Pushing the Elephant:

How to Make Innovation Happen in Large, Complex Organizations

By

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Abstract:

The purpose of this paper is to examine why large, complex private and public organizations often fail to develop and implement innovation. This study identifies barriers that deter innovation in six areas: bureaucratic structures; leadership; mindsets; organizational culture; core capabilities and market/environment conditions. The study builds a conceptual model of the barriers to innovation, and suggests a number of structural, leadership and "corporate camouflage" strategies that innovators and intrapreneurs can use to overcome the "innovation killers" inherent in large bureaucracies. The paper focuses on both the barriers that prevent unique innovation stages and a range of innovation types that includes process, complex, radical and disruptive innovation. The study examines both internal and external inhibitors of innovation and their inter-dependencies. A comprehensive literature review provides the basis for a detailed discussion of the characteristics of large organizations and the barriers to innovation. Innovation, with the exception of limited process innovation, faces significant if not insurmountable barriers in large organizations. No single cause prevents the innovation process. The barriers and the reasons for the barriers are varied. Rigid organizational structures reinforced by a rules-based culture and risk-adverse leadership focus on short-term results, efficiency, current core capabilities, and existing market dominance. The outcomes provide poor soil for innovation. The characteristics of an organization's leadership and the cultural and mindset dynamics that result may enable or inhibit creativity and innovation, but often reflect an organizational intolerance of "change agents" and innovators. Markets, the structure of competition and high barriers to entry also play a significant role acting as "deterring" barriers for organizations seeking to take innovation beyond marginal improvements. The strategies recommended for diluting and overcoming barriers to innovation include internal or independent innovation capabilities, new models of creativity that enable leaders to innovate, raising the entrepreneurial calibre of leadership, strengthening the motivation of innovators, and enabling shifts away from current core capabilities.

Keywords: Innovation, Large Organizations, Innovation Barriers and Innovation Strategies.

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“There is no sausage crank for innovation, but it’s possible to increase the odds of a “Eureka!” moment by assembling the right ingredients.”

Gary Hamel (Hamel, 2006)

Section 1: Why does Innovation in Large, Complex Organizations Matter?

1.1 Introduction: Research Problem

Innovation in large, complex organizations is often necessary, but can be complex, sensitive and difficult to accomplish. The ability to develop and adopt novel ideas, transform them into products and services of value and disseminate them is vital to an organization's long-term success (Deaton, D. K, 1999), (Christensen, C. & Raynor, M. 2013) and (Christensen, C. M., & Overdorf, M. 2000). Innovation is clearly of great importance to large organizations as it enables them to maintain market competitive advantage (Christensen, C. M., Kaufman, S. P., & Shih, W. C. 2008), respond to rapid technological change (Hill, C.W.L & Rothaermel, 2003), foster a strong economy (Drucker, P. F. 1985) and, in the case of public institutions, respond to changing citizen expectations (Mulgan, G., & Albury, D. 2003). *Intrapreneurs*, a term first coined by Gifford Pinchot to describe innovators employed within an existing large and complex organization to exploit new opportunities and create economic value (Pinchot, G. 1985), are likely to face both enablers and inhibitors to their innovations. As Assink has noted, in large bureaucracies, innovation and those who advocate for it are often stifled or even thwarted by the complex interplay of internal and external "barriers" that inhibit creativity and the development and dissemination of innovative ideas (Assink, M. 2006).

This research focuses on impediments to innovation in large, centralised bureaucratic organizations. The purpose of the research is to examine why large, complex private and

public sector corporations often fail to develop and implement innovation. The study identifies barriers to innovation, builds a conceptual model of the barriers to innovation, and suggests strategies that innovators can deploy to overcome "innovation killers" in large bureaucracies.

Supported by a systematic literature review, the study maps the topography of the barriers and "innovation killers" that obstruct and constrain innovation in large, complex structures. Building on the work of existing scholarship on innovation barriers, the study seeks to supplement and extend previous studies by providing a comprehensive analysis and a conceptual framework for decoding barriers and creating strategies for overcoming them (Assink, M. 2006), (Christensen, C. M. 2000), (D'Este, P., Iammarino, S., Savona, M., & von Tunzelmann, N. 2012), (Dougherty, D. 1992) and (Christensen C. M. and Overdorf, M. 2000). As a result this study's objectives, include: 1) analysis of six organizational research areas that define the internal and external environment of large organizations; 2) a broad barrier taxonomy that identifies what underlies the drivers of inhibitors to innovation; 3) considering whether certain apparent barriers to innovation work to enable or deter innovation ; and 4) considering when in the innovation process the intrinsic nature of a large, complex organization begins to present impediments.

1.2 Method

A literature review of the barriers to innovation in large enterprises needs to be systematic, comprehensive, rigorous and methodical. While formal searches of key

words in electronic databases yielded many responses,[1] many responses had little relevance to this study. As a result, this paper started its review by studying prominent innovation authors and then broadened the review by using a "snowball" approach to pursuing citations and references. Through this process, more than 1,000 titles, reports and abstracts were reviewed, and approximately 200 normative and empirical studies were selected to form the foundation of this research. Most of the selected research is contemporary (1990-2016). Recognizing that large corporate, bureaucratic organizations are long established and much examined, the review also included preeminent sociology, business and economic texts. To be included, a study had to provide insight into one of more of the following: 1) innovation in large, complex organizations; 2) barriers to the successful implementation of the innovation process; 3) types of innovation in large organizations; and 4) catalysts and inhibitors of innovators in corporations.

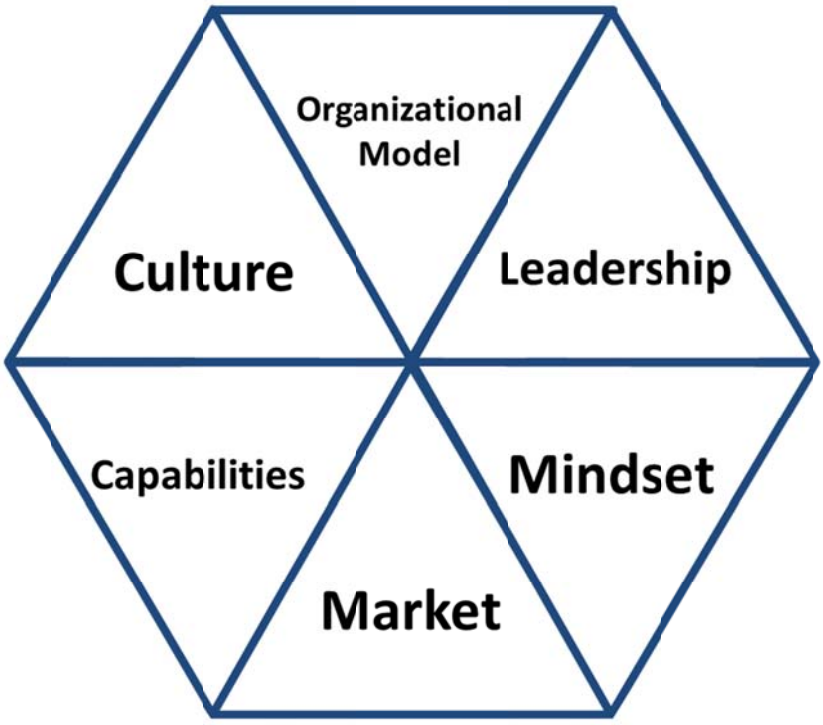
The literature identified four broad types of barrier: revealed barriers, deterring barriers, structural barriers and interpretive barriers. This categorization is used in this study to determine the influence of each type of barrier on preventing innovation in large, complex organizations. ***Revealed barriers*** refer to challenges that arise when engaging in the innovation process. Examples include technological or capital constraints uncovered during the actual innovation process (D'Este, P., Iammarino, S., Savona, M., & von Tunzelmann, N. 2012). ***Deterring barriers*** refer to "risk based" inhibitors that reduce an organization's willingness to pursue innovation (D'Este, P.,

[1] For example, Google Scholar returns more than 3.1 million results for "innovation," 2.2 million results for "innovation+ large organizations" and 1.6 million results "innovation + barriers."

