

ABSTRACT

POURMOJIB, SAMANEH. Significant Factors for Successful Entrepreneurial Innovation in Textile and Apparel Industries (Under the direction of Dr. A. Blanton Godfrey).

Almost every country, state, region and city now has innovation and entrepreneurship as a priority for economic growth and job creation. Throughout the course of this study in two phases, we discovered that both individual factors and environmental factors impact the success of entrepreneurial innovation. Our results complement and extend the existing well-accepted theories on entrepreneurship intention models during the first phase. Our study, using in-depth interviews of entrepreneurs in the apparel and textile industries, showed that these models, with slight modifications, can be used to study entrepreneurs' behaviour during their business growth period.

Throughout phase two, the environmental factors for textile and apparel industries were investigated using the framework of entrepreneurial innovation & context. This framework includes all the contexts that influence entrepreneurial innovation. It states that strengthening the weakest link or bottleneck is the key to improvement. We found the primary bottleneck for textile and apparel entrepreneurial innovation was a limitation on available funding during the early phases of the companies. Next, we focused on how the critical parts of this framework vary among different industry sectors based on secondary data collected from North Carolina department of commerce. In the North Carolina companies studied, there is not much difference in different industry categories in the proportion of innovative companies. But available funding is significantly different for different industry categories.

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Significant Factors for Successful Entrepreneurial Innovation in Textile and Apparel Industries

by
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DEDICATION

To my parents

Zahra Hosseini and Ramezanali Pourmojib

for their love and endless support.

BIOGRAPHY

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CHAPTER 1: Introduction

1.1. Background

Throughout its history, research in entrepreneurship has grown extensively. In the 1930s, Schumpeter was the leading researcher in the field. He defined the entrepreneur as an innovator who (1) introduces new goods or services, (2) introduces new methods of production, (3) operates new markets, (4) finds new sources of raw materials and/or (5) carries out a new organization of any industry (Schumpeter, 1934). Since Schumpeter, almost everyone agrees that entrepreneurs are important for economic change and growth. In the 1970's, many western countries realized new jobs are not created by large firms but by small and new firms (Davidsson, 1995). In the 1980's entrepreneurship at best was a promising field of scholarly research. In the 1990s the challenge was to build models and theories on a solid foundation of social sciences.

Figure 1.1 shows the history of publications in entrepreneurship over time based on Web of Science data, there were on average over 100 publications per year on entrepreneurship before 2000. Research in the field started increasing rapidly in the 2000s and later exploded (Reuters, 2012). Entrepreneurship is a major component of a dynamic modern economy but still high rates of failure are reported. When entrepreneurs fail it is costly for societies in terms of lost resources and missed opportunities (Zhao, Seibert, & Lumpkin, 2010). Due to high rates of failure among entrepreneurs and to prevent these costs, the research in the field is growing every year.

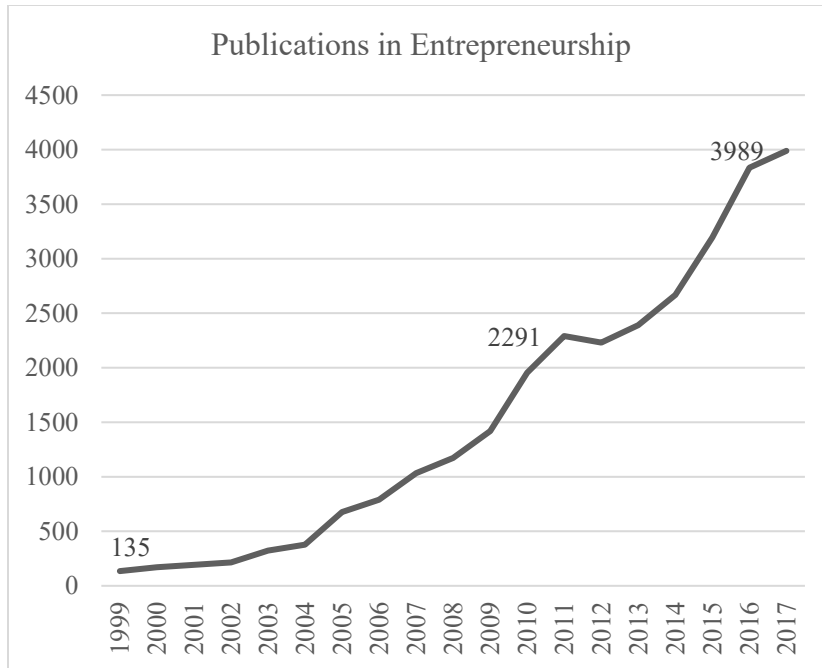


Figure 1.1 Entrepreneurship publications over time (based on Web of Science)

Job creation opportunities are another reason that almost every country, state, region and city now have innovation and entrepreneurship as a priority (Chesbrough, 2006). The Global Entrepreneurship Monitor provides a conceptual framework that explains the processes by which entrepreneurship, disruptive innovation in products and services, business renewal, job creation, economic expansion, and social wellbeing occur. According to the GEM 2017/2018 report, the United States has the highest proportion of entrepreneurship job creation opportunities among countries. GEM compares early-stage entrepreneurs' current employees to the number of employees they expect to have in the next 5 years. The estimate is that 38.6% of entrepreneurs in the United States expect to generate 6 or more jobs in the next 5 years (Global Entrepreneurship Monitor, 2018).

More recently some authors suggest that entrepreneurship should be counted as an area of study that describes the knowledge and skills required for a person to fully contribute in

modern society, these studies are known as Liberal Arts (Baker & Powell, 2018). Baker and Powell discuss how in modern societies entrepreneurship is vital by examining the Liberal Arts crisis in the USA. Later they discuss how counting these studies as Liberal Arts would change the way of teaching of students in business schools and other disciplines.

It is difficult to discuss a concept without definitions, but there is not a universal definition on entrepreneurship. Since good science should start with good definitions, Bygrave & Hofer suggested that every researcher should clearly state the meaning of the entrepreneurship term used ((Bygrave & Hofer, 1992). Innovation is also a term with many definitions. Following the suggestion of Bygrave & Hofer, we will make clear the definitions of entrepreneurship and innovation we are using in this research.

1.2. Definitions

1.2.1. Entrepreneurship definition

There are many different definitions of entrepreneurship in the literature. Gartner used the Delphi method to construct a series of three questions to produce definitions. Gartner concluded that an accepted definition of entrepreneurship has yet to emerge at this time (Gartner, 1990). Kirzner defines entrepreneurship as a mechanism to discover and reduce inefficiencies in the economy (Kirzner, 1997). In another study based on collective theory, Shane and Venkataraman introduce a framework to study entrepreneurship. In this article, a mechanism is defined by which society converts technical information into products and services. The authors claim that entrepreneurship in a capitalist society is a main engine of innovation (Shane & Venkataraman, 2000). Christensen et al. defined the field of entrepreneurship as the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited (Christensen, Cook, & Hall, 2005).

Historically definitions of entrepreneurship were focused on the desire to produce a product to make a profit. Later definitions include goods, services, raw materials, and organizing methods, which are more comprehensive (Barringer & Ireland, 2016). Other definitions include social entrepreneurship and pursuing opportunities without regard to resources that the entrepreneur controls (Gartner, 1990). The working definition for this research that benefits from all definitions mentioned above is *the creation of any business, for profit or for common good, without regard to resources under the entrepreneur's control, in order to seize a new opportunity for needed or wanted products, services, materials or business models.*

1.2.2. Innovation definition

Earlier definitions of innovation were introduced by the forming of the theory of innovation diffusion (Van Slyke, Prescott, & Kittner, 1997). Innovation was defined as a technology, or tool or an improvement that is used for the first time by the company (Nord & Tucker, 1987; Tornatzky, Fleischer, & Chakrabarti, 1990). There is a distribution aspect to the innovation through companies, industries and nations (Li & Atuahene-Gima, 2001). Haiyang and Kwaku defined innovation as a new product that is developed and commercialized for a specific market. This could be either on (1) the project level, which includes all the process from conceive, design, produce, and distribute or (2) the company level, which innovate products as a part of their competitive advantage strategy (Li & Atuahene-Gima, 2001).

In this research innovation is defined based on the early working definition in Bell Laboratories as *a fundamental breakthrough in science and/or technology, followed by a reduction to practice, followed by a practical and economical means to produce the innovations in products or services, followed by a widespread acceptance in the marketplace of the products or services* (Gertner, 2012).

1.3. Research Purpose

The purpose of this study was to better understand the entrepreneurship and innovation concept in the textiles and apparel industry. The intersection of innovation and entrepreneurship is of primary interest, how one drives the other and vice versa. The study was started with a thorough sensitivity to existing literature around key models and theories on entrepreneurship and innovation, as well as the textile industry context, and formulated three research questions to frame this inductive study.

RQ1. How can current models on entrepreneurship explain the dynamic growth of entrepreneurial companies?

RQ2. What are the critical parts (bottlenecks and incentives) of current entrepreneurial innovation frameworks for successful entrepreneurial textile and apparel companies?

RQ3. How do the critical parts of this framework vary among different industry sectors?

These questions were answered by investigating current entrepreneurship and innovation models and theories through two research phases. Phase one consisted of investigating individual factors by studying current entrepreneurship models and theories. The most promising model was tested by multiple regression and statistical modeling on current entrepreneurs to investigate if the intention of dynamic growth is partially explained by these models.

Throughout phase two by exploring the entrepreneurial innovation context, the most influential theories in the literature was investigated among textile and apparel entrepreneurs by in-depth interviews. Then the findings were explored among North Carolina as the leading state for these industries to capture differences in industry sectors. The main objective was to identify

and classify the main incentives and bottlenecks of the industry impacting successful entrepreneurial innovation among different sectors.

CHAPTER 2: Literature Review

Research in the inter-disciplinary field of entrepreneurship has received much attention in recent years. Hmieleski and Powell's extensive literature review on university science commercialization on entrepreneurship and innovation categorized studies in the area from different disciplines as human capital, social capital, heterogeneous objectives, and demographic characteristics (Hmieleski & Powell, 2018). Qualitative research is the most popular method used in the field based on surveys, interviews and case studies. Most studies about disruptive change and disruptors in the entrepreneurial world have been conducted in the last decade. Christensen, Cook and Hall discuss the challenges of disruptive change. They argue that you build a brand by "attaching the customer to products" that mean something to the customer. They discuss how to create these products, and finally, they describe how new, valuable brands can be built to truly deliver sustained, profitable growth (Christensen et al., 2005). Later, Baron discusses behavioural and cognitive factors in several key behaviours of entrepreneurs by reviewing entrepreneurial theory and investigating the context (Baron, 2007).

2.1. Entrepreneurship Intention Models

One of the key questions investigated by those interested in new enterprise creation is about intentions. Entrepreneurship is a way of thinking that emphasizes opportunities over threats. The opportunity identification process is clearly an intentional process, and therefore, entrepreneurial intentions clearly merit attention (Krueger Jr, Reilly, & Carsrud, 2000). The decision to start a new firm is expected to be planned for some time and therefore preceded by an intention to do so. Understating the intentional behavior helps scholars understand why many entrepreneurs start their own businesses based on possible opportunities. Moreover, entrepreneurs need to have a better understanding of their own motivations which can be

explained by intentions. Intentions provide an understanding of why they made certain decisions in their vision of their new enterprise.

Intention models provide a framework for understanding behavior. These models describe how external factors and entrepreneurial training impact attitudes and intentions and, eventually, enterprise creation. Almost everyone agrees that attitudes affect behavior by influencing intentions. Situation and personal variables have impacts on intention and attitude however, they do not have a direct impact on entrepreneurship (Krueger Jr et al., 2000). Intention models can also be used for other strategic decisions like expanding or leaving the business (Krueger Jr et al., 2000). Understanding intentions helps researchers and scholars to better understand related facts (e.g., what causes considering opportunities, the sources of ideas for a business enterprise, and how eventually the enterprise becomes a reality) (Krueger Jr et al., 2000). This research offers a review of the current significant intention models among literature, along with some empirical testing on these models.

2.1.1. EE: The Entrepreneurial Event Model

The Entrepreneurial Event model is one of the primary models in the field which is comprehensive. Shapero suggests two types of entrepreneurs. Schumpeterian entrepreneurs who stir the economic balance with commercializing radical innovations implemented in the market. And Austrian entrepreneurs, who have essential cognitive and behavioural capacities to grasp opportunities and reposition resources to fill a gap in the market (Shapero & Sokol, 1982). Shapero's Entrepreneurial Event model suggests two main factors for behavioural intention: (1) perceived credibility, defined as perceived feasibility and perceived desirability (2) and propensity to act. He states propensity to act is the nature of one's intention to act. As an

example, in a study among 126 business students on their intentions toward entrepreneurship, these variables explained more than half of the variance (Krueger & Carsrud, 1993). (figure 2.1)

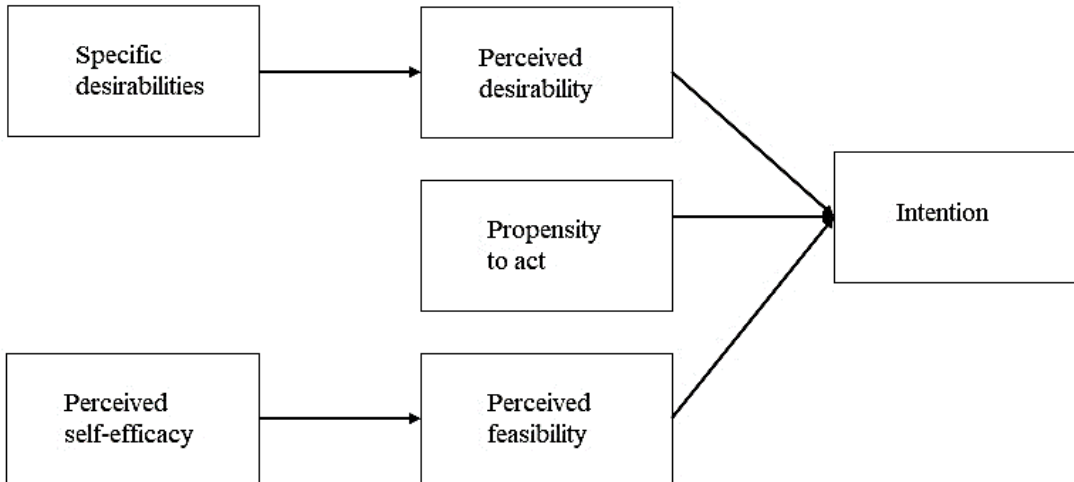


Figure 2.1 Shapero-Krueger model of entrepreneurial intentions

Later the propensity to act component was redefined by other scholars. Bateman and Crant stated a different view of the component of propensity to act, which was the propensity to act upon identified opportunities. This view is a more active measure which is related to opportunity identification (Bateman & Crant, 1993). The term was redefined by Krueger as “desirability of control” (Norris F. Krueger & Brazeal, 1994). Reitan refined the propensity to act component with a ‘support of change orientation’ index and an achievement motivation index. The construct of an individual’s move to create a venture is explained by the indexes (Reitan, 1997).

