effectual approach should be seen as a cycle that starts with an entrepreneur evaluating how much he or she can invest, followed by evaluating how much he or she is willing to invest, and ultimately resulting in an investment if the ability is larger than the willingness. Furthermore, theoretical implications specifically for the SIDS context are the conditions that lead to the combined use of the causal, effectual and entrepreneurial bricolage logics. The factors that influence the use of causal, effectual and entrepreneurial bricolage logics, in general, can be organized into the demand- and supply-sides. Uncertainty and accessible information can be considered to be part of the demand-side. This study shows that besides uncertainty, the limited opportunities on the demand-side also influences the use of the causation, effectuation, and entrepreneurial bricolage logics. Entrepreneurs pursue a product differentiation strategy in niche markets. In the SIDS the niche markets are often too small to sustain a profitable entrepreneurial venture, and this may induce the entrepreneur to use causal logics. On the other hand, the nepotism and reciprocal

favors that exist in the society may create a need for the entrepreneur to maintain a network of stakeholders to through which he or she can acquire resources and capabilities.

Additionally, the gap between technical knowledge of the entrepreneur and the technical knowledge that is required in developing the product has theoretical implications for effectuation theory. The need for goal-driven acquisition of resources is the effect of the SIDS context that operates through the constraints in the supply-side. The entrepreneur may set goals using effectual logics, but due to constraints in resources to attain the goal, the need is created to oscillate causal logics.

Likewise, the gap between the knowledge of the entrepreneur and the knowledge required to develop the product can also be seen as an antecedent for the use of decision logics for the internationalization at inception. A large gap may create the need for goal-driven acquisition of resources.

Furthermore, the results of the fsQCA analysis show the boundaries of the effectual approach to explaining innovations that are new to the world. The effectual approach is limited to understand new-to-the-world innovations that emerge in penurious environments.

#### **8.4.2 Managerial implications**

This study offers several implications for practice. First, entrepreneurs should look into causation, effectuation and entrepreneurial bricolage as strategic tools. Entrepreneurs should use the effectual and entrepreneurial bricolage logics to make the initial investments and start the entrepreneurial processes. More specifically, they should approach the potential customers very early in the development processes and involve the customers during the entire development of the products (i.e. co-create with the potential customer). This requires that the entrepreneurs use the causal logics to get an initial idea of a product they can develop that can be sustained by the small economy, create an idea of potential customers, to acquire resources and maintain relationships with partners e.g. investors.

Second, when entrepreneurs make the investment decisions, they should consider all of their sources of income and develop a scheme of their residual income after paying their monthly fixed and variable expenses (including savings). Subsequently, they should evaluate which of the residual income diminishes in value if not used. They should use this residual income to invest. Entrepreneurs should also inquire how much they should invest (e.g. notary expenses) to gain legitimacy and assume the role and identity of being an entrepreneur. If the minimum investment is smaller than their residual income, they should make the entrepreneurial entry. If it is not, they should not make the entrepreneurial entry.

Third, if entrepreneurs would like to go global at inception, they should use the causal logics to develop international social networks and leverage these networks to acquire human capital.

Finally, my study suggests that entrepreneurs should look into causation, effectuation and entrepreneurial bricolage as tools to also develop new-to-the-world innovations. Successfully developing innovations is a complex test, even more, when these innovations are new to the world. Entrepreneurs should be flexible to oscillate between the decision logics despite operating in resource constraint environments.

### **8.4.3 Policy implications**

This dissertation also has implications for policy. The knowledge that has been gained gives rise to two policy recommendations. The first is mobilizing the Diaspora for entrepreneurial development. One of the major challenges entrepreneurs face in the small island context is the limitation of resources, which is enhanced by brain drain, the isolation from large markets, and limited access to capital markets. However, this may also be a blessing in disguise. Because of mainly brain drain, small islands have large Diaspora networks that are usually concentrated in developed countries. These networks can be leveraged to acquire the knowledge and skills that are required for opportunity discovery, enactment, evaluation, and exploitation and the rapid internationalization of firms. My research has shown that due to a large gap between the technical expertise of the entrepreneur and the technical expertise required to develop the product, SIDS entrepreneurs form networks based on causal logics. These networks are used to acquire knowledge and resources. A Diaspora policy should target the SIDS entrepreneurs and the expats, and include them in the Diaspora network to encourage collaboration. Such intervention could increase the speed with which these firms can become a 'born-global' firm.

A second policy intervention relates to the use of the causal, effectual and bricolage logics. A recurring theme throughout this dissertation is that entrepreneurs in the SIDS context use these heuristics in combination; both in the process to leverage social networks and becoming a 'born-global' firm and in the process of developing innovations that are new to the world. Entrepreneurs should be trained on when and how to oscillate among these logics. Entrepreneurship education has included lots of business planning exercises, although the links between training and entrepreneurial success are ambiguous (Honig, 2004). More beneficial would be to prepare future entrepreneurs on how to recognize situations and relate them to adequate decision logics.

## 8.5 Limitations

This study is not without its limitations. First of all, there are limitations in the data. The collection of data in Curaçao has been a challenge. I have provided the participants with the option for non-compete agreements, in which I am restricted in the use of the data for competitive purposes. All participants have signed this agreement. Despite this the amount of data provided by the participants was limited. I have consulted public records but also the data available in these were limited. In addition to issues related to the availability of data, the data collected in the multiple-case study was not coded by independent coders. Consequently, the conclusions can be influenced by researcher's bias.

Furthermore, this research is limited in its generalizability. It is an explorative multiple-case study and the conclusions are drawn from a limited set of cases. Chapter 5 made use of a four cases and Chapters 4, 6 and 7 used seven cases. Subsequent work is required to test the relationships proposed in this study on a larger sample.

In addition, the data was collected in Curaçao, a Small Island Developing States. Because the context is very important to understand the entrepreneurial processes (Zahra & Wright, 2011) the findings of this study cannot be generalized to all context. The findings are only valid for small islands, small towns, and SIDS entrepreneur operating in the ICT industry.

There are also limitations related to specific topics of this study. Regarding 'born-global' firms, the data collected and conclusions drawn, focus on SIDS entrepreneurs that have internationalized from inception to participate in the globalization of production. The conclusions drawn cannot be extended to SIDS entrepreneurs that have internationalized at inception to take advantage of the globalization of markets. Including the demand side in future studies can provide more insights into the use of logics and social networks in the internationalization of the 'born-global' firms.

Regarding innovations that are new to the world, I did not access expert reviewers for their judgments of the novelty of the innovation of my cases. Due to incomplete information it was a challenge to assess the newness of the innovation on a world podium. This limitation can also lead to biases. I also have a large number of conditions versus a low number of cases. This can lead to a 'garbage-can' model.

Finally, the study to come to a process model of affordable loss interviewed only SIDS entrepreneurs that had made the entry/plunge decision. Thus this study can lead to incorrectly accepting faulty explanations of the data collected (Type II errors).

## 8.6 Areas for future research

This research identifies several areas regarding the topics of the 'born-global' firm, new-to-the-world innovations from penurious environments, and the affordable loss, which require further research in the future. Regarding the use of cognition and leveraging social networks in the process to become a 'born-global' firm, future research should address the distinction between how entrepreneurs in small countries and small islands are born globally. The 'born-global' firm is mostly evident in small economies (Cavusgil & Knight, 2015; Terjesen, 2015), but in the literature no distinction is made between small countries and small islands. Small islands are recognized as a distinctive group of developing islands that share similar characteristics and a unique set of challenges<sup>67</sup>. However, small islands also have small isolated and peripheral towns with similar characteristics<sup>68</sup> for example brain drain. Thus besides the distinctive context between these groups of small countries there is also similarities that makes future research on this topic interesting. An example of a question that can be asked is "how does the size of the island and its context influence do internationalization process?" A comparison of the use of decision logics between SIDS and small and isolated towns can generate important insights on this matter.

Another important area for future research is the 'gap'. The gap implies a spectrum over which the gap can differ (i.e. smaller or greater gap); a small gap between the entrepreneur's technical expertise and the technical expertise of the product or a larger gap between these. How does the difference over the entire spectrum influence the entrepreneur's ability to leverage his or her social networks? Future research should address this matter and examine how a variety in the gap between the technical expertise of the SIDS entrepreneur and the technical expertise required to develop the product influences the use of social networks in the rapid internationalization process.

Regarding the new-to-the-world innovations from penurious environments, an area that is underdeveloped is the entrepreneur's resource position. Prior literature shows that novelty of innovation is related to the variety in the domains of knowledge on which the novelty rest, and on the distance between these domains (Schoenmakers & Duysters, 2010). More variety and larger distance are conducive to more novel innovations. The accumulation of knowledge can be facilitated by increasing the entrepreneur's resource position. However, prior research also shows that poor environments also induce innovation; 'necessity is the mother of invention'. This oxymoron leads to the dilemma of how innovation should be encouraged. Should poor SIDS entrepreneurs receive more funding? Or

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<sup>67</sup> 1. Small size, 2. Remoteness and insularity, 3. Disaster proneness, 4. Environmental fragility and 5. Other factors (Briguglio, 1995).

<sup>68</sup> Apart from an island being surrounded by an ocean and challenges flowing forth from this e.g. high transportation costs.

should 'rich' SIDS entrepreneurs be restricted in their use of large amounts of investments? Is it possible to train SIDS entrepreneurs to apply the heuristics that lead to new-to-the-world innovation from poor environments, while also providing them additional funding? Although these questions are formulated as policy questions, scholarly investigation can provide sound theory and evidence on which to base policy making.

Regarding the process model for the affordable loss, further work is required to advance the process model of affordable loss into a well-developed theory. In order to do this, taking into consideration the maturity of the research, open-ended questions are ideal (Edmondson & McManus, 2007). Examples of questions that can lead to more understanding to advance the process model of the affordable loss are: how can my process model of the affordable loss explain social and psychological investments?; how does the level of complexity or time required to exploit the opportunity influence the preference component?; how does an increase in ability influence the entrepreneur's propensity to make serial investments?; how is the affordable loss heuristic linked with the stages of financing?; and how is the affordable loss heuristic applicable to the priority of the investments?

Finally, future studies should seek for larger sample sizes. Larger sample sizes are vital to increasing the reliability of the findings (e.g. eliminating the problem of conducting fsQCA analysis with a large number of conditions versus a low number of cases) and enable statistical generalization.

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## **APPENDICES**

## Appendix 1.1 The internet as a breakthrough technology<sup>69</sup>

The Internet is a global electronic communications network that connects billions of devices and it has led to several entrepreneurial opportunities such as web browsers, search engines and Search Engine Optimization (SEO) markets, to name just a few. The web browser market's value is significant although it is difficult to determine the exact monetary value of the browsing market for the reason that most browsers are released as free complementary products for other platforms e.g. computer operating systems or search engines. An indication of market value is provided by the value of acquisitions that have taken place and the revenues of companies that sell browsers. For example, Netscape Communications Corp. was purchased by America Online Inc. in 1999 in a deal valued at US\$ 10 billion (Wire, n.d.); in 2013 Mozilla Foundation, whose flagship web browser (i.e. Firefox) has a 21.5% share of the market (w3schools.com, n.d.), received US\$ 306 million in royalties for permitting search engine providers to provide search tools to its web browsers (Hood & Strong LLP, 2014); and Opera Software, who has only 1.6% share of the market (w3schools.com, n.d.), had revenues of US\$ 481 million in 2014 (Opera Software, 2015), US\$ 304 million from advertising and US\$ 110 from licenses and royalties. As illustrated by the numbers, the web browser is a large market and it could not exist without the Internet.

A ripple effect that was created due to the 'Web' and the large content on it is the search engine market. To facilitate the process to find specific content on the 'Web' search engines were created. Search engine providers index the 'Web' and make these indices available through a search tool on their websites. An individual can perform a search query by using keywords that represent the information for which an individual is searching, and subsequently the individual is shown a results list with the websites that contain the desired information. Search engine providers' main source of income is advertisements that are linked to the results rankings. This search engine advertisement industry is substantial. It is estimated to grow worldwide from US\$ 53 billion in 2014 to US\$ 85 billion in 2019 (PWC, n.d.). It is dominated by Google that holds 64% share of the market as of May 2015 (Netmarketshare, n.d.). Google is an 'online' company in that its core business is dependent on the Internet and provides services through this medium. As one of the Internet behemoths, it is ranked at the second place on the list of the most valuable companies worldwide (Forbes, 2015).

The search engine market also created a new entrepreneurial opportunity which is the Search Engine Optimization (SEO). These are companies that help their clients (i.e. owners of websites) to appear high in the results rankings of search

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<sup>69</sup> The Internet is also a medium for telephony (VoIP), television (IPTV), and instant messaging (e.g. WeChat, WhatsApp, and Facebook Messenger).

engine providers (Couvering, 2004) by increasing the relevancy and quality of the websites to consumers or by adapting the websites' coding structures to affect the quality ranking process of a search engine (Berman & Katona, 2013). Although an exact number for the size of this market is not available, Econsultancy (2011) reports that 11% of companies spent US\$ 250 thousand or more on SEO in 2009<sup>70</sup>. In 2010 13% of companies reported to have spent US\$ 250 thousand or more on SEO. In 2011 this percentage increased to 20% (Econsultancy, 2012). This represents an increase of 54% from 2011 to 2013.

In addition to the web browsers, search engine providers and SEO markets, the Internet has also facilitated global digital commerce. Also called ecommerce, this market place is estimated to grow from US\$ 1.1 trillion in 2013 (5.1% of total retail) to US\$ 2.5 trillion (8.8% of total retail) by 2018 (eMarketer, n.d.). Although the ecommerce growth has been declining from 22.2% in 2014 to estimated 13.3% by 2018 (eMarketer, 2014), its share of the total retail is increasing.

The Internet has also made the emergence of several large 'online' companies possible. These are companies whose products are mainly produced and sold on the Internet. Forbes publishes a yearly list of the largest (i.e. market value) public companies in the world. Four firms in the top 40 are 'online' companies; Google at the 2<sup>nd</sup> position, Facebook at the 17<sup>th</sup> position, Alibaba at the 24<sup>th</sup> position, and Amazon at the 34<sup>th</sup> position (Forbes, 2015). Combined these companies are valued over US\$ 976 billion (Forbes, 2015).

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<sup>70</sup> 18% of these companies spent more than US\$ 3 million.

## **Appendix 1.2 Behavioral and market uncertainties at TheFacebook.com**

Facebook was co-founded by Mark Zuckerberg and three college friends (Facebook, 2015). In the same week the website was launched, three Harvard University senior students, Cameron Winklevoss, Tyler Winklevoss, and Divya Narendra, accused Mark Zuckerberg of stealing their idea and misleading them when he was hired to build a similar website to be called HarvardConnection.com (Nicholas Carlson, 2010). The Winklevoss brothers and Divya Narendra filed a lawsuit against Mark Zuckerberg and Facebook that was settled out of court for 1,253,326 shares and US\$20 million in cash in 2008 (Parr, 2011). When the Winklevoss brothers and Divya Narendra hired Mark Zuckerberg to build HarvardConnection.com, they did not foresee the opportunistic behavior displayed by Zuckerberg and hence did not use legal mechanisms (e.g. a written contract) to protect themselves against any opportunistic behavior. Their agreement was only verbal and not written (Parr, 2011). Not even during the development of HarvardConnection.com and the period preceding the launch of Facebook in 2004, did the Winklevoss brothers and Divya Narendra have any suspicion that Mark Zuckerberg would show opportunistic behavior. They had several in-person meetings and exchanged 52 emails and so the perception was created that Zuckerberg was working on their idea. Only when "TheFacebook.com" was launched did the Winklevoss brothers and Divya Narendra recognize the wrong doing of Mark Zuckerberg. This example illustrates the behavioral uncertainty with which entrepreneurs can be faced during the entrepreneurial process. It is difficult for an entrepreneur to foresee if a partner will comply with the agreements that have been made or not.

The Facebook example also serves as an illustration of market uncertainties. In 2007, Facebook introduced Beacon. This was a product that was part of their advertisement platform that would allow Facebook to share a member's purchases on third-party websites in the Facebook news feed. This product was heavily criticized and was considered a breach of privacy (Wheaton, 2007). After several protests and lawsuits in 2008 against Facebook and any third-party website that would partner on the Beacon product, the product was finally shut down in 2009 (Metz, 2009). In an apology letter Mark Zuckerberg expressed the product and its launch as 'mistakes' and 'a bad job', and admitted that Facebook "took long to decide on the right solution". This example shows that Facebook was uncertain concerning the market's acceptance of Beacon and failed to solve the problem promptly.

### **Appendix 1.3 Technological uncertainty at Clinkle**

Entrepreneurs also face technological uncertainty. This is illustrated with an example of Clinkle. Clinkle is a mobile wallet app that uses high-frequency sound to transmit money between users including merchants (Shontell, 2014). This technology was innovative because to transfer money it was not required to bump phones, scan a QR-code, swipe a card, send a text message, or any other currently used method. The technology showed promise and a patent was filed in 2013 (the patent was granted on March 10, 2015: number 8,976,959). Clinkle also received an early investment of US\$ 30 million from Peter Thiel, Andreessen Horowitz, Marc Benioff, Jim Bryer, Accel Ventures, Index Partners (Constine, 2015) and Richard Branson (Shontell, 2014). This was the biggest early investment in Silicon Valley history (Shontell, 2014). Nevertheless, despite having initial evidence that the technology could work, it was never successfully developed. It experienced unexpected problems such as interference of “a noise as common as a blender in the background at a coffee shop” (Shontell, 2014). How the technology would be negatively influenced by its surroundings was not foreseen and thus the technology could be characterized as uncertain.