Iammarino, S., Savona, M., & von Tunzelmann, N. 2012) & (Assink, M. 2006) ***Structural barriers*** refer to organizational "rigidities" that inhibit or preclude the adoption and/or realization of innovation (Assink, M. 2006). ***Interpretive barriers*** refer to established organizational "world views" and defined "learnings" that filter and discourage innovation (Dougherty, D. 2000).

Using this broad "barrier" taxonomy, the literature review analyzes each type of barrier in the context of six key organizational research areas that create the ecosystem of large complex organizations. The first area is the ***organizational model***, i.e., how the corporation or government agency is internally structured. The second area is the role of ***leadership*** in hindering or enabling innovation. For the purpose of this study, a leader is defined as someone in a position of authority and accountability within a large organization. They can have many different attributes, behaviours and traits. The third research area is the dominant ***mindset*** in the organizations. Dweck defines mindset as the mental paradigm (i.e., the notions, assumptions and methods) that govern a group. The paradigm may be "fixed" or "growth" orientated (Dweck, C. 2006). The fourth area is ***Organizational culture*** which is defined as the collective values, beliefs and principles of the organization's members (Needle, D. 2010). The fifth organizational area is ***internal innovation capabilities***. Innovation capabilities are defined as the dynamic capabilities and competencies that allow the organization to create new products or services for changing markets or citizen's needs (Teece, D. J. & Pisano, G. 1994) and (Lawson, B., & Samson, D. 2001). The sixth organizational area is the ***market or sector*** in which the large organization operates. This study considers the implications for

Figure 1: Large Complex Organizations (Research Areas)



innovation of each barrier is relation to each key organizational area. The six areas are considered interdependent. They are shown in Figure 1.

When grading the evidence for barriers or support for innovation in an organization, this study modifies the evaluation criteria used in a systematic review of the diffusion of innovation in service organizations by Greenhalgh, Robert, MacFarlane, Bate and Kyriakidou[2] (Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. 2004) as follows:

- ***Strong direct evidence:*** two or more empirical studies identify clear innovation inhibitors in a large organization.

[2] This grading criteria was based on the World Health Organization Evidence Network ((Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. 2004).

- ***Strong indirect evidence:*** two or more empirical studies that imply the existence of barriers to innovation.
- ***Moderate direct evidence:*** two or more normative studies (with examples) demonstrate clear barriers to innovation.
- ***Moderate indirect evidence:*** two or more normative studies (with examples) demonstrate the possibility of innovation barriers.
- ***No evidence or low evidence:*** there is limited or no evidence of a significant innovation inhibitors.

1.3 Definitions

Innovation has many definitions. Each reflects the author's perspective. Simple definitions include "a novel creation that produces value" (Nagji, B., & Tuff, G. 2012). Others focus on ideation as “an idea, practice, or object perceived as new” (Rogers, E. M. 2003) and some definitions focus on innovations’ value-generating potential, for example, "innovation is the effort to create purposeful focused change in an enterprise’s economic and special potential,” (Drucker, P. F. 1985). A few authors define innovation based on its adaptive capabilities, for example, "innovation is the generation, development and adaption of an idea or behaviour, new to adopting organization" (Damanpour, F. 1996). Others stress innovation’s connection to creativity and the creation and exploitation of new ideas (Kanter, R. M., 1988). All of these definitions emphasize the importance of change, value and newness when considering the nature of innovation. For the purpose of this study, innovation is defined as the successful

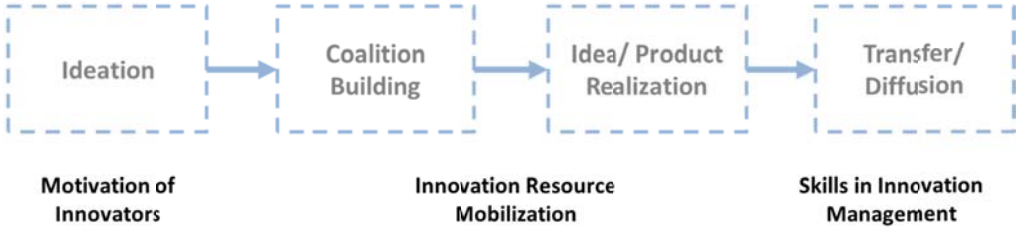
development, adoption and implementation of ideas that create value for the organization.

Similarly, the range of innovation typographies is extensive, from Doblin's ten types of innovation grouped around business models, products and services (Larry, K. Pinkel, R. Quinn, J., B. & Walters, H (2013) to typographies that focus on value creation related to products, services, operations, processes and the management practices of people in the organization (Baregheh, A., Rowley, J., & Sambrook, S. 2009). The classifications based on value creation are useful to appreciate the breadth of innovation types, their relative impacts and the inhibitions in large, complex organizations pursuing innovation. As a result, the types of innovation defined in these pages are adapted from Tidd, Pavitt and Bessant's work on managing innovation and organizational change.

At the lowest rung of the innovation ladder is ***process innovation*** which is typically incremental and aims at continuous improvement in cost or performance. The second tier is ***complex innovation*** where the barriers to entry remain high because of the difficulties in capital concentration or organizational learning capabilities. Examples include building a significant telecommunications network, mineral extraction or advanced manufacturing. The third level is ***radical innovation*** which offers a highly novel or unique service at a premium price. The last and ultimate form of innovation is ***disruptive innovation*** (Tidd, J., Pavitt, K., & Bessant, J. 2001). Disruptive innovation, first coined by Christensen, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors (Christensen, C.M., 2000).

As this work focuses on accurately analysing the barriers, or roadblocks, to innovation in bureaucracies, it is also useful to define the stages in the ***internal innovation process.*** We use Kanter's on work the structural, collective and social conditions of innovation in organizations and her four step innovation process approach. ***Step 1*** is ***idea generation*** where ideas are triggered, developed and refined by individuals or teams. ***Step 2*** is ***coalition building*** where a product or service concept has gained traction in the organization, but needs leadership "sponsors" to mobilize resources across the organization. ***Step 3*** is ***Idea realisation/ innovation production*** which refers to turning the concept into “complete” and tangible products or services that can be valued by others. This step includes the prototyping and experimentation stage. It also requires the scaling of the innovation for mass production or institutionalisation. ***Step 4*** is ***Transfer and diffusion*** where the innovation is commercialised and made ready to enter the market (or public sector space) or embedded as an ongoing organizational practice (Kanter, R. M., 2000). The innovation process is summarized in Figure 2.

Figure 2. Innovation Process



The last definition is our understanding of what constitutes a large, complex organization. Bureaucracies are defined as large, hierarchical and formal organization governed by rules that delineate roles and authorities, but are separate from ownership

of the means of production (Weber, M., 1947). In addition to this generic definition, this study makes some further assumptions about the type of large, complex corporations under examination. The definition of a "large" organization is based on the US Census Bureau's description of a large organization as an organization with more than 10,000 employees (US Census Bureau, 2013). This study also focuses on corporations and government agencies that have a dominant market position (defined as a significant or controlling market share) or exist as (legislated) monopoly/oligarchies with ten or more organizational layers between senior leadership and customer/citizen interactions. Figure 3 provides a table summarizing the key terms and definitions used in this study.

