FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

UNDERSTANDING THE CULTURAL FACTORS TO BUILD INNOVATION IN ORGANIZATIONS

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR OF BUSINESS ADMINISTRATION

by

Ranjeet Deshmukh

2021

To: Interim Dean William Hardin
College of Business

This dissertation, written by Ranjeet Deshmukh, and entitled Understanding the Cultural Factors to Build Innovation in Organizations, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Date of Defense: May 17, 2021

The dissertation of Ranjeet Deshmukh is approved.

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Florida International University, 2021

DEDICATION

This dissertation is the culmination of my father's lifelong ambition for me to complete my doctorate. This work is specially dedicated to his relentless efforts in managing several successful business ventures on the foundation of his armed forces training. This coupled with the blessings of my under-graduate engineering dean, Prof Darade-Patil and my under-graduate dissertation chair Prof K.V. Nagaraj who have continued to guide and inspire me over the past 3 decades.

My wife, Priya and kids Ronica and Rasika have been extremely supportive throughout this journey and have maintained a level of peace and sanity at home that has allowed me to focus on this project. Last, but not the least – my mother has been my biggest supporter through her unconditional love and support. I dedicate this work to all the above folks. Their constant support and encouragement have fueled this journey.

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ABSTRACT OF THE DISSERTATION

UNDERSTANDING THE CULTURAL FACTORS TO BUILD INNOVATION IN ORGANIZATIONS

by

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Florida International University, 2021

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Radical innovation is the key for organizations to reinvent themselves and become successful in competitive markets. Compared to other types of innovation such as incremental which focuses on customers' immediate needs, radical innovation offers a company unprecedented customer benefits and the ability to create new businesses and markets. Previous studies have shown that cultural factors play an important role in the successful integration of radical innovation efforts. Using the Adhocracy and Market Orientation components within the Competing Values Framework, I developed a testable model of the relationship between cultural factors and radical innovation. The study involved 4 constructs – namely learning capability, shared vision, open mindedness and proactive market orientation. Initial pilot included 50 participants and the main study included 166 participants across different organizations covering 15 industries. I did a hierarchical linear regression in order to examine the direct effects of the predictors on the outcome. Proactive market orientation, shared vision and learning orientation have a positive effect on radical innovation while open mindedness did not have a significant effect on radical innovation.

The study highlights the importance of organizational context in order to optimize the cultural factors required to drive innovation. The insights from the main study can be used as interventions to increase the innovation levels in multiple parts of the organization.

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CHAPTER I: INTRODUCTION

Innovation as a firm-level outcome has been explored extensively (Rubera & Kirca, 2012), and researchers have developed many concepts differentiating innovation (Gatignon et al., 2002). Traditionally, product development in most organizations has focused on incremental innovations primarily driven by customer requests. Incremental innovation is focused on building product extensions and reacting to customer needs whereas radical innovation which is the focus of this study is centered around building new products and services that can help companies tap new or adjacent markets since it bolsters firm performance. (Leifer et al., 2000, Utterback 1994; Rubera & Kirca 2012).

To achieve success in today's competitive environment, firms increasingly must develop new products in complex market places. Firms dealing with rapid changes in technology view radical innovation as a means of survival and staying relevant in the face of an increasingly competitive market landscape (Tellis, Prabhu, & Chandy, 2009). Radical innovation relies on substantially different technologies and can help firms to redefine their current markets or build new ones to enhance their competitive positions (McDermott & O'Connor, 2002; O'Connor and Rice, 2013; Zhou and Li, 2012). To this end, they must leverage and coordinate broad creative capabilities and resources, which often are diffused across geographical and cultural boundaries. This can be done through radical innovation (Tellis, Prabhu, & Chandy, 2009).

Radical innovation has more significant influences on firms' long term competitive advantages than other types of innovation (Perez-Lu, Medina, Lovado, & Rodriquez, 2011). Hence, Radical Innovation is key to an organization's ability to constantly reinvent itself in the midst of a competitive environment.

Innovation manifests in different forms, and an effective study has to consider that the characteristics of radical innovation are different from those related to incremental innovation (Mohr, Sengupta, & Slater, 2012). The innovation perspective, whether technological innovation or social innovation, and identification of the level and unit of analysis (e.g., a process innovation, a product innovation, an individual, a firm, an industry or a supply chain) as seen through the proposed definitions of radical innovation (Linton, 2009) applies to the degree of change in technology and the market, the process of radical innovation and the impacts on existing products and business.

Research around radical product innovation highlights organizational culture as one of the strongest drivers of radical innovation (McLaughlin et al., 2008; Slater, Mohr, & Sengupta, 2013; Tellis et al., 2009). A culture that fosters relentless innovation may help ensure that the firm stays constantly at the leading edge of innovation (Govindarajan & Kopalle 2004; Tellis & Golder 2001). For the purpose of this study, the main research question will be "***What is the effect of organizational culture on radical innovation?"***

As companies veer off the normal path and explore untested waters, irrespective of the size of the firm or the resources allocated towards radical innovation, the journey can

be very unpredictable. Let's take the example of autonomous vehicles developed by Tesla and Alphabet - an area of radical innovation within the automobile industry. Despite the grand vision and hype, the age of fully autonomous vehicles has yet to arrive. In the case of Tesla, Elon Musk's "complete autonomy" vehicle vision did not materialize in time for his 2017 deadline. The Tesla Model S crash involving a tractor – trailer was caused due to the autopilot and driver failing to notice the white side of the tractor-trailer against the brightly lit sky failing to apply the brake. It is challenging to getting a computer to adapt to new circumstances on the road just like humans do. (LoRicco. 2017).

Alphabet's Waymo too failed to deliver on its driverless taxi fleet in 2018. Soon after retrofitting Lexus into self-driving cars, the Waymo team learned that once the drivers became less observant in driverless mode, they tend to lose the attention to take control back in emergencies. Hence, the interplay of the human aspects within the technological innovation was a key driver for the successful commercialization of this technology. (Anne-Laure Mention, João José Pinto Ferreira, & Marko Torkkeli, 2019).

The development of radical innovation presents significantly greater risk than the development of incremental innovations because radical innovations require substantial investments in new technologies or markets and bring greater uncertainty of outcomes (Danneels & Kleinschmidt, 2001; Garcia & Calantone, 2002). Some of these risks include abundant capital investment, process complexity, and outcome uncertainty (Cuevas-Rodrıguez, Cabello-Medina,& Carmona Lavado, 2014) combined with a long period required for commercialization (McDermott and O'Connor, 2002).

CHAPTER II: THEORETICAL BACKGROUND

Competing Values Framework

There are a number of organizational culture frameworks covered in management literature. Driven by the need to understand organizational effectiveness, Quinn and Rohrbaugh (1983, p.365) invited 52 organizational researchers to order the criteria listed by Campbell (1977). Quinn and Rohrbaugh concluded that the identification of effectiveness criteria must be done on the basis of some understanding of the organization's direction and the choice of a particular criteria is more of a reflection of personal values emphasized within each domain of effectiveness. This formed the basis of the Competing Values Framework (CVF). Each quadrant of the CVF – human relations model, open systems model, rational goals model and internal process model has a different focus driven by the underlying effectiveness criteria. Quinn and Rohrbaugh (1983, p. 375) suggested that there are likely to be tradeoffs between the criteria. But, depending on the organization's focus, it's important to align on the criteria in each of the quadrants to have a balanced view of performance.

Over time, CVF developed by Quinn Rohrbaugh (1983) is one of the established theories for studying the phenomenon of culture. During the past decade, the competing values model has been widely used in the context of innovation-oriented culture. This highlights the strong linkage between organizational culture and radical innovation and the CVF became the primary theoretical framework behind my research model.

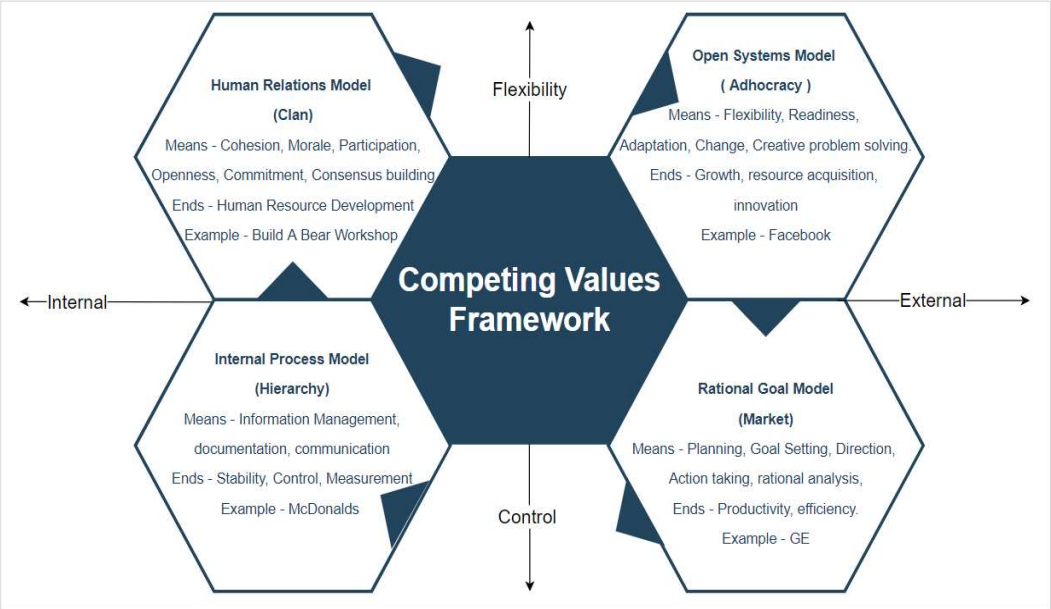

Fig 1.0 – Competing Values Framework

As seen in Fig 1.0 above, this framework is seen through two contrasting dimensions - internal versus external focus and the need for control versus the need for flexibility (Quinn & Rohrbaugh 1983). While one dimension has more employee (internal) and organizational focus (external), the other dimension is organized by degree of structure (flexibility versus stability). The intersections between these dimensions form 4 quadrants – human relations, internal process, open systems and rational goal – each leading to a different type of subculture. The implications for each culture type are summarized below.