## Appendix 3.1 Domestic product by sector and industry

Table A3. 1 Domestic product by sector and industry, Curaçao (MM USD [1 USD=1.82 ANG])

		2010	2011	2012*	2013*	2014*
	Non-financial corporations					
<b>A+B+C</b>	Agriculture, fishing and mining	11.8	10.9	10.7	10.4	10.1
<b>D</b>	Manufacturing	179.6	329.0	339.5	346.7	348.6
<b>E</b>	Electricity, gas and water	102.0	60.8	61.2	60.0	59.5
<b>F</b>	Construction	147.5	160.4	155.4	155.9	153.8
<b>G</b>	Trade	302.5	316.2	336.1	311.8	306.5
<b>H</b>	Hotels and restaurants	100.1	128.8	139.0	143.1	152.9
<b>I</b>	Transport, storage and communications	288.9	309.8	332.0	347.7	343.0
<b>K</b>	Real estate, renting and business activities	202.2	212.0	210.5	214.7	213.0
<b>M</b>	Education private	13.0	13.7	14.4	13.6	14.1
<b>N</b>	Health and social work	133.0	140.3	139.0	139.4	143.6
<b>O</b>	Other community, social and personal service activities	74.9	87.9	89.5	90.0	90.8
	Value added, gross, market prices	1555.6	1769.9	1827.2	1833.2	1836.0
	Financial corporations					
<b>J</b>	Financial intermediation	492.9	334.6	348.9	351.5	349.4
	Value added, gross, market prices	492.9	334.6	348.9	351.5	349.4
	Government					
<b>A+B</b>	Agriculture	1.0	0.8	0.7	0.7	0.7
<b>I</b>	Transport, storage and communications	4.2	9.0	8.0	7.5	7.3
<b>K</b>	Real estate, renting and business activities	1.9	2.0	1.9	1.9	1.9
<b>L</b>	Public administration and defense; compulsory social security	210.5	195.2	204.1	205.3	200.1
<b>M</b>	Education	50.5	58.1	53.6	54.4	53.2
<b>N</b>	Health and social work	39.0	47.8	44.0	44.9	44.9
<b>O</b>	Other community, social and personal service activities	27.4	33.9	30.8	28.6	28.2
	Value added, gross, market prices	334.6	346.9	343.0	343.2	336.2
	Households & Non-profit institutions serving households					
<b>A+B</b>	Agriculture and fishing	0.3	0.3			
<b>D</b>	Manufacturing	0.7	0.2			
<b>F</b>	Construction	1.4	1.9			
<b>G</b>	Trade	1.0	0.1			
<b>H</b>	Hotels and restaurants	2.1	0.7			
<b>I</b>	Transport, storage and communications	8.6	8.4			
<b>K</b>	Real estate, renting and business activities	259.5	277.0			
<b>N</b>	Health and social work	1.4	0.7			

		2010	2011	2012*	2013*	2014*
<b>O</b>	Other community, social and personal service activities	8.5	7.1			
<b>P</b>	Private households	18.1	17.7			
	Value added, gross, market prices	301.6	314.0	331.0	309.9	319.9
	Total Value Added gross, market prices	2684.7	2765.4	2850.2	2837.8	2841.4
	plus Taxes less subsidies on products	297.1	304.9	313.2	346.0	344.8
	minus Fisim	79.2	81.7	83.9	87.5	79.0
	Domestic Product gross, market prices	2902.7	2988.6	3079.5	3096.4	3107.2
	Nominal growth	2.9	3.0	3.0	0.5	0.3
	Inflation	2.8	2.3	3.2	1.3	1.5
	Real growth	0.1	0.6	-0.1	-0.8	-1.1
<b>* Note: Estimated GDP values</b>						

Source: Central Bureau of Statistics Curaçao

## Appendix 3.2 Income per capita

Table A3. 2 Income per capita, Curacao MM USD (1 USD=1.82 ANG)

	2007	2008	2009	2010	2011
<b>Gross National Income, market prices</b>	2599.9	2779.8	2774.3	2892.2	2971.5
<b>Net national income, market prices</b>	2329.5	2491.7	2413.5	2516.2	2566.0
<b>Mid-year population (x1000)</b>	79.1	80.1	80.7	81.7	82.9
<b>Per capita Gross National Income, market prices</b>	18049.4	19058.2	18897.6	19450.9	19701.0
<b>Per capita Net National Income, market prices</b>	16172.4	17082.6	16439.8	16922.2	17012.6
<b>Other taxes on production</b>	24.1	20.1	24.5	39.0	37.3
<b>Other subsidies on production</b>	70.0	78.0	53.1	54.4	56.9
<b>Depreciation</b>	270.4	288.2	360.8	376.0	405.5
<b>Net national income, basic prices</b>	2283.7	2433.8	2384.9	2500.8	2546.4
<b>Per capita Net National Income, basic prices</b>	15853.9	16685.6	16245.1	16818.6	16882.6

Source: Central Bureau of Statistics Curaçao

## **Appendix 3.3 Background information about Curaçao**

### **Introduction**

Curaçao is an island of approximately 444 square kilometers situated very close to the north coast of Venezuela. It has a population of roughly 157 thousand. It used to form part of the federation of islands called the Netherlands Antilles, together with Bonaire, St. Maarten, St. Eustatius, and Saba. Since October 10, 2010 the federation was dissolved and Curaçao became an autonomous state within the Kingdom of the Netherlands (Central Bureau of Statistics Curaçao , 2015).

### **History and Culture of Curaçao**

An island with Arawak Indians as the original inhabitants was first discovered by the Spaniards. It is an island with a history in slavery. Curaçao was conquered in 1634 by the Dutch West India Company (WIC) from the Spaniards. In 1639 the WIC started transporting slaves from West-Africa to Curaçao completing the slaves-transport-triangle between Europe, Caribbean, and the Americas. In 1863 the slave trade was abolished by the Dutch. To-date Curaçao's culture is predominately formed by African ancestors (Abraham-van der Mark, 2003). However, Curaçao enjoys of a rich multicultural society with nationalities ranging from European Dutch and Surinamese to Venezuelan and Colombian, to Haitians and Dominicans.

Inequalities of power and wealth are very prevalent in Curaçao. This can have the following consequence. According to a study of Husted & Instituto Tecnológico y de Estudios (1999) power distance in a society has a positive impact on the level of corruption in that country. This is exactly the case in Curaçao. There has been a great deal of corruption in the government of this island. Several government authorities were convicted in the beginning of 2004 of various charges ranging from fraud, to bribery and false contracts. Corruption continues to be a weakness after 2010. There are cases in the process against the former prime minister and minister of finance. A research performed by Transparency International in 2013 (Transparency International, 2013) highlights that the political system and the government to be the weakest link to combat corruption.

Curaçao is a very collective society. Asian, African, and South American culture tend to be collective cultures (Triandis, 2001). This translates in a relatively low individualism which represents a society with collective achievements with close ties between individuals. This dates back to when Africans slaves were brought to Curaçao by the Dutch. These slaves formed groups and close ties to help each other support the burden of slavery. They lived in small slave huts with as many as eight slaves. By living this lifestyle, they adopted this collective mindset. This collectivism is still apparent in the household of the population of Curaçao. Households used to be relatively large with at least 4 persons. However, there is a

developing trend of individualization. In 1992 the average households contained 3.5 individuals. This decreased to 3.0 in 2001 and 2.7 individuals in 2011 (Maduro-Jeandor, 2014).

Masculinity has been a big issue in this society. This island has been considered to be very masculine. This can be due to the religious preference of the majority of the population. Curaçao has been considered to be predominately Catholic (80 percent). According to Catholic religion, women have not much to say and the major roles in the religious organization and the Vatican are occupied by man. However, this society is becoming more feminine. Women are taking more responsibilities. There are many single mothers in Curaçao and they have to take the masculine role of provider upon themselves. We nowadays see more women in top government functions and heading large organizations.

The inhabitants of Curaçao show average uncertainty avoidance. However, the level of avoiding uncertainty is dropping. There is a clear relationship between the individualization and risk-taking in a society. The more individualistic and feminine a society becomes; the more risks individuals are prone to take. This can be due to that the strict rules formed by masculine societies, and social sanctions due to deviation from norms (Triandis, 2001) formed by collectivistic groups and mentality are lessened.

Curaçao is a long-term oriented society. The society embraces traditional values and norms. An example is that this society does not accept marriages between same sex partners. This could be related to the masculinity and the collectivism of the society and religious influences from the Catholics. The society has great respect also for traditions such as celebration of Carnival, and religious holidays such as the Ash Wednesday and Christmas. However, this culture is changing towards a more short-term oriented society. Quick results are wanted versus waiting for long-terms for results. This can be clearly seen in the government election for the island of Curaçao. Every four years, election is held and every four years there is a clear different result from the previous years. As Curaçao has been through a difficult economic period and crime rates are said to be sky high, it will take a long-term effort to change the situation around. But the population of Curaçao has not been patient with the government officials at command. Direct and short-term results were not present from the plans that were carried out by the officials. So the society chooses other officials to represent the country instead of waiting for long-term results.

### **Economy of Curaçao**

Curaçao's currency, the Dutch Antillean guilder, is pegged to the US dollar at an exchange rate of 1 NAF = 0.55 USD. It has an open economy that relies primarily on three sectors: financial intermediation (USD 349.4 million in 2014; 11.24% of GDP),

manufacturing (USD 348.6 million in 2014; 11.22% of GDP), and transport, storage & communication (USD 343.0 million in 2014; 11.04% of GDP). The major import countries are the United States of America (USD 692 million in 2012; 46% of the totality) and the Netherlands (USD 243 million in 2012; 16% of the totality); the major export countries are the United States of America (USD 52 million in 2012; 26% of the totality) and Aruba (USD 46 million in 2012; 23% of the totality) (see Table A3.3).

**Table A3. 3 Imports and exports by main country (excl. Oil products) (MM)**

	2010		Import 2011		2012		2010		Exports 2011		2012	
	USD	%	USD	%	USD	%	USD	%	USD	%	USD	%
Aruba							14	10	25	16	46	23
Netherlands	245	20	226	18	243	16	20	14	23	14	35	17
Panama	50	4	46	4	56	4						
Puerto Rico	67	5	64	5	75	5						
Rest of the world	372	30	356	28	368	25	44	31	77	49	41	21
St. Maarten							4	3	4	3	20	10
U.S.A.	460	37	521	41	692	46	57	40	25	16	52	26
Venezuela	60	5	50	4	57	4	2	2	3	2	7	4
<b>Total</b>	<b>1,254</b>	<b>100</b>	<b>1,263</b>	<b>100</b>	<b>1,491</b>	<b>100</b>	<b>142</b>	<b>100</b>	<b>158</b>	<b>100</b>	<b>201</b>	<b>100</b>

Source: Central Bureau of Statistics Curaçao

The major imported commodities are machinery and transport equipment (USD 551 million in 2012; 37% of the totality), followed by food and live animals (USD 268 million in 2012; 18% of the totality). The major exported commodities are machinery and transport equipment (USD 183 million in 2012; 50% of the totality) and food and live animals (USD 45 million in 2012; 12% of the totality) (see Table A3.4).

**Table A3. 4 Imports and exports by Commodity (excl. Oil products) (MM)**

SITC-Sections <sup>1)</sup>	2010		Imports 2011		2012		2010		Exports 2011		2012	
	USD	%	USD	%	USD	%	USD	%	USD	%	USD	%
0. Food and live animals	221	18	240	19	267	18	14	10	26	16	25	12
1. Beverages and tobacco	52	4	51	4	64	4	7	5	10	6	12	6
2. Crude materials, inedible, except fuels	14	1	14	1	14	1	1	0	7	5	3	2
4. Animal and vegetable oils and fats	6	0	7	1	7	0	0	0	0	0	1	0
5. Chemical products	139	11	157	12	173	12	12	9	18	11	18	9
6. Manufactured goods	170	14	163	13	184	12	13	9	16	10	17	8
7. Machinery and transport eq.	435	35	415	33	551	37	80	56	55	35	101	50
8. Miscellaneous, other art.	204	16	207	16	222	15	11	8	21	13	15	8
9. Commodities not classified	13	1	11	1	9	1	5	3	5	3	10	5
<b>Total</b>	<b>1,254</b>	<b>100</b>	<b>1,263</b>	<b>100</b>	<b>1,491</b>	<b>100</b>	<b>142</b>	<b>100</b>	<b>158</b>	<b>100</b>	<b>201</b>	<b>100</b>

1) Standard International Trade Classification - Revised

Source: Central Bureau of Statistics Curaçao

Curaçao went through a prolonged economic down turn in the nineties and subsequently it entered in a recession in 1997. This recession was caused mainly by

inadequate policies and it was accompanied by a staggering rise in the inflation mainly due to the rise of world oil prices and indirect taxes. In 1997 the International Monetary Fund (IMF) was involved to develop an economic recovery plan for the Netherlands Antilles.

In 1998, with the collaboration from the International Monetary Fund (IMF), the Government of the Netherlands Antilles developed a recovery plan. This recovery plan, named the Structural Adaptation Program (SAP), focus was to implement actions in the functional areas of budget management & policies, debt management & policies, labor agreements & policies, taxation, privatization of State Owned Enterprises, and enhanced controlling of costs in the social health system. Major attention was directed towards attracting Foreign Direct Investment (FDI) in the privatization efforts. Large parts of the FDI came from the Netherlands. Porto Paseo, former Kadushi Cliffs, Kura Hulanda Museum, and Hotel Kura Hulanda were invested in by the Dutch entrepreneur Jacob Geldt Dekker; Curaçao's Blue Bay Golf is an initiative from entrepreneur Joep van de Nieuwenhuyzen; and the distributor of electricity and water Aquaelectra signed an agreement with Delta Nutsbedrijven from the Netherlands.

Some actions carried out by the government of Curaçao in her endeavor to revive the economy of Curaçao were the reorganizing of the public sector. The government, which was one of the biggest employers on the island, severely reduced her staff to make an attempt to cut into her labor expenditures. In the end of 2000 the foundation called The Foundation for Implementation of Privatization ("Stichting Implementatie Privatisering") was founded by the Curaçao Government to facilitate the privatization of the State Owned Enterprises with means to economic development. Government also made new policies with the intent to attract Foreign Direct Investment. One of the developments to attract foreign investors is the E-Zone legislation. This is a tax haven that provides a 2 percent net income tax to companies that cater to international markets.

Since 2003 Curaçao has experienced moments of slow economic growth (between 0.2% and 2.5%). After 2010 the debt of Curaçao towards the Netherlands was cancelled. In 2012 it experienced a negative growth of 0.1%, in 2013 of 0.8%, and 1.1% in 2014 thus officially entering a recession (Central Bureau of Statistics Curaçao, n.d.).

The income per capita in 2011 was USD 16,882.6 and the change in income distribution is very stable with a slight decrease in the income inequality. In 1992 the average income was USD 1,368 per month and the median income USD 880 per month. The average income per month increased 11.6% in 2001 and 6.8% in 2011, while the mean income per month increased 10.7% in 2001 and 2.3% in 2011 (Vierbergen, n.d.). The GINI coefficient was 0.412 in 1992, 0.423 in 2001 and 0.415 in 2011 (Vierbergen, n.d.), which represents an improvement in income equality.

In 2013 there were 63,493 individuals employed in Curaçao, from which 0.49% (i.e. 310) worked in the ICT industry (see Table A.3.5). The computer consultancy and facilities management branch contains the majority of the ICT employees followed by other information technology and computer service activities.

**Table A3. 5 Employment by ICT industry**

ISIC Code	Total Employees
62010 Computer programming activities	22
62020 Computer consultancy and computer facilities management activities	151
62090 Other information technology and computer service activities	130
63310 Data processing, hosting and related activities	7
63120 Web portals	0
<b>Total</b>	<b>310</b>

Source: Central Bureau of Statistics Curaçao

### Entrepreneurial Firms

The growth rate in newly started companies and registered in the Curaçao Chamber of Commerce has been fluctuating the last years. In 2010 there was an increase of 24% in local companies; in 2011 the increase was only 4.7% while in 2012 there was a decrease of 13%. The explanation for the growth in 2010 is the creation of many foundations that were used as 'holding' companies with no shares and under which the limited liability companies are placed. This structure is used for tax advantages (see Table A.3.6).

**Table A3. 6 New registrations into the Curaçao Chamber of Commerce**

	2009	2010	% change	2011	% change	2012	% change	2013	% change
Offshore Companies	394	824	109.1	827	0.4	708	-14.4	697	-1.6
Local Companies	2106	2612	24.0	2736	4.7	2380	-13.0	2515	5.7
<b>Total</b>	<b>2500</b>	<b>3436</b>	<b>37.4</b>	<b>3563</b>	<b>3.7</b>	<b>3088</b>	<b>-13.3</b>	<b>3212</b>	<b>4.0</b>

Source: Curacao Chamber of Commerce

A more in-depth look in the registrations of new companies by legal status shows that the majority of the new companies registered in 2012 were sole proprietorships (i.e. 43%). If we consider the sole proprietorship and the Limited Liability Company to be representations of entrepreneurs, the growth rates of local newly registered companies for the former are 17.8% in 2012 and 2.7% in 2013; and for the latter are -13.3% in 2012 and -18.8% in 2013 (see Table A3.7).