2.1.2. TPB: The Theory of Planned Behavior

Ajzen, as the base of his theory, indicated that all variables must be assessed in relation to the particular behaviour of interest. And the specified context must be the same as that in which

the behaviour is to occur. Stable intentions and perceived behavioural control are a must during the period of assessment and behavioural observation (Ajzen, 1991). According to this theory, behavioural achievement can be predicted by two variables of perceived behavioural control and behavioural intention (Ajzen, 1991). The model is shown in (figure 2.2).

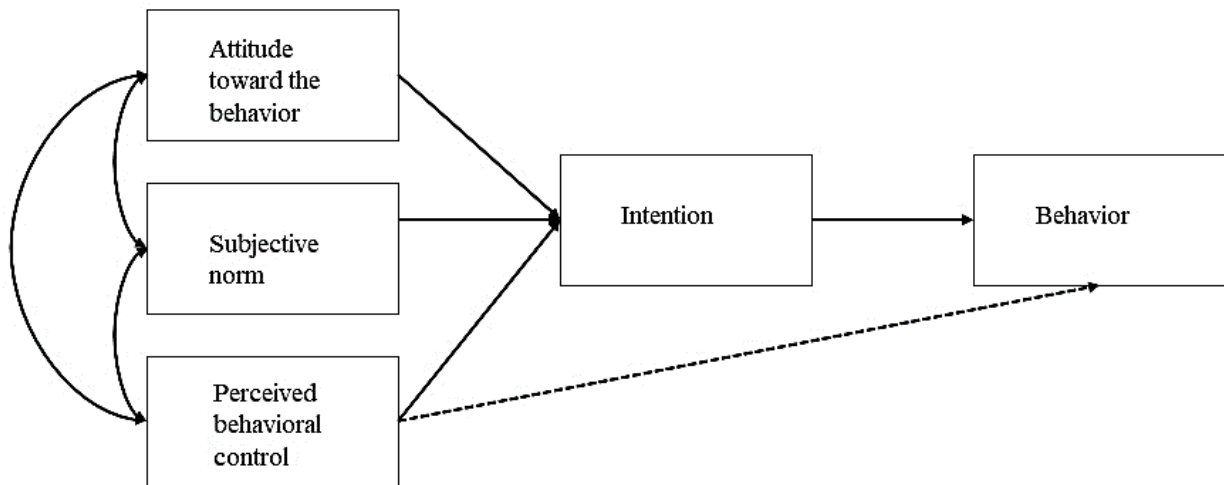


Figure 2.2 Theory of planned behaviour -Ajzen, 1991

Three kinds of salient beliefs are included in this model. First, behavioural beliefs which are assumed to influence attitudes toward the behaviour. A person's attitude towards the behaviour is defined as directly proportional to the sum of noticeable behavioural beliefs. Second, normative beliefs which establish the important factors of subjective norms. Normative beliefs are defined as the likelihood that significant referent individuals or groups approve or disapprove of performance of the behaviour. And third, control beliefs which provide the basis for perceptions of behavioural control. The perception of behavioural control (PBC), refers to the perception of the ease or difficulty of becoming an entrepreneur. It is, therefore, a concept quite similar to self-efficacy (SE) of Bandura and Krueger (Bandura, 1977; Norris F. Krueger & Brazeal, 1994) and to perceived feasibility of Shapero (Shapero & Sokol, 1982). Although there

is empirical support for perception of behavioural control (PBC) predicting behavioural achievement, intentions and perceived behavioural control are both important. Moreover, in certain applications, one may be more important than the other, and in fact only one of the two predictors may be needed (Bygrave & Hofer, 1992).

The Theory of Planned Behaviour provided a valuable conceptual framework for dealing with the complexities of human social behaviour. Although this theory offers explanations for significant relationships between behavioural beliefs and attitudes towards the behaviour, and between normative beliefs and subjective norms, and between control beliefs and perception of behavioural control, the exact form of these relationships are uncertain (Bygrave & Hofer, 1992).

2.1.3. EAO: Entrepreneurial Attitude Orientation

According to this theory, studying attitude is presented as a better approach to the description of entrepreneurs compared to personality characteristics or demographics. In a social psychological context, attitude is defined as the tendency to respond favourably or unfavourably with respect to the object of the attitude, moreover no attitude occurs in isolation (Robinson, Stimpson, Huefner, & Hunt, 1991).

There are two approaches taken to studying attitudes. One approach presents attitude as a uni-dimensional paradigm and is effectively represented by affective reaction alone (Fishbein & Ajzen, 1975). The other approach, known as the tripartite model, states that attitude is a combination of three types of reaction: affect, cognition, and conation (Breckler, 1984). The cognition counts as the beliefs and thoughts about the attitude object. The affect is defined as the positive or negative feeling about the behaviour, and conation as behavioural intentions. The EAO model, distinguishes four constructs that have been commonly used in studying

entrepreneurs from the body of the research on personality and entrepreneurship, using the tripartite view of attitudes. These four constructs are achievement in business, innovation in business, perceived personal control of business outcomes and perceived self-esteem in business. The model shows that the constructs of attitudes are significantly different between entrepreneurs and non-entrepreneur samples.

2.1.4. Davidsson Model

The Davidsson model summarized and corroborated many previous findings in entrepreneurship research. The model defines intentions as convictions, and highlights that conviction is a major determinant of entrepreneurial intentions. Conviction is one's decision that this career is a fit for them or not (Davidsson, 1995). Another main component of the model is the employment situation of the person which has shown a strong direct influence on behaviour. Many studies in the field have also found a positive relationship between unemployment and firm formation. (Davidsson, 1995). The nature of the sample is one of the unique characteristics of this research, the mail survey was sent to 300 subjects of 35-40-year olds in six different regions of Sweden. The response rate was 73 percent on average, and main tool of the study was multiple regression for each step of the model. The conviction and employment situation explained 46 percent of the variation in entrepreneurial intentions, with conviction standing out as the main explanation of entrepreneurial intention variation. These two variables are the same as Attitudes towards the act from the Theory of Planned Behaviour (Ajzen, 1991).

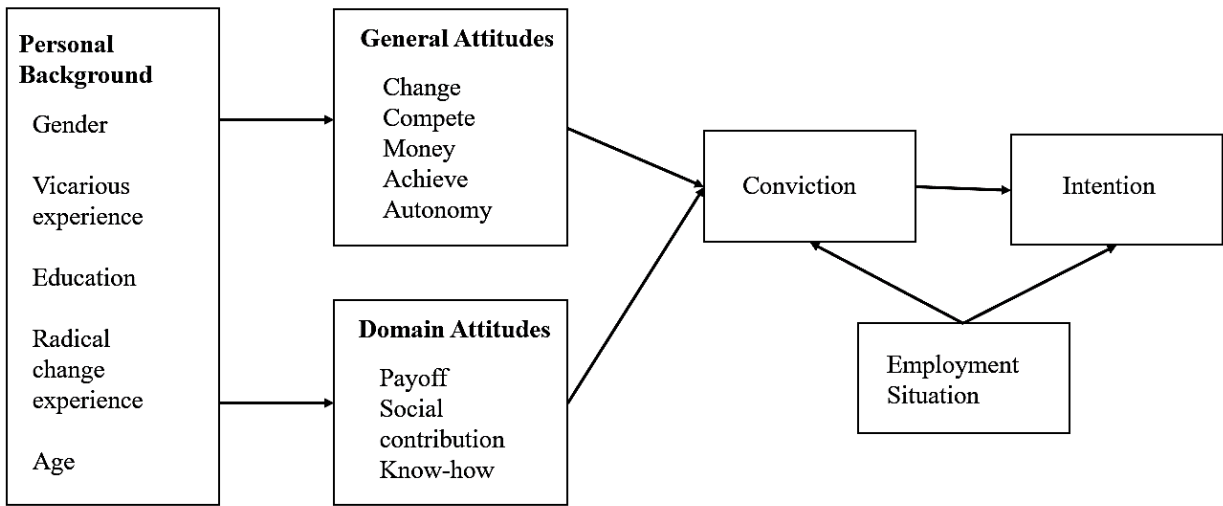


Figure 2.3 Davidsson model on entrepreneurial intention

In the Davidsson model shown in figure 2.3, there are two categories of attitudes that had been studied. General attitudes that are broad with no reference to entrepreneurship or small firm creation, and domain attitudes which explicitly concern entrepreneurship. General attitudes are listed in the model as: *Change, Compete, Money, Achieve and Autonomy*. The domain attitudes are defined as, *Payoff, Social contribution and Know-how* (Davidsson, 1995).

Table 2. 1 Davidsson's model definitions

Variable	Definition
Employment situation	Permanent/ Temporary/ Unemployed/ Student
Conviction	One's decision that the career is a fit for them or not
Change	One's general favorable- unfavorable disposition towards major life changes.
Competitiveness	One's competitiveness and valuation of money
Achievement motivation	The propensity to go into business for oneself
Autonomy	Independence
Pay off	A composite of beliefs concerning the workload, risk, and financial gain to be expected by oneself
Social contribution	the extent to which one perceive entrepreneurs' actions as being valuable to society

Davidsson found that current employment status, general attitudes and domain attitudes are strong predictors of entrepreneurial intentions. The all variable model explained 51 percent of the variation, showing that expected payoff and perceived know-how, are the strongest variables. Personal background in the context of entrepreneurial behaviour has not shown a strong direct effect on intentions, but they affect conviction in combination with general and domain attitudes

Davidsson, 1995). This model offers a reasonably high explanatory power for variations in entrepreneurial intentions.

2.1.5. Empirical testing on entrepreneurship intention models

A reasonable body of past research supports the Theory of Planned Behaviour (TPB). Krueger et al. in 2000 compared the two intentions models of TPB in social psychology (Ajzen, 1991) and the Entrepreneurial Event model (EE) (Shapero & Sokol, 1982). This study investigated the predictive ability of these two models (Krueger Jr et al., 2000), which resulted in the conclusion that both theories are significant. The adjusted R^2 for the regression of perceived feasibility, attitude, and social norms upon intentions was 0.350 for TPB ($p < 0.0001$). The adjusted R^2 for the regression of global perceived feasibility, global perceived desirability, and propensity to act upon intentions was 0.408 for EE ($p < 0.0001$). The sample was comprised of 97 senior university business students with broad ranges of experiences, intentions, attitudes toward entrepreneurship and dispositions currently facing important career decisions. The research used single item measures for each parameter (Krueger Jr et al., 2000).

In another study in 2009, Liñán and Chen built an entrepreneurial intention questionnaire (EIQ) based on Ajzen's Theory of Planned Behaviour (Liñán & Chen, 2009). In that study, a questionnaire was piloted with 519 senior students from the two diverse countries of Spain and Taiwan. Structural equation modelling using EIQ was conducted and different hypotheses were tested. The demographics were measured and included in the structural analysis. Attitude toward start-up (Personal Attitude, PA) was defined as the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur (Ajzen, 2001; Autio, H. Keeley, Klofsten, GC Parker, & Hay, 2001; Kolvereid, 1996). A number of nonsignificant path coefficients were discovered and a recursive method was used to eliminate the paths with the

lowest t-statistic at each iteration, until all coefficients were significant ($p < .05$) (Liñán & Chen, 2009). Demographic and human capital variables had relatively few significant effects on the antecedents of entrepreneurial intention. Subjective norms exerted a strong influence over both PA (Personal Attitude) and PBC (Perceived Behavioural Control) in Taiwan. The demographic variables that include gender, role model, self-employment experience and work experience in the Taiwanese subsample were not significant. Their structural equation model explained 55.5% of the variance in entrepreneurial intention. Most previous research that used linear models explained less than 40% of the variance (Liñán & Chen, 2009).

In 2011, Izquierdo and Buelens studied the effect of entrepreneurship education on entrepreneurial intentions, attitudes and self-efficacy. This study used a model based of EE, TPB and the Davidsson model (Izquierdo & Buelens, 2011). Data were collected from 236 students who took an entrepreneurship course. ESE was defined as the students' confidence in successfully performing certain tasks such as identifying new business opportunities, creating new products, thinking creatively, and commercializing an idea or new development (McGee, Peterson, Mueller, & Sequeira, 2009). To measure ESE an instrument developed by De Noble et al. was used (De Noble, Jung, & Ehrlich, 1999). This instrument consisted of items to assess a person's capability of performing a required task to start a new business. The students' attitudes toward entrepreneurial acts were measured by an instrument, based on the Entrepreneurial Attitude Orientation model (EAO) by Robinson et al. (Robinson et al., 1991). Four new business or entrepreneurial acts were assessed: identification, evaluation of business opportunities, networking, and communication abilities. This questionnaire was built based on the three attitude components of affective, cognitive or behavioural that is discussed earlier in the entrepreneurial attitude orientation model (Robinson et al., 1991). Four hypotheses were tested and the results

supported the positive influence of entrepreneurship education on attitudes. The study also provided evidence of self-efficacy as a mediator between students' competencies for entrepreneurship and their intentions to create a new venture. Better explanatory power was achieved when attitudes were mediators between ESE (a person's capability of performing a required task to start a new business) and intentions rather than a direct link (Izquierdo & Buelens, 2011).