Clan culture focuses on collaboration through openness, commitment, trust and morale. Some of the themes include cohesion, participation and consensus building with empowerment and employee evolvement being a central focus. Collaboration with leaders

involves activities that are centered around facilitation. The manager communications are relational coupled with high employee involvement and job satisfaction creating a family atmosphere. (McCarrt & Rohrbaugh, 1995). The downside of this culture is the possibility of group think and lack of diversity. With its focus on unity and team building, Build A Bear Workshop is a good example of human relations type of culture.

Adhocracy culture involves leaders playing the role of innovators / intrapreneurs / entrepreneurs with focus on risk taking, autonomy and individuality while being innovative and agile in response to market changes. (Cameron, Quinn, & Tromp, 1999). They are always in tune with the marketplace and constantly evaluate their ability to take advantage of changing business conditions. Some of the themes include increased levels of risk taking, autonomy and individuality. With focus being on transformation and change, adaptation and agility in response to changing market conditions is prioritized over following a pre-determined plan. The planning function is more dynamic with limited room for contingencies due to loosely tied hierarchy and policies. With its move fast and break things approach built on experimentation and adaptation, Facebook is a good example of adhocracy type of culture.

Market culture involves competitive focus with leaders driven by output and market share. There is a strong component of centralized decision making supported by control systems and tight coordination. (Zammuto & Krakower, 1991). With goal setting, better market understanding and focused efforts, there is increased focus on profitability and overall company performance. With stable structure and focused strategy, organizations might be slow in reacting to dynamic market conditions and risk sacrificing long term

growth over short term profits. Stable hierarchy culture involves leaders with tight control involving documentation, structured management of information, and relationships that are low on trust and morale. (Zammuto & Krakower, 1991). There is increased focus on value efficiency, consistency and effective processes. This could lead to organizational silos and bureaucracy coupled with the risk of curtailing innovation and change. GE uses its ability to drive big changes at once instead of small adaptations towards becoming the top 1-2 businesses in every market segment it competes in. GE is a good example of market culture.

Hierarchy culture involves focus on value efficiency, consistency and effective processes. The origins of this type of culture can be traced back to the early 1990s with companies needing to figure out the right mix of products and services in order to cater to stable market demand. With predictable day to day operations and minimization of uncertainty, leaders act as monitors and coordinators with clear authority structure and a path to move up the organizational ladder. (Gupta et al., 2019). Employees have clarity in their roles and managers exhibit strong control directed towards predictability and consistency in delivering desired outcomes (Cameron et al., 2014). Divestiture of unproductive projects and employee layoffs are common practice. However, the bureaucracy leads to limited innovation. Change is generally hard and the strong hierarchical structure inhibits collaboration. With routine and formalization along with process centricity being at the center of its operations, McDonalds is a good example of hierarchy culture.

Multiple studies show that flexibility and external orientation are more conducive to innovation (Lukas & Ferrell, 2000; Naranjo-Valencia et al., 2011). Along similar lines,

previous studies show that the external orientation within market culture drives the firm's competitive positioning as it relates to external information and knowledge, which in turn drives radical innovation. (Naranjo-Valencia et al., 2016). Previous studies found a similar positive linkage between adhocracy culture and radical innovation. (Naranjo-Valencia et al., 2016; Slater et al., 2014; Matzler et al., 2013).

Our literature review also confirmed that hierarchy culture which focuses on rules and formal procedures with limited autonomy inhibits radical innovation (Büschgens et al., 2013; Schultz et al., 2013; Tushman & O'Reilly, 1996). Further, along the same lines, past studies also show that clan culture is not related to radical innovation (Naranjo-Valencia et al., 2016). Hence, the hierarchy and clan culture were not considered in my model. With the knowledge that radical innovation will likely occur when creative problem solving, adaptation and change management are involved, my study uses two of the four constructs used within the CVM framework.

Multiple studies have also used all four cultural constructs within the competing values framework. These are closely linked together and require organizations to consider the positive and negative effects of specific culture types for better decision making. (Tian et al., 2018). This helps balance the competing goals of flexibility and control enabling organizations to build richer innovation networks supported by well managed innovation outcomes. (Yoo et al., 2010). Most of these studies use the Organizational Culture Assessment Instrument – (OCAI)[1] developed by Cameron and Quinn (1999).

[1] OCAI is used in order to determine the current and desired organizational culture.

CHAPTER III : RESEARCH HYPOTHESES

Radical Innovation

Based on a series of study of radical innovation research programs conducted in the United States, Leifer et al., (2000) defined radical innovation as involving commercialization of products based on significant leaps in technology development, with the potential for entirely new features or order-of-magnitude improvements in performance or cost compared with existing substitutes. This definition agrees with that of Linton (2009), that radical innovation should involve two dimensions which were a significant leap in technological development (technical dimension) and a potential for entirely new features and improvement (social dimension). The objective is to view radical innovation as a sustainable activity that involves high levels of complexity and uncertainty which increase the need for learning, adaptability, and flexibility (Valle, & Vázquez-Bustelo, 2009).

The adhocracy and marketing culture were most aligned with radical innovation since it included the elements of learning and adapting, creativity and entrepreneurship. (Deshpande et al., 1993; Slater et al., 2011). Hence, the model in Fig 2.0 on next page was proposed.

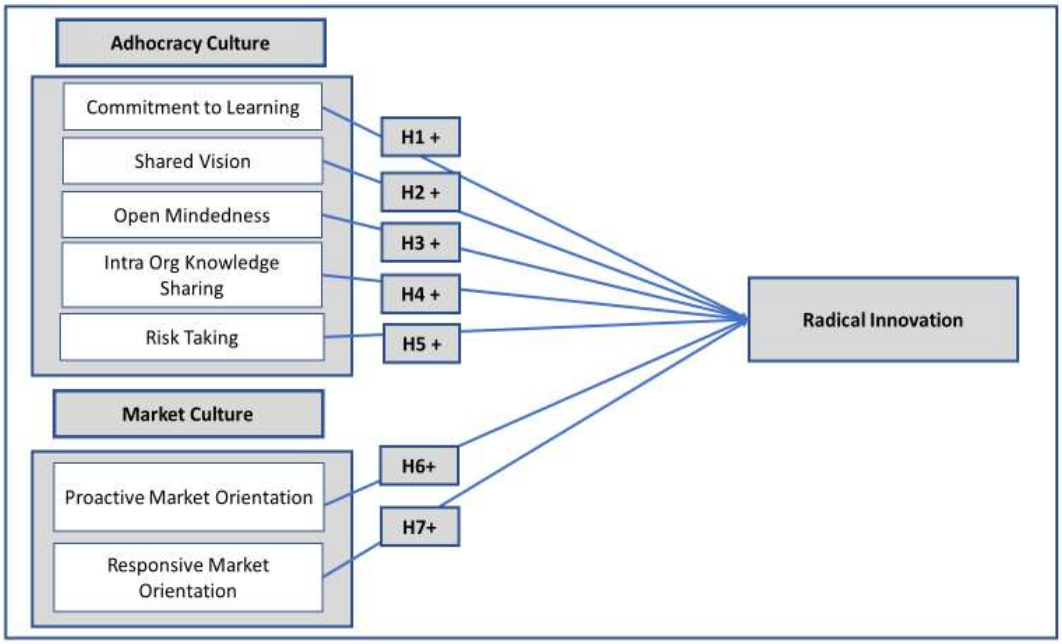

Fig 2.0 – Original research model

Commitment to learning and radical innovation

Within an organizational context, commitment to learning involves the creation and application of knowledge that in turn leads to competitive advantage in the long run (Calantone et al., 2002). The extent of learning commitment is determined by the type of information being gathered (Dixon, 1992), interpretation of the information (Argyris and Schön, 1978), evaluation of the information (Sinkula et al., 1997) and sharing of the information (Moorman & Miner 1998).

Several researchers have investigated the relationship between organizational learning capability and innovation (Slater & Narver, 1995; Baker & Sinkula, 1999; Slater & Narver, 2000). With the renewed focus on customer needs identification, market changes and competitor actions, learning capability inevitably leads to the development of newer

technologies resulting in product lines that beat the competition. This is the essence of radical innovation. (Mone et al., 1998; Moorman & Miner 1998; Hurley & Hult 1998). The multiple perspectives available through this process enable employees to build on their knowledge and speed up problem solving and innovation processes (Amabile 1988; Ericsson et al., 1993; Ford 1996; Gist & Mitchell 1992). As discussed previously, a culture centered around learning orientation enhances innovation performance. By enhancing the firm's competitive positioning and creating a knowledgeable workforce, learning orientation raises the level of innovation within organizations (Calantone, et., all 2002). Consistent with this stream of literature, I propose:

Hypothesis H1: Commitment to learning has a positive effect on radical innovation.