Table A3.7 New local registrations into the Curaçao Chamber of Commerce

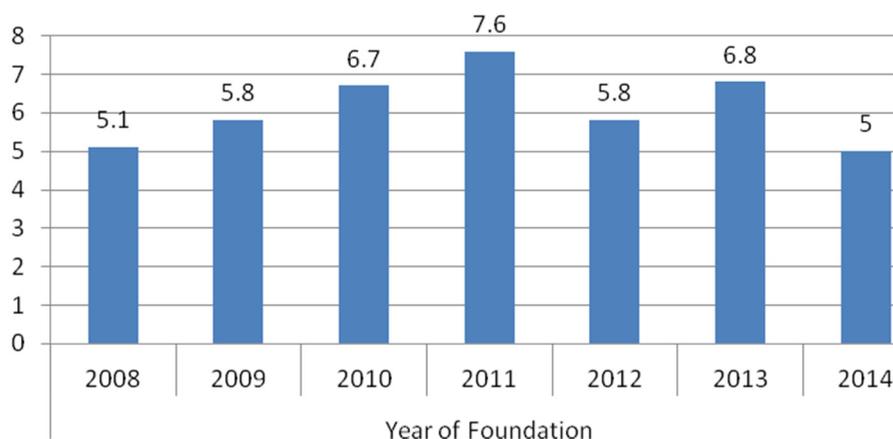
	2012	2013	% change	2014	% change
Sole proprietorships	1,080.0	1,272.0	17.8	1,306.0	2.7
Partnership without limited partners	46.0	54.0	17.4	67.0	24.1
Partnership with limited partners	3.0	7.0	133.3	10.0	42.9
Limited Liability Company	301.0	261.0	-13.3	212.0	-18.8
Private Limited Liability Company	691.0	657.0	-4.9	699.0	6.4
Co-operatives	0.0	1.0	100.0	1.0	0.0
Foundations	131.0	138.0	5.3	103.0	-25.4
Foundations SPF	41.0	32.0	-22.0	63.0	96.9
Associations with full legal authority	54.0	41.0	-24.1	47.0	14.6
Associations with limited legal authority	17.0	27.0	58.8	23.0	-14.8
Private Limited Liability Company (Holland)	5.0	6.0	20.0	6.0	0.0
Rest (Ltd and SA)	11.0	19.0	72.7	29.0	52.6
<b>Total</b>	<b>2,380.0</b>	<b>2,515.0</b>	<b>5.7</b>	<b>2,566.0</b>	<b>2.0</b>

Source: Curaçao Chamber of Commerce

### Business Census Korsou 2014

In 2014 the Ministry of Economic Development conducted a survey (i.e. the Business Census Korsou 2014) among businesses in Curaçao<sup>71</sup>. The objective was to census all active companies in Curaçao. Out of the total population of 24,466 active local companies in Curaçao in 2014 (Curaçao Chamber of Commerce, 2015) a total of 5,425 companies were sampled. The most used legal forms are limited liability companies (41.5%), proprietorships without personnel (16.8%), private liability companies (16.3%), and sole proprietorships with personnel (13.1%). The sample consisted of relatively young companies (see Figure A3.1); 42.8% of the sample are firms that are 7 years or younger.

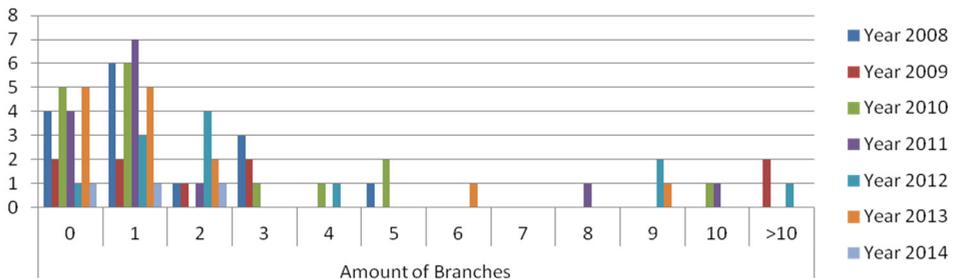
Figure A3.1 Percentage of companies newly registered between 2008-2014



<sup>71</sup> No report has been made with the data collected. The Ministry of Economic Development shared some results of the survey with the researcher.

An in-depth analysis of the newly registered companies between 2008 and 2014 shows that the majority of the companies (36%) have one (1) branch (see Figure A3.2); out of these companies 23% have been founded in 2011, 20% in 2008 and 20% in 2010. There are only three (3) companies with more than 10 branches. These have been founded in 2009 (66.6%) and in 2012 (33.3%).

**Figure A3. 2 Number of branches for companies newly registered between 2008-2014**



Other insightful information is concerning the international presence (i.e. branches). The number of international branches of companies founded between 2008 and 2014 is minimal. In 2012 established companies that represents the foundation year with the most international branches is 4%.

Most foreign branches of the companies founded between 2008 and 2014 are in Aruba, Bonaire and St. Maarten (see Table A3.8).

**Table A3. 8 Countries of international branches for percentage of companies newly registered between 2008-2014**

	Aruba	Bonaire	St. Maarten
2008	1.4	1.4	1.1
2009	1.0	0.0	1.0
2010	1.4	0.3	0.6
2011	0.7	0.2	0.2
2012	0.6	0.6	1.0
2013	0.5	0.3	0.3
2014	0.4	0.4	0.4

Concerning the export countries of the companies founded between 2008 and 2014, there is a clear link with the colonialism history of Curaçao. Aruba, Bonaire, St. Maarten, and the Netherlands are all part of the Kingdom of the Netherlands (see Figure A3.3)

**Figure A3. 3 Export countries for companies newly registered between 2008-2014**

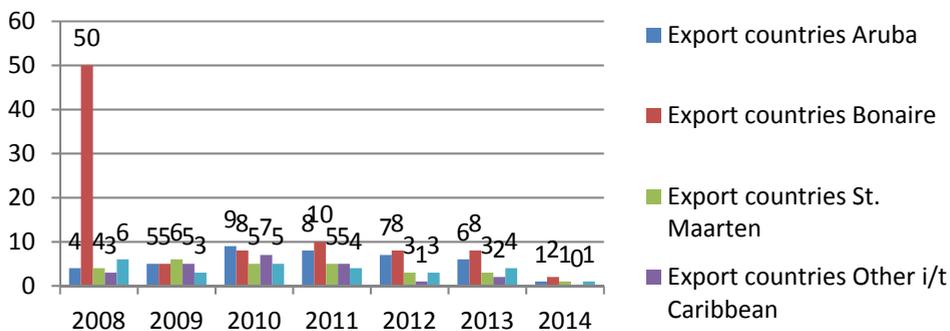
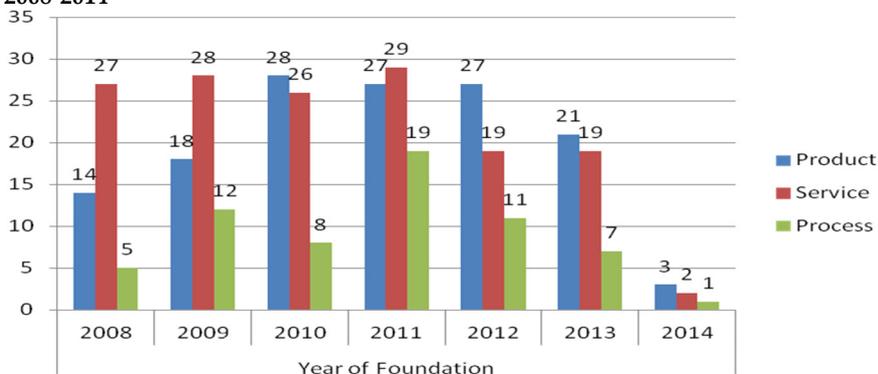


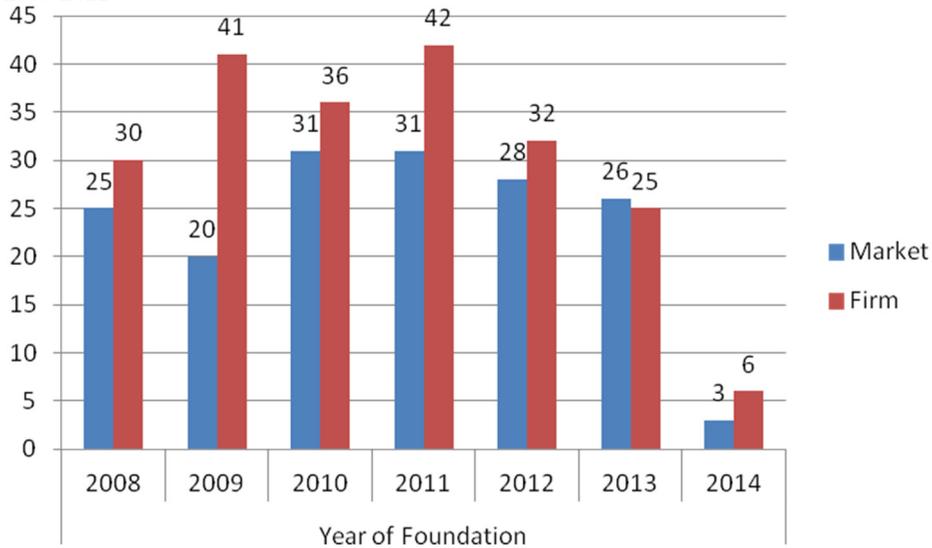
Figure A3.4 shows the type innovation between 2010 and 2013 displayed by companies that been established between 2008 and 2014. In general service innovation is more represented than product innovation. This is intuitive since Curaçao has a service based economy.

**Figure A3. 4 Type of innovation (2010-2013) for companies newly registered between 2008-2014**



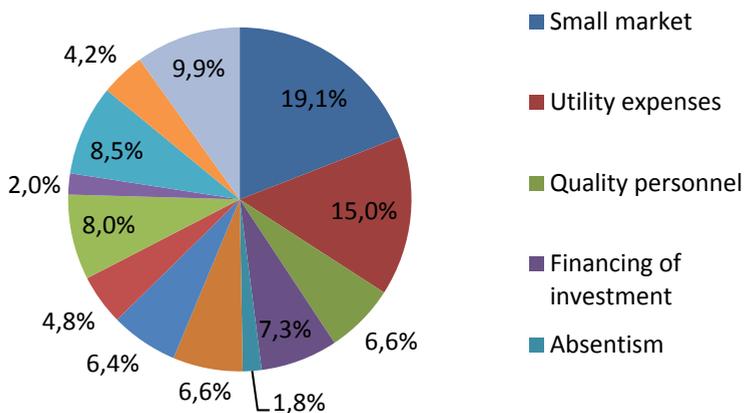
Out of the 351 firms that reported to have introduced either a product, service or process innovation between 2010 and 2013, 56% reported that the innovation introduced is new to the firm and not new to the market (see Figure A3.5); 66% reported to be the author of the innovation.

**Figure A3. 5 Novelty of innovation (2010-2013) for companies newly registered between 2008-2014**



Concerning the challenges faced by the companies founded between 2008 and 2014, the three most reported challenges are: 1. a small market (19.1%), 2. the utility expenses (15.0%), and 3. the absenteeism (8.5%) (see Figure A3.6).

**Figure A3. 6 Challenges faced by companies newly registered between 2008-2014**



## **Entrepreneurial Incentives**

There were many incentive programs established since 2000 ranging from financial support, training, incubation, administration, and management support. The main incentive programs launched and small business bureaus established were:

- Sentro pa Desaroyo di Empresa Chiki Korsou (SEDECK)
- Financieel Ondersteuning Startende Ondernemers (FASTON)
- Ayudo den Administrashon (ADA-regeling)
- Training Grant Scheme (TGS)
- Small Enterprise Solution Program Netherlands Antilles (SESNA)
- E-fondo
- Programa Uitzending Managers (PUM-regeling)
- Spin-Off Curaçao (Spoc)
- Business Boost

The above discussed incentives were launched specifically for the small and medium sized business on the island of Curaçao by the Commissioner of Economic Affairs of the island territory of Curaçao. The only incentive program that is still operational today is the Business Boost (a financial injection of NAf 7,500 for qualifying entrepreneurs)<sup>72</sup>.

## **Entrepreneurial Procedures**

During the startup process entrepreneurs in Curaçao usually seek advice from family, friends, and in some cases organizations such as the Curaçao Chamber of Commerce and ADECK. This is a very unique way many entrepreneurs conduct market research on the Curaçao. No systematic marketing research is performed but they have sufficient with self-intuition and opinions from close family and friends. Afterwards they get started with the actual foundation of the company. This involves tasks such as getting the concerning permits, registering at the Chamber of Commerce, and other related paper work such as an authenticated certificate from the notary. These are done in no particular order. After doing the paper work the company would be operational meaning that the entrepreneur starts doing business.

A very interesting observation is the progress of markets on Curaçao. This would be explained with an example in the automotive service industry. Dating back to the year 2000, automobile owners that lived in the neighborhood Brievengat had to drive to one of the approximately five carwashes in other neighborhoods because there was none in Brievengat. Around the year 2001 the first carwash was opened in Brievengat and it filled a big need of many automobile owners. Business

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<sup>72</sup> The Spoc is operational but the mission of this organization has changed to stimulating international trade between the Netherlands and South America using Curaçao as a hub. This program is not directed towards only the SME segment but all companies either in Curaçao or the Netherlands.

was booming and almost every day there were long lines of automobiles waiting to be washed. But the success was short lived. After less than one year after the carwash has open many more carwashes opened their doors. Not only in Brievengat but all over Curaçao. There was a carwash at every corner so to speak and the market became too populated. Consequently, the market was not big enough to support all the carwashes and very fast many of these carwashes went out of business. The interesting part is that the carwashes did not differentiate much on their services and many of the carwashes that went out of business were those that entered the market the last. This phenomenon is remarkable because it seems that the carwashes did not perform good marketing researches before entering the market. This is assumingly the reason for failure of these entries. Like it has been explained previously, many of the entrepreneurs conduct market research by only acquiring opinions of family and friends. The reason can be lack of education. About 82 percent of entrepreneurs on Curaçao have a high school diploma as their highest educational achievement (Gijsbertha, 1997). This same pattern is noticeable in other markets as well, for example beauty salons, barbershops, nail salons, and this behavior of imitation is called in folk term 'the snèk<sup>73</sup> effect'.

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<sup>73</sup> A snèk is a local micro convenience store that is family operated.

## Appendix 3.4 Case descriptions

*BudgetCo:* The idea for a mobile platform that helps users to make more informed decisions in terms of purchases to manage their budgets came to the founder of BudgetCo in 2012. One of the weaknesses of the founder is proper administration of expenses. In pondering for a solution and considering the administration of expenses as a pillar in budgeting for future purchases, the founder came to the idea to develop a mobile application to enable smart life style decisions starting with purchases.

After developing an initial concept of the idea the founder approached three close friends to be part of the founding team. These were friends with whom the founder was acquainted through a religious group. As the group gathered the product concept evolved and expanded to also include mobile payments.

All initial investments (e.g. logo design and early prototype) were financed by the founder; money that came from another business owned by the founder. However, in 2014 the group came to the conclusion that a large investment was required to make the mobile app a reality as they have designed it on paper. After meetings with a few local angel investors, the founder and another member of the group decided to venture with another project with the aspiration to raise the required capital. The plan is to invest the money raised from the new venture into BudgetCo.

*GameCo:* With the introduction of the iPad in 2010 the creator of GameCo started the development of this iPad game. However, before the founder settled on developing a game, the founder explored other alternatives. For the reason that another idea was not possible due to restrictions from Apple (i.e. the producer of the iPad) on which functions of the operating system an app is allowed take over, the founder used his knowledge and skills as a graphic designer to design the iPad game.

With support of an outsourced iOS developer (i.e. a software developer that focuses on the Apple mobile operating system) to write the software code the game was launched in the Apple's Appstore in 2011. The founder came to know the iOS developer through an advertisement in a magazine. However, before contacting this developer, the founder sought assistance in the founder's professional and social network but to no avail. Other collaborators e.g. the musicians and illustrator the founder sourced from the professional network.

The founder financed all expenses. The source of the capital was another business owned. The founder was approached by a friend to invest in GameCo but this offer was declined since the founder reasoned that the development of the game was almost completed at the time of the offer, and no capital was required to launch the game in the Appstore.

After launched on the market, GameCo did not meet the expectations of the creator and GameCo is considered to be unsuccessful. For this reason, the founder started working in 2011 with a different outsourced iOS developer with the intention to relaunch the iPad game.

*MusicCo:* This company is an online streaming music service with focus on Dutch Caribbean music. The idea started with one of the co-founders realizing that accessing local (i.e. Curaçao) music is difficult. The co-founder approached a good friend, who is also music lover, with the idea to upload all their music on the World Wide Web and make it accessible to everyone. The friend accepted this challenge and together they started to work on MusicCo in February 2012.

Initially the two co-founders contacted their family and friends in their network to design and develop the product. But the first two contributors, a relative and a friend, did not produce any results. Hence the co-founders restarted their search for contributors to MusicCo. In their search for new contributors a relative referred them to the current Creative Director, and through an online freelance platform (i.e. oDesk.com) the former Chief Technology Officer was found.

The initial expenses were financed by the two co-founders with money from their personal savings. As MusicCo progressed the expenses could not be covered by the co-founders anymore. Hence, they drafted a profit & lost statement and developed a scheme to raise funds by selling advertisements. In addition, the co-founders are looking into raising capital from equity investors.

Since February 2012 the idea evolved from a website with digital content to a streaming music service resembling Spotify<sup>74</sup>. The beta was launched on the October 1, 2013 marking the official entry into the startup phase. A launch party was organized with the necessary press releases in local online news websites (e.g. Versgeperst.com October 4, 2013; Kiva Curaçao, October 8, 2013; Caribseek News, November 7, 2013) to commemorate this achievement. The launch did not proceed without any challenges; it has been postponed twice; first from August to November 2012 and afterwards to October 2013.

Since the launch MusicCo had some slight changes in the team. Due to work overload an assistant developer and an assistant designer were added to the team. However, as a result of insufficient compensation and not being able to balance a fulltime job and working on MusicCo, the Chief Technology Officer quite his job in February 2014.

MusicCo has been incorporated as a limited company (Ltd) in the UK on Feb 21, 2012 but is registered and pays taxes in Holland. It consists of a truly international team. Two team members reside in Curaçao, three in the Netherlands and one in Tunisia.

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<sup>74</sup> Spotify is a Swedish digital music service.