Schlaegel and Koenig in 2014 examined both the Theory of Planned Behaviour and the Entrepreneurial Event model. Their study presents an organized review of the literature and meta-analytically compares and integrates the two intention models (Schlaegel & Koenig, 2014). Schlaegel and Koenig summarized the findings of 98 studies conducted in more than 30 countries during the past 25 years. These entrepreneurial intentions (EI) studies used either of the TPB and EE, or an extension, or combination of the two theories. The majority of the samples in these studies consisted of students. Subjective norm and PBC were significant positive effects and explained 28% of the variance in Entrepreneurial Intentions. The Subjective norm–EI relationship and the perceived desirability–EI relationship had a stronger positive association in Western countries (Schlaegel & Koenig, 2014). In conclusion, they suggested a revised model based on their findings, which has not improved the explanatory factor impressively.

Based on the thorough investigation of current entrepreneurial intention models, this research identified the Davidsson model as the most promising model with reasonable explanatory power. As discussed earlier the foundation of the model is based on the Theory of Planned Behaviour (Ajzen, 1991), in addition to detailed explanation of attitude component based on the Entrepreneurial Attitude Orientation model (Robinson et al., 1991). Although some of the later studies have suggested more detailed models, none has offered significant

improvement to the Davidsson model. There are numerous studies on the entrepreneurial intention models and many empirical tests of these models, and the literature seems saturated in the area. This study had distinguished a gap in the literature, where the intention models are only being used to predict entrepreneurship, where it could be used to describe how external factors and entrepreneurial attitudes impact intentions of current entrepreneurs.

2.2. Entrepreneurial innovation

Over the last decade, large corporations have had the majority of market share in most industries. Entrepreneurs needed to be disruptive to enter and survive in these competitive markets. That is one of the primary reasons why many innovations are introduced by entrepreneurs. Some examples are sound motion pictures, personal computers and search engines (Autio, Kenney, Mustar, Siegel, & Wright, 2014). Therefore, new policies have been adopted by many nations, states, cities and universities to inspire entrepreneurs to innovate to stimulate economic growth (Grimaldi, Kenney, Siegel, & Wright, 2011). These initiatives include incubator accelerators and also formal governmental programs. The Small Business Technology Transfer (STTR) and Small Business Innovation Research (SBIR) programs in the U.S. are examples of these.

Dyer, Gregersen, and Christensen developed a theory using exploratory interviews and active experimentation that states that innovative entrepreneurs differ from other executives on four behavioral patterns through which they acquire information: (1) questioning (2) observing (3) experimenting and (4) idea networking (Dyer, Gregersen, & Christensen, 2008).

Chandra and Yang developed a theoretical framework by deep study and literature survey using content analysing tools which explains disruptive innovation as a co-evolutionary

entrepreneurial process at the firm, product, and customer level. This framework offers a set of testable propositions to advance theory and practice in the field (Chandra & Yang, 2011).

Another qualitative study is about understanding of both disruptive innovation and the nature of opportunity generation. An innovation becomes disruptive when the basic opportunity has a certain demand (Christensen, Hall, Dillon, & Duncan, 2016). The importance of innovation, data mining in innovation, and also why and how customers need the product are discussed in this article. The authors define disruptive innovation as a core process that is about competitive responses to innovation (Gertner, 2012).

According to Garud et. al, in their review of the literature on entrepreneurial innovation, there are several approaches that have been taken by scholars to study the phenomena: Micro-Macro approaches, Multilevel approaches and Constitutive approaches (Garud, Gehman, & Giuliani, 2014).

2.2.1. Micro-Macro approaches

The micro approach to entrepreneurial innovation is focused on how entrepreneurs and their team innovate successfully (Baum & Locke, 2004). This approach emphasizes an entrepreneurial agency and entrepreneurial attitudes as the core of entrepreneurial innovation. In the micro approach the role of contexts is not explicitly considered, but the personality and cognition of entrepreneurs and team is studied (Garud et al., 2014).

The macro approach investigates how a nation, region or industry could cause innovations among entrepreneurs (Hannan & Freeman, 1987; Poole & Van de Ven, Andrew H, 1989; Saxenian, 1996). In this approach entrepreneurs are influenced by institutional structures that include nations, regions and industries.

None of the mentioned approaches could explain the complex phenomena of entrepreneurial innovation reasonably. In one study, a grounded theory on identity processes of entrepreneurship was developed by conducting a longitudinal inductive study on nine cases of nascent ventures. The authors suggest that entrepreneurship research should shift from an individual founder identity focus toward understanding how founding teams work through organizing issues (Powell, E. E., & Baker, T., 2017). The micro approach ignores contexts in which the entrepreneurial innovation happens and considers that at the core of innovation a certain demand is needed for an opportunity to be valuable. The macro approach ignores the fact that many opportunities are generated by individual entrepreneurs and focuses on how contexts are creating opportunities for entrepreneurs to discover.

2.2.2. Multilevel approaches

In these approaches, entrepreneurs are the center actor within an established context and contexts play a major role in entrepreneurial innovation. The multilevel approach argues that the contexts either create opportunities for entrepreneurs to “find” or dictate viability of the opportunity “made” by entrepreneurs (Garud et al., 2014). The research of Sarason, Dean, and Dillard (2006) is based on the multilevel approach, and they discuss how opportunities are reflections of social systems which are found by altered entrepreneurs. Some scholars highlighted the role of the team rather than one entrepreneur (Gartner, Shaver, Gatewood, & Katz, 1994). Meanwhile, others by emphasizing more on social and institutional aspect of entrepreneurship, highlight the role of team interactions and negotiation and shared experience in shaping and reshaping the opportunities (Peredo & Chrisman, 2006).

A good example is the AMR (Academy of Management Review) decade award winner individual-opportunity nexus theory (Shane & Venkataraman, 2000). This study has an artificial

view to entrepreneurship rather than natural or social view based on Simon's (1996) description of artificial phenomena. This theory describes how key variables are artificially related to each other rather than a natural or social approach. The authors argue that artifacts can be designed based on human purposes at front line of the design process other than the ones that preexist. By this view, entrepreneurship decision making in uncertainty becomes designing with constraints in interaction with the environment (Shane & Venkataraman, 2000). Their research offers three basic elements of studying entrepreneurship (1) opportunities are made as well as found (2) transformations are a central concept, and (3) the actions and interactions of entrepreneurs and their stakeholders are a key unit of analysis. They state that some opportunities are obvious and some are hard to discover but others do not exist until a person makes it exist. Most entrepreneurial opportunities are made through actions and interactions of entrepreneurs and stakeholders using materials and concepts of the world (Shane & Venkataraman, 2000).

Shane and Venkataraman explained that opportunities are formed of three parts and each are vital for a situation to count as an opportunity. The example mentioned in the study is the opportunity of a person finding a \$100 bill, which consists of three major parts, (1) the bill exists (2) the person realizes that it is a \$100 bill, and (3) other people acknowledge the value of the bill. The following strategies and techniques and mechanisms were listed from different studies that are utilized by entrepreneurs which are based on their attitude's interaction with the outside world. These strategies include: articulated cognition (Bingham, Eisenhardt, & Furr, 2007; Geroski, 2003), Bricolage (Baker & Nelson, 2005; Mair & Marti, 2009), co-construction/co-creation of markets (Read, Song, & Smit, 2009; Read, Dew, Sarasvathy, Song, & Wiltbank, 2009; Santos & Eisenhardt, 2009), effectuation (Read et al., 2009), emotions (Brundin, Patzelt, & Shepherd, 2008; Chen, Yao, & Kotha, 2009), equity negotiations (Hellmann & Wasserman,

2010), exaptation (Dew, Sarasvathy, & Venkataraman, 2004), improvisation (Baker, Miner, & Eesley, 2003; Hmieleski & Corbett, 2006), pattern recognition (Baron & Ensley, 2006), reassessment of assumptions (Haynie, Shepherd, Mosakowski, & Earley, 2010), transformation (Dew, Read, Sarasvathy, & Wiltbank, 2011; Sarasvathy & Dew, 2005).

But not all entrepreneurs' narratives follow the Silicon Valley model of entrepreneurship where entrepreneurs are continuously seeking to grow. Baker and Powell discuss how some entrepreneurs start small and stay small and are not concerned with the opportunities to either construct or discover (Baker & Powell, 2018). The multilevel approach does not explain the actions of these entrepreneurs.

2.2.3. Constitutive approaches

In this view there is a dynamics whereby entrepreneurial innovations emerge and there is a momentum to the field of entrepreneurship. Neither the agent-centric view that the contexts have been underemphasized, nor in context-centric view with underemphasizing agents explain the entrepreneurial innovation well. But the constitutive approach does discuss different ways that the entrepreneurs and their environments are co-created (Garud et al., 2014). Some scholars suggest that the outcomes of any action serve as the medium for future action (Chiasson & Saunders, 2005; Sarason et al., 2006) based on structuration theory (Giddens, 1984).

Specifically, Chiasson and Saunders argue that opportunity recognition and opportunity formation are recursively implicated because this formation dissolves the contrast between structure and agency (Chiasson & Saunders, 2005). In this approach, opportunities are creative imaginations of entrepreneurs which are pursued as their goals based on their forward-looking prospects (Chiles, Tuggle, McMullen, Bierman, & Greening, 2010). This perspective has so far been under-theorized.

In the Garud, Gehman, & Giuliani model, a narrative toolkit is formed consisting of three facets – relational, temporal, and performative– of how entrepreneurs contextualize innovation. In the relational facet they argue that entrepreneurs “neither accept nor reject ‘reality.’ Instead, they seek to mold it, shape it, and infuse it with meaning” (Gabriel, 2000). The relational facet discusses how entrepreneurial narratives make stakeholders understand the innovation and shape the entrepreneur’s identity to get support from the stakeholders. In the temporal facet, they discuss that each entrepreneur envisions purposes differently with different temporal orientations. In the journey of creating the enterprise, entrepreneurs and stakeholders are not isolated and have to constantly be aware of what happened and what is going on and what could happen in the future. This is why it is important to add different notations of time to these narratives. In the performative facet, the entrepreneurs’ need to generate meaning around their ventures is discussed. One of performative facets of the narrative could be by enrolling stakeholders, or making business plan, bringing a product to market or even executing a human resources policy. It is indicated that entrepreneurs do not just have a narrative but continuously revise the narratives for different stakeholders (Garud et al., 2014). “Entrepreneurs attempt to contextualize innovation by establishing links with the past, present and future to generate meaning.” Since the envisioned outcome is not always met, these narratives are constantly changing to make meanings (figure 2.4) (Garud et al., 2014).

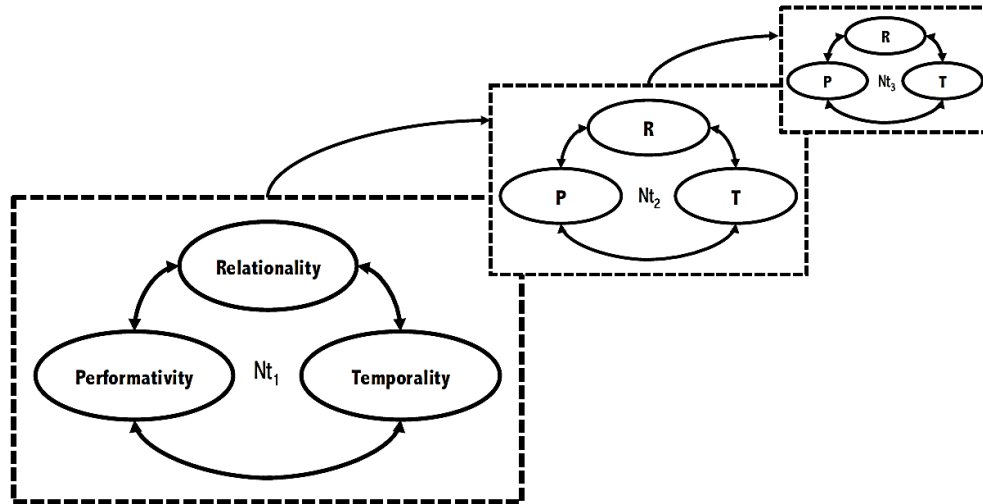


Figure 2.4 Constitutive approaches to entrepreneurial innovation (Garud et al., 2014)

2.3. Framework of entrepreneurial innovation

There is increasingly evidence that the quality of entrepreneurship matters, but entrepreneurial innovation differs across industries and regions. Different international indices have used different measurements for entrepreneurship. The most influential country level innovation study– the National Systems of Innovation literature (Acs, Autio, & Szerb, 2014) mentions three different measures. The *output measure* is either based on the number of employees or paid salaries or revenue for registered companies. Whereas it has been shown that in some developing countries the ratio of registered companies to unregistered is one to one hundred, this is an example of ignoring the contexts. The *attitude measures* are based on firm creation. It is discussed that more firm creations will not necessarily result in more economic growth. Also, as discussed earlier, this measure can weakly connect the attitudes to the actual entrepreneurial act. The *framework measure* highlights institutional and regulatory conditions of the entrepreneur. This measure also fails to connect the framework to the actual entrepreneurial act. Therefore, none of these measures are satisfactory (Acs et al., 2014).

Acs et al. define a systematic approach to entrepreneurship at a country level. This approach explains entrepreneurship as “dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures” (Acs et al., 2014). The National System explains entrepreneurship by emphasizing the interaction between individuals and institutional contexts (Acs et al., 2014).

This proposed system covers a wide range of components besides being interactive between system level components and individual components. The individual components have been weighted after testing numerous alternative weights by framework measures. This framework uses the penalty of bottleneck factors, the direct effect of the concept of components interaction, to analyze what holds back the system performance (Acs et al., 2014). It utilizes the theory of constraints (TOC) and theory of the weakest link (TWL) stating that strengthening the weakest link or bottleneck is the key to improvement (Goldratt, 1994; Yohe & Tol, 2002). The theory of Six Sigma Quality in management is also based on removing the cause of mistakes (weakest link) and reducing the variation (Nave, 2002).