Shared vision and radical innovation

Shared vision is defined as a possibility space that can be used to test problem and solution strategies while discovering common grounds of agreement (Vergragt, et al., 2007). This space helps analyze problems, test solutions and direct responses towards overcoming cross functional barriers. (Tepper, 1996). The organization of resources leads to an increased likelihood of aligning the firm's capacity and its ability to fully exploit recognized opportunities. (Wang, et al., 2009). By pointing organizations towards their north star, shared vision helps channel limited organizational resources towards well understood organizational goals and instilling a sense of purpose for organizational learning. (Sinkula et al., 1997).

With the increased links between vision and product success (O'Connor, et al., 2001), there is an increasing awareness of visioning approaches to product design for radical ideas. It is no surprise that over the past decade, design thinking has seen increased adoption in product design. As outlined in the strategic entrepreneurship literature (e.g. Hitt et al., 2001), the combination of strategic management and corporate entrepreneurship points to shared vision and its role in translating entrepreneurial ambitions into innovative outcomes.

This was in line with shared vision driving goal-oriented behavior and learning driven outcomes within organizations (Senge, 1990). The focus of the resource commitment shifts towards development of shared vision and knowledge driven through past experiences (Slater & Narver, 2000, Lipshitz et al., 1996: p 293). This shift is driven through values centered around pursuing new knowledge and challenging the status quo (Slater & Narver, 1995; Sinkula et al., 1997; Moorman & Miner, 1998). This process facilitates filtering of relevant info (Hult, 2003) leading organizations closer towards innovation. By harnessing creative ideas to move towards successful commercialization, shared vision helps differentiate entrepreneurial firms enabling higher innovation outcomes.

Consistent with this stream of literature, I propose :

H2: Shared Vision has a positive effect on radical innovation.

Open mindedness and radical innovation

Open mindedness is the willingness to challenge one's inherent beliefs and paths through the process of active evaluation of evidence when available. (Sinkula, et.al., 1997). Open Mindedness also termed as receptivity to new and possibly different ideas positively influences an organization's output of radical innovations (Sinkula, et.al., 1997). This is based on the premise that knowledge for solving past problems does not necessarily translate into solving new problems (Cegarra-Navarro & Sánchez-Polo, 2011). When teams are encouraged to have an open mind, they are more likely to abandon the existing way of doing things in search of novel approaches to solving problems.

Managers can have a direct impact on the firm's overall radical innovation by creating an environment in which team members can express different views and explore diverse perspectives (Tjosvold & Poon, 1998; Cegarra-Navarro & Sánchez-Polo, 2011). With organizations having to give up short term benefits in favor of medium to long term growth, organizational culture built on openness and encouragement is the glue that binds people together through the creation of new mental models. (Schein, 1993). Creation of an environment involving questioning of current truths and the status quo is encouraged (Narver et al., 2004). This freedom to explore is more likely to lead to outside the box thinking which in turn can lead to radical innovation. Unlearning older ways and refreshing it with newer knowledge during the process of pursuing new ideas is key (Calantone, Cavusgil, & Yushan, 2002; Calantone et al., 2002; Slater et al., 2014).

Pursuing of new ideas implies being open to possibilities in adjacent markets that are in the periphery of the organization's existing market. This would enable organizations to leverage their core competency that involves product differentiation and low costs that creates a new market space and demand for the product / service through the concept of value innovation. (Chang, 2010). I expect that teams that have higher levels of open mindedness will have a higher impact on radical innovation

Consistent with this stream of literature, I propose:

H3: Open Mindedness has a positive effect on radical innovation.

Intra-org knowledge sharing and radical innovation

The collection of knowledge from different units within an organization can be used as a baseline for future activities (Lukas et al., 1996). Aulawi et al., (2009) argued that intra firm knowledge sharing can trigger individuals critical and creative thinking leading to new knowledge. This type of knowledge sharing across departments can also lead to efficiencies in experiences and lessons learned across the organization (Calantone et al., 2002). Additional studies by Jantunen (2005) and Lin (2007) explored the concepts of knowledge donating and knowledge sharing and how they lead to higher innovation capabilities within the firm. Although a number of studies have confirmed the positive effect of intra firm knowledge sharing on innovation, there have also been a few contradictory studies which show that knowledge sharing does not have any effect on innovation. Yeşil et al., (2013)

Consistent with this stream of literature, I propose:

H4: Intra-org knowledge sharing has a positive effect on radical innovation.

Risk taking and radical innovation

Risk taking is defined as the degree to which experimentation with new ideas and challenging of the status quo is valued within an organization (Hogan and Coote, 2014). Risk taking has been found to be one of the cultural dimensions that influences an organization's output of radical innovations (Hogan and Coote, 2014).

When the expected outcome is radical innovation, organizations must work to build a culture that supports risk taking (Aagaard, 2017). Team leaders and managers can have a direct impact on the firm's overall radical innovation by creating an environment in which subordinates feel encouraged to take risks. When teams are encouraged to take risks, they are more likely to abandon the existing way of doing things in search of novel approaches to solving problems (Sethi, Smith & Park, 2001). This freedom to explore is more likely to lead to outside the box thinking which can lead to radical innovation. Therefore, I expect that teams that have higher levels of risk-taking attitudes will be more radically innovative than teams with lower risk-taking attitudes.

Consistent with this stream of literature, I propose:

H5: Risk Taking ability has a positive effect on radical innovation

Proactive / Reactive market orientation and radical innovation

Market culture is defined as “the organizational culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and, thus, continued superior performance for the business.” (Narver & Slater, 1990). An alternative definition is “the set of cross-functional processes and activities directed at creating and satisfying customers through continuous needs-assessment.” (Deshpande & Farley, 1998).

Although the market orientation constructs have evolved, there is concurrence that market orientation encompasses three related areas: customer orientation, competitor orientation, and inter-functional coordination (Lukas & Ferrell, 2000).

Lukas & Ferrell (2000) also concluded that the components of market orientation have different effects on technology product innovation ranging from incremental "line extensions" and "me-too" products driven by reactive market orientation products to radical innovation or "new-to-the-world" products driven by proactive market orientation.

Responsive Market Orientation involves information gathering and dissemination activities centered around existing customers and products with a strong focus on meeting current customer needs. On the other hand, Proactive Market Orientation involves latent needs discovery that involves new market opportunities and cannibalizing existing offerings (Jaworski, et. all 2000). The proactive market culture lays emphasis on control and an external orientation that produces highly competitive behaviors. The original concept and the way to measure proactive market orientation emerged from an empirical

study of 25 companies across 41 business units in different industries and 120 top manager respondents. In the analysis, Narver et al., (2004) concluded that proactive market orientation "increases the explanatory power" for innovative product success and the effect is stronger than the isolated effect of responsive market orientation. These results were confirmed and expanded in a follow-up study (Gima, Slater, & Olson, 2005).

Since market orientation and innovation are linked (Han, Kim, & Srivastava, 1998), a more inclusive model that includes both proactive and reactive market orientation in the context of radical innovation was adopted. I propose a positive relationship between proactive market orientation and innovation.

Therefore,

H6: Proactive Market Orientation has a positive effect on radical innovation.

H7: Reactive Market Orientation has a positive effect on radical innovation

CHAPTER IV : RESEARCH METHODOLOGY

In order to test the proposed model, two studies were conducted. The first study was a pilot study that assessed the validity of the construct measures. The original research model as outlined in Fig 2.0 was then updated based on the results from the pilot study. This was followed by the main study and the updated research model was tested. In the following section, I will provide an overview of the overall research methodology followed by a discussion around the pilot and main study.

Measures

This study followed the Quantitative Methods Approach involving a pilot with 50 participants. Well established measures from extant literature were used for the study. In order to measure commitment to learning, shared vision and open mindedness, a five-point Likert scale was adopted. This 20-item scale was adopted from (Baker, et al., 1999), One item was adopted from (Sujan, et al., 1994). In order to measure, proactive market orientation, a scale was adopted from Narver, Slater, & McLachlan, (2004). Radical innovation was measured using a scale adapted from (Tellis, Prabhu, and Chandy 2009). A well-validated three-item scale measured all items assessed with a five-point Likert scale, with 1 = “strongly disagree” to 5 = “strongly agree".

Study sample

The survey questions were adapted from previously validated scales. Please see Appendix A. The sample was a convenience sample with the participants selected from my

professional LinkedIn network. LinkedIn is an online platform consisting of a professional network of working professionals. As seen in Figure 3.0 below, the sample was representative of different management levels and had an average of 10 years' experience in the industry. Middle management consisted of mainly project / project managers while senior executives consisted of Director, VP and above. There was a good mix of different organizational sizes with a roughly even split between small, midsize and large organizations.