In its short two years of existence MusicCo has created an impressive track record. As of April 2014 its database consists of more than 20 thousand songs. In June 2013 they finished in the top three in the JCI IOBA Creative Young Entrepreneur Award 2013 and in August 2014 they won the MCB's Premio Komersiante Briante 2014.

The future plans of MusicCo are to open the platform to public, index their content in the Google search engine and also introduce a mobile version of the service. For this MusicCo has partnered with a local Curaçao mobile solutions developer.

*PaymentCo:* The idea for a new mobile and online payment solution came to the founder of PaymentCo in 2008 but it was not till 2012 that he started with the design and development of the product. While on a vacation in Curaçao the founder noticed a need for an online payment solution for low sales volumes.

In 2012 the founder decided that the time was right to start the development of the online payment solution. All costs incurred during the development were financed by the founder with money from another business.

The product was designed by only the founder and the development is spearheaded by the founder with a friend to test the software for bugs. The tester is a longtime high school friend of the founder.

Currently PaymentCo is in the seed phase. A patent has been applied for and granted, and the founder is pitching the product to potentials partnering banks with the hope to launch in 2015. The PaymentCo's vision is to position this product as the main online and mobile payment solution in the world.

*PostCo:* PostCo is a digital post notification product. The founder came to the idea in 2007 from an experience in a post office; as the founder with his brother were developing a tracking system using second hand equipment, the founder continually needed to go to the post office to mail and pick up the device. One of the times the founder was standing at the post office the founder saw an old lady open a mailbox. She did not receive any post. Subsequently the founder wondered if it was not possible to just receive a notification on a telephone when a letter is inserted in the mailbox and thus so avoid someone having to go to the post office for nothing.

The founder did an analysis of why the product is needed and based on this set a goal. Subsequently the founder analyzed what was required to make it, who was needed to make it, and how it should be done. A budget was made and the founder contacted people in the founder's network for help.

As the necessary budget for purchasing the materials was not available, the founder used scrap materials from other projects. The founder received assistance both from family members and friends (with whom the founder became acquainted while working on previous projects) in developing the prototype of the digital post notification.

The current status of PostCo is that there is a working prototype and a patent has been granted, but the founder did not further develop PostCo since 2009. The main motive behind this decision is the developments on the market: a large European company introduced a competing product that renders PostCo obsolete. Initially the founder of PostCo wanted to launch its product first in the European market but now the founder is contemplating if and how to continue forward.

*SecurityCo:* The founder of SecurityCo started in 2009 as a result of an unforeseen need. The founder was repurposing the use of storage area networks as data storage for large companies such as banks and casino's in order to decrease data storage expenses. In a promotional seminar and company visits the founder was overwhelmed with the requests for these systems but for another industry namely the security industry.

The founder embarked on the solo journey to make SecurityCo a reality. In 2010 the first major project was completed. The founder contracted several subcontractors to work on this project. These subcontractors were old colleagues and subcontractors with whom they have worked on other projects. The investment necessary to execute this project was covered by a local bank as a loan. SecurityCo was outrivalled by its competitors due failing to create a sustainable competitive advantage. Competitors were able to imitate SecurityCo and introduced similar products on the market at lower selling prices.

In 2015 SecurityCo is developing new products with its international partner with whom the founder came into contact when working on a bid for another project. The major expenses of this new product are mainly covered by the international partner because SecurityCo was unable to acquire the necessary funding.

*TransactionCo:* In 2000 TransactionCo was funded as a consultant's bureau for the banking industry. With their experience in this industry, the two co-founders pitched a new automated transaction processing system that became the flagship product of TransactionCo. The idea came from the realization that instead of treating bank transactions departments as cost centers, proper breakdown and processing of these transactions can turn these departments into profit centers. One of the co-founders came to this idea from his experience in another industry that used transaction processing to determine expenses that should be taken into account when setting selling prices.

The two co-founders outsourced the software development of their idea to an international agent whom they used to work with in previous projects. After about one year and a half working together the agency integrated with their company and the owner of the agency became their third partner.

The entire development of the product was paid by the first customer. The co-founders presented their ideas to a potential customer. This potential customer bought the product that was pitch and the initial payment of this product was

used to finance the development of the product. The co-founder did not invest their own capital, neither raised capital from family of friends, nor took a bank loan. To this date TransactionCo uses the same philosophy to finance their products. Additional modules are first pitched to a few their customers. Once these customers purchase the module the initial payments are used to develop the modules. Their profit comes from sales to additional customers.

During the years the co-founders have grown TransactionCo to include mostly international clients; they have added additional features and functionalities to their flagship product; and they have developed two additional automated transaction processing system for other sectors. Future plans are to rollout the new products to international customers in the European market and afterwards in Asia.

## Appendix 3.5 Semi-structured interview questions

### General

1. How did you start your company?
2. What is the level of novelty of the products you develop?
3. Did you/ do you experience any constraints in resources?

### Access to capital

4. With how much money did you start your company?
5. Where and how did you acquire this money to fund your operation?
6. What was the level of difficulty to acquire this money?

### Range of local skills

7. Where and how did you acquire the skills necessary to run your operation?
8. What was the level of difficulty to acquire the skills to run your operation?

### Affordable loss heuristic

9. How did you determine how much to invest in your company?

### Starting from means heuristic

10. How did you determine what to do/ where to start?

### Effectual network

11. Did you make use of your networks? If yes, which networks and how?

### Dealing with unexpected surprises

12. Where there any unexpected surprises (both negative and positive) as you started and grew your company?
13. If yes, what were these and how did you deal with these surprises?

### Combination of acquired and resources at hand

14. How did you use the resources to run the operations?
15. Did you repurpose a resource for a new problem/ opportunity that you did not plan in advance?

## Appendix 3.6 Interview background information

BACKGROUND INFORMATION					
1 I am ... years of age	18 - 25	26 - 30	31 - 40	41 - 50	51 or more
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 I am ...	Male	Female	Transgender		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
3 The highest degree of formal education I have obtained is ...	Elementary	High school			
	<input type="radio"/>	<input type="radio"/>			
	University				
	Bachelor	Master	PhD		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
4 I have completed certifications, workshops or company in-house training programs ...	Yes	No			
	<input type="radio"/>	<input type="radio"/>			
5 The disciplines in which I have formal and informal training are ...	Accounting/ Finance	Human Resources	IT/ICT		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
	Legal/ Fiscal	Marketing	International Business		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
	Other				
	<input type="radio"/>				
6 I am ... years active in this (related) industry	1 - 5	6 - 10	11 or more		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
7 I have founded or been part of a founding team in ... start-ups	1	2	3	4	5 or more
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Appendix 3.7.1 Coding structure and exemplary quotes of causation

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
BudgetCo	Makes financial forecasts of required funds.	"In the summarized business plan we calculated more or less our operational costs for 6 months ...based on that we also came to the amount that we need to invest".	Defines a clear course of action (i.e. goal).	"Money resources also play a role. For that we decided to write business cases and business plan and see if we can find funds for that"...Define those things that we see as essential".
	Makes forecasts on expected market return.	"The product has a potential to become the first product in this form on the local market".	Does research to define opportunities, requirements and needs.	"From there we said let us look at has a potential. Meaning we choose a few products. Next what we needed to do is for each of those products make a business case and do a research, a small marketing to see how many people would be interested in this".
	Makes forecasts on expected market return.	From there we said let us look at has a potential. Meaning we choose a few products. Next what we needed to do is for each of those products make a business case and do a research, a small marketing to see how many people would be interested in this.	Defines a clear course of action (i.e. goal).	"After we described everything of Slapp, registered it, etc., we came to the conclusion that for us to implement Slapp on the scale that we want, including development, etc. it will take us at least between NAF 200 - 300 thousand.
			Takes action on a clearly defined course of action (i.e. goal).	"I contacted another friend of mine that also programs. He did not have the time neither experience about mobile. He recommended me this person. This person, I knew him.

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
GameCo	Expects a return on competence/ personal satisfaction.	"Is a type of investment in my skills".	Takes action on a clearly defined course of action (i.e. goal).	"I looked for people who could develop it because as I said, I do not write much code. Then I saw in a magazine WIRED. It was an advertisement for the company. They are in America ... Then I approached them".
	Expects a return on competence/ personal satisfaction.	"For the first time a lot of money has been invested. What I got back I'm not satisfied with it".	Takes action on a clearly defined course of action (i.e. goal).	"These are friends of mine and I also work occasionally with them thus I already knew them. For them I have just made an assignment."
	Expects a return on competence/ personal satisfaction.	"I'm not at all proud. I want to put in money but to finish it and also can be proud".		
MusicCo	Makes financial forecasts of required funds.	"We made the P&L when we had already started".	Defines a clear course of action (i.e. goal).	"When we went live our goal was that we would have five founding partners, who would all invest an x amount into the platform".
	Active attempt to raise external funds (e.g. capital investors).	There were two (2) fulltime developers on the payroll plus the server capacity (i.e. hosting) had to be increased. It was not possible anymore to cover the expenses using their own savings hence they decided to raise funds elsewhere.	Takes action on a clearly defined course of action (i.e. goal).	"We also organized a fundraising in the carnival period"..."a. The fundraising was a lottery for iPhones. The lottery was to raise money so Skempi can participate in the 2014 Carnival".
			Defines a clear course of action (i.e. goal).	"Another thing we are busy with is looking into finding a capital investor to invest in the platform for 4-5 years, 2-3 years where we won't have to worry about 'how are we

Expected return		Goal-orientation	
Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
			going to survive as a company next month' ".
		Defines a clear course of action (i.e. goal).	"It is just that we took an x amount of what we needed in one year and divided that by 4 or 5. Actually our goal was 4 but if we can find 5 that is good too ".
		Has a long term vision.	"our vision is very long-term".
		Takes action on a clearly defined course of action (i.e. goal).	"Very often you think let's find cheap developers [in Asia via freelance platforms]".
		Defines a clear course of action (i.e. goal).	"You have your goals... We knew exactly what we wanted to achieve".
		Defines a clear course of action (i.e. goal).	They planned that they would like to raise funds from three (3) capital investors by January 5, 2015.
		Does research to define opportunities, requirements and needs.	"we thought about needing to have someone with more technical expertise, and we also needed a designer".
		Defines a clear course of action (i.e. goal).	"We had different goals with MCB."
		Takes action on a clearly defined course of action (i.e. goal).	"I went on Google and looked at what kinds of accounting services there were in Groningen and then I ran into this accountant".

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
			Takes action on a clearly defined course of action (i.e. goal).	"We kind of selected a company per sector (e.g. telecommunication, insurances, banking etc.) based on someone we already knew inside top-management or that could arrange a talk with management".
PaymentCo	Active attempt to raise external funds (e.g. capital investors).	"But it was also possible to fund everything I needed based on the contracts from the projects".	Defines a clear course of action (i.e. goal).	"I started to look on their website on what the requirements in Curacao were in comparison with those in Holland. And afterwards I just took the necessary steps".
	Expects a return on competence/ personal satisfaction.	"As long as I receive recognition that I have worked on [this product] I will be very happy".	Takes action on a clearly defined course of action (i.e. goal).	"I did some research. I think one of those times that I came for vacation I called some banks to ask what about I want to accept online payments to verify indeed if there was no possibility".
	Expects a return on competence/ personal satisfaction.	"Anyway the financial return that it will provide is very attractive but I see it as a very good step for Curacao".	Defines a clear course of action (i.e. goal).	"My first step is to start in Curacao because we have to prove the technology and solution before we can enter through the doors of large organizations and they take you seriously".
			Does research to define opportunities, requirements and needs.	"Before I start I did a lot of research to look what is on the market, how those work, why there are some that fail".
			Does research to define opportunities, requirements and needs.	"I did not have the feeling that I lacked information. But it is always good to do a product research".
			Has a long term vision.	"For this project the vision did not

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				change".
			Defines a clear course of action (i.e. goal).	"You did not ask anything concerning my vision, where I see the product going or where I expect or am trying to go".
			Takes action on a clearly defined course of action (i.e. goal).	"Others [people I asked for feedback on the product] I contacted during network events and on social media channels (LinkedIn in particular)".
			Does research to define opportunities, requirements and needs.	"The first action I undertook was to receive and make a good overview of the specifications of the system. And so I know how I'm going to prepare for the work that comes to my direction; namely the testing".
PostCo			Does research to define opportunities, requirements and needs.	One of the times he was standing at the post office and saw an old lady open a mail box and she did not receive any post. Subsequently he asked himself if it is not possible to just receive a notification on a telephone when a letter is inserted in the mailbox and thus so avoid someone having to go to the post office for nothing. So he started to develop the digital post notification.
			Does research to define opportunities, requirements and needs.	Based on his idea he did a research to find out the features of the digital post notification and what

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				resources where necessary.
			Defines a clear course of action (i.e. goal).	The development process he uses for the product development starts with why the product is needed and he sets a goal.
		Defines a clear course of action (i.e. goal).	He set a personal goal and afterwards a business goal (in this case it was to set up this company and launched the product on the European market and afterwards other countries).	
SecurityCo	Makes forecasts on expected market return.	"And once the spin-offs we got from the first seminar and the one-on-one meetings with prospects during the same week looked very promising, we decided to continue to ride the wave".	Defines a clear course of action (i.e. goal).	"It was something I was looking at before I started the company. I was lightly looking at it. When I quit [my job] I went to look more in-depth into it. I thought that this is something that I really could use".
	Active attempt to raise external funds (e.g. capital investors).	"The first project was a pre-financing ... they signed the formal contract and subsequently I went to a bank ... and so I received my pre-financing".	Does research to define opportunities, requirements and needs.	"I had a lot of specific questions for me to find out if I can use this for the thing that I want".
			Does research to define opportunities, requirements and needs.	"Many times when you look at a lot of technology, one will spring out. And immediately you start thinking if this is something that I can market? That was the first step".

	Expected return		Goal-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				Does research to define opportunities, requirements and needs.
			Takes action on a clearly defined course of action (i.e. goal).	"They made this equipment for small communities because it already existed in the US but more than US\$60 thousand for only 1 unit. Than they thought that they can make a unit for the lower market because for that there is no product".
TransactionCo	Makes financial forecasts of required funds.	"Let's say our goal is to acquire one or two clients in a period of two years. Than we know based on the conversion ratios that we need to talk to 100 clients".	Defines a clear course of action (i.e. goal).	"When you are doing this for 10, 11, 12 years, we have often talked about how we will proceed. The market is saturated so we will tap into another market".
	Makes forecasts on expected market return.	"Those are investments you do in order to have a return in 2 or 3 years because you will acquire clients".	Defines a clear course of action (i.e. goal).	"Two years ago we opened a rep office in Asia, Kuala Lumpur. Why? Because if you look at the reception that Alchemy received in our region, I always had the gut feeling that this thing I think we can sell elsewhere, too. Other bigger markets. Because I believe all banks have the same problem".
	Makes financial forecasts of required funds.	"You budget it in advance... it will cost 80 days, 100 days. This person you will	Does research to define opportunities, requirements and needs.	"We analyzed what are the things that banks are currently doing wrong".

Expected return		Goal-orientation	
Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
	let work on it. That's how you budget it".		
Makes forecasts on expected market return.	"[The product] is something we presented and the folks reacted enthusiastically. Thus we than said we have to invest there".	Defines a clear course of action (i.e. goal).	"What we wanted was for the banks endorse the use of the product. And it happened".
Makes forecasts on expected market return.	"What gave some security that we could offer some service and thus my decision [to start the company] became easier".	Has a long term vision.	"But the vision was always to make something international".
		Takes action on a clearly defined course of action (i.e. goal).	"At a certain moment we searched for a partner; a company in Holland which was an expert in that area".
		Does research to define opportunities, requirements and needs.	"Concerning environment and concerning the automatization level and the bank itself with its bank payment systems, we did our homework and researched".
		Defines a clear course of action (i.e. goal).	"The goal is to have at least one client in all jurisdiction we make contact".

	Competitive analysis		Hedging against contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
BudgetCo	Acquires resources through arm's length contractual assignments.	"Then I acquired someone else to do that [develop a product prototype]. We started. We even signed a non-disclose agreement and gave him an assignment of what we wanted so he could give us a tender",	Stops a project due to unforeseen events.	"Thus we put things on hold especially because the potential client that we had said that they did not see themselves as partners anymore due to the restrictions they had".
	Acquires resources through arm's length contractual assignments.	"The supplier will rent us the platform so we do not have to pay a lot of money in advance".		
	Develops a competitor's analysis.	"Next what we needed to do is for each of those products make a business case and do a research, a small marketing to see how many people would be interested in this".		
	Makes use of property rights protection.	"After we described everything of Slapp [one co-founder] registered it [at the Bureau for Intellectual Property".		
GameCo	Acquires resources through arm's length contractual assignments.	"They did exactly what I said and there was a price tag for everything. I ask clear questions of what they think of something and if they can share their opinion. They did not react".	Not open to act upon requests that will change the company.	"I had someone, a Dutchman, a business partner of mine who said "I want to put in money." But I did not do it because it was practically finished."
	Acquires resources through arm's length contractual assignments.	"These are friends of mine and I also work occasionally with them thus I already knew them. For them I have just made an assignment."		

	Competitive analysis		Hedging against contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
MusicCo	Acquires resources through arm's length contractual assignments.	"We pay him an amount of hours per month, but the hourly rate is much lower than what he charges if he works for other people".		
	Develops a competitor's analysis.	"At the moment [in late 2014] we are working on a business plan".		
	Develops a competitor's analysis.	"We made a P&L".		
	Acquires resources through arm's length contractual assignments.	"I got a price [for the account to make the annual financial reports] that was quite competitive".		
PaymentCo	Makes use of property rights protection.	"My first step was to apply for a patent. While I do not have the patent I can't speak with anyone about the product".	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).	"There are some key persons with whom I have spoken. Just to receive some feedback. But even in that case, I did not give them to entire solution I was working on. I just gave them the part that I wanted to receive feedback".
	Does systematic research.	"I did a lot of research and ended finding a white paper that has a list with all payment methods that exist. And there is a list of things that I did not know. That white paper is very good because they also specified all that failed and why they failed.		