Acs et al. construct a Global Entrepreneurship and Development Index (GEDI), that explains system dynamics by accounting for the interactions of essential components. To better understand the GEDI index, a baking example was used to explain the view of the bottleneck’s factors. If 1 kg flour, 6 eggs (300 gr) and 200 grams of sugar are needed to bake a cake, and the amount of sugar is low by half in the traditional index the ingredients are 9% low. But in GEDI since only half a cake can be baked, it is considered 50% low on ingredients and adding 100 grams of sugar will result in 100% efficiency. These bottlenecks have been compared among US, Japan and India in the research based on a wide range of data sets (figure 2.5). The US is almost

on top of almost every pillar except for Process Innovation and High Growth where Japan leads (Acs et al., 2014)

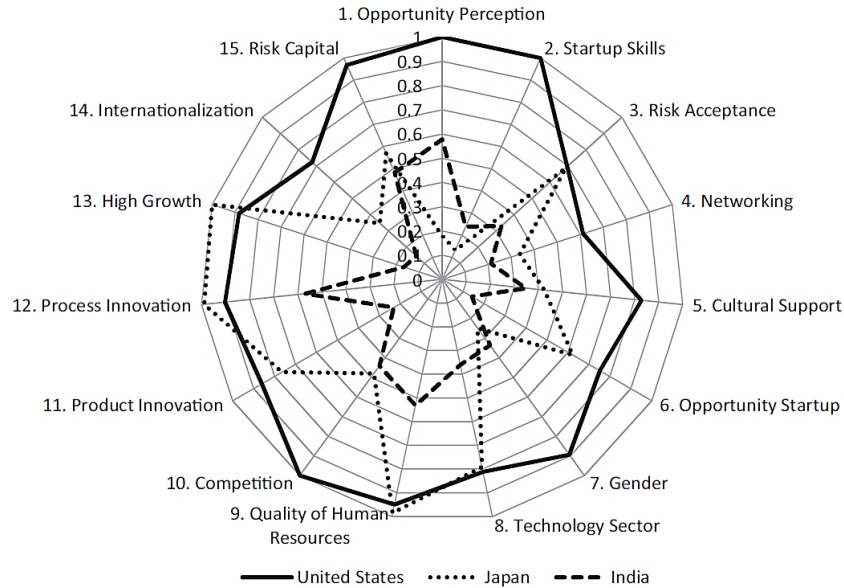


Figure 2.5 GEDI index comparison among US, Japan and India (Acs et al., 2014)

But the National Systems of Innovation literature which is one of the most cited studies in Innovation (Acs et al., 2014) has focused on patentable technological innovations and not softer innovations like new business models or creating new markets. Although, as discussed earlier there are a wide range of innovations that have been introduced by entrepreneurs. The other weakness of this study is that it only includes institutional context and not others.

2.4. Framework of entrepreneurial innovation and context

It has been shown that there is a difference among individuals with different backgrounds in terms of their innovative or high-growth entrepreneurial behavior. For instance, highly-trained graduate entrepreneurs want to grow faster to compensate the cost of not having a good income they could earn in other occupations (Autio & Acs, 2010).

Research Policy published a special issue on entrepreneurial innovation in 2014. Autio et al. set a framework for entrepreneurial innovation based on different contexts: (1) industry and technological contexts; (2) organizational contexts; (3) institutional and policy contexts (further distinguishing between formal and informal institutions); and (4) social contexts, overlain by (5) temporal and (6) spatial contexts (figure 2.6) (Autio et al., 2014).

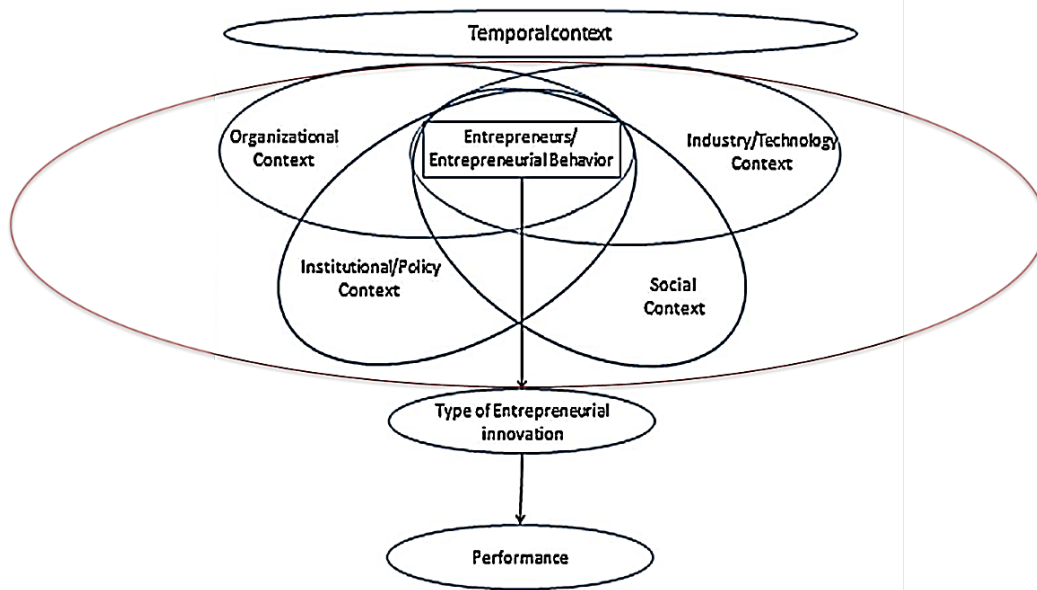


Figure 2.6 Framework of entrepreneurial innovation and context (Autio et al., 2014).

Among other contexts *industry and technological context* got the most attention in entrepreneurial innovation studies. For instance, there is more innovative entrepreneurial activity when the industry is new, since there is the need of new products and new processes (Abernathy & Utterback, 1978; Anderson & Tushman, 1990; Kenney & Von Burg, 1999). In another study, it is stated that technological platforms increase the entrepreneurial innovation activity (Garud, Jain, & Tuertscher, 2008).

Organizational context has an important influence on entrepreneurial innovation which has been explored thoroughly by scholars. It has been shown that former employments have a

significant effect on the entrepreneurial entry (Buenstorf & Klepper, 2009). Three different organizational contexts (previous employment in the industry- academic- being a user) have been studied to see how they impact the entrepreneurial innovation. Agarwal and Sonali Shah found that the entrepreneurial innovations differs for different organizational contexts. Product innovations mostly come from academics and users while process innovations are mostly introduced by employee founded entrepreneurial organizations (Agarwal & Shah, 2014).

Formal and informal *institutional contexts* have also been defined. Formal institutions mostly influence economic outcomes and opportunity costs. Informal institutions establish social norms and perceptions and social desirability for entrepreneurs often called “entrepreneurial support networks” (Kenney & Patton, 2005). Informal institutions range from culture (Stephan & Uhlaner, 2010) to social norms (Holder-Webb, Cohen, Nath, & Wood, 2009) to peer influences (Obschonka, Goethner, Silbereisen, & Cantner, 2012).

Social context focuses on the networks between entrepreneurs, trading partners, investors and incumbent firms, as well as how these networks influence entrepreneurship (Dubini & Aldrich, 1991; Hoang & Antoncic, 2003). This context has received much attention in the recent literature. It has been shown that the knowledge disperses among heterogeneous agents and the flow is crucial for new knowledge production.

These contexts overlay in temporal and spatial dimensions. It has been shown that industries have a *temporal dimension* as they grow from new to growth and maturity and then decline. Since the ownership or governance changes happen during the firm’s growth, there is a temporal dimension to the organizational context too (Xu & Meyer, 2013). Regulation and laws change regularly and that puts a temporal dimension to institutional contexts. A good example to understand the temporal dimension of the social contexts is the case of developing new industrial

clusters like Silicon Valley where successful entrepreneurs changed the culture and created an environment for entrepreneurship to flourish. These changes resulted in local institutional helpful changes and a positive feedback loop of encouragement (Feldman, Francis, & Bercovitz, 2005).

Spatial dimension argues how entrepreneurs distribute globally, nationally, regionally and locally (Welter, 2011). Different contexts like social and institutional changes in different places can influence entrepreneurial behavior. Different laws and regulation in different places can accelerate innovation and able entrepreneurs to innovate (Autio et al., 2014).

This framework includes all the contexts that influence entrepreneurial innovation; therefore, this research has focused on investigating this framework for textile and apparel entrepreneurs.

2.5. Entrepreneurship and entrepreneurial innovation among the textile and apparel industries

There are few entrepreneurial studies in the literature focused on the textile and apparel industries. Yusuf determined the South Pacific entrepreneur's critical success factors for small businesses in textile industry. He concluded that both individual factors (such as having certain skills and good character) and environmental factors (such as government support, political and traditional demands, and the need for balancing these demands with business commitments) are critical to small business success (Yusuf, 1995). Hardill and Wynarczyk inspected the relationship between technology, entrepreneurial human capital, and company performance in a sample of textile and clothing SMEs in Great Britain (Hardill & Wynarczyk, 1996). Their findings are based on computer network usage in 1996. Yu discusses success factors of Hong Kong entrepreneurs in the textile and garment industries. This study suggests that Hong Kong's industrial vitality mainly depends on a large number of adaptive entrepreneurs who are

continuously aware of opportunities, keep a high degree of flexibility in their production, and embrace change rapidly (Fu-Lai Yu, 1999). Based on this research the textile and garment industry firms in Hong Kong survived by pursuing a product imitation strategy, operating at a small scale, extensively utilizing subcontracting networks, producing customer label garments as well as performing 3-D arbitrageurship (Fu-Lai Yu, 1999).

Powell and Baker conducted 150 hours of interviews with textile entrepreneurs who were trapped when larger manufacturers were moving operations to Central America and Asia. Interestingly, money generation was not the primary reason for these entrepreneurs to start their businesses but the reasons were closely tied to their sense of identity. The “founders use their firms as vehicles through which they affirm and defend their identities but also create new roles to express previously suppressed social identities” (Powell, E. Erin & Baker, 2014). Moreover, they found that financial institutions were being more cautious when making investment decisions about the entrepreneurial motivations and resiliency. It has been suggested to study how entrepreneurs deal with resource constraints and adversity (Rick Uhlmann, 2016). In another study, Aldas-Manzano, Küster, & Vila investigated the association between market orientation and innovation in the textile sector. They studied 465 leading textile companies operating in Spain and clustered these companies based on their commitment to market orientation attitudes and behaviour positions (Aldas-Manzano, Küster, & Vila, 2005). In this study, innovation is measured based on a scale borrowed from other sectors (Henard & Szymanski, 2001). Four sub-scales including innovation in products, innovation in processes, innovation in strategy and innovation as a whole were examined. These four sub-scales are taken as predictors of the success or failure of a new product. Based on in-depth interviews with general directors, a thirteen-item scale for innovations as a whole and ten-item scale for

innovations related to products, processes and strategies were developed (table 2.2). Four items were used to measure performance as response variable, the ratios of profitability to investment, profit margins to sales, increase in turnover and global results (Aldas-Manzano et al., 2005).

Table 2.2 Innovation scales for textile sector (Aldas-Manzano, Küster, & Vila, 2005)

Innovation as a whole scale	Innovations related to products, processes and strategies scale
1. Uses e-mail with clients and suppliers	1. Launching of high-tech brands
2. Has a web page director	2. Use of up-to-date, cutting edge machinery
3. Uses the intranet	3. Flexible production systems adapted to a changing environment
4. Uses mailing lists	4. Use of revolutionary raw materials
5. Has access to mailing lists	5. Novel staff training/remuneration methods (i.e. online training)
6. Takes part in chats	6. Innovative communication campaigns
7. Takes part in news groups	7. Novel distribution systems (for example online sales)
8. Uses mobile telephones as e-mail terminals	8. Attendance at top-ranking, prestigious trade fairs
9. Has electronic diaries	9. Permanent diversification of product range (extensive product range)
10. Uses self-management mechanisms	10. Modern stock control and order systems
11. Uses gateways for fax through the internet	
12. Uses voice synthesis/recognition systems	
13. Uses video conferences	

Although the typology of Aldas-Manzano et.al. on innovation among textile and apparel industries is adequate, the scales do not necessarily cover all the aspects of each innovation type. This research investigated the innovation typology of Aldas-Manzano et.al. but used more thorough definitions on each type of innovation. Table 2.3 summarizes the definitions of each innovation type used in this research.

Table 2. 3 Innovation types definitions for this research

Innovation type	Definition
Innovation as a whole	If the company offered a new technology or utilized the current technologies to create novel products or even created a new market
Innovation in Process	If the company changed the common business models in order to create or utilize new processes to operate
Innovation in Product	If the company is offering a new product or customized the existed product for a target market
Innovation in Strategy	If the company is based on communicating the innovation strategy

CHAPTER 3: Methodology

3.1. Research Design

Both individual factors (such as having a certain skills and good character) and environmental factors (such as industry, government support, political and traditional demands, and the need for balancing these demands with business commitments) are critical to small business success.

This study was divided into two research phases, each which called for multiple steps. During phase one, we investigated the first research question of how current models on entrepreneurship can explain the growth of entrepreneurial companies. Individual factors were studied by current entrepreneurial intention models and the theories in the literature. This research identified the Davidsson model as the most promising model as discussed earlier. This model was tested by multiple regression and statistical modeling on current entrepreneurs, to distinguish if it fit or partially fit the entrepreneurial dynamic intentions during their business growth period.

Throughout phase two research questions two and three were answered, the environmental factors for textile and apparel industries were investigated using the framework of entrepreneurial innovation & context. This framework includes all the contexts that influence entrepreneurial innovation. It states that strengthening the weakest link or bottleneck is the key to improvement. To identify the critical parts for this framework, in depth interviews were conducted of North Carolina Entrepreneurs. As discussed earlier, textile and apparel industries have different innovation types, therefore an entrepreneur per each innovation type was selected for this study. Secondly, to capture the differences in critical parts (bottleneck/innovation) among different industry categories, secondary data for textile and apparel entrepreneurs in North

Carolina were collected. The data were clustered based on four industry categories as attribute variables, and annual sale and number of employees as continuous variables (two widely used variables in entrepreneurship studies as success measures). Five clusters were distinguished, later the bottleneck and innovation factors were studied among open source data for the stratified samples of 50 to capture these differences. The below figure summarizes the design of this research (figure 3.1).