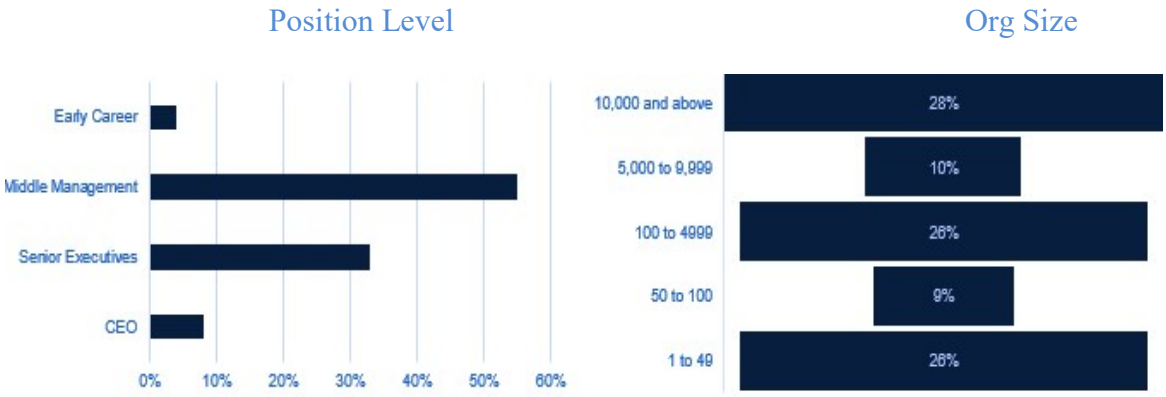

Figure 3.0 – Position levels and organizational size within the survey

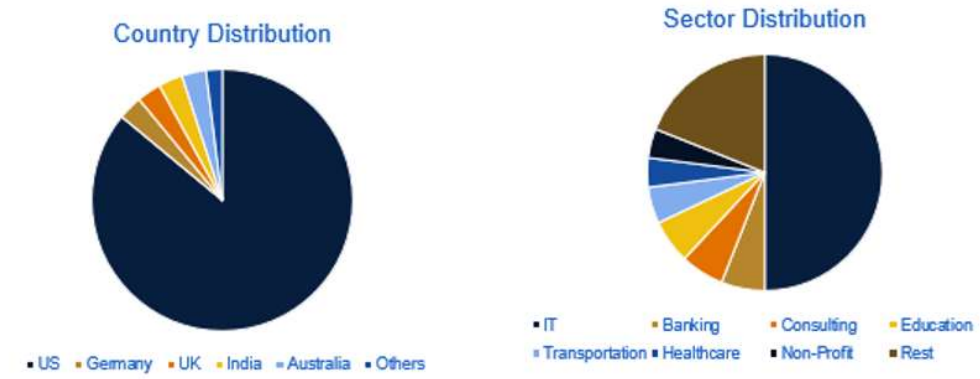

Fig 4.0 – Country and sector distribution

As seen in Figure 4.0 above, most of the participants in the main study included organizations based in the UK, Australia, US and India. The majority of the participants were within information technology (50%) followed by banking (6%), consulting (6%), education (6%), transportation and warehousing (3.8%), healthcare (3.3%), non-profit (3.3%). The rest of the 27% represented various industries including retail, real estate, manufacturing, publishing, telecom, construction and related industries. Thus, although 50% of the participants were in technology, I tried to cover different industries in order to build a generic framework around the survey results. In addition, having multiple participants across different organizational levels and industries improves the validity of the study findings.

36% of the organizations did not have a dedicated R&D organization while 64% did have a dedicated R&D department.

Methods

The quantitative research methodology was adopted and data was collected through a survey administered through Qualtrics. The survey included questions around the key cultural drivers that drive radical innovation and were designed using a Likert scale.

Once the survey results were in, the data was examined for outliers and distributional assumptions. Descriptive statistics, correlations analyses and exploratory factor analysis (EFA) using principal component factor analysis and varimax rotation techniques were used to assess the reliability and dimensionality of the measures. KMO measures were used to check sampling adequacy and Cronbach's Alpha was used to measure scale reliability.

Mean scores and standard deviation for each construct were calculated. This was followed by a hierarchical linear regression using SPSS V26.0.2 in order to examine the direct effects of the predictors on the outcome.

Pilot Study

For the initial EFA, all items were used in a principal component factor analysis with varimax rotation. Based on the results (See Appendix B.0) , one of the radical innovation items (Inn_3) did not load well with the rest of the innovation items. The constructs involving intra organizational knowledge sharing and risk taking were dropped since they showed high cross loading and low extraction values. Besides, both responsive and proactive market orientation could not load within the model at the same time. This was an important outcome from the pilot since it forced me to further streamline and simplify my model. This was supported through existing literature which makes a clear distinction between radical and incremental innovation. Grinstein (2007), calls for additional research concerning market orientation and innovation effects since increased focus on being customer centric and responsiveness could lead to higher levels of incremental innovation. Since my study is focused on radical innovation, responsive market orientation was removed from the model. The descriptives are displayed in Table 1.0 below.

Table 1.0 - Descriptive statistics of original pilot data (N = 50)

Construct / α		Item	Mean	SD
Radical Innovation (Tellis, Prabhu et.al., 2009) α = 0.87	Inn_1	We frequently introduce innovation to generate competitive advantage ahead of competition.	3.94	1.11
	Inn_2	We are ahead of competition in introducing products / services based on new technology	3.94	1.16
	Inn_3	*No difficulty in introducing products / services that are radically different from existing ones.*	*N/A*	*N/A*
Learning Orientation (Baker, et.al; 1999; Sujan, et. al., 1994) α = 0.89	*LO_1*	*Team and Management set aside enough time for learning new skills that can lead to innovation.*	*N/A*	*N/A*
	LO_2	*Our core values include learning as a key to unlocking innovation*	*N/A*	*N/A*
	LO_3	Employee Learning (such as outside classes) is seen as an investment and not just an expense	4.32	1.05
	LO_4	Learning is perceived as necessary in order for the organization to survive	4.04	1.24
	LO_5	We generally prefer to work on tasks that require learning new things	4.42	1.03
Shared Vision (Baker, et.al., 1999; Sujan et. al., 1994) α = 0.85	SV_1	How would you rate the extent of shared vision within your company? - Well defined vision exists	4.46	.76
	SV_2	How would you rate the extent of shared vision within your company? - Overall commitment to company goals	4.48	.67
	SV_3	How would you rate the extent of shared vision within your company? - Clear understanding of where we are and where we are going	4.38	.69
	SV_4	*There is total agreement on our business unit vision across all levels, functions and divisions.*	*N/A*	*N/A*
	SV_5	How would you rate the extent of shared vision within your company? - Employees view themselves as partners in charting the direction of the company	3.98	1.11
	SV_6	How would you rate the extent of shared vision within your company? - Top leadership believes in sharing a vision for the company	4.52	.73
Open Mindedness	OM_1	Managers do not want their view of the world to be questioned	N/A	N/A

(Baker, et. al., 1999; Sujan et. al., 1994) α = 0.89	OM_2	What is the extent of open mindedness within your organization? - "Out of the box" thinking is favored while solving problems in spite of the risk	3.84	1.03
	OM_3	What is the extent of open mindedness within your organization? - Its ok to reflect critically on the shared assumptions about the way we do business	4.08	1.02
	OM_4	What is the extent of open mindedness within your organization? - High value is placed on open-mindedness	4.02	1.16
	OM_5	What is the extent of open mindedness within your organization? - Original ideas are highly valued	4.30	0.90
Proactive Market Orientation (Narver, et. al., 2004), α = 0.9	PM_1	We brainstorm on how customers use our products / services to discover new customer needs	3.88	1.15
	PM_2	We have familiarity with the hardest problems to be solved in our business - the problems that no one is solving because they are too hard	3.66	1.00
	PM_3	We spend enough time exploring key technology, business and customer lifestyle trends, even if not directly related to the core product technology to gain insight into what customers in our current market would need in the future	3.98	1.04
	PM_4	We work closely with lead users who try to recognize customer needs months or even years before the majority of the market recognizes them	3.50	1.11
	PM_5	We extrapolate key tech, business and customer lifestyle trends to gain insight into what customers in our current market would need in the future	3.52	1.18
	PM_6	We incorporate solutions to unarticulated customer needs in our new products and services	3.66	1.15
Knowledge Sharing (Narver, et.al., 2004) α = 0.83	*KS_1*	*The team engages in questioning and learning from past lessons*	*N/A*	*N/A*
	KS_2	*The team regularly and refreshes their knowledge*	*N/A*	*N/A*
	KS_3	*Employees are encouraged to build on what they know*	*N/A*	*N/A*
Reactive Market Orientation (Narver, et.al., 2004) α = 0.88	*RM_1*	*We constantly monitor or level of commitment and orientation to serving customer needs*	*N/A*	*N/A*
	RM_2	*We freely communicate information about our successful and unsuccessful customer experiences across all business functions*	*N/A*	*N/A*
	RM_3	*Our strategy for competitive advantage is based on our understanding of customers' needs*	*N/A*	*N/A*

	RM_4	*We measure customer satisfaction systematically and frequently*	*N/A*	*N/A*
	RM_5	*We have routine or regular measures on customer service*	*N/A*	*N/A*
	RM 6	*We are more customer-focused than our competitors*	*N/A*	*N/A*
	RM_7	*Data on customer satisfaction are disseminated at all levels in our organization on a regular basis*	*N/A*	*N/A*
Risk Orientation (Hogan and Coote, 2014) α = 0.82	*RO_1*	*We are expected to challenge the status quo in order to come up with new ideas and ways of doing things*	*N/A*	*N/A*
	RO_2	*The firm encourages teams to experiment with new ideas and new ways of solving problems*	*N/A*	*N/A*
	RO_3	*Taking calculated risks with new ideas and practices is encouraged by the firm*	*N/A*	*N/A*

Note: All *italicized* items / constructs are dropped either due to low or cross-loadings.

The Cronbach α for all constructs were excellent (> 0.70). Based on Kaiser's classification of KMO values, the KMO of 0.921 was excellent. KMO values greater than 0.5 imply that the results of the factor analysis are significant. Besides, Bartlett's test of sphericity value is below .05 and is statistically significant. Hence, the variables do relate to one another enough to run a meaningful EFA.