	Competitive analysis		Hedging against contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
PostCo	Makes use of property rights protection.	He received a patent for the product.	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).	He asked his friends to work on small blocks and used APIs to merged/ connect the loose pieces together into one digital post notification system. In this way he did not have to inform the people he sourced the job the whole idea behind the project.
	Acquires resources through arm's length contractual assignments.	He focused on investing and building relationships with people in his network and this formed a basis for whom he would approached to work on the digital post notification. In addition, he " compensated the persons that helped me through for example barter deals.	Stops a project due to unforeseen events.	The most important change happened during the development of the digital post notification is the introduction of the new (and competing) technology by Post NL. This caused the founder to stop with the development of the digital post notification.
SecurityCo	Acquires resources through arm's length contractual assignments.	"I already knew them. I knew their work and I told them to come help me in certain projects. If I had small specific things e.g. troubleshooting, I would just hire specialist on an hourly basis. Those were also people I already knew from my previous jobs".		
	Develops a competitor's analysis.	"My first step was simply to create awareness [through seminars] that this technology exists...and for you to receive signals from the market if there is		

	Competitive analysis		Hedging against contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
		demand for it, yes or no".		
	Develops a competitor's analysis.	"I had a lot of specific questions for me to find out if I can use this for the thing that I want".		
TransactionCo	Acquires resources through arm's length contractual assignments.	"We hired a software development company".	Not open to act upon requests that will change the company.	"We do not take it because it is not in our line of strategy and in our focus of transactional banking, transaction processing, etc.".
	Does systematic research.	Let's say our goal is to acquire one or two clients in a period of two years. Than we know based on the conversion ratios that we need to talk to 100 clients.		
	Develops a competitor's analysis.	"The market is saturated so we will tap into another market".		
	Does systematic research.	"When you are going to sell something internationally in a sector, the first thing you do is to see which are the interest groups in that sector".		

### Appendix 3.7.2 Coding structure and exemplary quotes of effectuation

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
BudgetCo	Investment is seen as a first necessity to create an opportunity to start the development of a product.	It is not as the funds are not there. I see things are necessary to keep doing things as these have to be done.	Makes use of own knowledge, resources, or network of stakeholders.	"Since I have been working on mobile payments since 2003, but in another format such as SMS and MMS, I thought let us try to do this. So we came to a different set up".
	The initial product idea is seen as interesting and feasible.	The problem that [this product] will solve; the feasibility of the product/platform; the trends in innovation for mobile payment methods.	Makes use of own knowledge, resources, or network of stakeholders.	"Seeing that they have more experience with me in development, they have more experience in interfacing with other systems. I did not have the knowledge so I asked if we would like to interface with a bank, what are the things that we have to take into consideration?" "I do not have all knowledge so I have to approach those that do have the knowledge so I can finalize my final product".
			Has an undefined desired idea.	"You just put it on paper, how the business will function...not too in-depth but a just a bit high-level for eventually when I sit with the other guys [friends he approached to become co-founders].

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
GameCo	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	"That was very difficult [how much to invest] because I had no idea how much it should cost".	Makes use of own knowledge, resources, or network of stakeholders.	"I am actually a graphic designer which is nowadays more and more apps and websites and so actually it falls a little under this. I do not do development and so forth. So no programming and stuff but design".
			Makes use of own knowledge, resources, or network of stakeholders.	"I also designed the game myself".
			Makes use of own knowledge, resources, or network of stakeholders.	"In the first instance I also looked for a developer in Curacao [among my friends] but then there was none for iPad and iOS development. There was no one in Curacao who could. In 2010 we already started thus that was not there."
			Makes use of own knowledge, resources, or network of stakeholders.	"I approached them first before I even had the idea for the game in sight. I am first going to look at what you can, how, etc."
			Does not focus on future 'problems' but deals with them in near-present.	"We made it up as we went along".
			Does not focus on future 'problems' but deals with them in near-present.	"I made no business plan or anything. I just started".
			Has an undefined desired idea.	"The first thing is I want to do something with that Appstore. That is where I started. I do not know what, but I knew I wanted to do something with it".

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
MusicCo	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	"The reason why we wanted to finance everything was because we didn't want to take a lot of risks".	Makes use of own knowledge, resources, or network of stakeholders.	"When I had the idea in my head, but very raw, I contacted [the other co-founder]. I already knew [the other co-founder] would be a good partner".
			Makes use of own knowledge, resources, or network of stakeholders.	"[The former CTO] referred us to this [current CTO]".
			Makes use of own knowledge, resources, or network of stakeholders.	"We were working with a guy called [...] ... he referred us to [the current Head of Design]".
			Makes use of own knowledge, resources, or network of stakeholders.	"When [the Head of Design] got busy with school he needed some support and another guy [the assistant designer] joined"..."I know [the assistant designer] from Curacao, we used to compete in speed swimming together... So I see him at school every time... we took the same classes."
PaymentCo	Willingness to make sacrifices.	"You need something of your willing loose...what comes after that we finance via projects in another way".	Makes use of own knowledge, resources, or network of stakeholders.	"The way I work is with inspiration. Many times I am inspired when I am lying on the bed looking at the ceiling without being able to fall asleep, and then an idea comes to my mind".
	Investment is seen as a first necessity to create an opportunity to start the development of a product.	When I founded [this company] I put my own money into it, a lot of money.	Makes use of own knowledge, resources, or network of stakeholders.	"I did not have the feeling that I lacked information. But it is always good to do a product research".
	Willingness to make sacrifices.	"I think that these three weeks that I'm going I'm not going to invoice. I see it as my own investment in the	Makes use of own knowledge, resources, or network of stakeholders.	"Some [people I asked for feedback on the product] I already knew from my previous work

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
		project".		experiences".
	Investing limited, small amounts of personal/company money, time and effort.	"For me it [investment] is just time".	Identifies opportunities based on network of stakeholders.	"I acquired my first client through my network... other clients also came through my network".
			Makes use of own knowledge, resources, or network of stakeholders.	"I know 'the co-founder' since I was in middle school... [the founder] always contacts me when [the founder] has an idea or a project and needs to know something about testing. [The founder] contacts me to pick my brain but not to form an official partnership".
			Makes use of own knowledge, resources, or network of stakeholders.	"the sister of [the founder], [she] also worked on [the product] but she worked solely on the patent".
PostCo	Finding unused resources in local environment (including subsidies).	He could not afford the sensor. So instead he used two cables he had in the box as sensors.	Makes use of own knowledge, resources, or network of stakeholders.	The founder involved other people he knew from other projects he worked on together with them and also family members.
			Makes use of own knowledge, resources, or network of stakeholders.	In the initial stages of the prototype development he looked people around him that could help him acquire the resources to build the prototype. For example, he approached an uncle, who was a carpenter, for wood that he could use to build a mailbox. He developed the design

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				of the box and his uncle helped him make the box.
SecurityCo	Investment is seen as a first necessity to create an opportunity to start the development of a product.	"You have to go to the notary and that is Naf 2 thousand".	Makes use of own knowledge, resources, or network of stakeholders.	"I already knew them. I knew their work and I told them to come help me in certain projects".
TransactionCo	Investing limited, small amounts of personal/company money, time and effort.	"We included our cars as capital and that is it. We do not have a financier and we did not loan money from the bank. We started with nothing actually. We borrowed a laptop in the beginning".	Identifies opportunities based on network of stakeholders.	"By coincidence we came in contact with a big trust company and we invited them to visit us and together we brainstormed to verify what we can help them with based on our expertise".
	Investing limited, small amounts of personal/company money, time and effort.	Along the way you will invest.	Makes use of own knowledge, resources, or network of stakeholders.	"At a certain moment we said that we have Alchemy, we are successful with it, but we should be able to reinvent it for another sector".
			Makes use of own knowledge, resources, or network of stakeholders.	"When I used to work for the bank they used to already develop things for us".
			Identifies opportunities based on network of stakeholders.	"...when you have a partnership you make sure it is reciprocal. They also have to represent you".
			Identifies opportunities based on network of stakeholders.	"And also that we accidently get into contact with people from Curacao

	Affordable loss		Means-orientation	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				somehow work in a bank in Malaysia".
			Makes use of own knowledge, resources, or network of stakeholders.	"A lot of experience we have gained [we determined how much to visit a bank before getting the contract]".

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
BudgetCo	Approaches potential client with a prototype early in the development process.	"He brought forward [the potential client] to see if it could be a partner because we said we wanted a target group. Seeing that [the potential client] has members it would be ideal to introduce this product for them". "It was a membership organization...and they were a bank. We wanted them to be the trusted party"... "We went to give a presentation to [the potential client] and its team. We presented some of the products we can develop".	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"I said that an important part to include is the ability to also pay, that would give it much more value. Since I have been working on mobile payments since 2003, but in another format such as SMS and MMS, I thought let us try to do this. So we came to a different set up".
	Co-create with stakeholders.	"Based on this I worked out some ideas, put it on paper, and share this with a couple of friends, and we arrived a technical concept that must be feasible".		

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
GameCo	Co-create with stakeholders.	"Now I got from the developer in Portugal ... who did what I thought the first developer did not. They have even played it. They feel that this should change or that should change. They can be program so they know what can be done and they also said that if you do this that will happen, and that's nicer".	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"The first thing is I want to do something with that Appstore. That is where I started. I do not know what, but I knew I wanted to do something with it. Then I started to think; First I had an app ... just could not be done."
			Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"I had due to Kung Fu Spinner the acquired taste. You should continue as an entrepreneur so when Braintoss came on my path I immediately jump on the opportunity".
MusicCo	Co-create with stakeholders.	"When I had the idea in my head, but very raw, I contacted [the other co-founder]. I already knew [the other co-founder] would be a good partner".	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"He commented once on a post, then he sent me a Facebook message, I think, about something. A leak that he found in the website. I called him immediately. We met with him, and that's when it started actually".
			Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"From the CYEA contest that we participated in, I talked to her. She was looking for work. I didn't have a clear proposition on how to help her. After seeing each other at the concert [at Brionplein about living], she was very excited and since that moment she joined the bandwagon".

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
			Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	The other capital investor was approached based on someone in their network informing them that this capital investor is interested in investing in their company.
			Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"What we ultimately did, was that we heard via the network that BNK had a great collection of music of Curaçao that they had collected, which was just catching dust. Nobody could listen to that music and for a long time already they were looking for a solution to make the collection accessible to the public".
			Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"[The founder] went back to Curaçao from Holland and he worked at Bearing Point and at a certain moment an uncle of his, who is one of the directors at Extura, just made an appointment with him to catch up. At the moment in which Gino met them, he immediately saw an opportunity to let me sell the vision again and see if Extura and all the companies wanted to advertise on Skempi, because they were busy with a whole rebranding".

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
PaymentCo	Co-create with stakeholders.	"It is true that I am working with a tester. He has broad knowledge so I can throw ideas at him to receive feedback".	Open to change strategy based on unexpected events.	"The only bummer was that it took about 1.5 to 2 years before I received my permit from the Ministry of Economic Development. That is way everyone including themselves and the Chamber of Commerce said to go ahead and start and the permit will follow later".
	Reaching trust-based flexible stakeholder agreements and commitments.	"I know him for years since high school...when I realized what he was doing and that he specialized in testing, I told him that maybe one day we could work together. We discussed this a bit further so I can feel what his expertise were".	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"My first client was in St. Martin...via my network I have been told to contact them".
	Approaches potential client with a prototype early in the development process.	"What I this is I made an appointment with the president of the banking association and gave a presentation of what the intention is and what I am trying to accomplish".	Open to change strategy based on unexpected events.	"In that time I had an idea how I will do my acquisition, which marketing I will do, etc. But afterwards that I acquired my first client through my network, the necessity for that changed because other clients also came through my network".
			Open to change strategy based on unexpected events.	"If you go to a networking reception you never know who you will meet. The one you meet and talk to and there is a vibe and invites you to a meeting, that is the one that can turn into something".
			Does not develop concept in detail but leaves room for	"But I like to leave some room for the unknown or

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
			unexpected events.	unexpected or what I cannot anticipate".
			Open to change strategy based on unexpected events.	"We both have the feeling that maybe we have to put a lighter version on the market so people will come in contact with this and also for banks to see that it will be used".
PostCo				
SecurityCo	Co-create with stakeholders.	"My first step was simply to create awareness [through seminars] that this technology exists...and for you to receive signals from the market if there is demand for it, yes or no ...The cost for the seminars the supplier was willing to take all for themselves".	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	"In the end instead of receiving assignments of companies and their offices, I received assignments in security".
			Open to change strategy based on unexpected events.	In this case the company resolve it by sending the equipment themselves. That was how it took place but the idea was that I would buy it and start up these projects on my own but with support of the company.
			Open to change strategy based on unexpected events.	"He did not want to send his personnel. That cause me to have a problem in the week of implementation. I solved it in that way, that resulted in a blessing in disguise because I was obligated get go in-depth in the

	Pre-committed stakeholders		Leveraging contingencies	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
				technology".
TransactionCo	Co-create with stakeholders.	"By coincidence we came in contact with a big trust company and we invited them to visit us and together we brainstormed to verify what we can help them with based on our expertise".	Does not develop concept in detail but leaves room for unexpected events.	"A part of course is that when someone buys a product than the project's development is completed. But for 95% it has to be there and must work".
	Approaches potential client with a prototype early in the development process.	"You develop a prototype and you demo".	Open to change strategy based on unexpected events.	"At a certain moment it was picking up speed with them but the deal fell through... I said let us look at the others".
	Reaching trust-based flexible stakeholder agreements and commitments.	"If you come with an idea, you need a person/ company that will be an early adopter".	Open to change strategy based on unexpected events.	"If you look closely at our trajectory, we are about 2.5 years busy, and I have never planned it that way".
			Does not develop concept in detail but leaves room for unexpected events.	"And also that we accidentally get into contact with people from Curacao somewhere work in a bank in Malaysia".

### Appendix 3.7.3 Coding structure and exemplary quotes of bricolage

	Making do		Resources at hand	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
BudgetCo			Gives ownership in the product/ company.	"From outset I told them that if we are going to work on this I do not have the money to pay them but eventually we will partner. Everyone will receive shares. We put different things on paper to guarantee that the moment this becomes something they are also guaranteed that they will benefit and receive from the revenue stream".
			Licenses a resource instead of buying.	"If I had money I would implement the software, take some risk, and maybe things would go a bit faster. Because I choose another model where the supplier will rent us the platform so we do not have to pay a lot of money in advance".
GameCo	Uses an existing resource in a new way.	"At this point I had an idea for another game ... and it is called for example Kung Fu this or Kung Fu that. We use the music again ... that was a sort of extension in the same game. We could use the background again, use the music, we could use the whole game. Only it was just another game"	Makes use of royalty deals.	"I have not with the Portuguese developer. They said that "We will also invest in it. We will not charge you the normal price. We will charge you something but much lower than you would normally receive".

	Making do		Resources at hand	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
MusicCo	Uses untapped/ unwanted resources to create something new.	"She was looking for a job ... what we did was she works part- time for MusicCo and part-time for [another company where this co- founder is the marketing director].	Gives ownership in the product/ company.	"Then they [the new developer] have given a very good deal".
			Compensates with non-monetary resources (e.g. be part of a disruptive innovation).	"It's something we can't pay. So we said we'll talk to him about the bigger picture". "We pay him an amount of hours per month, but the hourly rate is much lower than what he charges if he works for other people".
			Compensates with other (employment) opportunities.	"What we did with her then was that she would work part-time for MusicCo and she would work part-time [another company where I am a director] because [at the other company] she could go on the payroll. So that way we found a way to make it attractive for her".
			Compensates with other (employment) opportunities.	"[the assistant designer], we can't pay him just yet but what I can do is give him assignments for [another company where I am a director]. That way I can still pay him for his design work and keep him close in the loop".

	Making do		Resources at hand	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
			Executes parts of the tasks himself.	"We agreed upon what software he would use, but he was already using the same software as me. For him it was just a matter of taking my output, putting it in his software and his software would deliver it neatly finished. He had his own programs that ran annual reports and this way I got a price that was quite competitive".
			Makes use of barter deals.	"Another example of creative things we did with [a marketing employee] was when he actually approached us, or me, that he needed development in general. From [another company I own] we were offering ...technical development. He was very interested in MusicCo and then we got thinking, "What about Marketing?" ... We made a deal that instead of paying [the marketing employee], he gets a return via the development for work done each month".
			Makes use of royalty deals.	"They talked about a mutually beneficial partnership: costless development in return for a recurring piece of the pie from all subscriptions".

	Making do		Resources at hand	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
PaymentCo	Uses an existing resource in a new way.	"I made an administration module and this I am using also for the product".		
PostCo	Uses untapped/ unwanted resources to create something new.	He could not afford the sensor. So instead he used two cables he had in the box as sensors.	Asks for a favor.	In the initial stages of the prototype development he looked people around him that could help him acquire the resources to build the prototype. For example, he approached an uncle, who was a carpenter, for wood that he could use to build a mailbox. He developed the design of the box and his uncle helped him make the box.
			Makes use of barter deals.	"I compensated the persons that helped me through for example barter deals. Instead of money I would help then with their needs in areas that I have expertise example I would develop a website".
SecurityCo	Uses untapped/ unwanted resources to create something new.	"I was going to take a product; it was a storage area network (SAN) that is a box specifically made to store images of digital security cameras. Because the price was much better compared with other similar products that are used for offices, thus companies, I thought what about I take this product and repurpose it to use for these companies, offices, their network for administration	Compensates with other (employment) opportunities.	"The cost for the seminars the supplier was willing to take all for themselves".