Figure 3: Summary of Key Terms and Definitions

Barrier Taxonomy	Organizational Research Areas	Types of Innovation	Innovation Process
1. Revealed barriers:	**1. Organizational model**	**1. Process innovation**	**1. Idea generation**
Innovation inhibitors that emerge during any stage of innovation process	Internal structure of the organization	Incremental improvements to an existing product or service	Ideas generated and refined by individuals and teams
2. Deferring barriers:	**2. Leadership**	**2. Complex innovation**	**2. Coalition building**
Perceived risks that frustrate the willingness to innovate	Someone with authority and accountability within the organization	Capital intensive or high organizational learning capabilities required to realize innovation	Innovation concept needs leadership sponsorship to mobilize resources
3. Structural barriers:	**3. Mindset**	**3. Radical innovation**	**3. Idea realisation/ innovation production**
Organizational structures that create rigidities and prevent innovation	Governing mental "paradigm" pervasive within the organization	Niche products or services offered at a premium price	Turning ideas into market ready products and services.
4. Interpretive barriers:	**4. Culture**	**4. Disruptive innovation**	**4. Transfer and diffusion**
Organizational "world views" that hinder innovation	Observable group norms, behaviours and values	Product or services that take root at the margins of an industry and unseat dominant market leaders	Innovation enters the market and becomes an ongoing organizational practice
	5. Innovation Capabilities		
	Dynamic capabilities that allow innovation process to take place		
	6. Market/Sector		
	The competitive environment within which the large firm organization operates		

1.4 Why does a Study of Innovation Barriers in Large, Centralized Organizations Matter?

Despite the massive attention given to start-ups (companies in their infancy) and technology driven companies (Kutcher, E. Nottebohm, O. and Sprague, K. 2014), large bureaucracies remain the dominant form of social organization in the public, not-for-profit and private sectors (Downs, A. & Rand Corporation, 1967). In 2013 US Census Bureau's business statistics data, the top 974 firms (those with 10,000 or more employees) dwarfed the scale of all enterprises of more than 500 and less than 10,000 employees, employing 33.3 million people with an annual payroll of $1.8 trillion (US Census Bureau Statistics, SUSB 2013)[3]. The US public sector is also large. In the latest census data, the US Federal Government employed 2.7 million people including government agencies and the armed forces. The annual payroll was $17 billion (US Census Bureau Statistics, Annual Survey of Public Employment & Payroll, 2014). In addition, state and municipal governments employed 67.2 million full-time and 14.3 million part-time employees with a combined payroll of $73.2 billion (US Census Bureau Statistics, 2014 Annual Survey of Public Employment & Payroll State, and Local Government Employment and Payroll Data 2014).

Joseph Schumpeter's work *Capitalism, Socialism and Democracy* was seminal in building the belief that only massive, dominant corporations and government bureaucracies had

[3] The United States Census Bureau states that there are 17,662 firms ranging in size between 500-9,999 employees. Together the employ 28.1 million people with an annual $1.5 trillion payroll. Small firms (<500 people) represent the largest group with 5.7 million firms. These small businesses employ 56.8 million people, with and annual payroll of $2.3 trillion (United States Census, SUSB Annual Data Tables by Establishment Industry, 2013).

the wealth to create dramatic social and economic change (Schumpeter, J. A. 1942). In developed democracies, the health, education and social welfare of citizens and consumers have vastly improved through mass production and the provision of public services. In the United States, the wealthiest of the developed nations, real median family income rose by 99.3% between 1949 and 1969 (Lipczynska, S. 2005). Life expectancy increased from 65 years in 1945 to 78.7 years in 2011 (Arias, E. 2011), and the standard of living for the average American family more than doubled from 1946 to 1978 (Moretti, E. 2012). The fruits of mass production and consumption were also evident. By the mid-1980s, 98% of American households had a telephone, 77% a washing machine, 45% had a freezer, and 43% had a dishwasher (Time-Life Books, 1989).

After World War II, large centralised and hierarchical structures became the template for government and corporate institutions. For example, the U.K. National Health Service is the fifth largest employer in the world with a staggering 1.7 million employees. MacDonald's amassed 1.8 million workers, and Wal-Mart amassed 2.1 million employees (The Telegraph, March 20th 2012). Each institution was driven by the vast bureaucracies of the post-war interventionist states or the large corporation. The institutions were hierarchal in structure with a cascading and progressive sub-division of functions and responsibilities. They were slow to pivot, but during the post-war consumer-industrial period, they were able to produce the goods and public services that transformed modern societies and their economies (Downs, & Rand Corporation 1967).

However, despite this record of social and economic transformation, big institutions have proven slow to change to meet the evolving environment's needs. For private sector companies, business changes include market and consumer changes, digitalization and global competition. MacKenzie, Meyer and Noble from the McKinsey consulting firm compared major US retailers in 1990 and 2012. Their detailed market analysis showed an upheaval in US retailing driven by the emergence of important demographic groups (e.g., Hispanics, baby boomers and Millennials) and the rise of online commerce[4] (MacKenzie, I. Meyer, C and Noble, S. 2013). Digitalization is unleashing powerful disruptive forces for established big companies. In another study, McKinsey Quarterly Reports described how digitalization is upending the core tenements of competition in many sectors providing "high-speed passing lanes" that dramatically reduce the barriers of entry and shrink marginal costs (Chui, M. and Manyika, J. 2015).

Similarly, public institutions have faced a changing economy: the decline in manufacturing, the rising service industry, fiscal constraints, high debt levels[5] (OCED General Government Debt, 2014), rising inequality[6] (Sommeiller, E. Price, M. and

[4] The McKinsey study showed that six of the ten largest US retailers in 1990 have since fallen from their positions and some have disappeared (Kmart and May Department Stores) as new winners, such as Amazon.com, Costco and Walgreens, emerged in their place (MacKenzie, I. Meyer, C and Noble, S. (McKinsey & Company) 2013).

[5] OCED reports (2014) the general government debt levels of all countries, as percentage of GDP. For G7 nations their debt levels are: Italy (156%), France (119%), Germany (82%), Japan (247%), United Kingdom (114%), United States (123%) and Canada (108%). The Organisation for Economic Co-operation and Development (OECD) OECD Data: General government debt

[6] The Economic Policy Institute report estimates that in the States, the top 1 percent captured 85.1 percent of total income growth between 2009 and 2013. In other words the top 1 percent of families made 25.3 times more than the bottom 99 percent (Sommeiller, E. Price, M. and Wazeter, E (2016) Economic Policy Institute Report)

Wazeter, E. 2016) and the fiscal costs of an aging society (Heller, M. P. S. 2003). These changes have created complex challenges for the delivery of sustainable public services (Osborne, S. P., Radnor, Z., Vidal, I., & Kinder, T. 2014). The US Department of Health and Human Services estimates that seniors represent 14.5% of the US population in 2014. By 2040, seniors are expected to account for 21.7% of the population (US Department of Health and Human Services, 2016). Drawing on US federal government and empirical studies, one team of researchers estimated that the cost of publicly funded social services, Medicare and Medicaid Long-term for the aging population would in increase from 6.2% (2000) to 13.2% (2050) of GDP (Wiener, J. M., & Tilly, J. 2002).

Rigidities and hierarchies have created barriers to the adoption of new ideas and approaches (Assink, M. 2006). Bureaucracies are often designed to bring about, and even enforce, stability, rules and order (Brown, J. S., & Hagel, J. 2005). In fact, many large institutions seem to be engineered to create sustainable margins or standardised social goods (Leonard-Barton, D. 1992). The tension between evolving needs, emerging ideas and the structural rigidities of large bureaucracies creates an immense challenge when advocating for innovation (Farjoun, M. 2010) especially disruptive innovation. While incremental “process change” may occur and be absorbed, rapid changes in the environment are often beyond centralised bureaucracies’ ability to handle change, resulting in massive dislocation between the emerging environment (market or citizens’ expectations) and the ability of the institution to respond (Christensen, C. M. 2000). In

extreme cases, the tension can lead to a financial or legitimacy crisis (Norris, P. 1999) that leads to an institution's collapse (Lucas, H. C., & Goh, J. M. 2009).