Convergent validity and discriminant validity for the rest of the measures were then performed by running several iterations of the EFA. With the exception of SV_5 (0.546), the loadings for each of the selected constructs was above 0.6. Three items within the constructs involving open mindedness, shared vision and learning orientation (OM_1, SV_4 and LO_1) did not have high loadings and did not fit well with the proposed model.. After running several iterations, the best EFA model (Appendix C) was generated after removing the above items.

Based on insights from the pilot data, the initial model was updated as shown in Fig 5.0 below. As evident, the hypotheses pertaining to knowledge sharing, risk taking ability and proactive market orientation were removed given the lack of support for them in the EFA. This was used as the basis for the main study which is outlined in the next section.

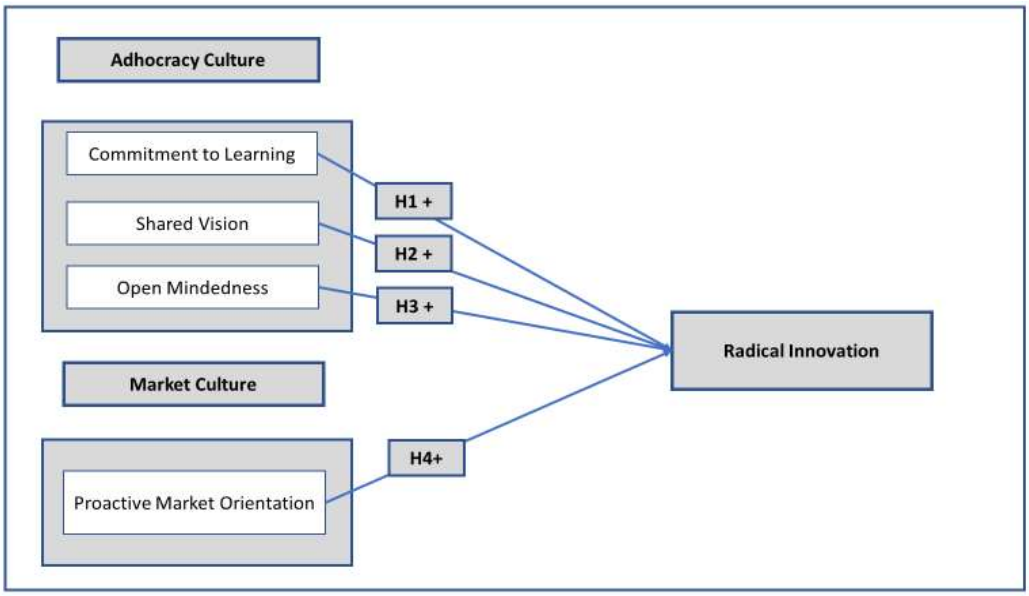

Fig 5.0 – Updated research model

Main study

I was now prepared to undertake the main study for a total of 166 participants within my LinkedIn network. Convergent validity and discriminant validity for the measures were then performed by running several iterations of the EFA using the principal component factor analysis with varimax rotation. With the exception of OM_2 (.539), PM_2 (0.593), PM_3 (0.569) and PM_6 (0.580), the loadings for each of the items within the selected constructs was above 0.6.

Four items within the constructs involving learning orientation, open mindedness and proactive market orientation (LO_5, OM_1, PM_4 and PM_5) did not have high loadings and did not fit well with the proposed model. After running several iterations, five factors were retained and the best EFA model (Appendix D) was generated after removing the above items.

Table 2.0 - Descriptive statistics of main study (N = 166)

Construct / α		**Item**	**Mean**	**SD**
Radical Innovation α = 0.81	Inn_1	We frequently introduce innovation to generate competitive advantage ahead of competition.	2.22	1.04
	Inn_2	We are ahead of competition in introducing products / services based on new technology	2.26	1.06
	Inn_3	No difficulty in introducing products / services that are radically different from existing ones.	2.18	1.12
Learning Orientation α = 0.83	LO_1	Team and Management set aside enough time for learning new skills that can lead to innovation.	1.97	1.113
	LO_2	Our core values include learning as a key to unlocking innovation	1.87	1.102
	LO_3	Employee Learning (such as outside classes) is seen as an investment and not just an expense	1.69	1.010
	LO_4	Learning is perceived as necessary in order for the organization to survive	1.48	.770
Shared Vision α = 0.91	SV_1	How would you rate the extent of shared vision within your company? - Well defined vision exists	1.77	1.051
	SV_2	How would you rate the extent of shared vision within your company? - Overall commitment to company goals	1.58	.870
	SV_3	How would you rate the extent of shared vision within your company? - Clear understanding of where we are and where we are going	1.89	1.048
	SV_4	There is total agreement on our business unit vision across all levels, functions and divisions.	1.91	1.142

	SV_5	How would you rate the extent of shared vision within your company? - Employees view themselves as partners in charting the direction of the company	2.27	1.128
	SV_6	How would you rate the extent of shared vision within your company? - Top leadership believes in sharing a vision for the company	1.64	1.036
Open Minded $\alpha = 0.86$	OM_2	What is the extent of open mindedness within your organization? - "Out of the box" thinking is favored while solving problems in spite of the risk	2.16	.994
	OM_3	What is the extent of open mindedness within your organization? - Its ok to reflect critically on the shared assumptions about the way we do business	2.10	.960
	OM_4	What is the extent of open mindedness within your organization? - High value is placed on open-mindedness	1.90	.932
	OM_5	What is the extent of open mindedness within your organization? - Original ideas are highly valued	1.79	1.003
Proactive Market Orientation $\alpha = 0.85$	PM_1	We brainstorm on how customers use our products / services to discover new customer needs.	2.32	1.132
	PM_2	We have familiarity with the hardest problems to be solved in our business - the problems that no one is solving because they are too hard	2.34	.97
	PM_3	We spend enough time exploring key technology, business and customer lifestyle trends, even if not directly related to the core product technology to gain insight into what customers in our current market would need in the future	2.30	1.166
	PM_6	We incorporate solutions to unarticulated customer needs in our new products and services	2.32	1.126

Note: All *italicized* items are dropped either due to low or cross loadings.

As seen in the descriptive statistics above, the Cronbach value for each of the constructs is above 0.8 indicating internal consistency and validity. I measured for multi-collinearity which occurs when two or more predictors in the model correlated and provide redundant information about the response. All VIF values were less than 3 implying low multicollinearity. As the study was expanded to include multiple industries and multiple

countries across different levels of the organization low collinearity was ensured by making sure that the questions were well vetted out and not open to misinterpretation due to the nature of the industry or type of organization being surveyed.

In order to test the model, a hierarchical linear regression was then performed using SPSS V26.0.2. The resultant model produced an R-Square of 0.428. As seen in the results within Table 3.0 below, 3 hypotheses were supported and 1 hypothesis was not supported.

Table 3: Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		Beta	Std. Error	Beta	t	Sig.
1	(Constant)	0.671	.170		3.935	p<.001
	Learning Or	.207	.090	.183	2.298	p<.05
	Shared vision	.191	.092	.175	2.070	p<.05
	Openminded	-.031	.083	-.028	-.372	.711
	Proactive Mkt	.418	.089	.407	4.712	p<.001

R-square = .428, Adjusted R-square = .414

Using the model, the regression accounted for 42.8 % of the variation in radical innovation.

I hypothesized that learning orientation has a positive effect on radical innovation. The results support that. The results (beta coefficient $\beta = .18$, $t = 2.29$, $P<0.05$) are in line with existing literature.

Hypothesis H1 is thus supported.

I hypothesized that shared vision has a positive effect on radical innovation. The results (beta coefficient $\beta = .17$, $t = 2.07$, $p<0.05$) are in line with existing literature.

Hypothesis H2 is thus supported.

I proposed that open mindedness has a positive effect on radical innovation. However, I did not find support for this argument. With regards to open mindedness, defining the boundary conditions was critical in order to increase the possibility of success. Without proper due diligence, open mindedness could lead individuals to doing the wrong things right or the right things wrong. (Bent et al., 1999). The results (beta coefficient $\beta = -.02$, $t = -.37$, $p>0.05$) are not in line with existing literature.

Hypothesis H3 is not supported.

With increased focus on untapped market opportunities and competencies in predicting customer behavior, proactive market orientation leads to increased levels of radical innovation and was supported by my model. The results (beta coefficient $\beta = .4$, $t = 4.71$, $p<0.001$) are in line with existing literature.

Hypothesis H4 is supported.

To sum up, 3 hypotheses were supported and 1 hypothesis was not supported.

Table 4: Summary of findings

Hypothesis	*Results*
H1: Learning Orientation has a positive effect on Radical Innovation	*Supported*
H2: Shared Vision has a positive effect on Radical Innovation	*Supported*
H3: Open Mindedness has a positive effect on Radical Innovation	*Not Supported*
H4: Proactive Market Orientation has a positive moderating effect on radical innovation	*Supported*

CHAPTER V: DISCUSSION

The purpose of this study was to investigate the relationship between different cultural components and radical innovation. The study validates my approach of using organizational culture as a trigger for driving radical innovation. The implications of the study are discussed below.

Theoretical implications

Prior studies have looked at the relationship between organizational culture and innovation using the competing values framework. Through its support of the hypothesis involving adhocracy culture and proactive market orientation, my study contributes to literature on organizational culture and its role in enhancing innovation.

Benner & Tushman, (2003), suggest that radical innovation cycles are followed by periods of incremental innovation. These cycles can be captured by using a time dimension within the study. However, similar to my study, most studies involving culture and innovation were cross-sectional and did not have a time dimension which would be typically covered in a longitudinal study. As a result, most models do not accommodate radical and incremental innovation at the same time. This has implications to research in the field of innovation culture and highlights the importance of a holistic view of radical innovation. By capturing data at different points within the innovation cycle – namely ideation, rollout and operational touch points, the competing values framework can be expanded to its full potential.