	Making do		Resources at hand	
	Measurement indicators	Exemplary quotes of incidents	Indicators	Exemplary quotes of incidents
		and internal systems."		
	Uses an existing resource in a new way.	"The first project was a pre-financing ... they signed the formal contract and subsequently I went to a bank ... and so I received my pre-financing".		
TransactionCo	Using an existing resource in a new way	"It is a product that we have developed specifically for the trust sector. This product is composed from existing products we have that is the Alchemy Payment System, connection with SWIFT, international network, our banking package".	Gives ownership in the product/ company.	"We decided it was time to put those things under one company 'and I became the third partner".
	Using an existing resource in a new way	"We make use of things we already have and the moment we made things we always take into account that we can make use of it for something else".		

<b>New problem/ solutions</b>		
	<b>Measurement indicators</b>	<b>Exemplary quotes of incidents</b>
<b>BudgetCo</b>	New product/ service.	"It is a very innovative product and concept that helps via automatization the client and also consumers involved, that helps them solve different problems".
	New solution/ technology/ organizational process.	"I thought of another way I can generate funds to invest in the project. That lead to me develop another product that as an easier market to penetrate and as a higher turnover. That is what we are going to launch. Those funds of that project, that product will fund the development of our BudgetCo".
<b>GameCo</b>	New solution/ technology/ organizational process.	"I don't do development. Thus no software programming and those type of things ... In the first instance I also looked for a developer in Curacao [among my friends] but then there was none for iPad and iOS development. There was no one in Curaçao who could. In 2010 we already started thus that was not there."
<b>MusicCo</b>	New solution/ technology/ organizational process.	"The financial aspect is always a struggle but we except that it is just part of the roadmap for you to realize your goals as a company".
<b>PaymentCo</b>	New solution/ technology/ organizational process.	"What makes it innovative in comparison to everything local and international is that ...we do not accept any information from the user. All financial information remains in the client's bank".
<b>PostCo</b>	New product/ service.	A new product that sends SMS alerts to the user when mail is entered in the user's postbox.
<b>SecurityCo</b>	New product/ service.	"The SAN technology is rather well known in the IT world. In security they have never heard of these type of things".
<b>TransactionCo</b>	New solution/ technology/ organizational process.	"We say there was a need for a system that could translate all the manually processed transactions into automated transactions processing where one can see the profit for each payment".
	New product/ service.	"It is a platform on which trust companies manage their payment. It eliminates manual processing. It is a portal where clients of the trust companies and login and look at their accounts and initiate payment requests. That was not possible".

### Appendix 3.8.1 Fit incidents-indicators of causation

Dimension: expected return				
Indicators				
	Makes financial forecasts of required funds.	Makes forecasts on expected market return.	Expects a return on competence/ personal satisfaction.	Active attempt to raise external funds (e.g. capital investors).
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Dimension: goal-orientation				
Indicators				
	Defines a clear course of action (i.e. goal).	Does research to define opportunities, requirements and needs.	Takes action on a clearly defined course of action (i.e. goal).	Has a long term vision.
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Dimension: competitive analysis				
Indicators				
	Acquires resources through arm's length contractual assignments.	Develops a competitor's analysis.	Makes use of property rights protection.	Does systematic research.
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Dimension: hedging against contingencies			
Indicators			
	Stops a project due to unforeseen events.	Not open to act upon requests that will change the company.	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).
BudgetCo			
GameCo			
MusicCo			
PaymentCo			
PostCo			
SecurityCo			
TransactionCo			

= none

= weak

= medium

= strong

### Appendix 3.8.2 Fit incidents-indicators of effectuation

Dimension: affordable loss				
Indicators				
	Investment is seen as a first necessity to create an opportunity to start the development of a product.	The initial product idea is seen as interesting and feasible.	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	Willingness to make sacrifices.
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Indicators		
	Investing limited, small amounts of personal/company money, time and effort.	Finding unused resources in local environment (including subsidies).
BudgetCo		
GameCo		
MusicCo		
PaymentCo		
PostCo		
SecurityCo		
TransactionCo		

Dimension: means-orientation				
Indicators				
	Makes use of own knowledge, resources, or network of stakeholders.	Does not focus on future 'problems' but deals with them in near-present.	Has an undefined desired idea.	Identifies opportunities based on network of stakeholders.
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionC				

Dimension: pre-committed stakeholders			
Indicators			
	Approaches potential client with a prototype early in the development process.	Co-create with stakeholders.	Reaching trust-based flexible stakeholder agreements and commitments.
BudgetCo			
GameCo			
MusicCo			
PaymentCo			
PostCo			
SecurityCo			
TransactionCo			

Dimension: leveraging contingencies			
Indicators			
	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	Does not develop concept in detail but leaves room for unexpected events.	Open to change strategy based on unexpected events.
BudgetCo			
GameCo			
MusicCo			
PaymentCo			
PostCo			
SecurityCo			
TransactionCo			

 = none

 = weak

 = medium

 = strong

### Appendix 3.8.3 Fit incidents-indicators of entrepreneurial bricolage

Dimension: making do		
Indicators		
	Uses an existing resource in a new way.	Uses untapped/ unwanted resources to create something new.
BudgetCo		
GameCo		
MusicCo		
PaymentCo		
PostCo		
SecurityCo		
TransactionCo		

Dimension: resources at hand				
Indicators				
	Gives ownership in the product/ company.	Licenses a resource instead of buying.	Makes use of royalty deals.	Compensates with non-monetary resources (e.g. be part of a disruptive innovation).
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Indicators				
	Compensates with other (employment) opportunities.	Executes parts of the tasks himself.	Makes use of barter deals.	Asks for a favor.
BudgetCo				
GameCo				
MusicCo				
PaymentCo				
PostCo				
SecurityCo				
TransactionCo				

Dimension: new problem/ solutions		
Indicators		
	New product/ service.	New solution/ technology/ organizational process.
BudgetCo		
GameCo		
MusicCo		
PaymentCo		
PostCo		
SecurityCo		
TransactionCo		

= none

= weak

= medium

= strong

### Appendix 3.9.1a Fit dimensions of causation (qualitative)

	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
BudgetCo	strong	strong	strong	weak
GameCo	strong	medium	medium	weak
MusicCo	medium	strong	strong	none
PaymentCo	strong	strong	medium	weak
PostCo	none	strong	strong	medium
SecurityCo	medium	strong	strong	none
TransactionCo	strong	strong	strong	weak

 = none

 = weak

 = medium

 = strong

### Appendix 3.9.1b Fit dimensions of causation (quantitative)

	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
<b>BudgetCo</b>	1.00	1.00	1.00	0.33
<b>GameCo</b>	1.00	0.67	0.67	0.33
<b>MusicCo</b>	0.67	1.00	1.00	0.00
<b>PaymentCo</b>	1.00	1.00	0.67	0.33
<b>PostCo</b>	0.00	1.00	1.00	0.67
<b>SecurityCo</b>	0.67	1.00	1.00	0.00
<b>TransactionCo</b>	1.00	1.00	1.00	0.33

### Appendix 3.9.2a Fit dimensions of effectuation (qualitative)

	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies
<b>BudgetCo</b>	Medium	Strong	Medium	Weak
<b>GameCo</b>	Weak	Strong	Weak	Medium
<b>MusicCo</b>	Weak	Strong	Weak	Strong
<b>PaymentCo</b>	Strong	Strong	Strong	Strong
<b>PostCo</b>	Weak	Medium	None	None
<b>SecurityCo</b>	Weak	Weak	Weak	Strong
<b>TransactionCo</b>	Medium	Strong	Strong	Strong

 = none

 = weak

 = medium

 = strong

### Appendix 3.9.2b Fit dimensions of effectuation (quantitative)

	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies
BudgetCo	0.67	1.00	0.67	0.33
GameCo	0.33	1.00	0.33	0.67
MusicCo	0.33	1.00	0.33	1.00
PaymentCo	1.00	1.00	1.00	1.00
PostCo	0.33	0.67	0.00	0.00
SecurityCo	0.33	0.33	0.33	1.00
TransactionCo	0.67	1.00	1.00	1.00

### Appendix 3.9.3a Fit dimensions of entrepreneurial bricolage (qualitative)

	Making do	Resources at hand	New problem/ solutions
BudgetCo			
GameCo			
MusicCo			
PaymentCo			
PostCo			
SecurityCo			
TransactionCo			

 = none

 = weak

 = medium

 = strong

### Appendix 3.9.3b Fit dimensions of entrepreneurial bricolage (quantitative)

	<b>Making do</b>	<b>Resources at hand</b>	<b>New problem/solutions</b>
<b>BudgetCo</b>	0.00	0.67	0.67
<b>GameCo</b>	0.33	0.33	0.33
<b>MusicCo</b>	0.33	1.00	0.33
<b>PaymentCo</b>	0.33	0.00	0.33
<b>PostCo</b>	0.33	0.67	0.33
<b>SecurityCo</b>	0.67	0.33	0.33
<b>TransactionCo</b>	0.67	0.67	0.67

### Appendix 3.10a Scores of indicators across cases

<b>Causation</b>				
<b>Expected return</b>				
	Indicators			
	Makes financial forecasts of required funds.	Makes forecasts on expected market return.	Expects a return on competence/ personal satisfaction.	Active attempt to raise external funds (e.g. capital investors).
<b>BudgetCo</b>	0.33	0.67	0.00	0.00
<b>GameCo</b>	0.00	0.00	1.00	0.00
<b>MusicCo</b>	0.33	0.00	0.00	0.33
<b>PaymentCo</b>	0.00	0.00	0.67	0.33
<b>PostCo</b>	0.00	0.00	0.00	0.00
<b>SecurityCo</b>	0.00	0.33	0.00	0.33
<b>TransactionCo</b>	0.67	1.00	0.00	0.00
<b>Score (avg)</b>	0.19	0.29	0.24	0.14
<b>Goal-orientation</b>				
	Indicators			
	Defines a clear course of action (i.e. goal).	Does research to define opportunities, requirements and needs.	Takes action on a clearly defined course of action (i.e. goal).	Has a long term vision.
<b>BudgetCo</b>	0.33	0.33	0.33	0.00
<b>GameCo</b>	0.00	0.00	0.67	0.00
<b>MusicCo</b>	1.00	0.33	1.00	0.33
<b>PaymentCo</b>	1.00	0.67	0.67	0.33
<b>PostCo</b>	0.67	1.00	0.00	0.00
<b>SecurityCo</b>	0.33	1.00	0.33	0.00
<b>TransactionCo</b>	1.00	0.67	0.33	0.33
<b>Score (avg)</b>	0.62	0.57	0.48	0.14
<b>Competitive analysis</b>				
	Indicators			
	Acquires resources through arm's length contractual assignments.	Develops a competitor's analysis.	Makes use of property rights protection.	Does systematic research.
<b>BudgetCo</b>	0.67	0.33	0.33	0.00
<b>GameCo</b>	0.67	0.00	0.00	0.00
<b>MusicCo</b>	0.67	0.67	0.00	0.00
<b>PaymentCo</b>	0.00	0.00	0.33	0.33
<b>PostCo</b>	0.33	0.00	0.33	0.00
<b>SecurityCo</b>	0.33	0.67	0.00	0.00
<b>TransactionCo</b>	0.33	0.33	0.00	0.67
<b>Score (avg)</b>	0.43	0.29	0.14	0.14

<b>Hedging against contingencies</b>			
	Indicators		
	Stops a project due to unforeseen events.	Not open to act upon requests that will change the company.	Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible).
<b>BudgetCo</b>	0.33	0.00	0.00
<b>GameCo</b>	0.00	0.33	0.00
<b>MusicCo</b>	0.00	0.00	0.00
<b>PaymentCo</b>	0.00	0.00	0.33
<b>PostCo</b>	0.33	0.00	0.33
<b>SecurityCo</b>	0.00	0.00	0.00
<b>TransactionCo</b>	0.00	0.33	0.00
<b>Score (avg)</b>	0.10	0.10	0.10

<b>Effectuation</b>						
<b>Affordable loss</b>						
	Indicators					
	Investment is seen as a first necessity to create an opportunity to start the development of a product.	The initial product idea is seen as interesting and feasible.	Investment requirements are seen as uncertain and there is a desire to minimize this uncertainty.	Willingness to make sacrifices.	Investing limited, small amounts of personal/company money, time and effort.	Finding unused resources in local environment (including subsidies).
<b>BudgetCo</b>	0.33	0.33	0.00	0.00	0.00	0.00
<b>GameCo</b>	0.00	0.00	0.33	0.00	0.00	0.00
<b>MusicCo</b>	0.00	0.00	0.33	0.00	0.00	0.00
<b>PaymentCo</b>	0.33	0.00	0.00	0.67	0.33	0.00
<b>PostCo</b>	0.00	0.00	0.00	0.00	0.00	0.33
<b>SecurityCo</b>	0.33	0.00	0.00	0.00	0.00	0.00
<b>TransactionCo</b>	0.00	0.00	0.00	0.00	0.67	0.00
<b>Score (avg)</b>	0.14	0.05	0.10	0.10	0.14	0.05
<b>Means-orientation</b>						
	Indicators					
	Makes use of own knowledge, resources, or network of stakeholders.	Does not focus on future 'problems' but deals with them in near-present.	Has an undefined desired idea.	Identifies opportunities based on network of stakeholders.		
<b>BudgetCo</b>	0.67	0.00	0.33	0.00		
<b>GameCo</b>	1.00	0.67	0.33	0.00		
<b>MusicCo</b>	1.00	0.00	0.00	0.00		
<b>PaymentCo</b>	1.00	0.00	0.00	0.33		
<b>PostCo</b>	0.67	0.00	0.00	0.00		
<b>SecurityCo</b>	0.33	0.00	0.00	0.00		
<b>TransactionCo</b>	1.00	0.00	0.00	1.00		
<b>Score (avg)</b>	0.81	0.10	0.10	0.19		
<b>Pre-committed stakeholders</b>						
	Indicators					
	Approaches potential client with a prototype early in the development process.	Co-create with stakeholders.	Reaching trust-based flexible stakeholder agreements and commitments.			
<b>BudgetCo</b>	0.33	0.33	0.00			
<b>GameCo</b>	0.00	0.33	0.00			
<b>MusicCo</b>	0.00	0.33	0.00			
<b>PaymentCo</b>	0.33	0.33	0.33			
<b>PostCo</b>	0.00	0.00	0.00			
<b>SecurityCo</b>	0.00	0.33	0.00			
<b>TransactionCo</b>	0.33	0.33	0.33			
<b>Score (avg)</b>	0.14	0.29	0.10			

<b>Leveraging contingencies</b>			
	<b>Indicators</b>		
	Open to act upon ideas/ requests that will change the product/ company/ add an additional product.	Does not develop concept in detail but leaves room for unexpected events.	Open to change strategy based on unexpected events.
<b>BudgetCo</b>	0.33	0.00	0.00
<b>GameCo</b>	0.67	0.00	0.00
<b>MusicCo</b>	1.00	0.00	0.00
<b>PaymentCo</b>	0.33	0.33	1.00
<b>PostCo</b>	0.00	0.00	0.00
<b>SecurityCo</b>	-0.33	0.00	0.67
<b>TransactionCo</b>	0.00	0.67	0.67
<b>Score (avg)</b>	0.29	0.14	0.33

<b>Entrepreneurial bricolage</b>				
<b>Making do</b>				
	Indicators			
	Uses an existing resource in a new way.	Uses untapped/ unwanted resources to create something new.		
<b>BudgetCo</b>	0.00	0.00		
<b>GameCo</b>	0.33	0.00		
<b>MusicCo</b>	0.00	0.33		
<b>PaymentCo</b>	0.33	0.00		
<b>PostCo</b>	0.00	0.33		
<b>SecurityCo</b>	0.33	0.33		
<b>TransactionCo</b>	0.67	0.00		
<b>Score (avg)</b>	0.24	0.14		
<b>Resources at hand</b>				
	Indicators			
	Gives owner-ship in the product/ company.	Licenses a resource instead of buying.	Makes use of royalty deals.	Compensates with non-monetary resources (e.g. be part of a disruptive innovation).
<b>BudgetCo</b>	0.33	0.33	0.00	0.00
<b>GameCo</b>	0.00	0.00	0.33	0.00
<b>MusicCo</b>	0.33	0.00	0.33	0.33
<b>PaymentCo</b>	0.00	0.00	0.00	0.00
<b>PostCo</b>	0.00	0.00	0.33	0.00
<b>SecurityCo</b>	0.00	0.00	0.00	0.00
<b>TransactionCo</b>	0.33	0.00	0.00	0.00
<b>Score (avg)</b>	0.14	0.05	0.14	0.05
	Indicators			
	Compensates with other (employment) opportunities.	Executes parts of the tasks himself.	Makes use of barter deals.	Asks for a favor.
<b>BudgetCo</b>	0.00	0.00	0.00	0.00
<b>GameCo</b>	0.00	0.00	0.00	0.00
<b>MusicCo</b>	0.67	0.33	0.33	0.00
<b>PaymentCo</b>	0.00	0.00	0.00	0.00
<b>PostCo</b>	0.00	0.00	0.00	0.33
<b>SecurityCo</b>	0.33	0.00	0.00	0.00
<b>TransactionCo</b>	0.00	0.00	0.00	0.00
<b>Score (avg)</b>	0.14	0.05	0.05	0.05
<b>New problem/ solutions</b>				
	Indicators			
	New product/ service.		New solution/ technology/ organizational process.	
<b>BudgetCo</b>	0.33		0.33	
<b>GameCo</b>	0.00		0.33	
<b>MusicCo</b>	0.00		0.33	
<b>PaymentCo</b>	0.00		0.33	
<b>PostCo</b>	0.33		0.00	
<b>SecurityCo</b>	0.33		0.00	
<b>TransactionCo</b>	0.33		0.33	
<b>Score (avg)</b>	0.19		0.24	