Currently, "start-ups" have gained much attention as the fulcrum of innovation. Small and with limited capital, they are commonly depicted as inherently vital and nimble, able to seize disruptive forces and turn those forces to their benefit (Ries, E. 2011). At the other end of the organizational scale, electronic consumer products and technology giants spawned from "start-ups" have maintained an entrepreneurial mentality. For example Google, Facebook, Microsoft, Pixar, Apple, and Tesla have all become large corporations, but continue to seek game-changing ideas and innovation (Mauzy, J. Harriman, R.A & Harriman, R. 2003) and (Schmidt, E. & Rosenberg, J. 2014).

For vast and centralised bureaucracies, the need to anticipate and respond to the changing circumstances of citizens and global markets is growing each year and often becoming acute. Global competition is becoming tougher with the ascendancy of Asian manufacturing. Since economic liberalization began in the 1970s, China has been driven by export manufacturing led growth and has been one of the world's fastest growing economies (Vaughn, B., & Morrison, W. M. 2006). Between 2000 and 2010, the size of Chinese economy doubled and consumption grew from $650 billion to almost $1.4 trillion (Towson, J. & Jonathan Woetzel, J. 2015). In 2006, the Boston Consulting Group's study of emergent nations identified 100 large companies that pose significant threats

to established firms in developed nations[7] (Aguiar, M. Bhattacharya, A. Bradtke, T. Meyer, M. Michael, D. C. & Sirkin, H. L. 2006).

The changes go further than the geo-economic shift of manufacturing to Asia. There has also been a loss in competiveness. As Pisano and Shih explain in a detailed Harvard study of technology product innovation, high-tech advanced manufacturing and production skills have been progressively lost to Asian countries. They cite the example of the Amazon Kindle 2 electronic tablet reader for which the vast majority of components are made China, Taiwan and South Korea with only the design work being done in California. When examining laptop computers, the situation was even worse: "nearly every U.S. laptop and cell phone is not only manufactured but designed in Asia" (Pisano, G. P & Willy C. Shih, W.C., 2009).

Technology has also reshaped the economy by changing the way customers and citizens buy and access services. A Boston Consulting Group team estimates that the internet economy in the G20 nations is worth $4.2 trillion. In 2016, globally there are 3 billion internet users (Dean, D., Digrande, S., Field, D., Lunmark, A., O'Day, J., Pineda, J. & Zwillenburg, P. 2012). In the United Kingdom alone, the internet economy contribution to GDP is more than education and construction combined. In the US, the internet economy exceeds the federal government contribution to GDP (Dean, D., Digrande, S., Field, D., Lunmark, A., O'Day, J., Pineda, J. & Zwillenburg, P. 2012).

[7] The Boston Consulting Group cited 15 examples of newly globalizing large companies including: Bharat Forge (India), the world's second largest steel producer; BYD Company (China), the world's largest producer of nickel-cadmium batteries; and Cemex (Mexico), the world's largest producer of cement products.

In fact, the scale of radical technological change has progress so rapidly that it has led some noted researchers to say that we are entering a "Second Machine Age" (Brynjolfsson, E., & McAfee, A. 2014) where the digital economy will disrupt even the most established industries (Downes, L. 2009). Analysts note that large and relatively new technology firms (e.g., Apple, Google and Amazon) have leapfrogged above traditional corporations in their valuation (Forbes Magazine, 2016). In 2015, the fastest rising companies in the top Fortune 500, were all technology related with Apple valued at $604 billion, Facebook at $347 billion, Alphabet (Google) at $525 billion, and Netflix at $43 billion (Fortune 500 Listing, 2016). These technology companies have transformed and shattered many industries. Amazon is example of an online bookstore that has transformed itself into the world's largest retailor (Prince, M & Slobin, S. 2015). Hirt and Wllmott writing in a McKinsey Quarterly report point out that technology has not only lowered the cost of market entry. Technology has also eroded the boundaries between sectors by accelerating the rate (and ease) of customer adoption and by reducing the cost of expanding into adjacent sectors. Hirt and Wllmott cite the examples of Google and Twitter which easily tested market boundaries with Google Wallet and Twitter's retail offering (Hirt, M., & Willmott, P. 2014). Enterprises that were non-existent a decade ago have risen from being small digital companies to disrupting entire, established industries including the hotel and hospitality business (Airbnb), the taxi services business (Uber), and the retail business (Amazon) (An, I. M. D., 2015).

Behind this technological, post-industrial revolution is the power of data. The power of data is propelling unforeseen changing services and taking over functions once

performed by humans (Brynjolfsson, E., & McAfee, A. (2014). Large companies that are able to invest and harvest the impacts of “big data” reap enormous economic benefits. Large retailers like Wal-Mart and Kohl’s use sophisticated “data mining” to analyze sales, pricing and other variables to determine product offerings and optimize supply chain decisions (McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. 2012). Brynjolfsson conducted an economic study of 179 large companies and found that companies that adopted “data-driven decision making” were 5 to 6 percent more productive and profitable than their competitors. For example, in the airline industry the failure to predict Estimated Time of Arrival (ETA) accurately was caused by a manual system dependent on pilots and ground crews. Since 2001, and the installation of the PASSUR system which monitors aviation traffic every 4.6 seconds, ETA estimates have vastly improved saving airlines and airports millions of dollars. (McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. 2012). In parallel, new forms of networked collaboration are emerging and shifting public and economic interactions (Tapscott, D. & Williams, A. D. 2008). Social networking, the internet and search engines have upended institutions’ hegemony and control of information (Kahler, M. (Ed.) 2015) and given citizens and consumers the ability to mobilize and self-organize through social media to create change (Couldry, N. 2012).

Innovation has affected not only the form of new product and technologies. Innovation has also transformed business models. A definition of business model innovation is the combination of the business model design and its innovative configuration (Massa, L., & Tucci, C. L. 2013). Examples include airline, automobile and consumer products

industries. When Qantas, Australia's the established airline, was faced with low-cost competition from Virgin Blue (Virgin Group), Qantas set up its own low-cost carrier designed from the ground up to have the lowest cost structure and most innovative passenger offerings in the aviation industry (Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. S. 2009). In India, Tata Motors, the creator of the world's most affordable family car, the Nano, reinvented car design, manufacture and distribution, including the decision to outsource more than 85% of all components (Johnson, M. W., Christensen, C. M., & Kagermann, H. 2008). The Dollar Shave Club offered cheap shaving products online direct to customers. A niche industry a decade ago, the firm grew to a $539 million valuation and was recently acquired by the established dominant market leader, Unilever, for $1 billion (Primack, D. 2016). So important has examining and reinventing a firm's business model been that in a recent Economist Intelligence Unit global survey of 4,000 senior managers, 54% favoured business model innovation over product and service improvements as the source of competitive advantage (Amit, R., & Zott, C. 2012).