Current studies involving knowledge sharing and innovation have a strong focus on untapped and adjacent markets since they are focused on initiating radical innovation. However, knowledge sharing has also an aspect related to internal knowledge building and growth, especially when it comes to sustaining radical innovation. The inability to fit knowledge sharing within my model clearly highlights the rationale for a more comprehensive coverage of knowledge sharing as seen through the distinct lenses of initiating and sustaining radical innovation. This would lead to a more extensive coverage and wider adoption of the competing values framework.

Practical implications

National culture characteristics have been conceptualized, tested and proven applicable to new product development and innovativeness outcomes (Sivakumar & Nakata, 1996; Steenkamp, 1999; Grinstein, 2008). According to innovation researchers Zhang, Wei, Yang, & Zhu (2018) organizations need to periodically revive or create businesses through radical innovation while dealing with constraints imposed due to the global nature of the firm's activities. It's important to note that although my study covered different industries, it was primarily targeted at US firms (86%). According to Hofstede (1983), with Western firms focused on individualism and their non-Western counterparts laying more emphasis on collectivism, there are clear and significant cultural differences between them. Hence, given the increased inter-dependence between world economies and the role of technology in reducing national barriers, the generalization of results around non-US firms need to be carefully vetted out, especially due to the small sample size of 210 participants across 140 companies.

Studies involving organizational size and radical innovation have mixed results. Some large technology companies like Amazon and Google are highly innovative, while other large organizations such as Blockbuster and Hertz were slow to evolve and react to changing market conditions. As part of my survey, I reached out to my network of contacts within large technology organizations (Amazon, Facebook, Google). These organizations are perceived as having bigger budgets with greater capacity to absorb failure, while providing their teams with a longer runway to experiment. However, successful large organizations leveraged the power of their expansive networks and managed these experiments in a controlled manner. They were also quick to either shelve projects or pivot and continue to invest based on customer validation.

Expanding on the constructs involving learning orientation and shared vision, the survey questions also led to insights around forming loose informal networks of people with diverse viewpoints tied together with a shared vision. This would help kick start the ideation phase and increase the probability of radical innovation success within the organization. Companies that have failed to develop strong internal knowledge networks are hampered in their ability to collaborate and deliver radical innovation outcomes. During my early years working with IBM, they reminded all new employees about IBM's inability to quickly engage their internal knowledge networks around developing the windows operating system for their in-house PC development efforts. Hence, even though IBM had the capability to build their own operating system, the customer urgency coupled with IBM's inability to bring together their in-house expertise in a timely manner provided the opportunity for Microsoft to build this out. Since then, IBM has taken active steps to build

knowledge networks around communities of practice through a rigorous knowledge management program. Being part of IBM's knowledge management division, I experienced firsthand IBM's ability to leverage their internal knowledge around their own transformation in the late 90's. Eventually, IBM used their internal transformation to launch their consulting services division.

Another example of leveraging the power of strong internal networks was SAP. I reached out to several folks involved in building innovation networks within SAP. Some of the major product innovations within SAP originated from SAP innovation labs. Within the innovation lab, employees get to spend a year building out futuristic products that go through intensive market validation activities. If the products and services being developed pass market validation and generate sufficient pilot data to pursue further work, the employees get to work on the project beyond the 1-year period. If not, they go back to their regular day job. This involves some level of financial risk. At the same time, having a 1-year timeframe also sets some boundaries for firms intending to use a lean model to develop proof of concepts and assess product-market fit.

Overall, my study was successful in adding an applied context to the existing body of knowledge involving culture and innovation.

Study limitations and implications for future research

In order to meet the timelines outlined in the program, it was important to clearly outline the scope of the study. At the same time, I also captured additional data points that would serve as logical extensions of this study.

While looking at open mindedness (OM), it's important to note that many organizations tend to stay within their comfort zones leading to a future that is carved out from their past with minimal infusion of new ideas (O'Connor et.al., 2008). For new ideas to thrive, it is important to be able to set aside existing set of knowledge that is embedded in organizational memory, but appears flawed. (Barr et al.,1992). Past studies have shown that lack of open mindedness leads to lower levels of radical innovation.

In this context, it is also important to note that past studies have shown a positive association between knowledge sharing and radical innovation due to the factors involving human exchange of competence, expertise, information, intuitions and creative approaches (Kremer et al., 2019). Based on a study from Gupta, et. al., 2012, organizational culture is a critical factor that affects creativity. The study covers computer mediated socializing as a means of increasing creativity for certain organizational cultures. While the present study finds a weak link between open mindedness and innovation, a future extension of this study needs to explore open mindedness through the lens of creativity and organizational culture as it impacts radical innovation.

This study used SPSS V26.0.2 for the analysis. However, for the 4 items[2] that loaded below 0.6, given the high reliability scores, I decided to retain them within the model. Future extensions of this study using smart PLS would provide better results.

The survey captures organizational size and organizational type data across a range of radical innovation outcomes. Although organizational size is not one of the prime antecedent factors in radical innovation, it still needs to be considered. (Camison et al., 2004; Chandy & Tellis, 1998). An examination of organization size within the context of radical innovation shows that size is more positively related to radical innovation in manufacturing and profit-making organizations as opposed to service and non-profit organizations (Fores & Camison, 2016). Large manufacturing and profit organizations can use economies of scale to increase profits and provide a funding platform to build out radical innovation practices that could lead to increased market share. Service and non-profit organizations, on the other hand could become so deeply embedded in their existing knowledge and tool sets that they might overlook adjacent market opportunities. (Herriott et al., 1993; Nooteboom et al., 2007). Hence, the combination of organization type and organizational size data will provide valuable insights as part of an extended study.

Employee tenure and dedicated R&D facility data was also captured as of this study. These data points along with multiple open-ended conversations with survey participants provides an opportunity to extend this study into a qualitative or hybrid approach that complements the analysis within this study.

[2] 3 items involving proactive market orientation and 1 item involving open mindedness has loadings under 0.6

Risk taking traits drive radical innovation levels (Naranjo-Valencia et al., 2016; Shahzad et al., 2017), However, they did not line up with my model since most of the survey participants were middle managers with limited decision making around the resources required to support radical innovation efforts. Future extensions of this study need increased focus on senior management and CEO's in order to do a realistic assessment involving the risk construct.

In order to achieve innovation outcomes, it is important to build managerial practices and organizational structures that sustain the creativity and flexibility at the cost of existing control and co-ordination mechanisms. To support successful digital innovation processes, firms must "develop managerial practices and systems that recognize creativity and differentiation at the expense of prevailing authority structures and integration arrangements" (Svahn et al. 2017a, p. 240). Future extensions of this study should include all 4 dimensions of the CVM to develop a more realistic view of the organizations current state and build out an innovative culture.

Conclusions

The study's findings provided conclusive evidence on the relationship between culture and radical innovation.

Learning orientation and its impacts on radical innovation need to be seen as part of a broader knowledge management ecosystem that is designed to drive radical innovation at multiple levels of the organization.

This brings us to another key radical innovation culture trend – the ability to sense opportunities and capitalize on them. Since the source of these opportunities could be a combination of customers, partners or even competitors, this type of opportunity driven culture does not blend itself into a reactive or proactive market orientation. Going forward, opportunity driven orientation should be carefully considered as part of a company's overall cultural component.

With COVID-19 and the increasing reliance on virtual means, the efficacy of in-person interactions and their impact on organizational culture needs to be closely evaluated. Insertion of the social context and building trust are key components that are required to build and sustain closely knit teams that are capable of delivering innovative products and services that can re-define the market. This intersects each of the cultural constructs outlined in my study and has implications on a firm's ability to deliver innovative products and services.

The objective of this study was to set up a generic template for radical innovation culture that could be applied in different organizational settings. However, the results of the survey showed that there was considerable variance in innovation levels across the companies due to different organizational contexts. There was no one size fits all template. The study clearly highlighted the importance of organizational context and its role in defining the necessary cultural components required to drive radical innovation.

The organizational context brings organizational self-awareness to the forefront. It's also important to note that although the concept of self-awareness has been extensively studied in the context of leadership, it has not been explored in the context of organizations.

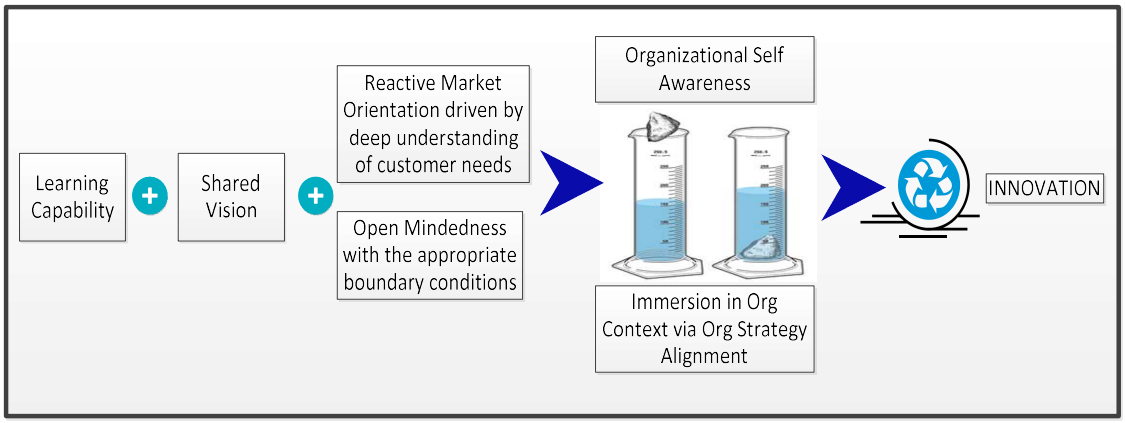

Fig 6.0 – Radical innovation through the lens of organizational self-awareness

As seen in Fig 6.0 above, the cultural constructs outlined in my survey need to be fully embedded within the organization and closely tied to its strategy. I recommend for organizations to undertake an organizational self-awareness audit and clearly define their internal and external context using the above framework.