This Research	Phase 1 Individual factors	Tested Davidsson’s model of entrepreneurial intention by multiple regression and statistical modeling on current entrepreneurs.
	Phase 2 Environmental factors (Entrepreneurial Innovation & context)	Investigated the most influential theory by in-depth interview Investigated the findings for North Carolina Textile and apparel entrepreneurs by clustering and subsampling.

Figure 3. 1 Summarized research design

3.2. Phase One - Effect of individual factors

3.2.1. Research Method

Although there is much research on entrepreneurial intention models, as Krueger discusses in his book, entrepreneurs’ intentions may easily change over the time. Intentions should be considered a stepwise process and a dynamic view in modeling is suggested. Krueger states that the Theory of Planned Behavior still offers substantial explanatory power even with it being a static snapshot of a complex and dynamic process (Krueger, 2017). There is much evidence in the literature supporting the Theory of Planned behavior and the Entrepreneurial Event model as discussed earlier. Moreover, the Davidsson model is a summary of the two models and in our research, we use the Davidsson model as the most promising model. During

phase one, the first research question of how we investigate how current models on entrepreneurship explain the dynamic growth of entrepreneurial companies.

Most of the studies in entrepreneurship use students as study subjects. Samples containing current entrepreneurs are considered biased when measuring intentions creating unpredictable outcomes when analyzing the results of the study (Krueger Jr et al., 2000). On the other hand, it has been suggested that intention models can also be used for other strategic decisions of entrepreneurs, like expanding or leaving the business (Krueger Jr et al., 2000). This study has distinguished a gap in the literature, where the intention models are only being used to predict entrepreneurship when they could be used to describe how external factors and entrepreneurial attitudes impact intentions of current entrepreneurs. It is a common phenomenon in entrepreneurial empirical intention model testing to only partially test the intention models. In this research, the attitude variables and situation variables of the Davidsson model were tested. We list the variables that were included in this research in bold in figure 3.2. One variable that was tested in this study and not in the final model of Davidsson is the role model. Almost everyone agrees that the role model has a positive effect on entrepreneurial intentions, although Davidsson concluded that it was not a significant variable to be included in the final model. The data we gathered includes the role model, and we included it in our study.

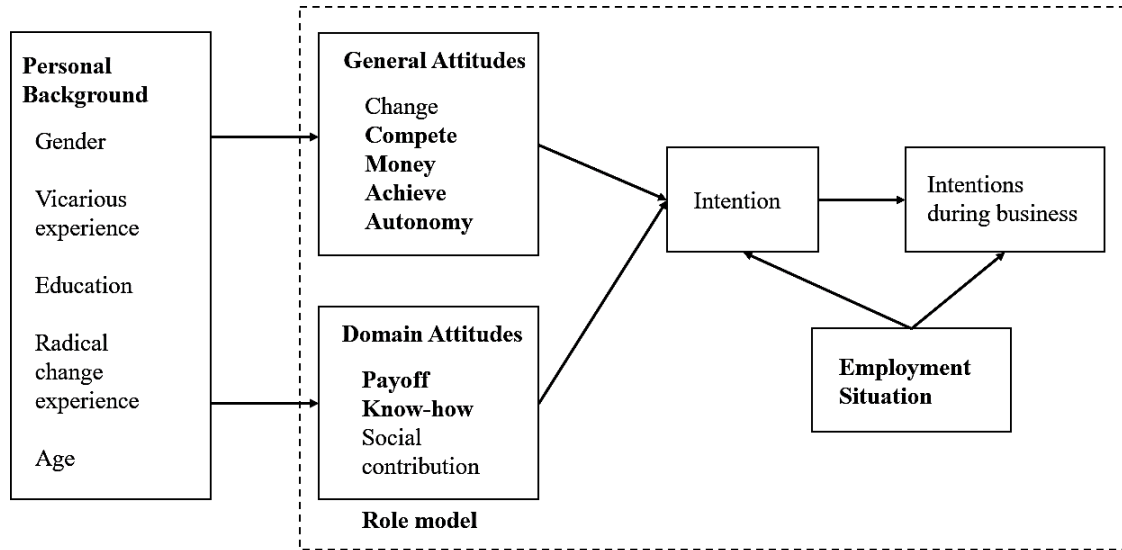


Figure 3.2 This study's investigation summary of Davidsson model

According to the body of scientific inquiry, attribution is a description of how people answer the “why” question (Krueger, 2017). This study has used entrepreneurs’ answers to why they became entrepreneurs as their attitude towards entrepreneurship. Moreover, the existence of a relationship between the entrepreneurs’ attitude and entrepreneurial intentions during the act was of interest. These intentions included where they would like to see their business in next five years: either larger, about the same size or smaller, in terms of sales or profits. These intentions were called the business owner aspiration during running the business.

The following hypothesis was developed for the purpose of this phase of the study. The hypothesis was that the Business Owner Aspiration is explained by the Attitudes and Situation constructs of the Davidsson model of entrepreneurial intention.

3.2.2. Data Collection

Data were collected from the most recent published open data source of Annual Survey of Entrepreneurs (ASE) in 2016 (US Census Bureau, 2004). The Annual Survey of

Entrepreneurs (ASE) data provides information on employer firms and business owners regarding economic and demographic characteristics. This survey documents the story of American entrepreneurs, it is conducted every five years by the U.S. Census Bureau and collects and sample data electronically of approximately 290,000 employers. ASE gathers data in different sampling frames (e.g., American Indian, Asian, Black or African American, Hispanic, Non-Hispanic White Men, Native Hawaiian and Other Pacific Islander, Other, Publicly Owned, and Women). It includes the Survey of Business Owners (SBO), that is reported it two data sets, *characteristic of business owners' data* and *characteristic of businesses data*. We were interested in investigating the relationship between *reasons for owning a business* from the first data set, and *business aspirations of owners* from the second data set.

Tables of the reasons for owning a business and the business aspirations of owners were collected. The ASE data are reported in different layers of details (figure 3.3). The first few hundred rows of these data are reported in groups of ASE ID, these include: gender, ethnicity, race and veteran status for all industries. More detailed groups of industries and frames are also reported. For the purpose of this study, the more detailed layer of the data was of interest. This made it possible for us to test the hypothesis with an adequate sample size.

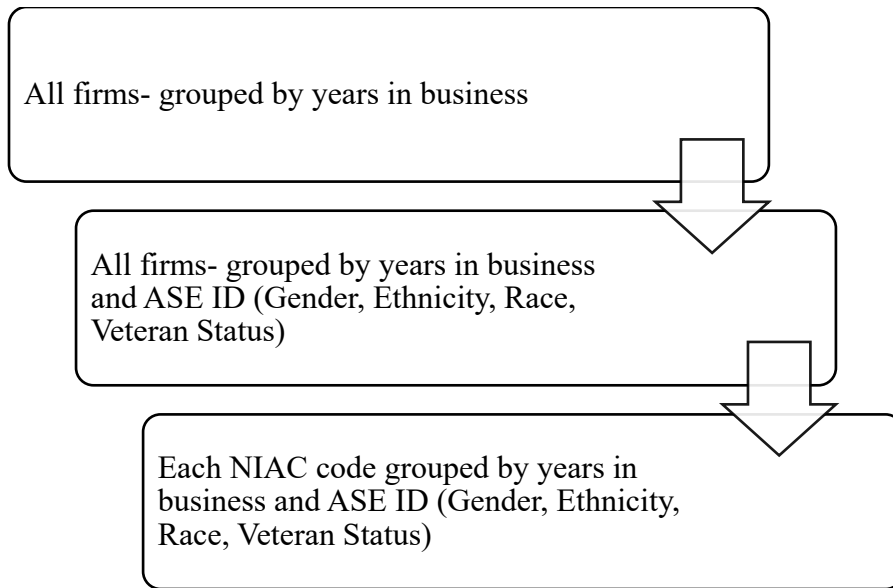


Figure 3. 3 The Annual Survey of Entrepreneurs (ASE) data structure

In this study, it was assumed entrepreneurs from different industries and different frames, have equal intentions for dynamically improving their firms. By this assumption using the third layer of the data, 259 data points were extracted from the ASE (Characteristics of Business Owner tables and Characteristics of Businesses Tables(Caffoni & Wedemeyer, 2010a; Caffoni & Wedemeyer, 2010b). Each of these data points represent an industry in different frames (e.g., mining, quarrying, and oil and gas extraction, female).

3.2.3. Data Analysis

In the ASE questionnaire on characteristic of business owner’s data entrepreneurs were asked the reasons for owning a business. Each question used a three-point scale of not important- somewhat important - very important (indicator variable; 1, 2, 3). Entrepreneurs should have chosen one scale for each reason. To calculate the Attitude value, the average answer of each group (not important - somewhat important - very important) in reply to each reason was calculated. The averages were normalized by the group size to be counted as a single data point.

The below table summarizes the nine reasons reported in this data set along with the attitude representative of the Davidsson intention model and definitions (table 3.1). The listed attitudes definitions in the ASE questionnaire are clearly the same as definitions of the model. Not all of the attitudes of the Davidsson’s model were tested in this research but the majority were (figure 3.2). We investigated the pay-off variable by averaging two reasons of flexible hours and balancing work and family to cover the definitions of the model.

Table 3. 1 Definitions of tested entrepreneurial attitudes

ASE Reasons for Owning a Business	Entrepreneurial Attitude	Davidsson’s Model Definitions
R1-Wanted to be my own boss	Autonomy	Independence
R2 - Flexible hours	Pay-off	A composite of beliefs concerning the workload, risk, and financial gain to be expected by oneself
R3 - Balance work and family		
R4 - Opportunity for greater income/wanted to build wealth	Money	high Valuation of money
R5 - Best avenue for my ideas/goods/services	Know-how	Whether the respondent would know what to do if s/he came up with a good business concept (perceived know how)
R6 - Couldn’t find a job/unable to find employment	Employment situation	Permanent/ Temporary/ Unemployed/ Student
R7 - Working for someone else didn’t appeal to me	Competitiveness	Concerns comparison with other people
R8 - Always wanted to start my own business	Achievement motivation	Concerns comparison with an individual’s internal standards
R9 - An entrepreneurial friend or family member was a role model	Role model	Close role model

The business owners’ answers to where they would like to see their business in the next five years were used to estimate the business aspirations. To calculate the Business Owner Aspiration value, the average answer of each group in reply to the question (1= Large 0 = about

the same size and -1= smaller in terms of sale or profit indicator variables) was calculated. The averages were normalized by the group size to be counted as a single data point. It should be mentioned that if the answer was “other” to this question, that case was excluded from the analysis.

The data was combined using open source R software. Multiple regression and statistical modeling were used to test if these entrepreneurial attitudes had any significant relationships with Business Owner Aspiration for the business. Open source R software was used for these analyses as well.

3.3. Phase Two- Effect of environmental factors

As discussed earlier, there is a difference among individuals with different backgrounds in terms of their innovative or high growth entrepreneurial behavior. Qualitative research is the most popular method used in the field of entrepreneurship studies by using surveys, interviews and case studies. The Autio et al. framework for entrepreneurial innovation includes different contexts that influence entrepreneurial innovation. Our research focus on investigating the Autio et al. framework for textile and apparel entrepreneurs. This framework states that strengthening the weakest link or bottleneck is the key to improvement. To identify bottlenecks of this framework for these industries, in-depth interviews were conducted of North Carolina entrepreneurs.

The identified bottlenecks and innovations were then investigated using secondary data for the North Carolina textile and apparel industries. We investigated how entrepreneurial companies had managed the bottleneck and, how innovative they are.

3.3.1. In depth interviews

3.3.1.1. Research Method

There are four types of innovations that were discussed earlier for textile and apparel entrepreneurs: innovation as a whole, innovation in process, innovation in product, and innovation in strategy. These categories were selected based on the typology of Aldas-Manzano et al. (2005) that is appropriately adequate for the textile sector. The companies selected for the in-depth interviews for this research were selected after a critical review of all possible options among the large entrepreneurial community in North Carolina. Four cases were selected to cover all innovation types, these cases have best covered the innovation definitions listed in table 3.2 among other options available. The Institutional Review Board procedures for Human Subjects research were followed throughout the investigation (Appendix A).

Table 3. 2 Innovation definitions

Innovation type	Definition
Innovation as a whole	If the company offered a new technology or utilized the current technologies to create novel products or even create a new market
Innovation in Process	If the company changed the common business models in order to create or utilize new processes to operate
Innovation in Product	If the company offered a new product or customized the existed product for a target market
Innovation in Strategy	If the company adopted novel or new strategies for the business model

3.3.1.2. Data Collection

For this research we conducted in-depth interviews of various textile and apparel entrepreneurs from different types of innovations namely innovation as a whole, innovation in process, innovation in product and innovation in strategy. Some of these companies are quite new but have already provided strong economic gains to their regions with several hundreds of

new jobs. Others are just beginning to grow and build local, national and international markets.

Table 3.3 summarizes the description of each case that has been interviewed.

Table 3. 3 In-depth interviews cases summary

Case ID	Innovation type	Entrepreneur former employment	Support system	Added value
A	Innovation in Products	User & Student	NCSU- VC competition	New market creation
B	Innovation in Processes	Academic & Industry	Kick starter- Program for entrepreneurs in poverty	On- demand manufacturing to solve waste problem
C	Innovation in Strategy	Industry	Friends and Family	Reuse of waste
D	Innovation as a Whole	User & Industry	NCSU & [TC] ²	New market creation & repurposed existing technology

The data were gathered from highly knowledgeable informants, the entrepreneurs. Various perspectives of the phenomena in question were investigated to minimize the bias (Eisenhardt & Graebner, 2007). Questions were asked in a manner to include how entrepreneurial narratives (Garud et al., 2014) have changed over time. The interviews were audio recorded for further analysis. The interview protocol was submitted to the Institutional Review Board for the Protection of Human Subjects of North Carolina State University. The following open-ended questions were asked covering all contexts of the framework:

1. How and when do you feel entrepreneurial attitudes (financial gain, passion for a particular product or service offering, social contribution, job creation, or other factors) drive entrepreneurial behavior over time?