Other companies, both large, established firms and entrants, are experimenting with different forms of management innovation. Defined as changes in management practices and processes designed to create long-lasting competitive advantage, such changes often deliberately produce organizational structures meant to stimulate the innovation process (Hamel, G. 2006 and 2008). Hamel conducted extensive research and cited several examples including General Electric, Whirlpool and Whole Foods. In the case of the health food chain Whole Foods, management made a deliberate choice not

to slash its costs, but to fuel growth through higher than industry margins and a unique "community based" model of collaborative and non-hierarchal store management[8] (Hamel, G. 2006). The online shoe and apparel retailer, Zappos is even more radical. Claiming to have a "boss-less" culture, it inspires customer service excellence through its non-hierarchal and low "power status" work environment (Hsieh, T. 2010). These models of non-hierarchal organization are designed to encourage internal "change agents" by motivating staff to drive innovation within the firm (Hargrave, T. J., & Van de Ven, A. H. 2006).

For large, complex companies and government agencies, the market, technological, financial, demographic and competitive trends outlined above have made the need for change more urgent. As Hamel has written, the future growth of big, established companies cannot be guaranteed by selling the same products through the same established channels (Hamel, G. 2002). As the pace of change accelerates, the very viability of many large corporations (and even government agencies) depends on their ability to anticipate future needs, respond to these trends and continuously innovate (Hamel, G. & Prahalad, C. K. 2013). As interconnected economies become more global and uncertain, markets are shifting and becoming more volatile, dynamic and complex (Christensen, C. M. 2006). The need for large firms to innovate is becoming inescapable, and now goes beyond a need for evolutionary (product) improvements toward a need for greater revolutionary (disruptive) change (Assink, M. 2006). As a Deloitte annual survey of the business confidence of 600 top American business leaders noted,

[8] In 2006, Whole Foods had 161 stores and $3.8 billion in revenue (Hamel, G. 2006).

executives recognize the need for innovation and change, but cannot realize it within their organizations (Deloitte, 2016). It has become clear that while the ability to manage disruptive or radical innovation is now deemed a necessity for long-term sustainable growth but the ability to innovate successfully remains poorly understood and managed (Leifer, R., O'Connor, G. C., & Rice, M. 2001).

Innovation has become the lifeblood of the sustained success any large organization (Christensen, C. M. 2006). As the pace of societal, technological and economic change has accelerated, large and dominant institutions must adapt and embrace new ideas. However, many bureaucracies lack the agility required to seize market and environment changes (Christensen, C. M., Kaufman, S. P. & Shih, W. C. 2008). It would, however, be a mistake to assume that creative innovators and innovation do not exist in big, slow organizations. No bureaucracy can be entirely immune to change, but if innovation occurs in such organizations, it is often conducted as a series of disparate and uncoordinated actions that take place apart from the core capabilities of the organization. As Paap and Katz have declared following their research, the challenge for great corporations is that innovation has often been treated as an aberration or something that is in conflict with functional efficiency (Paap, J. & Katz, R. 2004). The problem is complex as the challenge of innovation goes beyond offering new products and services, vital as that may be, to changing the nature of management within large organizations (Vaccaro, I. G., Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. 2012).

With such massive change affecting so many sectors, the need to embed innovation into an organization's fabric by creating dynamic innovation cultures is becoming vital (Nagji,

B. & Tuff, G. 2012). This study systematically dissects the causes of institutional inertia and resistance to innovation giving special attention to hierarchy, the scale and form of business process organizations, the procedures adopted by large organizations, and the default cultural norms and expectations that impede creativity, innovation and innovators. Figure 4 summarizes the key trends driving large, complex organizations to innovate.

Figure 4: Summary of Key Trends Driving Large, Complex Organizations to Innovate

Private Sector Companies	Government Agencies
1. Globalization	**1. Globalization and Changing Economy**
• Direct competition from large firms in emerging nations • Loss of "core capabilities" in advanced manufacturing and production • Access to foreign markets and consumers	• Decline of manufacturing and the rise of the service sector • Adapting and supporting economic transition • Citizens expectations of digital channels and services
2. Digitalization	**2. Demographics**
• Global rise of the digital economy • "High-speed" lane to disruption with low margin costs • Reduces the entries of entry and boundaries between sectors • Rise of large and high-value technology looking to branch-out into other sectors	• Aging population that will place additional strain on the public provision of social services, healthcare and infrastructure. • Smaller working age tax-base
3. Changing Consumers Patterns	**3. Rising Inequality**
• Rise of e-commerce and retail channels • New important consumer segments: Hispanics, Millennials and Baby Boomers • Social media and self-organization	• Income disparities and the pressure on public services, such as: housing, social services, healthcare and infrastructure.
4. Data Driven Competitive Advantages	**4. Fiscal Challenges and Indebtedness**
• Harvesting "big data" to reap economic value	• Pressure of government spending and the levels of national debt across developed countries
5. Business Model Innovation	
• Develop a unique business model, offering and configuration.	
6. Management Innovation	
• Creating value through new management structures and practices	

Section 2: Innovation Barriers in Large, Complex Organizations

Many large organizations encounter significant internal and external challenges attempting to realize innovation. This section uses the broad “barrier” taxonomy to review each organizational research area and ascertain how each organizational research area negatively impacts or stimulates innovation and the innovation process. The intention is to understand the degree to which each organizational research area acts as a discreet and interdependent barrier, inhibiting and stifling the ability and willingness of a large organization to engage in innovation.

2.1 Organizational Model

2.1.1 Inherent Characteristics of Bureaucracies

In large and complex organizations, no discussion of the structural obstacles that frustrate creativity and innovation can take place without examining the unique features of bureaucratic forms of organization. As bureaucracy is the dominant organizational structure of the industrial age, it is vital to comprehend its origins and rationale.

In Weber’s seminal work, *The Theory of Social and Economic Organizatio*ns (1947 ed.), he argues that bureaucracies are inherently rational and legitimate as they are built on a pedestal of laws, legal authority and traditional authority shaped by established beliefs and the binding influence of charismatic “heroic” leadership (Weber, M., 1947). As a ninetieth century writer, he was trying to create a "rational" organization that would

supersede the nepotistic governance of the pre-war aristocratic age. Making few distinctions between public and private organization, Weber continues by saying that bureaucracies embody legitimate forces that bind the organization and allow its "rational pursuit" of its stated purpose.

A central concept of the “rational” bureaucracy is the idea of a ***hierarchical pyramid***. As Weber states, "the organization of offices (bureaucracy) follows the principle of hierarchy; that is, each lower office is under the control and supervision of a higher one” (Weber, M., 1947). Technical rules and norms govern these hierarchies, with each office separated into distinct functions where appointment and promotion are the products of “rational” processes of seniority or merit (Weber, M., 1947).

In its purest form, bureaucracy is believed to achieve the "highest degree of efficiency" in the control and organization of human beings. As Weber states, "the superiority of bureaucratic administration lies in the role of technical knowledge which, through the development of modern technology and business methods in the production of goods, has become completely indispensable” (Weber, M., 1947). For Weber, ***bureaucratic control*** has only positive “social consequences." He sees the "rational" organization as one in which the ascension of technical competence, or "plutocracy," overcomes outdated class-based privileges, “levels” personal interests into group interests, establishes a clear chain of command, and ensures a desired set of behaviour based on regulations and rules (Weber, M., 1947).

2.1.2 Rules-Based Hierarchy

Formal hierarchy and bureaucracy are very common in large, complex organizations. “Networked” organizations are organizations that are organized into product- and customer-centric divisions (McDowell, T., Agarwal D., Miller, D., Okamoto, T. & Page, T. 2016). They typically have flattened corporate organizational structures. Despite growing evidence that “networked” organizations are a growing phenomenon at divisional levels, most of the 300 largest firms in the US remained hierarchies in 2006 according to Rajan and Wulf (Rajan, R. G., & Wulf, J. 2006) and 15 US Government Departments continue to remain hierarchies (Google search, 2016).