### Appendix 3.10b Scores of logics and their dimensions across cases

<b>Causation; score = 0.73</b>				
	Expected return	Goal-orientation	Competitive analysis	Hedging against contingencies
<b>BudgetCo</b>	1.00	1.00	1.00	0.33
<b>GameCo</b>	1.00	0.67	0.67	0.33
<b>MusicCo</b>	0.67	1.00	1.00	0.00
<b>PaymentCo</b>	1.00	1.00	0.67	0.33
<b>PostCo</b>	0.00	1.00	1.00	0.67
<b>SecurityCo</b>	0.67	1.00	1.00	0.00
<b>TransactionCo</b>	1.00	1.00	1.00	0.33
<b>Final score (avg)</b>	0.76	0.95	0.90	0.29
<b>Effectuation; score = 0.65</b>				
	Affordable loss	Means-orientation	Pre-committed stakeholders	Leveraging contingencies
<b>BudgetCo</b>	0.67	1.00	0.67	0.33
<b>GameCo</b>	0.33	1.00	0.33	0.67
<b>MusicCo</b>	0.33	1.00	0.33	1.00
<b>PaymentCo</b>	1.00	1.00	1.00	1.00
<b>PostCo</b>	0.33	0.67	0.00	0.00
<b>SecurityCo</b>	0.33	0.33	0.33	1.00
<b>TransactionCo</b>	0.67	1.00	1.00	1.00
<b>Final score (avg)</b>	0.52	0.86	0.52	0.71
<b>Bricolage; score = 0.44</b>				
	Making do	Resources at hand	New problem/ solutions	
<b>BudgetCo</b>	0.00	0.67	0.67	
<b>GameCo</b>	0.33	0.33	0.33	
<b>MusicCo</b>	0.33	1.00	0.33	
<b>PaymentCo</b>	0.33	0.00	0.33	
<b>PostCo</b>	0.33	0.67	0.33	
<b>SecurityCo</b>	0.67	0.33	0.33	
<b>TransactionCo</b>	0.67	0.67	0.67	
<b>Final score (avg)</b>	0.38	0.52	0.43	

### Appendix 3.11: fsQCA 'born-global' firm

	Causal combinations				
	1	2	3	4	Born-global' firms
				CAUS	CAUS
				EFFECT	EFFECT
	CAUS	EFFECT	BRIC	BRICO	BRICO
Expected return	●			●	●
Goal-orientation	●			●	●
Competitive analysis	●			●	●
Hedging contingencies	○			○	○
Affordable loss		○		●	○
Means-orientation		●		●	●
Pre-committed stakeholders		●		●	○
Leveraging contingencies		○		●	●
Making do			●	●	○
Resources at hand			●	●	●
New solutions/ products					○
Frequency cutoff	1.000000	1.000000	1.000000	1.000000	1.000000
Consistency	0.333333	0.333444	0.500250	0.600240	0.750188
Raw/ unique coverage	0.667000	0.333500/ 0.167000	0.500000	0.500000	0.500000

Note: black circles indicate presence of conditions and white circles indicate their absence (Muñoz & Dimov, 2014)

# **VALORIZATION: A CAUSAL, EFFECTUAL AND ENTREPRENEURIAL BRICOLAGE APPROACH TO EFFECTIVE ENTREPRENEURSHIP POLICY PROCESS AND OUTCOME**

## **Abstract**

This appendix is concerned with valorization. Knowledge valorization is the creation of value from knowledge among others by explaining how the results of the dissertation shape processes and activities. In this appendix, I explain how the results of this dissertation can aid the policy maker in designing effective entrepreneurial policy process and outcome by coping with uncertainty in the policy process and with government budget constraints. To have an effective entrepreneurship policy process this process must take into account all actors involved in the policy process. To have an effective entrepreneurship policy outcome this outcome must take into account the stage of economic development in which a country is, must enable entrepreneurial firms to create and commercialize knowledge into products and startups, must take into account the actors on which it has influence, must have goals with indicators to measure the attainment of the goals, and must be long-term and global. I show how the use of the integrative framework of the causal, effectual and entrepreneurial bricolage logics that I used in this dissertation leads to both an effective entrepreneurship policy process and outcome.

## **Keywords**

Causation, effectuation, entrepreneurial bricolage, entrepreneurship policy process, policy outcome

## **1. Introduction**

World economies have shifted from an industrial economy to an entrepreneurial economy (Ács, Autio, & Szerb, 2014). Entrepreneurship is considered important for the economic development of a country and government should intervene with policy (Audretsch, Grilo, & Thurik, 2007). For instance, what facilitated the US to become an entrepreneurial center is a highly developed financial center what was partially created by policy (Walburn, 2005).

Entrepreneurship policy is often ineffective (Arshed, Carter, & Mason, 2014) because among others the process to design<sup>75</sup> entrepreneurial policy is uncertain. The entrepreneurship policy process is uncertain for the reason that “the

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<sup>75</sup> The design of entrepreneurship policy also includes the monitoring and evaluation of the policy.

externalities sometimes associated with failed firms, also create a market failure in the valuation of (potential) new enterprises by [...] policy makers (Gilbert, Audretsch, & McDougall, 2004, p.318). The entrepreneurship policy process is also constrained by limitations in government budgets (Hart, 2003). In addition, there are problems with the indicators to measure the effectiveness of the policy (Norrman & Bager-Sjogren, 2010). The policies are often too short-term and the effects have not yet taken place.

Frameworks have been proposed on how to design entrepreneurship policy e.g. Audretsch et al., (2007), Gilbert, Audretsch and McDougall (2004) and O'Connor (2013). These frameworks aid the policy maker to devise entrepreneurship policy with specific intended goals such as increase the number of individuals that start companies. The entrepreneurship policy process itself is a causal process that typically occurs in six stages (Arshed et al., 2014): 1. the identification of an area of policy interest, 2. the briefing, 3. the collection of evidence, 4. the clearing, 5. the announcement, and 6. the implementation. The existing frameworks do not take into account the uncertain nature and the budget constraints that governments face. The objective of this appendix is to use the knowledge developed in this dissertation to propose a design process of entrepreneurship policy that takes into account its uncertain characteristic and government budget constraints. It enables the policy maker to take the role of an institutional entrepreneur.

## **2. Criteria for effective entrepreneurship policy process and outcome**

World economies have shifted from industrial economies to entrepreneurial economies. An industrial economy is different from an entrepreneurial economy (Audretsch et al., 2007). The differences between an industrial economy and an entrepreneurial economy are that for the former capital is the market requirement, the market structure is an oligopoly, the market performance is determined by prices and policy is needed to restrict large enterprises in order not to terminate small and medium-sized businesses. However, in the latter the market requirement is knowledge, the market structure is entrepreneurial, the market performance is determined by innovation (Gilbert et al., 2004), and uncertainty is an important characteristic of the entrepreneurial economy.

The entrepreneurship policy process is characterized by uncertainty (Gilbert et al., 2004) and limitation in government budgets (Hart, 2003). In order for the entrepreneurship policy process to be effective, it must enable the policy maker to cope with the uncertainty and resource constraints. In addition, an effective entrepreneurship policy process must lead to the design of effective entrepreneurship policy outcomes. In the remainder of this section, I will discuss the criteria for an effective entrepreneurship policy process and outcome.

## **2.1 Criterion for effective entrepreneurship policy process**

A vital criterion for an effective entrepreneurship policy process is the support from all actors that are involved in the policy making. Arshed et al. (2014) showed that the process to design entrepreneurship policy takes place in stages and both internal actors (e.g. ministers and civil servants) and external actors (e.g. institutional entrepreneurs and domain experts) have vested interest in the policy process. The internal and external actors opportunistically exercise their power to influence the policy process to address their interests and not the interests of the other actors. This is a main reason for policy failure. An effective entrepreneurship policy process needs to take into account the needs of all the actors involved in the policy making and generate support from the majority. In acquiring the support, the process should strive to minimize the influence and opportunistic behavior of the powerful actors.

## **2.2 Criteria for effective entrepreneurship policy outcome**

I have established five criteria that are vital for achieving effective entrepreneurship policy outcomes. The entrepreneurship policy outcome must: 1. be specific to the stage of economic development of the respective country, 2. enable the creation and commercialization of knowledge, 3. address all actors that are influenced by the policy, 4. address a goal and have indicators to measure goal attainment, and 5. have a long-term and global view.

First, an effective entrepreneurship policy outcome should take into account the stage of economic development in which a country is (Minniti, 2008). Different types of economic activities require different types of entrepreneurial processes, behaviors, and cognitions (O'Connor, 2013) and thus also different types of entrepreneurial policies. Minniti (2008) showed that in low-income countries policy needs to direct talent towards entrepreneurial activities, and Acs and Szerb (2007) showed that policy needs to foster human capital in middle-income countries.

Second, in the entrepreneurial economy, the firm structure is more dynamic, market and individual firms are replacing the large bureaucratic organizations, and innovation occurs differently. In an entrepreneurial economy policy outcome is needed to enable entrepreneurial firms to create and commercialize knowledge into products (Acs & Szerb, 2007) and startups (Hart, 2003).

Third, an entrepreneurial economy has four actors namely: 1. the individual agent, 2. the newly formed business, 3. the institutions, and 4. the society (Acs, 2006). Each of these actors is influenced by entrepreneurial policy. Entrepreneurship policy is pervasive and has to take all of these actors into account (Audretsch et al., 2007). Entrepreneurship policy outcome influences the choice the individual agent has concerning his or her education and occupation. Entrepreneurship policy outcome enables or restricts the formation of new firms. Entrepreneurship policy outcome

creates and terminates the institutions that are necessary to support economic growth (Acs, 2006) and shapes the environment in which decisions take place (Minniti, 2008). And entrepreneurship policy outcome should sustain societies.

Fourth, goals are also necessary for an effective entrepreneurship policy outcome (Audretsch et al., 2007). Examples are the eradication of poverty and the creation of comparative advantage. Goals target specific market failures e.g. allocation of entrepreneurial activities (Baumol, 1990) and the failure in the valuation of (potential) new enterprises.

The indicators to measure if the goals are met are also important. The indicators are required to evaluate policy outcome by comparing its costs and benefits (Norrman & Bager-Sjogren, 2010). Good indicators take into account the stage of the entrepreneurial firm (Norrman & Bager-Sjogren, 2010) and should also be able to be tested in the entrepreneurial firms that were not part of the policy (Storey, 2000).

Finally, an effective entrepreneurship policy outcome should also be long-term (Acs & Szerb, 2007) and global (Gilbert et al., 2004). It should be long-term because it takes time for the effects of the entrepreneurship policy to take place (Norrman & Bager-Sjogren, 2010). And it must be global (Acs & Szerb, 2007) because the entrepreneurial climate is driven by globalization (Gilbert et al., 2004) and globalization drive policy (Watts, Holbrook, & Smith, 2015).

### **3. A combined approach to effective entrepreneurship policy process and outcome**

Taking into consideration the uncertainties (Gilbert et al., 2004) and the budget constraints that governments face (Hart, 2003) in the entrepreneurship policy process, this process should interactively be causal, effectual and entrepreneurial bricolage. In this section, I will first discuss how each of these approaches is adequate to meet one or more vital criteria for an effective entrepreneurship policy process and policy outcome. As my discussion will show, none of the approaches can independently meet all the important criteria. However, together these can aid an entrepreneurship policy process under uncertainty and resource constraints that lead to effective entrepreneurship policy outcome.

### **3.1 A combined approach to effective entrepreneurship policy process**

#### **3.1.1 The causal approach**

The causal approach to the entrepreneurship policy process relates to the rational and planning-based decision-making. It is especially adequate for devising policy to address specific failures with a clear goal. For instance, a government can overcome gaps in finance by creating venture capital markets and giving direct support (Audretsch et al., 2007).

The causal approach starts with a policy maker determining a goal followed by calculating the possibility to realize the goal and then he or she determines the steps necessary to realize the goal (Knight, 1921). To determine the probability of achieving the desired goal the policy maker will gather as much additional information and understanding of the goal. The policy maker will evaluate his or her means to be able to design the suitable policy for the goal. In this process, the policy maker engages other stakeholders to create legitimacy and evidence to acquire support for the policy (Arshed et al., 2014).

The goals that are created using the causal approach are specific and short-term, and the policy maker can develop indicators to evaluate the policy by comparing the costs and benefits.

#### **3.1.2 The effectual approach**

The effectual approach (Sarasvathy, 2001) addresses the uncertain characteristic and the constraints in government budgets in the entrepreneurship policy process. It revolves around five principles: 1. the pilot-in-the-plane (i.e. controlling one's future instead of predicting it), 2. the affordable loss (i.e. what one believes and is willing to lose in implementing a strategy), 3. the bird-in-hand (i.e. evaluation of what effects can be created within existing means), 4. the crazy quilt (i.e. collaboration with partners whom one already knows) and 5. the lemonade (i.e. leverage surprises). Together these principles of the effectual approach indicate that the decision-maker will first evaluate his or her preferences, his or her means and whom he or she knows. After this evaluation, the decision-maker will contact his or her potential partners to acquire their engagement. Partners will self-select to become a member of the team and add their expertise, resources, and networks. This process is a cycle that continuously expands until a goal is created.

This effectual approach is adequate for the entrepreneurship policy process for two reasons. First, because there is uncertainty in the entrepreneurial process the policy maker exercises a control logic. The policy maker will engage other actors (e.g. policy makers, domain experts, institutional entrepreneurs, entrepreneurs in general, institutions and the society) from his or her network in the process to design the policy. The actors will contribute with their expertise, tools, and networks to develop policy. In addition, because it takes time for policy to show its effects, and

the economy the policy-maker using the effectual approach is careful to take the contingencies into account.

Second, governments face budget constraints and need to be flexible when investing (Lerner, 2002). When using the affordable loss heuristic one invests less money compared to using a predictive based reasoning (Dew, Sarasathy, et al., 2009). In addition, empirical research shows that government credit assistance programs decrease the number of individual taking entrepreneurial activities (Li, 2002). Thus lowering the amount of money that government spend has additional benefits.

### 3.1.3 The entrepreneurial bricolage approach

The entrepreneurial bricolage is particularly useful for an entrepreneurship policy process under resource constraints. It is “creating something from nothing” (Baker & Nelson, 2005, p.331). Bricoleurs have an active attitude to create something from nothing, use discarded and unwanted resources for new purposes, and use untapped resources that other organizations failed to recognize (Di Domenico et al., 2010). Bricoleurs also refuse to accept the limitations imposed by the resources according to ‘collective wisdom’ or routines that have been universally accepted. Bricoleurs make use of resources in their possession and also acquire resources that are available for free or very cheaply. The resources are not only goods but also individuals that can provide expert knowledge. The application of entrepreneurial bricolage is not the use of resources to address existing challenges, but the application of the resources to new problems and opportunities that lead to innovation (Salunke et al., 2013).

Policy makers that use an entrepreneurial bricolage approach in the entrepreneurship policy process will engage their network. They do this to increase the pool of resources that they have available to devise policy. These resources are acquired through for example donations, voluntary work and students that go through apprenticeships. The policy makers creatively recombine their resources to design new policy to target market failure. In the process to design entrepreneurship policy, the policy makers that make use of an entrepreneurial bricolage approach are able to ‘stretch’ their limited funds and successfully deal with the faced resource constraints.

## 3.2 A combined approach to effective entrepreneurship policy outcome

### 3.2.1 The causal approach

As I have indicated before, the causal approach to the entrepreneurship policy process is especially adequate for devising policy to address specific failures with a clear goal. The goals that are created using the causal approach are specific and

short-term, and the policy maker can develop indicators to evaluate the policy outcome by comparing the costs and benefits.

### 3.2.2 The effectual approach

In the effectual approach, the policy maker leverages his or her network in the entrepreneurship policy process. In doing this, the effectual approach leads to meeting the criteria for an effective entrepreneurship policy outcome in four ways. First, the actors from the network have the opportunity to voice their interests and so to avoid that the policy outcome will take into consideration only vested interests of powerful actors such as ministers and institutional entrepreneurs.

Second, permitting all actors to be part of the entrepreneurship policy process is also a guarantee that the policy will take into account the stage of the economic development of the country. All actors have the opportunity to voice their concerns, needs, and interest.

Third, the use of an effectual approach to entrepreneurship policy process generates a policy outcome that enables the creation and commercialization of knowledge. The creation of knowledge is not a deterministic process but contains feedback loops. It contains experimentation and the knowledge that is created is not always planned. Knowledge is also created by chance. The policy maker that makes use of an effectual approach does not have a specific goal but start the design process with his or her resources and evaluates alternative solutions within his or her existing means. The policy maker also leverages surprises in the process to design policy. He or she enables experimentation to continually devise policy and in this way enable the creation of knowledge.

The knowledge that has been created should also be commercialized (Acs & Szerb, 2007). Successful commercialization means that the created knowledge is designed into products and adopted by the market. The use of an effectual network by a policy maker enables him or her to design entrepreneurship policy outcome that leads to the commercialization of knowledge for the reason that also potential consumers and the society are also integrated into the process to design the entrepreneurship policy process.

Finally, the use of an effectual approach by a policy maker will design long-term and global policy. For the reason that a goal is not created, the policy maker that makes use of an effectual approach will design a policy that is long-term. In addition, the policy is global because globalization is uncertain. It is out of the control of the policy maker and contains many actors and components. A lot of components and inherent variability leads to uncertainty (Walker et al., 2003).

### **3.3 Summary**

In summarizing this section, I showed how the use of the combined framework takes into consideration the uncertain characteristic of entrepreneurship policy process and also budget constraints that governments face. By having an open attitude towards surprises that might be during the entrepreneurship policy process, and by leveraging his or her network, the policy maker can cope with uncertainties that are present in the process. In addition, when the policy maker makes investment decisions based on what he or she is able and willing to loose, he or she can cope with budget constraints. Furthermore, the policy maker can manage budget constraints by acquiring the needed resources cheaply and recombine these with his or her existing resources. The policy maker can make use of the resources in ways that these have never been used and hence 'stretch' the economic life of the resource.