This will help align the organization's strategic direction and expected customer outcomes, thereby increasing the chances of radical innovation driven outcomes.

With the cyclic nature of creation and diffusion of innovations, radical innovation is complex. Organizational culture has the biggest impact on radical innovation when it is viewed as part of a broader strategy involving organizational leadership, structure and the environment within which companies need to execute in order to win in the marketplace.

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APPENDIX A

Survey instrument

1) Radical Innovation Questionnaire items (Tellis, Prabhu, and Chandy 2009)

Our team introduces innovation frequently enough to generate proper advantages against competitive products.

Our team is in front of others in introducing products/services based on radically new technologies

We have no difficulty in introducing products/services that are radically different from existing products/services in the industry

2) Commitment to Learning Questionnaire Items (Baker, et al., 1999; Sujan, et al., 1994)

Commitment to learning -

My team and management set aside enough time for learning new skills that can lead to innovation.

The core values of my business area include learning as a key to unlocking innovation

Employee learning (such as outside classes) within your business are seen as an investment and not just an expense.

Learning is perceived as necessary in order for the organization to survive.

Team preference is to work on tasks that require us to learn new things (Sujan, et. all., 1994)

3) Shared Vision - Questionnaire Items (Baker, et al., 1999; Sujan, et all., 1994)

Our team has a well-defined vision that closely aligns with the vision of the business unit.

The members of my team are committed to the goals of the business unit.

There is a well-expressed concept of who we are and where we are going as a business unit.

There is total agreement on our business unit vision across all levels, functions and divisions.

Employees view themselves as partners in charting the direction of the business unit.

Top leadership believes in sharing a vision for the business unit with the lower levels.

4) Open Mindedness - Questionnaire Items (Baker, et al., 1999; Sujan, et all., 1994)

Managers in this business unit do not want their view of the world to be questioned.

Managers encourage employees to think outside of the box when it comes to solving problems, even though it may present some risk.

We are not afraid to reflect critically on the shared assumptions we have about the way we do business.

Our business unit places a high value on open-mindedness.

Original ideas are highly valued in this organization.

5) Proactive Market Orientation Questionnaire items (Narver, Slater and Maclachlan, 2004)

We help customers anticipate developments in the markets.

We continuously try to discover additional needs of our customers of which they are unaware.

We incorporate solutions to unarticulated customer needs in our new products and services.

We brainstorm on how customers use our products/services to discover new customer needs.

We innovate even at the risk of rendering our own products obsolete.

We search for opportunities in areas where customers have a difficulty expressing their needs.

We work closely with lead users who try to recognize customer needs months or even years before the majority of the market recognizes them.

We extrapolate key technological, business and customer lifestyle trends to gain insight into what customers in our current market would need in the future.

Intra organization knowledge sharing -

Does the team engage in questioning and learning from past lessons?

Does the team regularly update and refresh their knowledge?

3) Market Orientation Questionnaire items (Narver, Slater, and Maclachlan, 2004)

Responsive Market Orientation

We constantly monitor our level of commitment and orientation to serving customer needs.

We freely communicate information about our successful and unsuccessful customer experiences across all business functions.

Our strategy for competitive advantage is based on our understanding of customers' needs.

We measure customer satisfaction systematically and frequently.

We have routine or regular measures of customer service.

We are more customer-focused than our competitors.

I believe this business exists primarily to serve customers.

Data on customer satisfaction are disseminated at all levels in this business unit on regular basis.

4) Risk Taking Questionnaire items (Hogan and Coote, 2014**)**

Within the Team

Team members are expected to challenge the status quo in order to come up with new ideas and ways of doing things.

Team members are encouraged to experiment with new ideas and new ways of solving problems.

Taking calculated risks with new ideas and practices is encouraged in this team

Within the organization

The firm expects teams to challenge the status quo in order to come up with new ideas and ways of doing things.

The firm encourages teams to experiment with new ideas and new ways of solving problems

Taking calculated risks with new ideas and practices is encouraged in the firm

APPENDIX B - CROSS LOADINGS FOR ORIGINAL MODEL

	Factor					
	1	2	3	4	5	6
Inn_1	.358	.164	.151	.220	.196	**.670**
Inn_2	.366	.184	.074	.116	.196	**.720**
Inn_3	**.586**	.284	.104	-.050	.118	.277
LO_1	.526	**.557**	.181	.152	.209	.339
LO_2	.334	**.643**	-.018	.135	.279	.413
LO_3	.335	**.667**	.232	.224	.098	-.133
LO_4	.327	**.576**	.102	.134	.364	.237
LO_5	.273	**.704**	.116	.258	.136	.199
SV_1	.027	-.017	**.808**	.071	.229	.059
SV_2	.260	.162	**.778**	.227	-.039	-.071
SV_3	.200	.296	**.629**	.142	.031	.005
SV_4	.134	.330	**.535**	.328	.007	.216
SV_5	.222	.381	**.601**	.278	.017	.125
SV_6	.130	-.077	**.767**	.137	.152	.118
OM_1	.104	-.122	-.115	-.487	-.012	.235
OM_2	.324	.251	.284	**.655**	.092	.131
OM_3	.119	.085	.063	**.682**	.070	.420
OM_4	.152	.096	.216	**.833**	.089	.262
OM_5	.139	.177	.251	**.773**	.010	.040
KS_1	.480	**.490**	.187	.200	.156	.418
KS_2	.491	**.506**	.029	.229	.484	.272
KS_3	.287	**.674**	.288	.193	.319	.082
RM_1	.449	.514	.218	.145	**.481**	.015
RM_2	.536	.251	.118	.072	**.718**	.059
RM_3	.393	.376	.149	-.002	**.685**	.240
RM_4	.372	.339	.190	.026	**.655**	.367
RM_5	**.536**	.215	.193	.051	.441	.270
RM_6	**.597**	.343	.119	.226	.326	.319
RM_7	**.737**	.153	.317	.176	.185	.189
PM_1	**.643**	.315	.281	.068	.166	.295
PM_2	**.749**	.338	.128	.067	.184	.229
PM_3	**.709**	.049	.204	.243	.468	.063
PM_4	**.677**	.068	.095	-.074	.106	.060

PM_5	**.690**	.203	.094	.134	.130	.297
PM_6	**.710**	.322	.127	.172	.138	-.002
RI_1	**.640**	.402	.149	.245	.245	.108
RI_2	**.712**	.306	.132	.312	.216	.188
RI_3	**.474**	.303	.359	.356	.253	.054

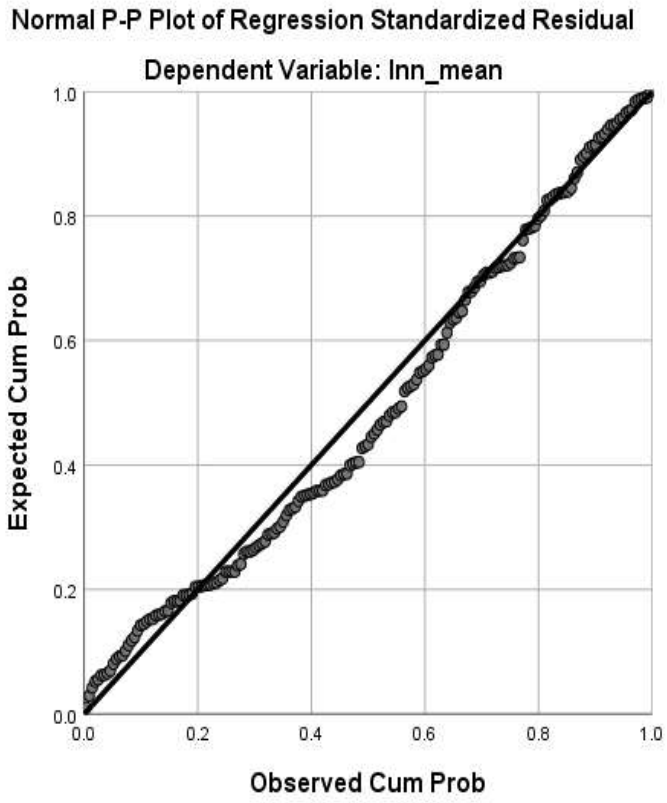
APPENDIX C - CROSS LOADINGS FOR UPDATED PILOT