The idea of a “rational” human structure where individuals, called “human resources,” are selected, promoted and given authority according to their technical or administrative expertise has appeal, but the “gap” between rational theory and messy reality can be immense. As Chisholm writes, bureaucracies impose control over chaos and inconsistency through discipline. Bureaucratic discipline achieves control through rules and regulations designed to remove independent human agency in favour of organizational consistency and efficiency (Chisholm, T. A. 2007), but bureaucratic discipline has a price. The rigid and hierarchal bureaucratic structure prevents the cross-fertilization of ideas and the introduction of new approaches in the organization. The structure makes it difficult or even impossible for effective innovation processes to cross organizational boundaries during the ideation stage and especially at the product stage realisation when ideas are turned in market ready products (Kanter, R. M. 2000).

Excessive rules, procedures and bureaucratic process structures requiring multiple approvals inhibit innovation and cause delays (Quinn, J.B. 1985). As rules become the "cultural default," the following of procedure, however, ill-conceived that procedure may be, can become more important than making the right decisions or even the ethical decision. The "bureaucratic survival instinct" can create a situation where a blunder is examined not by analyzing whether the action was negligent or detrimental, but by analyzing whether the organization can prove it followed the rules (Chisholm, T. A. 2007).

As bureaucratic standards and regulations become entrenched and progressively outdated, the "innovation gap" between current legacy practices and emerging market or societal need can provoke a systematic aversion to exploring opportunities beyond the prescribed internal rulebook (Koch, P. & Haukes, J. 2005). The net result is that an organization becomes hidebound within a ***rules-based culture*** where excessive bureaucracy and excessive adherence to rules, procedures and practices become institutionalised. In such a situation, any deviance is proscribed and prohibited. Creativity and new ideas may be regarded as heresy against the orthodoxy, leading to an aversion to taking risks or adopting innovation (Assink, M. 2006).

2.1.3 Excessive Efficiency Focus

The concept of "scientific management" was defined in 1911 as the application of analytical techniques to the management of workflows (Taylor, F. W. 2004). Mass production owes a great debt to the idea of scientific management which helped to introduce capital-intensive production lines capable of producing standardised, low-cost

and repeatable products for stable markets. However, the implementation of scientific management it is not without its pitfalls. Management may become isolated within its current manufacturing business paradigm and elevate “excessive rationalism” (in terms of targets, financial results and efficiency) to the point where it is prized over potentially disruptive changes to the system (Quinn, J.B. 1985). When this elevation of rationalism occurs, it may impede even incremental process innovations as well as more complex, radical or disruptive product and service innovation. As Kanter points out, when departments are extremely segmented and prevented from contact, different specialities are confined in isolated functions and the result is excessive formality and the stifling of creativity (Kanter, R. M., 2000). Brown and Hagel also note that management “efficiency fixation” and fears that any change might disrupt efficient operations causing a “break in the production line” has bordered on becoming obsessive for some Chief Executive Officers (CEOs), particularly in economic downturns (Brown, J. S. & Hagel III, J. 2005).

An excessive focus on current technologies and products can also create a “tyranny of success” when the innovative advantage decays and a company’s pathological pursuit of efficiency based on the familiar leads them from being market “winners” to becoming market “losers” (Paap, J., & Katz, R. 2004). Tushman and O'Reilly’s research catalogues various examples of established, large automobile, airline and consumer products companies that lost their coveted dominant market positions (Tushman, M. L., & O'Reilly, C. A. 2002). As Paap and Katz illustrate, sustaining current success can be at the cost of paralysing investment in future innovation. They cite examples, such Xerox,

Michelin, Siemens and Philips, where past success led to a pattern of inertia, complacency and failure (Paap, J., & Katz, R. 2004). The solution is to develop an intentional "dualism" within large corporations. This dualism must enable the corporation to sustain its business model and financial success through the efficient exploitation of their current mix of products and services while being in a position also to focus on long-term capabilities and possible disruptive innovations that can enable the corporation to remain competitive in the future (Paap, J., & Katz, R. 2004).

2.2 Leadership: Enabler or Impediment to Innovation

2.2.1 Absence of Transformative, Innovative leaders

The subject of leadership is pivotal to any study of innovation and the inhibitors of innovation in large, complex organizations. Much has been written about transformational, innovator leadership (Matzler, K., Schwarz, E., Deutinger, N., & Harms, R. 2008), (Jung, D. I., Chow, C., & Wu, A. 2003) and (Pieterse, A. N., Van Knippenberg, D., Schippers, M., & Stam, D. 2010). The CEO innovator is a popular archetype: a charismatic, future-oriented leader who bravely sees the world ahead and drives toward it (Isaacson, W. 2011). Part messiah, icon and saviour, the CEO innovator is depicted as a slayer of bureaucracy and credited with the great "turnarounds" that pivot dysfunctional companies back to relevance and profitability.

In their meta-analysis of the impact of leadership on innovation, Crossan and Apaydin found that leaders and their associated behaviours have a prominent role creating the organizational conditions within which the innovation process is supported and

implemented (Crossan, M. M., & Apaydin, M. 2010). Others have pointed out that as "internal change agents," leaders have significant impact on reducing, deterring and revealing barriers to innovation by reducing uncertainty and complexity (Birkinshaw, J., Hamel, G., & Mol, M. J. 2008) & (Birkinshaw, J., Bouquet, C., & Barsoux, J. L. 2012).

Within the literature, the transformational leader is described as having four components: ***charismatic role modelling***; ***individualised consideration***; ***inspirational motivation***; and ***high intellectual stimulation*** (Bass, B. M. 1990). In essence, this type of leader puts rocket fuel into the culture of innovation in a large organization. The leader's actions, behaviours and decisions stoke the "creativity enhancing forces" propelling innovation and autonomy by challenging the root of the organization's vision (Bass, B. M. & Avolio, B.J. 1995). Enticing though these innovator-hero figures are in contemporary society, they remain an anomaly in most institutions. As Hamel writes, even in profit-driven corporations, many executives, "choke on the word 'radical'… They equate 'radical' with high-risk, ill-conceived and highly speculative projects" (Hamel, G. 2007). Some writers have gone as far as to suggest that large enterprises develop a reflective intolerance of intellectual diversity, and brand spirited entrepreneurial employee as troublemakers, embarrassments and even "fanatics" (Quinn, J., B. 1985).

Other researchers have noted elaborate administrative systems which, coupled with the risk adverse attitudes common in bureaucratic organizations, burden innovators with "mindless procedures that dampen flexibility and responsiveness" (Sharma, R. 2010). A typical bureaucratic response to any "change agents," even when the bureaucrats have been given a mandate to innovate, is to conduct deliberately limited and slow

cooperation with the intention "waiting them out." Such bureaucratic tactics, bolstered by the strength of habit, form one of the most dominant factors in generating resistance to change (Sheth, J. N., & Stellner, W. H. 1979). The problem may be magnified by the fact that these "innovators" often cannot persuade their incumbent leaders to embrace innovation or sustain it through the innovation process. In an empirical study of 15 largest[9] and mature firms (in business for an average 96 years), innovators were thwarted in their ability to realize new products because they were thwarted when trying to connect with the processes, strategy and organizational resources required to innovate successfully (Dougherty, D., & Hardy, C. 1996).

2.2.2 Entrepreneurship, Change Receptivity and Resistance

Another aspect of innovative leaders is their predominance as entrepreneurs. For management studies guru Peter Drucker, entrepreneurship and innovation are inextricability linked. Successful entrepreneurs, whatever their motivations, Drucker writes, "try to create value and to make a contribution… (and to this end drive)…successful innovation to exploit change" (Drucker, P. F. 1985, 2014). Change is a given. A fundamental behaviour trait for a successful entrepreneur is being an advocate of change and innovation (Drucker, P. 2014).