2. What do you feel are the most important bottlenecks in the entrepreneurial process?
3. What are the backgrounds of the founder or founders, the reasons why he/she or they started the business, the support system that helped start the business, and the business model?
4. What is the innovation process at your company?

Many of our preliminary questions and hypotheses were based on our review of personal interviews of over 400 entrepreneurs located mostly in North Carolina conducted by our colleagues at North Carolina State University (Godfrey & Pourmojib, 2017).

3.3.1.3. Data Analysis

It is discussed that the researcher is the main tool in conducting in-depth interviews. The Autio et al. framework of entrepreneurial innovation and context is the main framework for the interviews. The qualitative data were gathered in each context of social, institutional, organizational and technology. After many hours of interviews with entrepreneurs, the bottlenecks and barriers and incentives for innovation in textile and apparel entrepreneurs were determined by the researcher. The entrepreneurs were asked to evaluate their actions and determine what attitudes mostly drove them. The first question is more of an introductory question for the interviewee to talk about the individual factors.

In question two and three, the barriers of the framework were investigated. Interviewees explained which context was a barrier and which one was an incentive for their business growth. Lastly, in question four the innovation process of each case was investigated.

3.3.2. Validation

3.3.2.1. Research Method

The current research is focused in the U.S. and primarily in North Carolina as one of the leading states in the textile and apparel industries. The North Carolina Innovation Index uses data from the NC department of commerce on their annual report (2017). In this step, Secondary data were collected from the North Carolina department of commerce and used to further investigate the findings of the in-depth interviews. Interestingly, the bottleneck for the industry was mutual between all four cases of the in-depth interviews. In this phase we also were interested in how innovative are the textile and apparel companies, so innovation was another factor that was investigated. The secondary data of North Carolina entrepreneurs were clustered and sampled to understand how entrepreneurial companies are dealing with the bottlenecks and innovations. The figure below (figure 3.4) summarizes this research methodologies in each step of the process. By this process the effect of environmental factors and context on entrepreneurial innovation among North Carolina textile and apparel industry, is distinguished.

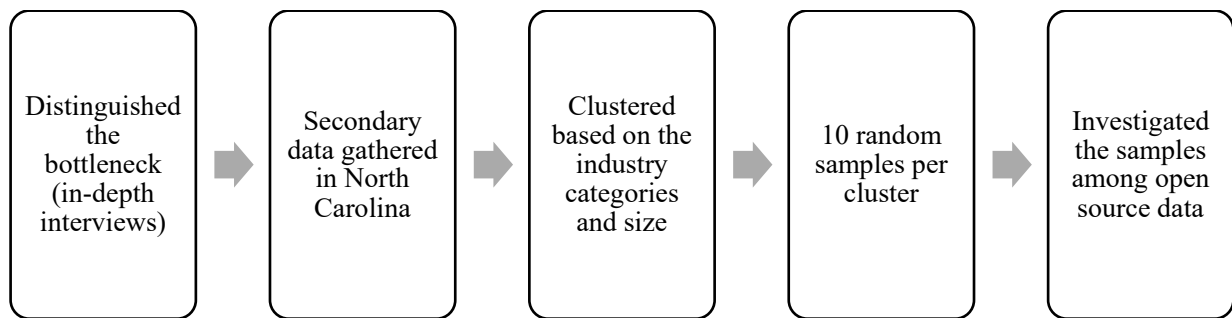


Figure 3. 4 Summary of this research process for phase two

3.3.2.2. Data Collection

Business data for all the textiles and apparel manufacturing sections of 313-314-315 NAICS codes from the NC department of commerce were collected manually in 16 different

sheets (Nccommerce.2017). We produced 775 rows of data for the textile and apparel manufacturing section in North Carolina by stacking the data sheets into one file. To limit the data for entrepreneurs and not from mature firms, the companies that were established before 2000 were excluded from the data set. This resulted in 377 rows of statistical data on textile and apparel entrepreneurs in North Carolina. The data include name, address, number of employees, annual sales, year of establishment and the business type of the company. In reviewing the data set, we found that 83 rows of the data (22%) were a part of a corporation development and not true entrepreneurial companies, and another four companies were listed in a wrong industry. These were excluded from further analysis, resulting in 290 rows of data on entrepreneurial companies.

The histogram below summarizes the 290 rows of statistical data on textile and apparel entrepreneurs in North Carolina based on the year of establishment. The histogram is drawn using JMP Pro 13 software (Hodgson, 2016). As the box plot shows 50 percent of the companies over the last 18 years have been established during the period of 2005 to 2012 in North Carolina. 42 companies have been established in 2011 which is the maximum in the period of study.

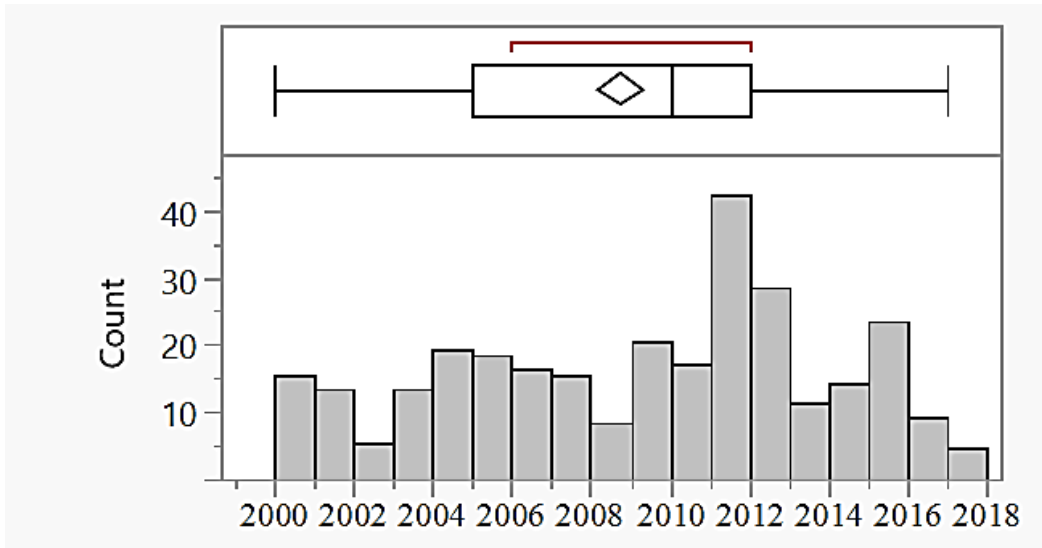


Figure 3. 5 Number of North Carolina textiles & apparel manufacturers established per year of establishment

3.3.2.3. Data Analysis

Among the 290 entrepreneurial Textile and Apparel companies in North Carolina, there were 62 business descriptions associated with different NAICS codes. To be able to study the different sections of industry these companies were divided into 4 categories (Figure 3.6); Textile Manufacturers includes any type of fabric or yarn preparation, manufacturing or finishing or textile goods manufacturing. Apparel & Accessories Manufactures includes any type of clothing or accessories, e.g., gloves manufacturing. Textile Wholesale includes any type of yarn, fabric or textile wholesale operations. Sewing Contractors are counted as a separate category.

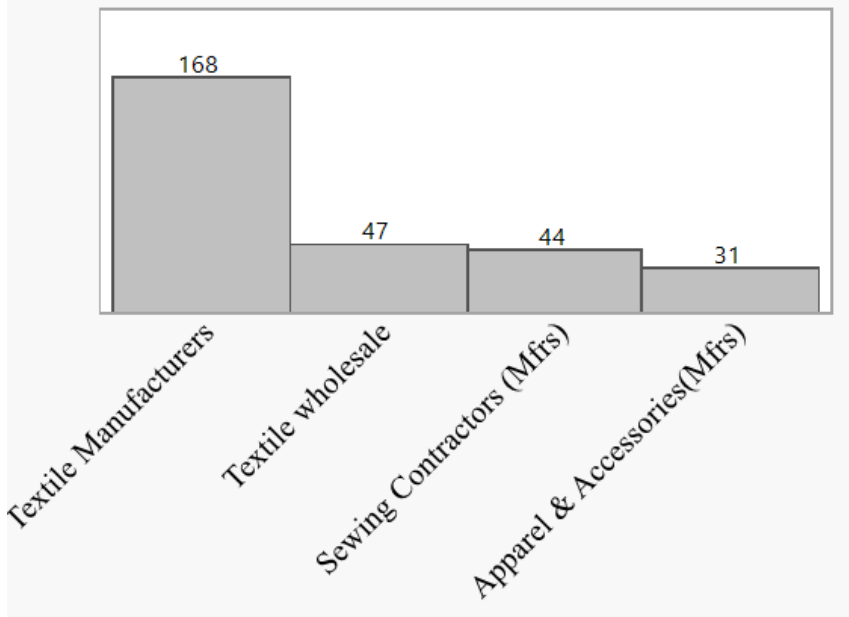


Figure 3. 6 Different industry sections for North Carolina entrepreneurs

At this step we used cluster analysis to explore the differences in the industry categories. For a better understanding of the clusters and their distribution over the state of North Carolina, we mapped the data using Tableau. We performed the cluster analysis using the four industry categories as attribute variables and using the aggregation of annual sales and the number of employees as continuous variables. Annual sales and number of employees are two widely used variables in entrepreneurship studies as success measures.

By clustering we were able to group the data into similar categories by industry category and maturity in terms of profit and size. The clustering process calculates the distance between all pairs of clusters and combines the two clusters that are closest together. Tableau uses a normalized scaling method that standardizes the data converting them into specific ranges using a linear transformation. The formula for this method, also known as min-max normalization, is $(x - \min(x))/(\max(x) - \min(x))$. Four clusters were distinguished, although not all the data fitted

cleanly in these four clusters. There were 124 points that counted as not clustered as shown in figure 3.7.

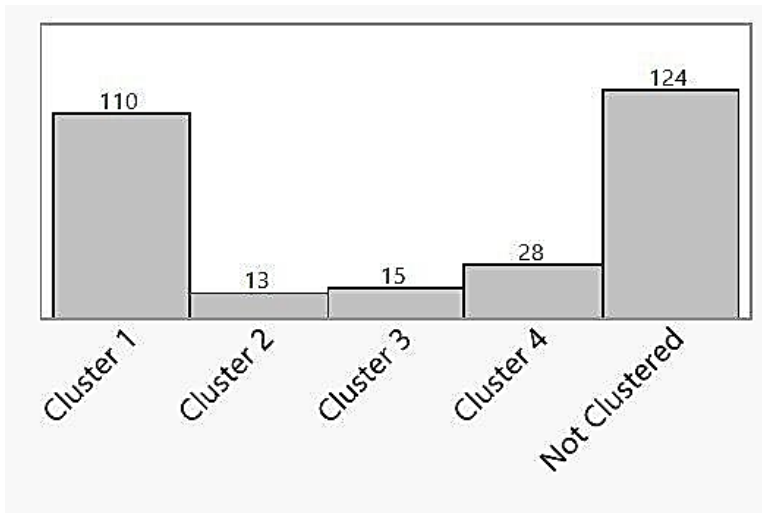


Figure 3. 7 Cluster analysis bar chart

The four clusters are based on the industry categories, but since the size of the company was included in the analysis, there are 124 companies that are not included in the clusters. Another approach that we could have taken was to not include the size of the company and only cluster based on the industry categories. But since we were investigating funding and the size of companies is a major factor in their needs, this approach enabled us to capture better samples that could explain our data. The summary of cluster analysis listed in table 3.4, explains how 124 companies with large annual sales but smaller number of employees compare to cluster 1 did not fit in the clusters.

Table 3. 4 Summary of cluster analysis

		Min	Mean	Mean	Median	Median	Max	Max	
	cluster	% of Total (Annual Sales)	(Employee)	(Employee)	(Annual Sales)	(Employee)	(Annual Sales)	(Employee)	
Textile Manufacturers	Cluster 1	37.66%	71,000	5,013,757	36	2,283,000	20	56,066,000	250
Textile wholesale	Cluster 2	1.66%	283,000	8,467,000	13	2,563,000	4	38,435,000	60
Apparel & Accessories(Mfrs)	Cluster 3	7.67%	47,000	2,641,000	52	353,000	4	28,387,000	600
Sewing Contractors (Mfrs)	Cluster 4	3.12%	124,000	1,570,607	11	439,000	3.5	12,800,000	81
	Not Clustered	49.89%	47,000	5,366,992	41	1,569,000	8.5	115,362,000	850

We investigated the not clustered group further and as table 3.5 shows 72% of textile wholesale companies are included in not clustered, this aligns with our understanding of the industry on how mostly textile wholesale companies have large number in sales and smaller number of employees compare to textile manufacturing.

Table 3. 5 Not clustered details

4 Category	Population	Not clustered	Not clustered/Population	
Textile Manufacturers		168	58	35%
Textile wholesale		47	34	72%
Apparel & Accessories(Mfrs)		44	16	36%
Sewing Contractors (Mfrs)		31	16	52%
Total		290	124	43%

Although the number of data points in each cluster differ, we decided to create equal random samples of 10 per each cluster to enable us to make better comparisons of the different industry categories. We selected subsamples from each cluster using JMP Pro resulting in a total of 50 samples. These 50 rows of data were studied using open source data. Most of these companies have websites, publications and establishment records online. In this step, the position

of each company for the bottlenecks and innovations was extracted and recorded. The results are presented in the next chapter.

CHAPTER 4: Results

4.1. Phase One

Phase one objective in this study was to investigate how the current models on entrepreneurship can explain the dynamic growth of entrepreneurial companies and is focused on individual entrepreneurs. As discussed, the Davidsson model is the most promising model among the literature based on personal backgrounds and attitudes of entrepreneurs. This research has focused to partially test the Davidson intention models for entrepreneurs during their growth period.

The results of the regression indicated that eight predictors explained 23% of the variance and five variables were significantly related to *business owner aspiration* ($R^2 = .23$, $F(8,249) = 9.51$, $p < .05$) (see Table 4.1). This compares favorably with the results of other studies. Davidson explained 51 percent of variation in entrepreneurial intentions by his model. Many of the empirical tests of intention models explained 25 to 40 percent of the variation in entrepreneurial intentions.