In addition to the ability to cope with uncertainty and resource constraints, the use of a combination of causal, effectual and entrepreneurial bricolage approaches to the entrepreneurship policy process leads to effective entrepreneurship policy outcomes that are specific to the stage of economic development in which the respective country is, enables the creation and commercialization of knowledge, addresses all actors that are influenced by the policy, generates support from all actors involved in the policy making, addresses a goal and have indicators to measure goal attainment, and has a long-term and global view.

## **4. A combined approach in practice**

In this section I would like to provide an illustration of how a policy maker can make use of the integrated framework of the causal, effectual and entrepreneurial bricolage approach to in effective entrepreneurship policy process. I will use the conclusions from this doctoral dissertation to develop the policy recommendations.

### **4.1 Entrepreneurship policy process and policy outcome in practice**

In this section, I first will illustrate the entrepreneurial policy process followed by the effective entrepreneurship policy outcomes.

#### **4.1.1 Entrepreneurship policy process in practice**

The starting point is the aspiration for an entrepreneurship policy outcome, e.g. create economic growth. The policy maker should first evaluate his or her aspiration, knowledge (and resources) and potential partners. Subsequently, the policy maker should approach his or her potential partners to acquire commitments and form a team. These potential partners include other policy workers from the same ministry and other ministries, representatives of NGOs and social groups that represent the community, and directors of private enterprises. Partners in the team should also

approach their networks to acquire commitments from stakeholders. This is an ongoing process during the entrepreneurship policy process.

In the meanwhile, the team designs an entrepreneurship policy outcome that is long-term and global. They should take into consideration that economic growth of a country takes time and it is a global affair. Thus the policy outcome remains loose and is not specific. The team should also devise specific policy outcome to deal with market failures that require urgent attention. The team should devise policy outcome that has a clear goal and also develop indicators and measurements to evaluate the effectiveness of the policy outcome. For instance, a policy outcome is to increase the number of startups.

The team should also be open to cope with contingencies. For example, a new actor e.g. a large multinational that would like to be part of the policy process, or a research institute that would like to contribute with evidence to device entrepreneurship policy outcomes. Next, I will discuss examples of goal-oriented entrepreneurship policy outcomes in more detail.

#### 4.1.2 Entrepreneurship policy outcome in practice

A short-term entrepreneurship policy outcome is to tax savings. The goal of the policy outcome is to increase the number of startups. The research on the affordable loss heuristic showed that increasing one's ability can positively influence one's threshold of investment that leads to one starting an entrepreneurial venture. The ability of an individual is influenced by among others funds that the individual considers to be perishable (i.e. the individual will lose the money if the individual does not make use of it). By taxing the savings of individuals, the individual will make use of this money. The individual can purchase consumer goods, give it to family members or charity, but also invest this money into a startup. The tax can be on savings of NAF 100 thousand and more.

An indicator to measure this policy outcome is to the registration at the Chamber of Commerce. Every individual that starts a company needs to register him or herself and the company at the Chamber of Commerce. By using this indicator, it is possible to compare individuals that have to pay the tax on savings to those that have not to pay.

Another goal is increasing companies that become global at their inception. An entrepreneurship policy outcome to realize this is to have individuals to develop products in which they do not have the required technical expertise. My research has shown that when there is a gap between the required technical expertise of the entrepreneur and of the product, the entrepreneur will use causal logic and create new international networks. An example of what the government can do is develop a contest to develop an audacious product in which the knowledge required to build the product does not reside in the country. The trick is to have sufficiently interesting

prizes for the participants that make them contact foreign networks, for instance, large cash money and tax reduction or exemption.

An indicator to measure the effect of this policy is to have all participants in the context indicate their domicile. This will provide a good overview if the teams that are participating consists of international networks or only local networks.

The proposed entrepreneurship policy outcomes described above should be accompanied by education policy. A recurring theme through my dissertation is that entrepreneurs use the causal, effectual and entrepreneurial bricolage logics in combination; both in the process to leverage social networks and become a 'born-global' firm and in the process to development innovations that are new to the world. Entrepreneurs should be trained on when and how to oscillate among these logics. Entrepreneurship education has included lots of business planning exercises although the links to success are ambiguous (Honig, 2004). More beneficial would be to prepare future entrepreneurs in how to recognize situations and relate this to adequate decision logics. In addition, Li (2002) found that government credit assistance programs have reduced the total entrepreneurial activity. An explanation of this is that if an individual's ability is severely increased and the individual does not purposively make use of the affordable loss heuristic, the individual might turn to using the expected return to direct his or her investment decisions. This will lead to higher investment amounts compared to using the affordable loss heuristic.

A final short-term entrepreneurship policy outcome is mobilizing the Diaspora for entrepreneurial development. One of the major challenges entrepreneurs face in the small island context is the limitation to resources that are enhanced by the brain drain, the isolation from large markets, and limited access to capital markets. However, this is also a blessing in disguise. Because of mainly the brain drain, small islands have large Diaspora networks that usually concentrate in developed countries. These networks can be leveraged to acquire knowledge and skills that are required for the opportunity discovery, enactment, evaluation, and exploitation process and the rapid internationalization of firms. My research has shown that due to a large gap between the technical expertise and the technical knowledge required to develop the product, entrepreneurs form causal networks to acquire knowledge and resources. A Diaspora policy should target these individuals and include them in the Diaspora network to encourage. This intervention will increase the speed of these firms becoming a 'born-global' firm.

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## ENGLISH SUMMARY

This dissertation concerns the entrepreneurial logic throughout the entrepreneurial process. I present the studies of the entrepreneurial decision-making that takes place under uncertainty and resource constraints in the context of Small Island Developing States (SIDS). I contribute new knowledge regarding the use of decision logics by SIDS entrepreneurs, the effect of the use on whether the entrepreneurial firm is international at inception, and on the process of developing innovations that are new to the world though emerging in resource constraint environments. I also contribute new insights regarding the entrepreneurial investment decisions.

In Chapter 1, I present the premises of the studies. Entrepreneurs and their firms are central in the commercialization of new technologies as they are more innovative than larger firms. Thus entrepreneurs play an important role in economic development because the new technologies they introduce in the market have ripple effects on the economic development. The processes that entrepreneurs go through when they exploit opportunities by introducing innovative products into the market are subject to uncertainties. The entrepreneur has limited information regarding the effects of his or her decisions. The uncertainty is increased by the entrepreneur's ability to deal with complex and uncertain situations. Entrepreneurs also face severe resource constraints because entrepreneurs have shortages of resources that are minimally required to produce any given levels of organizational outputs.

A topic that has received considerable attention among entrepreneurship scholars is the entrepreneurial decision-making under conditions of uncertainty and resource constraints. This dissertation is in particular concerned with the entrepreneurial decision-making in the context of the SIDS. The unique context of the SIDS, in particular, the vulnerability to external economic shocks and the secrecy that surrounds information enhances the uncertainty experienced by the entrepreneurs operating in the SIDS context (I call entrepreneurs that operate in the SIDS context 'SIDS entrepreneurs' to differentiate with general entrepreneurs). The unique context of the SIDS also increases the resource constraints experienced by the SIDS entrepreneurs. Despite the challenges that SIDS entrepreneurs face, they have built large and successful multinational firms. Thus the decision-making processes of SIDS entrepreneurs is an interesting for empiricism and might offer many lessons to the rest of the world. I am particularly interested in Information and Communications Technology (ICT) entrepreneurs for two reasons; ICT is an important avenue for sustainable economic development in SIDS, and small and young technology-based entrepreneurial firms experience severe resource limitations, and thus an appropriate study population for this research.

In Chapter 2, I discuss the literature regarding entrepreneurial decision-making under uncertainty and resource constraints. The field of entrepreneurship in itself is segregated into two streams, the entrepreneur that exploits opportunities,

and the characteristics of these opportunities. The first scholarly works that focus on the entrepreneur described him or her as a risk-bearing individual. However, inconclusive results of what has been called the trait-based approaches made scholars turn to other avenues to understand the entrepreneur, one of them being the entrepreneurial cognition. Two prominent theories that deal with entrepreneurial cognition, specifically decision-making under uncertainty are the effectuation theory and the entrepreneurial bricolage theory. I draw upon these theories to explore the decision-making logics used by entrepreneurs in the SIDS context. I complement my theoretical basis with the causal approach for the reason that recent research shows that entrepreneurs do not substitute effectual logics over causal logics. The causal approach posits that entrepreneurs are rational human beings. However, rational decision-making is difficult in circumstances of true uncertainty, where individuals are cognitively unable, and where there is pressure to make fast decisions. Under these circumstances, entrepreneurs turn to simplified rules to make decisions. According to the effectual approach, in uncertain situations entrepreneurs use the control logic for decision-making. Instead of trying to predict an uncertain future, entrepreneurs engage in immediate action. The entrepreneurial bricolage theory also propagates action, but in this case when entrepreneurs are faced with severe resource constraints. The entrepreneurial bricoleurs are able to 'stretch' their available resources to tackle new problems or opportunities.

In Chapter 3, I elaborate on the methodology I used to study the use of decision logics among entrepreneurs operating under uncertainty and resource constraints in the SIDS context. I studied four topics, the general use of the decision logics, the effect of the logics on becoming a 'born-global' firm, the effect of the logics on the process of developing new-to-the-world innovations, and entrepreneurial investment decisions. To study these problems I used a multiple-case research strategy. This strategy enabled me to deal with the lack or shortage of data, the unwillingness of participants to provide data, and the deliberate misrepresentation or response and recall biases; all typically challenges of collecting data on small islands. For each topic, I developed case selection criteria taking into account the relevance of the theories and research questions, the generation of rich information on the phenomenon to be studied, and the theoretical generalizability of the findings. General selection criteria were the uncertain and resource constraint context, expert and novice entrepreneurs, introduction of innovative or non-innovative products, 'born-global' firms and those that internationalize incrementally, solo and team entrepreneurs, successful and unsuccessful results, and entrepreneurs at different stages of the entrepreneurial development. I selected between four and seven cases in the ICT sector in Curacao. I approached the entrepreneurs through the Chamber of Commerce and used the snowball sampling to enlarge my participants. I used several sources to collect data, namely documentation, semi-structured and closed interviews and site visits. I applied a

pattern-matching analytical strategy. I compared the themes that emerged from my data across cases, and with the theory. The coding of the data that was on the basis of the analytical strategy was done at the level of the causal, effectual and entrepreneurial bricolage decision logics, the dimensions of the decision logics, the empirical indicators, and the quotes for the empirical data. I also conducted a Fuzzy-Set Qualitative Comparative Analysis (fsQCA) to study the effects of the decision logics on the process of developing new-to-the-world innovations in resource constraint environments.

In Chapters 4 through 7, I present the empirical findings of this dissertation. In Chapter 4, I present the descriptive data gathered during this study. The premise of the chapter is the decision logics used by the entrepreneurs in the SIDS context, and the results are drawn from seven cases. The results show that the SIDS entrepreneurs use the causal, effectual and entrepreneurial bricolage logics, but show a preference for the causal logics. The SIDS entrepreneurs have especially a 'goal-orientation' approach, form their strategies based on 'competitive analysis' and make investments based on the 'expected return'. The SIDS entrepreneurs also show a strong inclination for 'means-orientation' dimension of the effectual logic. The entrepreneurial bricolage logics did not score high compared to the other two logics.

I offer three explanations regarding the use of the decision logics among the SIDS entrepreneurs. First, SIDS entrepreneurs strive to remain flexible to oscillate between the decision logics as different decisions of the opportunity exploitation process are required. Second, in the small and resource constraint environment with limited market opportunities, SIDS entrepreneurs use the causal logic to acquire resources that he or she could not acquire using the effectual and entrepreneurial bricolage logics. Institutions (e.g. lending) also influence the entrepreneur and his or her choice for a certain decision logic. Finally, the gap between the SIDS entrepreneur's technical expertise and the technical knowledge required to develop the product influences the use of the decision logics.

In this chapter, I argue that our future conversation regarding the use of the entrepreneurial decision logics should take into consideration the context in which the entrepreneur operates. Constraints in the environment not only in terms of material resources, but also human resources shape the decision logics used by entrepreneurs. Consequently, entrepreneurs remain flexible in the use of the decision logics to oscillate between causal, effectual and entrepreneurial logics as the situation requires.

In Chapter 5, I empirically examine how the independent or jointly use of the causal, effectual and entrepreneurial bricolage logics influences the process of becoming a 'born-global' firm. In particular, I study the use of social networks in the process of rapid internationalization. The premise of the chapter is that the studies that have used the causal, effectual and/or entrepreneurial bricolage logics to study

the use of social networks in the rapid internationalization process, show conflicting results. The origin of the conflict is the failure to take into consideration the gap between the entrepreneur's technical expertise and the technical knowledge required to develop the product. Using four cases I show that large gaps lead the SIDS entrepreneurs to use causal logics to build international networks and become 'born-global' firms.

In this chapter, I argue that our future conversation regarding the use of social networks to enable the internationalization at inception should consider the gap between the technical knowledge of the entrepreneur and the technical knowledge required to develop the product. Effectual thinking on itself is not a silver bullet to rapid internationalization and the effective use of effectuation thinking is constrained by the gap.

In Chapter 6, I present the study of the independent or joint effects of causal, effectual and entrepreneurial bricolage logics on the process of developing new-to-the-world innovations in SIDS context. The premise of the chapter is that the North-South innovation diffusion patterns fail to explain new-to-the-world innovations that emerge in penurious environments. A review of the innovation literature show that new-to-the-world innovations are new combinations of existing knowledge and resources, inherently uncertain, shape by the sector, and only considered an innovation when it is first commercialized. Linking these characteristics of new-to-the-world innovations to the recognition, discovery and creation types of entrepreneurial opportunities, I argue that new-to-the-world innovations are most evident in opportunities where both the demand and supply sides are created. These types of opportunities are characterized by Knightian uncertainty, and thus requires the use of heuristics in the decision-making process. I studied seven cases and used the Fuzzy-Set Qualitative Comparative Analysis to study which decision logics leads to new-to-the-world innovations. The results show that the joint combination of causal, effectual and entrepreneurial bricolage logics has higher consistency compared to the logics independently or any other combination.

In this chapter, I argue that our future conversations regarding new-to-the-world innovations that emerge in penurious environments should consider causal, effectual and entrepreneurial bricolage decision logics. Although these innovations are truly uncertain, and thus a domain for effectual decision-making, the causal and entrepreneurial bricolage logics cannot be ignored.

In Chapter 7, I develop a process model of the affordable loss heuristic. The premise of the chapter is that the studies using the affordable loss heuristic have treated this heuristic as a black box. However, similar to research that shows the investment based on the expected return is influenced by the investor's threshold, in-depth studies of the elements of the affordable loss and the relationships between these elements is necessary. I defined the affordable loss heuristic as the ability and preference of the entrepreneur to make an investment to enter the opportunity

exploitation process. The ability is the size of what an entrepreneur can put at risk and the preference is how much an entrepreneur is willing to risk when making the entrepreneurial entry decision. Using seven cases I show that the entrepreneur's ability is influenced by the decoupling of payments and accounting in the unit 'time'. The preference of the entrepreneur is influenced by the considering resources as perishable or diminishing in value. I also show a causal relationship between the ability and the preference components of the affordable loss heuristic, and that the investment decision takes place in stages. Finally, I present a process model of the affordable loss. It starts with the SIDS entrepreneur perceiving his or her environment to be uncertain. He or she will use the affordable loss heuristic to invest. The SIDS entrepreneur will determine his or her ability and accordingly determine his or her preference. There are two possible outcomes; an investment decision or no entry. Subsequently, the SIDS will proceed to the next stage of development and evaluate the next investment decision.

In Chapter 8, the last chapter of this dissertation, I discuss the generalizability of the results of this study, the limitations, the areas for future research and I present recommendations for entrepreneurship policy. Although the results of this study are not possible to generalize statistically due to the small sample size, it is possible to have a theoretical generalization. The decision-patterns found in this study can be generalized to peripheral towns in other countries. The limitations faced in this study are the limitation in data that was not coded by independent coders, a focus only on 'born-global' firms that internationalized in the globalization of production, lack of expert reviewers to assess the innovations that are new to the world, and I only studied entrepreneurs that made the entry/plunge decision. Future research avenues are the differences between how entrepreneurs in small countries and small islands are born globally, how different sizes of the gap between the technical knowledge of the entrepreneur and the technical knowledge required to develop the product influence the rapid internationalization, and applying the process model of the affordable loss to social and psychological investments. Two important policy recommendations are to mobilize the Diaspora for entrepreneurial development and train entrepreneurs when and how to oscillate between the causal, effectual and entrepreneurial bricolage logics.

## **CURRICULUM VITEA**

Richard Martina (1978) was born in Aruba. He holds the position of academic staff member at the Faculty of Social Sciences and Economics at the University of Curacao. Richard's areas of teaching are entrepreneurship, innovation and strategy. Furthermore, he is the founder and project leader of StudInc, an incubation program for students. He has experience with developing, coordinating and teaching courses at bachelor and master levels. Richard started the Dual Career Training Program - Governance and Policy Analysis (GPAC2) in 2011. His main research interests are entrepreneurial decision-making and its influence on the internationalization process and disruptive innovations. Furthermore, Richard studies how entrepreneurs make decisions during the process of investing, and innovation systems of small island territories. Richard holds a Bachelor of Science in Business Administration (University of the Netherlands Antilles), Master of Science in Strategy & Innovation (Maastricht University), and a Master of Arts in Science & Technology Studies (Maastricht University; Lund University).

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