This proactive "change orientation" seems to suggest that entrepreneurship is an essential catalyst for innovation (Schumpeter, J. A. 1942). If entrepreneurs see change as normal and healthy, they are also comfortable with its risk, uncertainties and market

[9] The 15 firms had between them 54,000 employees and $9.4 billion in annual revenues (Dougherty, D., & Hardy, C. 1996).

volatility (McGrath, R. G., & MacMillan, I. C. 2000) and (Bessant, J., & Tidd, J. 2007). The role of the entrepreneur can be presented on a continuum ranging from a creative imitator to an originator of new products and services (McFadzean, E., O'Loughlin, A., & Shaw, E. 2005). Building on this work, other researchers have explored the concept of the corporate entrepreneur (Bessant, J. R. 2003) and (McFadzean, E., O'Loughlin, A., & Shaw, E. 2005). The three key attributes of the corporate entrepreneur are: 1) driven to exploit market opportunities (irrespective of internal inhibitors); 2) has a vision to reshape technology and the market; and 3) turns ideas into action through internal resource mobilization and generation of support for innovative ideas (McFadzean, E., O'Loughlin, A., & Shaw, E. 2005). Others in the behavioural sciences have defined additional leadership competencies as predictors of early innovation adoption. Oleg and Goldenberg summarize this field and list four leadership traits that make up an innovator's psychological profile: 1) ***novelty seeking***; 2) ***tolerance for ambiguity***; 3) ***openness to ideas;*** and ***cognitive innovativeness*** (the willingness to explore and pursue alternatives) (Oreg, S. & Goldenberg, J. 2015).

Leaders who enable innovation must be comfortable with ambiguity, uncertainty and experimentation: the ideation and coalition building stages of innovation. Martin points out that innovative thinkers have "the capacity to hold two diametrically opposing ideas in their heads." He explains, "Without panicking or simply settling for one alternative or the other, they're able to produce a synthesis that is superior to either opposing idea." (Martin, R. 2007). Throughout this creative process, leaders of innovation must be willing to handles their fundamental beliefs being challenged (Kanter, R. M., 2000).

Entrenched bureaucracies rarely hire or promote such lateral thinkers. The focus is on "guardians of order" who maintain the status quo through control, power from a distance and a rule-based hierarchy. Highly centralised bureaucracies solidify around a series fixed beliefs and "orthodoxies" where confrontations are frowned upon and where questioning firmly held briefs is perceived as disloyal (Kanter, R. M., 1988).

Researchers at McKinsey & Company have written extensively on innovation in large companies and the challenges "entrepreneur-leaders" face attempting to drive innovation in their organizations. In select interviews with CEOs from Fortune 500 companies, McKinsey & Company concluded innovation can happen if it is a strategic priority supported (and driven) by the leadership and an organizational footing (Chui, M. 2015). One of the interviewees was Cook, cofounder of Intuit, a large software company. He said that he made the company more innovative by changing the way decisions were made, "from decision by bureaucracy, decision by PowerPoint, persuasion, position, power" to "decision by experiment." He described his role as leader as the person who had to overcome the "phalanx of barriers and hurdles" that impede innovation and innovators and to create a "culture of experimentation" (Chui, M. 2015).

The literature on the adoption and diffusion of innovation is very broad and includes a focus on customer aspects (Kim, S. 2009), the demographics of customer segments (Laukkanen, T., Sinkkonen, S., Kivijarvi, M. and Laukkanen, P. 2007), and the market conditions for adoption (MacVaugh, J., & Schiavone, F. 2010). Rogers, whose ground breaking work established the adoption curve (Rogers, E.M. 1995), outlines three factors

for the adoption of innovation in organizations: 1) markets and consumers open to innovation; 2) internal organizational factors including the level of *centralization* (concentrated of power and control), *formalization* (following the rules and procedures), *size* (scale of the organization), *interconnectedness* (strength of networks), and slack in the organization (resources availability); and 3) individual (leadership) characteristics, i.e., an openness to change (Rogers, E.M. 1995). Rogers describes the path from resistance to innovation receptivity (or rejection) as "the process through which an individual (or another decision-making unit) passes from gaining initial knowledge of an innovation, to forming an attitude toward the innovation, to making a decision to adopt or reject it." (Rogers, E. M., 2003).

Leaders resistant to innovation are more than the opposite of “innovative.” An innovation resistant leadership profile tends to display high levels of *cognitive rigidity* and *dogmatism*. Oreg and Goldenberg explain that innovation resistant leadership “is the outcome of an interplay of personality traits and other, context-specific, factors and mechanisms” (Oreg, S. & Goldenberg, J. 2015). They crafted a convincing definition of ***resistance*** as a “negative attitude, comprising affective, cognitive and intentional components”. They are not talking about consumer resistance to a given product or service. They are talking about internal, organizational resistance to innovation. For Oreg and Goldenberg, individuals are driven to resist innovation by anxiety generated through a rational assessment that the change will have an adverse impact on themselves and the organization. Resistance, in this view, comes down to a "rational" assessment of the perceived benefit versus the perceived threat with the perceived

threat governing the response. It is "resistance" rooted as a ***rational manifestation*** of perceived threats to ***power, status or job security*** (Oreg, S. & Goldenberg, J, 2015).

2.2.3. Discovery versus Delivery Focused Leadership

Dyer, Gregersen and Christensen add an additional dimension to the role of innovative leaders in driving disruption innovation and innovation process (Dyer, J., Gregersen, H., & Christensen, C. M. 2013). They interview nearly a hundred inventors of "revolutionary" products, plus the founders and CEOs of game changing companies including eBay's Pierre Omidyar, Amazon's Jeff Bezos, and Research in Motion's Mike Lazaridis. The team's research found two distinct groups amongst senior executives: delivery focused and discovery focused. Most (more than 85%) are "delivery focused" and have superior analyzing, planning and execution skills. From their study these skills are reinforced by the hiring and promotion practices (Dyer, J., Gregersen, H., & Christensen, C. M. 2013).

Undoubtedly, delivery skills are pivotal for success for leaders working within their current business model paradigm. Indeed, once innovation has taken a foothold, the "downstream" delivery activities such as commercialization, manufacturing and distribution can be critical to a large organization's success (Dyer, J., Gregersen, H., & Christensen, C. M. 2013). However, the overdependence on delivery skills can act as potential barriers in the ideation and coalition building stages, particularly for disruptive innovations.

Dyer, Gregersen and Christensen note that innovative, discovery focused leaders have strong ***associational***, ***questioning***, ***observing***, ***networking*** and ***experimenting*** behaviours (Dyer, J., Gregersen, H., & Christensen, C. M. 2013). Innovative leaders scored 88% on discovery skills and only 58% on delivery execution skills. While non-founder CEOs were a mirror the opposite with 80% in delivery skills and 62% in discovery skills. Although, the study does not discount the need for delivery skills, within an executive team, the stark contrast between the two leadership competencies typologies suggest that embracing innovation, especially disruptive innovation, requires a particular leader make-up.