Table 4. 1 results of the multiple regression

Variable	Estimate	Std. Error	P-value
Autonomy(R1)	-0.25	0.14	0.07*
Payoff (R2, R3)	-0.07	0.14	0.60
Money(R4)	0.61	0.10	1.38e-9*
Know-how(R5)	0.07	0.08	0.37
Employment Situation(R6)	-0.29	0.08	0.0003*
Competitiveness (R7)	0.22	0.14	0.10
Achievement motivation (R8)	-0.24	0.10	0.012*
Role model(R9)	0.26	0.08	0.001*
(Constant)	-0.07		0.69
R ²	0.23		

Money stood out as the most significant variable in this model. Most entrepreneurial research indicates that external rewards such as money or power over destiny are strong motivations for entrepreneurs. Since this model investigated the intention to grow the business, it was expected that money would be a significant motivation.

The employment situation is a significant direct effect in the Davidsson model. Several scholars describe entrepreneurs as those who seek opportunities to start a business of any size; that is, as a chance to earn money through self-employment with expectations of stability and perhaps even some growth (Audretsch, Kuratko, & Link, 2015; Aziz, Friedman, Bopieva, & Keles, 2013; Cullen, Johnson, & Parboteeah, 2014; Deli, 2011; Denning et al., 2015; McMullen, Bagby, & Palich, 2008; Singh & Gibbs, 2013; Turkina & Thai, 2015). It has been discussed in the literature that job decisions are made through a growth process of beliefs, attitudes, and intentions based on knowledge, beliefs, and experiences (Lent, Brown, & Hackett, 1994). These findings showed that the employment situation when the entrepreneur started the business has a significant effect on their desire to growth business, and these findings are aligned with these definitions of entrepreneurship.

Autonomy was another significant variable of entrepreneurial intention to grow. The need for Autonomy (or independence) is one of the major reasons for entrepreneurial activities across countries (Bamberger, 1986; Cromie & Hayes, 1988; Scheinberg & MacMillan, 1988; Scott & Twomey, 1988). Achievement motivation was also discovered to have a significant effect on entrepreneurs' intention to grow business. Achievement motivation is one of the most used and most criticized concepts in entrepreneurship research (Davidsson, 1989; Wärneryd, 1988). This concept concerns the self-comparison with the entrepreneur's internal standards. Interestingly this attitude continues to affect the entrepreneur's intentions to grow or not grow their business.

Another significant variable is if an entrepreneurial friend or family member was a role model. This variable showed a significant positive relation with the entrepreneur's aspiration for business growth. There is some evidence that role models only weakly predict future entrepreneurial activity (Churchill, Carsrud, Gaglio, & Olm, 1987; Scott & Twomey, 1988). Instead the role models affect entrepreneurial intentions only if they affect attitudes like self-efficacy of the entrepreneur (Krueger & Carsrud, 1993; Scherer, Adams, Carley, & Wiebe, 1989). Our study indicated that having a role model is a significant factor in entrepreneurs' desire to grow business.

It should be considered that our results show a significant relationship between general attitudes of the Davidsson model with intention to grow, while none of the domain attitudes of the model have a significant effect. It is discussed in the literature that attitudes can change over time with education, this indicates that entrepreneurs can educate themselves to improve these general attitudes, which eventually could result in more business growth.

4.2. Phase Two

In this phase the environmental factors for successful entrepreneurial innovation were tested based on the Autio et.al framework. The textile and apparel industries have complex supply chains and both need a diverse array of partners and processes. The Internet makes it possible to reach resources and customers more easily (Annett-Hitchcock, K., & Relyea, R., 2017). In-depth interviews and secondary data were used in this phase.

4.2.1. In depth interviews

We have a constitutive approach in our study where the entrepreneurs and their environment are co-created. Interviews were conducted either by phone or in person and in all

cases Institutional Review Board procedures were followed. The table below summarizes the results from the in-depth interviews (Table 4.2). Since this research is focused on North Carolina as the leading state in the industry, all cases were in North Carolina. In this research innovation as a whole has been defined based on the Christensen et al. definition of disruptive innovation, which is “attaching the customer to products that mean something to them.”

Table 4. 2 Summary of in-depth interviews, the details of the in-depth interviews are listed based on each context of the framework.

Type of entrepreneurial innovation/ Context		Innovation in product	Innovation in processes	Innovation in Strategies	Innovation as a whole(disruptive)
Industry & technological context	Temporal dimension	Solving a problem on hand	Focuses on reducing waste in the industry	Start with recycled material in hand	Created a new market segment based on the needed product
	Spatial dimension	The local businesses in fashion are growing in the area.	Chose NC among Georgia, South Carolina and North Carolina as the textile and apparel hub	Sustainability focused strategy	Developed the technology for creating new products-based on the NC technology hubs
Organizational context	Temporal dimension	User founder- student	Graduate student- industry background	Family business- industry background	Similar Industrial background- user need
	Spatial dimension	Student at the time Nationwide top ranked school in entrepreneurship	Solve the problem of-risk of forecasting & 30% waste in clothing	Passion for design and the products	Founders background in another local business
Institutional contexts	Temporal dimension	Were a part of NCSU entrepreneurship support system	Part of a support program for entrepreneurs in poverty	Grew from making for friends	Received grant from a not-for-profit organization entrepreneurial support system in North Carolina
	Spatial dimension	Being at top ranked school in textiles with a lot of resources at hand	All made in US materials, natural colors	The business is created in founders' hometown	Have access to NCSU Wilson college of textiles for research and [TC] ²
Social context	Temporal dimension	Grew from locally to nationally and internationally	Grew from locally to nationally and internationally	Aware of customer needs constantly, more focused locally, established network	Created a community about making and sharing by initiatives
	Spatial dimension	Was a winner of an angel investor national competition	Kick starter raised money and awareness	Friends motivation to start business	Got first round of funding after 7 years

4.2.1.1. Industry and Technology Contexts

Among other contexts, the industry and technological contexts receive the most attention in entrepreneurial innovation studies. It is stated that technological platforms increase the entrepreneurial innovation activity. North Carolina has been a hub for technology start-ups of the industry for a number of years (Annett-Hitchcock, K., & Relyea, R., 2017). Our findings agree with the framework, the increase of technology caused more entrepreneurial innovation in both the apparel and textiles industries.

Our research, as do many other recent studies, finds sustainability as the new trend for textile and apparel entrepreneurs. Transparency and storytelling in addition to the use of technology are important for entrepreneurial success. In the case of process innovation, the storytelling and sustainability played a major role in the business model and their market has grown from local to international. In the strategy innovation case, sustainability is the nature of the company. The product is from rescued materials and the company strategy is to communicate the story behind products as clearly as possible.

4.2.1.2. Organizational Context

Based on the framework, organizational context has an important influence on entrepreneurial innovation. It is stated that product innovations mostly come from academics and users while process innovations are mostly introduced by employee founded entrepreneurs (Agarwal & Shah, 2014). These results are aligned with the literature, where it has been shown how the organizational context frames the entrepreneur's mind for different problems and needs.

Disruptive innovation was studied by a company that used a technology already available for other industries and in which the founders had a previous background. The innovative business model creates a community by offering initiatives and attaching the customers to it. This company has grown from 10 employees to more than 300 in four years.

The innovation in the product case was also founded by a user and student that had the need for a product that could not be found in the market. This company was founded using the founder's pocket money, created a new market, grew rapidly in a short period of time and became an international success. Later the company even won an angel investor national competition which helped extensively in market growth.

In the process innovation case, the founder was a graduate student while working in the industry. This company is focused on a major problem in the textile and apparel industries - waste. The founder explained the problem during the interview that, "30 percent of clothing is waste and thrown away. And about half of clothing sells at a discount. There is an over-supply of product. A close supply chain and on demand manufacturing as close as to consumers as possible is the solution." The company was founded using funds from family and friends and received much attention for the close supply chain in North Carolina and quickly attracted its customers. But this company has not grown over the last few years.

4.2.1.3. Institutional Context

The framework distinguishes between formal and informal institution influence on entrepreneurial innovation. The framework assumes that formal institutions mostly influence economic outcomes and opportunity costs. Informal institutions establish social norms and perceptions and social desirability for entrepreneurs called "entrepreneurial support networks."

Our findings show that North Carolina has created powerful informal institutional support for textile and apparel entrepreneurs. In the case of product innovation, a market gap was filled by a user who wanted to solve a problem. The founders were students when creating their businesses with access to the school entrepreneurial support system with free resources and mentors. In the disruptive innovation case a private grant from a not-for-profit organization for

entrepreneurial support in North Carolina was received which has rescued the company at the time of an economic collapse. This company used an already existing technology and modified it with the help of the North Carolina State University, Wilson College of Textiles and [TC]².

The question of whether formal institutions are having a positive impact can be answered with a resounding yes. Beside the in-depth interviews, our review of over 300 companies in North Carolina supported by federal grants and matching state funds shows clearly that for many entrepreneurial companies these funds were absolutely critical for their success. In the U.S., the federal government created the Small Business Innovation Research (SBIR) program in 1982 with the purpose of strengthening the role of innovative small business concerns by federally-funded research and development. The last data available indicate that over 112,500 awards have been made totaling more than \$26.9 billion. The State of North Carolina provides partial matching grants to companies receiving SBIRs that provide further funding for turning these research ideas into viable businesses. In addition to the SBIR program, the U.S. federal government also created the Small Business Technology Transfer (STTR) program in 1992 to facilitate the transfer of technology developed by a research institution to small business concerns.

4.2.1.4. Social Context

Social context focuses on the networks between entrepreneurs, trading partners, investors and incumbent firms, as well as how these networks influence entrepreneurship. Based on our findings, having investors, support system and mentors are critical for entrepreneurial success. In the case of strategy innovation, the social context was the main driver for the entrepreneurs to start the business. In all other cases the social support was a main factor that helped each of the cases to succeed.

Many communities in the U.S. have created entrepreneur spaces (incubators) to further facilitate the creation of new companies. In North Carolina over 300 start-up companies have space in the American Underground in Durham, over 70 are in the Innovation Quarter in Winston-Salem, and more than 50 in the American Underground and Raleigh HQ in Raleigh. In Greensboro a \$65 million research facility originally intended for academic purposes has become a catalyst for business growth. The Joint School of Nanoscience and Nanoengineering is a shared project opened four years ago between North Carolina A&T and UNC - Greensboro. But now a group of around 30 manufacturing companies are using the facility in the Gateway University Research Park to develop products. The partnership provides access to resources to give companies a competitive edge in the marketplace. In Charlotte the innovation and entrepreneurship programs are driven through the University of North Carolina – Charlotte and focus on banking and finance, strong industries in that region.

North Carolina has made major forward steps by creating an entrepreneurial culture with many resources and support systems. The North Carolina Board of Science, Technology and Innovation produces a tracking innovation report, develops policies and methods to support entrepreneurial growth, and administers the state’s One North Carolina Fund providing matching funds for entrepreneurial start-up companies.

4.2.1.5. Discussion

North Carolina as the leading state in the United States in the textile and apparel industries has made major improvements in terms of the entrepreneurial support system and networks of entrepreneurs. But we still have many bottlenecks in supporting entrepreneurial innovation. Our strengths are the Wilson College of Textiles, the Manufacturing Solutions

Center, other technology hubs, and the entrepreneurial support system for the industry. But the biggest challenge is making adequate funding available to these entrepreneurs.

The product innovation case received substantial validation after a winning national competition of angel investors. The entrepreneur that had process innovation stated, “The entrepreneurial support system is much better in North Carolina, the missing piece compared to California is funding.” The company he created in North Carolina was a pilot for him to create the B2B apparel business that now is founded and funded in California.

The strategy innovation case also described how extra funding would help them to expand their business. Here is the quote from the entrepreneur, “We would love to create a recycling center for people to bring things for us to work with...” Innovation as a whole had a hard time getting funded at the beginning. This company got the first serious funding after 7 years of high growth.

4.2.2. Validation

This research found a number of differences in the needs of small business entrepreneurs depending on the industry sector. Many of these differences are due to the costs of creating a business and the existing regulatory environment. For example, startup companies in the medical textile manufacturing industry require considerable capital for laboratory space and equipment and even more for the clinical trials required for regulatory approval before entering the market. On a smaller scale, starting a manufacturing company versus a retail company often also usually involves far more capital. We have found successful retail companies starting with only a few hundred dollars of personal investment being able to use existing resources and equipment, go “viral” on the Internet, and grow quickly by investing revenues into the business as it expands.

During this phase, the secondary data was used to capture the differences in innovation and funding for different industry sectors. The data shows textile manufacturing is about 60% of the companies established in this period in North Carolina, versus 10% apparel manufactures, this could be because of the wider size of textile market. The below bar chart shows the distribution of our 50 samples among industry categories (Figure 4.1).

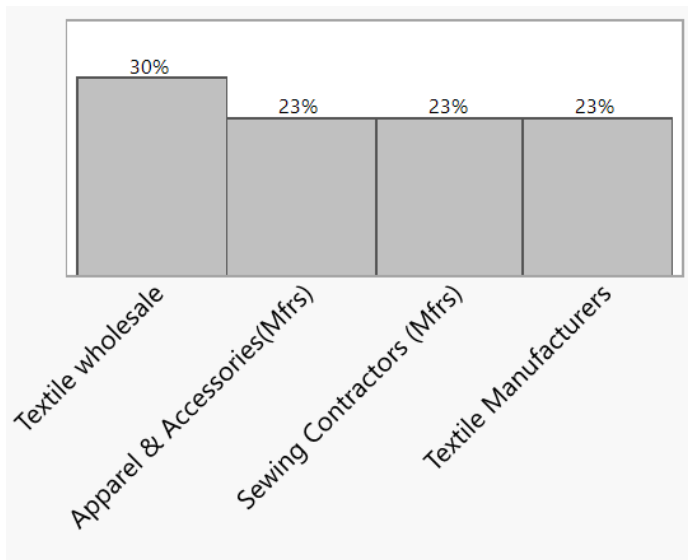


Figure 4. 1 Bar chart of sampled data based on the industry categories

4.2.2.1. Funding

As funding was identified as the bottleneck for the industry in entrepreneurial innovation, we investigated funding using the open source data for all the 50 companies we sampled. The results indicated that, in general, 28 percent of the companies were funded (14 out of 50), and about half of these companies are textile manufacturers (6 out of the 12 funded of the 50). The details of funding among the sample based on the clusters and industry categories are listed in below figure (Figure 4.1).