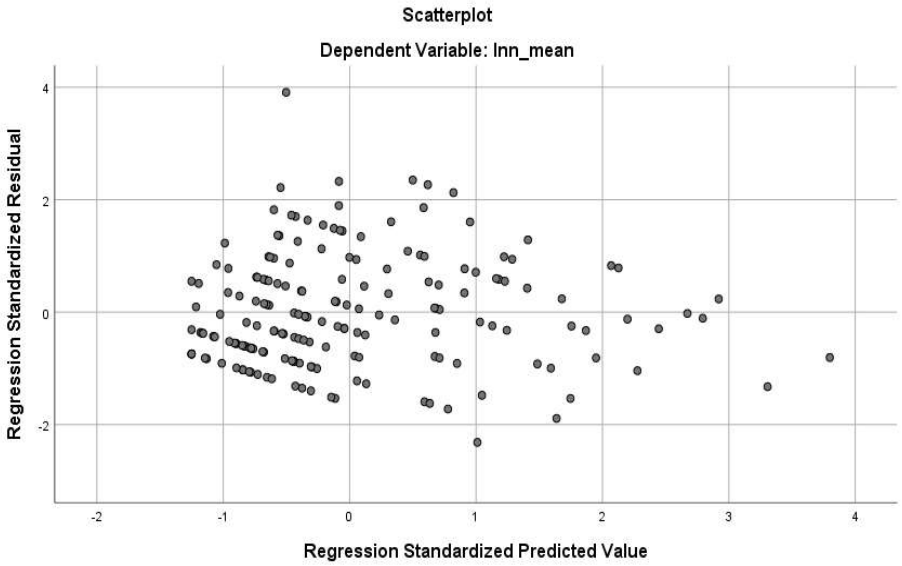
	Factor				
	PM	SV	OM	LO	INN
Inn_1	.320	.150	.273	.182	**.711**
Inn_2	.329	.075	.192	.209	**.794**
LO_2	.345	-.018	.177	**.682**	.393
LO_3	.303	.245	.218	**.670**	-.119
LO_4	.350	.119	.139	**.675**	.258
LO_5	.229	.141	.258	**.717**	.233
SV_1	.058	**.801**	.059	.016	.125
SV_2	.241	**.788**	.228	.142	-.068
SV_3	.147	**.649**	.173	.322	-.018
SV_5	.209	**.546**	.327	.335	.065
SV_6	.110	**.787**	.141	-.042	.159
OM_2	.299	.286	**.673**	.282	.091
OM_3	.061	.048	**.727**	.125	.345
OM_4	.129	.209	**.874**	.137	.172
OM_5	.088	.255	**.779**	.185	.001
PM_1	**.605**	.299	.108	.354	.336
PM_2	**.714**	.139	.151	.405	.223
PM_3	**.717**	.248	.248	.177	.181
PM_4	**.677**	.099	-.045	.088	.107
PM_5	**.679**	.084	.196	.209	.305
PM_6	**.730**	.139	.182	.343	.020

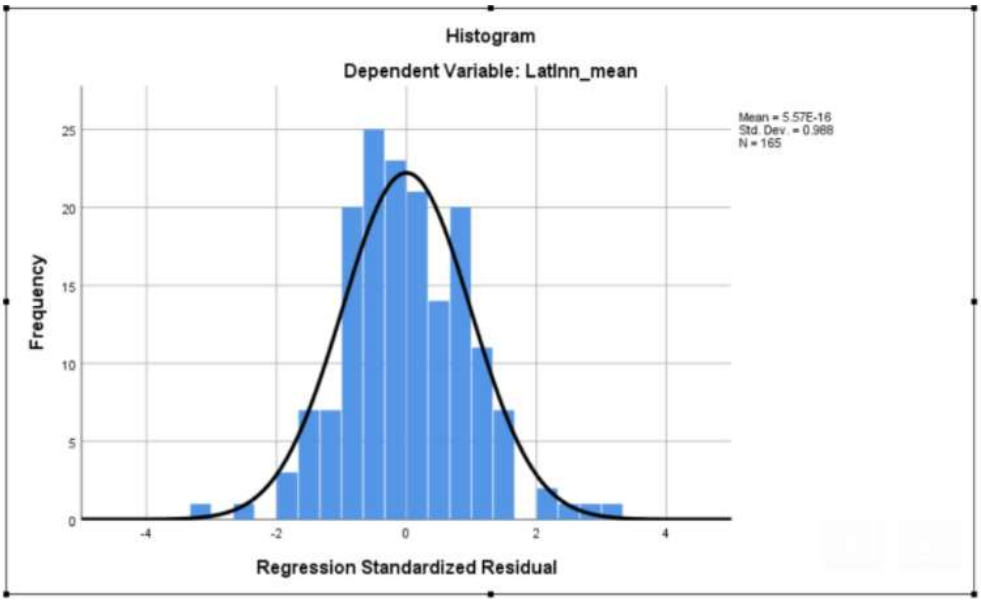
APPENDIX D - CROSS LOADINGS FOR MAIN STUDY

	Factor				
	SV	OM	INN	LO	PM
Inn_1	.195	.118	**.766**	.219	.162
Inn_2	..279	.137	**.674**	.140	.293
Inn_3	.162	.084	**.685**	.091	.211
LO_1	.210	.074	.424	**.610**	.292
LO_2	.266	.098	.248	**.666**	.248
LO_3	.152	.300	.163	**.638**	.042
LO_4	.189	.197	-.004	**.663**	.173
SV_1	**.703**	.175	.278	.293	.139
SV_2	**.762**	.149	.194	.113	.092
SV_3	**.747**	.286	.262	.120	.187
SV_4	**.623**	.225	.230	.253	.316
SV_5	**.628**	.103	.178	.267	.253
SV_6	**.796**	.249	.024	.141	.193
OM_2	.148	**.539**	.144	.311	.224
OM_3	.119	**.722**	.063	.016	.168
OM_4	.287	**.778**	.125	.234	.149
OM_5	.293	**.716**	.094	.251	.094
PM_1	.207	.256	.232	.226	**.662**
PM_2	.252	.254	.268	.156	**.593**
PM_3	.281	.244	.339	.360	**.569**
PM_6	.308	.122	.358	.184	**.580**

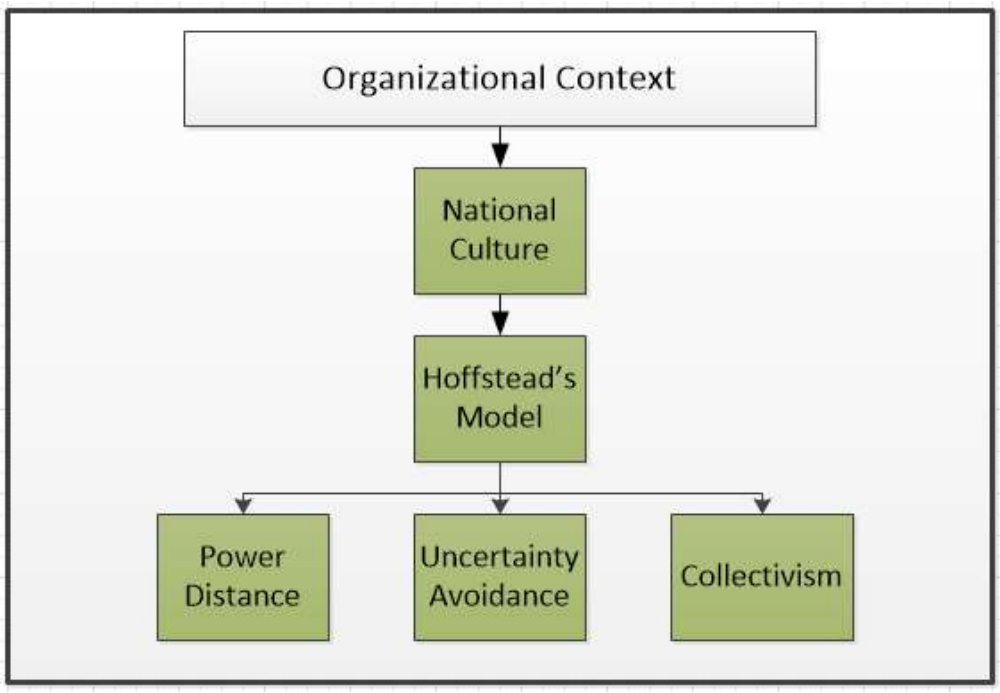
APPENDIX E CROSS LOADINGS FOR MAIN STUDY






Histogram
Dependent Variable: LatInn_mean
Mean = 5.57E-16
Std. Dev. = 0.988
N = 165
Frequency
25
20
15
10
5
0
-4
-2
0
2
4
Regression Standardized Residual

APPENDIX F – ORGANIZATIONAL CONTEXT



The original Hofstede's national culture framework originated from an empirical study of IBM Corporation employees from local subsidiaries in more than 50 countries. The dimensions included by Hofstede in his initial national culture model are power distance, individualism-collectivism, masculinity-femininity, and uncertainty avoidance. As seen in Appendix F above, these four areas were framed in context to social science phenomena and our review and evaluation of innovation outcome related studies led to three dimensions as outlined below:

Low Power Distance[3] – involves a decentralized Innovation Hub, low managerial oversight and hierarchy to maximize innovation outcomes (Nakata & Sivakumar, 2001)

[3] Hofstede's work highlights that in case of countries with large power distance, innovation is supported through the hierarchy whereas in countries with low power distance, innovations are more spontaneous and frequent involving people with original ideas.

Low Uncertainty Avoidance[4] involves a fail fast, learn fast model with dedicated time allotted to innovate. Driven by low uncertainty avoidance, loosely tied informal and non-standardized processes that are designed to trigger creative thinking during the initiation phase will be more closely tied to innovation (Johne, 1984).

Collectivism – Although individualism favors innovation, collectivism is closely associated with collaboration, harmony and cooperation between cross functional groups (Gupta & Wilemon 1988, Johne 1984, Souder 1988).

[4] Hofstede's work highlights that Innovation has taken more time in the uncertainty avoidance societies as opposed to uncertainty acceptance societies.

VITA

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