50 companies	14 funded	2 Apparel Mfrs
		7 Textile Mrfs
		5 Textile wholesale
		36 Not funded

Figure 4. 2 Funding summary of the sample based on the clusters and industry categories

The funding for these companies has three sources that includes: *subsidiary, acquisition* and *government funding*. Subsidiary stood out as the most common way these companies got funded. All seven textile manufacturers got funded by being a subsidiary of either national or international corporations, these investments ranged between 7 to 40 million dollars. The main financial resources are coming from major players in the industry.

Two apparel companies were funded by a subsidiary and government support. Among five wholesale companies two were funded by acquisition, two by subsidiary and one by government. This wholesale company was funded by the government to be a main contractor for government fabrications.

4.2.2.2. Innovation

As discussed earlier, we selected a random sub-sample of the clusters resulting in 50 rows of data. Innovation was studied based on definitions offered earlier, which counts any new offering in mix of services or products, a new business model and/or new technology as innovation. The data show out of the 50 companies that were investigated; 52 percent of the companies are truly innovative (26 out of 50). The innovative companies include 6 apparel manufactures, 5 sewing contractors, 8 textile manufacturers and 7 textile wholesale companies.

Some of the examples of innovations and the type of innovation that were captured during this investigation are listed as below (Table 4.3).

We found that almost all textile industry categories are innovative almost the same, but there are major differences in the type of innovations. In textile manufacturing more product and disruptive innovations are seen, and in textile wholesale and sewing contractors more process and strategy innovations are apparent. Apparel innovations are also more on process and strategy innovations.

Table 4.3 Some examples of the innovations among the sampled data

<i>Industry sector</i>	<i>Innovation summary</i>	<i>Innovation type</i>
<i>Apparel manufacturing</i>	offering whatever is needed for the target segment	innovation in strategy
	offer a wide variety of premium hair accessories for babies, toddlers target segment	innovation in strategy
<i>Textile manufacturing</i>	laminated solutions & nonwoven products	product innovation
	innovative solutions for custom fabric and technical fabric	innovation as a whole (disruptive)
	revolutionary high-performance yarn	innovation as a whole (disruptive)
<i>Sewing contractor</i>	produces several lines of accent fabrics and fabric accessories using a unique dye process	innovation in process
	interior decor workroom for the public and trade	innovation in strategy
<i>Textile wholesale</i>	specializing in government fabrications specific target segment	innovation in strategy
	bring customers into the design process with specific target segment	innovation in process

4.2.2.3. Discussion

Our results show there are major differences in industry categories in terms of innovation and funding. The below figure demonstrates these differences, the percentages are proportional to the total sample size of 50. Almost half of each industry category were innovative companies and the major difference is in the funding for different categories. Textile manufacturing received most of the funding while sewing contractors did not receive any. Apparel companies also have not attracted much of funding and we believe that improving this area could extensively attract more innovative entrepreneurs to the state of North Carolina.

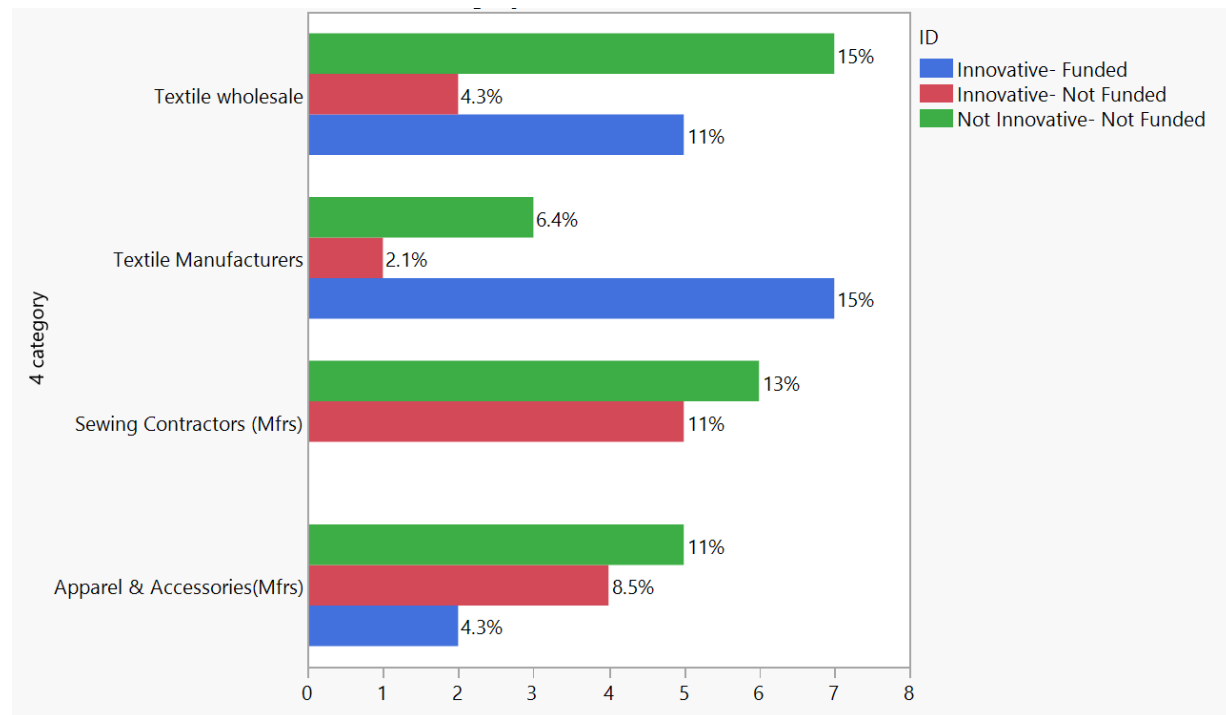


Figure 4.3 Sample distribution based on innovation and funding

CHAPTER 5: Conclusion

Throughout the course of this study, we discovered that both individual factors and environmental factors impact the success of entrepreneurial innovation. Our results complement and extend the existing well-accepted theories on entrepreneurship intention models. Our first research question was whether the current models on entrepreneurship explain the dynamic growth of entrepreneurial companies. Although many of the studies in the literature used only students in their samples for assessing entrepreneurial intention, our study using in-depth interviews of entrepreneurs in the apparel and textile industries showed these models, with slight modifications, can be used to study entrepreneurs' behaviour during their business growth period.

Our second research question was about the critical parts (bottlenecks and incentives) in current entrepreneurial innovation frameworks for successful entrepreneurial textile and apparel companies. We found the primary bottleneck for textile and apparel entrepreneurial innovation was a limitation on available funding during the early phases of the companies. Although in our study, both in the in-depth personal interviews and in the analysis of secondary data, we focused only on North Carolina companies, we feel this finding would be true in other leading apparel and textile producing states. We did not find that this primary bottleneck was different for apparel companies than it was for textile companies. They both need significant funding to be entrepreneurial successes. Both apparel and textile companies have limited access to funding compared to companies in other industries.

Our third research question was focused on how the critical parts of this framework vary among different industry sectors. In the North Carolina companies studied, there is not much difference in different industry categories in the proportion of innovative companies. But

available funding is significantly different for different industry categories. There is significant funding available for textile manufacturers. These companies often require large investments to create a new business. There is only limited funding available for apparel manufacturers. Some have left the state to find the required funding.

5.1. Individual effect

Understating the intentional behaviour helps scholars understand why many entrepreneurs start their own businesses based on possible opportunities. On the other hand, entrepreneurs need to have a better understanding of their own motivations which can be explained by intentions. Intentions provide an understanding of why an entrepreneur makes certain decisions in creating the vision of his or her new enterprise.

Our results indicate that the Davidsson intention model could partially explain the entrepreneurial intention to grow the business. In this model, attitudes are the main predictor of the intentions. The model includes domain attitudes (pay-off, social contribution, know-how) and general attitudes (change, compete, money, achieve, autonomy). Our empirical testing shows that general attitudes effect entrepreneur's intentions to grow, stay the same size or shrink the business, but not the domain attitudes. The general attitudes that have a significant effect on the intentions include: money, autonomy and achievement motivation. Our results also agree with Davidsson's model on direct effect of employment situation and role model and on intentions during the business growth period.

The effect of entrepreneurship education on entrepreneurial intentions had been studied by several scholars which indicate positive influence of entrepreneurship education on attitudes. Our results emphasize how education for entrepreneurs after business establishment could cause an attitude improvement and accordingly effect more business growth. This finding help policy

makers to establish better policies and programs for educational improvement of entrepreneurs after the business establishment. Our results also may help entrepreneurs to better understand how changing their attitude can improve their business growth, and that education could have a positive effect on these attitude improvements.

5.2. Environmental effect

The environmental factors for successful entrepreneurial innovation were identified in studies based on the framework of entrepreneurial innovation and context. This framework has a constitutive approach, that there is a dynamics whereby entrepreneurial innovations emerge. Different environmental contexts are considered in this framework including; technology and industry, social, institutional and organizational context.

Our results from the in-depth interviews show how North Carolina has created a powerful social and institutional context for textile and apparel entrepreneurs to innovate. We discovered that new technologies are another major component for entrepreneurial innovation growth, and North Carolina offers leading technology hubs to entrepreneurs. Among the cases, the major incentive for entrepreneurs to establish their business in North Carolina was access to these technology hubs like the Wilson College of Textiles at the North Carolina State University. Funding was discovered to be the bottleneck for all the studied cases, and since reducing the bottleneck offers the most efficient results, thus factor was further investigated using secondary data.

Our results of investigating North Carolina textile and apparel industry categories, indicates significant differences in funding but not in being innovative. Although there are many differences among industry categories in innovation types, almost half of the companies in each industry category are considered innovative. The industry category that attracts the most funding

is textile manufacturing, with a range between of seven to forty million dollars of funding during the early start-up phase. Textile manufacturing does require larger investments than other industry categories, but that does not explain the extremely large difference compared to apparel companies, many of whom received no outside funding. The second biggest industry category in funding is textile wholesale. Apparel manufacturing receives small shares of funding and no sewing contractors attracted any funding.

We hope that our results will help policy makers and investors to better understand the need for apparel manufacturing funding since there are many innovative apparel companies that are growing in North Carolina and many of these are potential large job creators. Our study also indicates that apparel entrepreneurs need to be more aware of the opportunities that actually may be available to them now.

5.3. Limitations

Although the best available secondary data was gathered and used during the course of this study, there are many limitations with these data. The North Carolina department of commerce has many missing companies and company details in their databases. Many of innovative entrepreneurial companies that we personally know in North Carolina do not appear in their databases. We have explored this issue with the North Carolina department of commerce and the Economic Development Partnership of North Carolina in personal meetings and emails. They are aware of many of the problems, but the bottom line is that they are trying to improve the quality of the data through third party contracts.

On the other hand, the data gathered from the US Census Bureau was also limited since the data are reported in groups and not individual data points. This has caused measurement errors in our analysis and limited the better explanation of the population.

5.4. Recommendation for future studies

1. Future studies should further investigate the relationship between education and attitude change during business growth period. What exactly is needed and what is the impact?
2. The environmental factor only has been investigated for the textile and apparel industries in North Carolina, it would be interesting if future studies investigated these industries in other apparel and textile producing states and further studies looked at other industries. These studies could provide an opportunity to compare policies and environmental factors in different states and the bottlenecks that could be reduced to improve entrepreneurial innovation and success.
3. Future studies could include larger samples of in-depth interviews to validate or refute the findings in this study and perhaps identify other bottlenecks limiting entrepreneurial success in the apparel and textile industries and how well the entrepreneurial innovation framework and context discussed here fits these companies.
4. We strongly suggest that future studies focus on completing and validating the North Carolina department of commerce and the economic development partnership databases for the North Carolina apparel and textile industries. A more complete and accurate database would make similar and other studies far more meaningful.

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APPENDIX

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Analytical view on Entrepreneurship and Innovation: case studies in textile and apparel industry

Principal Investigator: Samaneh Pourmojib Faculty Sponsor (if applicable): A. Blanton Godfrey

What are some general things you should know about research studies?

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue.

You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. If you would like, a copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher named above or the faculty sponsor.

What is the purpose of this study?

The purpose of this study is to examine Entrepreneurship and Innovation models and theories among textile and apparel entrepreneurs

What will happen if you take part in the study?

If you agree to participate in this study, you will be asked to answer four open-ended interview questions. The interview will take about two or three hours and it will be audio recorded for transcription and verification purposes only. The researcher would also like to observe your related processes and take notes while at your location. The researcher would also appreciate any documents on the growth of the company you are willing to share. These would include: annual reports, financial statements (or general summaries), marketing materials, etc. or other materials you feel would assist in understanding the growth of the company over time.

Risks and Benefits

There are minimal risks associated with participation in this research. There are no direct benefits to your participation in the research. Your participation will help us to get a better understanding of the Entrepreneurial and Innovation in the industry. Moreover, the results will help us to identify better variables to model successful entrepreneurship and improve the quality of entrepreneurship.

Confidentiality

The information in the study records will be kept confidential to the full extent allowed by law. Data will be stored securely in password-protected files in a North Carolina State University computer and secured storage area. No reference will be made in oral or written reports which could link you to the study. Your organization will only be mentioned by name with your express consent.

Compensation

You will not receive anything for participating in this study.

What if you have questions about this study?

If you have questions at any time about the study itself or the procedures implemented in this study, you may contact the researcher, Samaneh Pourmojib, spourmo@ncsu.edu, (919)376-6258.

What if you have questions about your rights as a research participant?

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact the North Carolina State University IRB Office via email at irb-director@ncsu.edu or via phone at 1.919.515.4514.

Consent to Participate

“I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”

Subject's signature _____

Date _____

Investigator's signature _____

Date _____