2. 3 Mindset: How Bureaucracies Think, Filter and Select Ideas

2.3.1 Group-Think and Organizational Conformity

In Janis' ground-breaking study, he observed the psychological willingness of individuals to subsume their moral agency for the decision-making cohesion of the group (Janis, I. L. 1971). “Group-think” is defined by Janis as “mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members’ strivings for unanimity override their motivation to realistically appraise alternative courses of action” (Janis, I. L. 1971). Contemporary definitions include “a pattern of thought characterized by self-deception, forced manufacture of consent, and conformity to group values and ethics” (Bénabou, R. 2012). Janis’ pioneering studies have generated much discussion, criticism but have validated through numerous supporting studies on

flawed decision-making processes in large organizations.[10] Although "group-think" does not guarantee failure in decision making, its presence increases the likelihood of low-quality and even unethical decision-making in an organization (Riordan, D., & Riordan, M. 2013). Whether through willful blindness to mounting signals of pending business disasters, overconfidence or denial that casts asides or selectively interprets evidence, the net result is often the same: dissenters are discouraged and shunned (Bénabou, R. 2012). Group-think is linked to a poor collective ethical bond between decision-makers in teams, bureaucracies and markets. It is now believed to be a significant part of many major decisions including President Kennedy's decision to launch the Bay of Pigs invasion and the escalation of the War in Vietnam (Janis, I. L. 1972), the Columbia Space Shuttle disaster (Ferraris, C., & Carveth, R. 2003), the collapse of US energy giants Enron and World Com (Eichenwald, K. 2005), and the US decision to invade Iraq in 2003 (Entman, R. M., Livingston, S., & Kim, J. 2009).

Empirical and case studies suggest that the key attributes of group-think are: 1) the importance of "strong" leadership as a role model for ethical or unethical choices (Park, W. W. 1990); 2) a group's sense of invulnerability when there is excessive optimism about taking extraordinary risks; 3) group pressure not to voice dissenting opinions; 4) negative stereo-typing of views that underrate contradictory signals; and 5) a guarded approach to the group discussing issues where differing points of view might destroy consensus (Sims, R. 1992) and (Bénabou, R. 2012).

[10] Riordan and Riordan's review of academic databases as part of their literature review generated 971 articles between 2010 and 2013 (Riordan, D., & Riordan, M. (2013).

The impact of “group-think” on innovation in large, complex organizations can be most profound on inhibiting creativity and the initial stages of the innovation process, i.e., the ideation and coalition building stages. Extensive empirical studies have explored the links between applied creativity, team interaction and innovation (Basadur, M. S. 1995), (Basadur, M. S., & Head, M. 2001) and (Basadur, M. S., Pringle, P. F., Speranzini, G. W., & Bacot, M. 2000). Basadur and Head showed that teams with “intellectual diversity” (heterogeneous viewpoints during the creativity and ideation stage) were significantly more innovative than teams with more conformist viewpoints. In addition, individuals within creative environments can learn attitudes, behaviours and skills that increase their creative performance (Basadur, M. S., & Head, M. 2001). Other studies have shown that teams with a high-degree of participation in decision-making and that allow minority dissent display high levels of creativity and divergence that manifest as innovation (De Dreu, C. K., & West, M. A. 2001). As Leonard and Swap have written, creativity depends on an entirely different employee characteristics. Innovation often requires having a select group of different, even flamboyant, individuals who provoke the questioning of core assumptions (Leonard, D. A., & Swap, W. C. 1999). However, creativity is an individual process, creativity is magnified when a group of people with complementary skills work together (Kanter, R. M. 2000). The idea of intellectual diversity leading to *creative abrasion* is a key concept. It does not imply conflict, but refers to ideas rubbing together to generate more dynamic solutions in a situation of creative tension (Leonard, D. A., & Swap, W. C. 1999).

The challenge of groupthink is amplified still further within large, bureaucratic organizations because of social conformity. As mentioned, bureaucracy means *"office* based power" with control exercised through a hierarchical division of delegated roles, powers and accountabilities. However, conformity is not merely a physical exercise. It is also a sociological phenomenon. The sociology pioneer Durkheim noted that individuals have a high capacity to internalise the values of their society and hierarchal microcosms. In bureaucracies, submission to internal values and the hierarchy occurs not only because individuals are compelled to do so, but also because they willingly assume the group's behaviours and norms (Durkheim, E. ed. 2014). This process of "values assimilation" happens at three intertwined but scaled levels: ***attitudinal conformity*** where the individual absorbs the organization's norms and values; ***behavioural conformity*** where actions and decisions follow a prescribed template; and ***doctrinal conformity*** where the organization dictates a set of infallible beliefs, strict dress codes and corporate rituals (Coser, R. L. 1961).

Although, these sources of conformity may appear extreme, they are surprisingly common in large, hierarchical public and private bureaucracies. Militaries (Hall, L. K. 2011), police services (Skolnick, J. H. 2008) and many uniformed professionals exhibit these attributes. In the private sector, conformity has been a contributing factor in large firms' decline and even collapse. Examples include the information and technology giant IBM's performance decline in the 1990s (Mills, D. Q. 1996), and Swiss Air's misplaced belief in itself own financial solvency (Hermann, A., & Rammal, H. G. 2010). Even large modern digital and innovative consumer electronics companies are not immune to the

detrimental impact of bureaucracy and conformity on internal innovation. Despite Apple Inc.'s string of ground-breaking products, its organizational size and hierarchy have lead some writers to suggest that a conformist culture has been growing (Lashinsky, A. 2012). Similarly, a New York Times investigative expose into online behemoth Amazon found a severe workplace culture with strong pressures to conform to high work demands and company values and expectations (Kantor, J. & Streitfeld, D. 2015).

2.3.2 Bureaucracies as Regulator of Status, Knowledge and Communications

As Hamel writes, "in big organizations, the only way to change how managers work is to reinvent the processes that govern their work" (Hamel, G. 2006). The gears that turn management's work are the mechanics of corporation functions: strategic planning, hiring and promotion, resource allocation and communications (Hamel, G. 2006). In many professions, the rewards of status, power and recognition correlate with recognized achievement within their speciality. Obtaining a senior corporate leadership position depends on, in part, being recognized by professional peers as an "expert." The challenge is that innovation and its precursor, creativity, often spring from the margins of specialities and disciplines, not from their core (Kanter, R. M. 2000).

The "core" of many specialities is "orthodoxy" codified through "group" rules, incentives structures and even accreditation. Orthodoxy is a deeply held belief, a traditional practice or conventional way of thinking commonly assumed true or correct (Gibson, R. 2015). Furthermore, ideation often takes as its source ideas from other disciplines. Great ideas, formed from creative abrasion, come through a continuous "messy" process of combining many ideas from within or beyond an organization (Skilton, P. F., &

Dooley, K. J. 2010). However, as individuals become rooted in their fixed expertise, a process reinforced by hierarchy, they become isolated from different opportunities, perspectives and approaches (Van de Ven, A. H. 1986).

This tendency to distrust ideas and information generated beyond the group is intensified in large, complex institutions. In rigid bureaucratic structures, ideas from other fields and sectors are treated with derision, suspicion and even fear. Those that advocate for greater “diversity of thought” are dismissed. In Dougherty’s study of large manufacturing companies, he shows the dominance of the current product, and accompanying stability mindset, can be overbearing to the point where it eliminates innovators and the promotion of future opportunities (Dougherty, D. 1992).

Another measurable consequence of a bureaucratic structure impeding innovation is the degree of openness in communications. As Roger and Shoemaker note, innovation flourishes where an organization has a high level of "communication integration" and *open communications* help innovators to find potential collaborators and coalitions (Rogers, E. M., & Shoemaker, F. F. 1971). In receptive innovation organizations, information flows unencumbered. Questions, improvements and critics add to the development of more vibrant ideas. One telling metric is the use of face-to-face communication over written forms. Large, low innovation organizations have been found to rely on impersonal written communications rather than personal interactions (Kanter, R. M., 2000).

2.3.3 Short-Term Focus “Results today!”

Another mindset challenge that acts an “innovation killer” in a large complex organization comes from ***short-sighted focus on financial performance*** (Christensen, C. M., Kaufman, S. P., & Shih, W. C. 2008). Standard financial evaluation tools, such as discounted cash flow, earning per share and net present value, limit investment in innovation because future revenue is hard to predict. The resultant short-term "trap" sabotages innovation because "analytical methods make innovation investments extremely difficult to justify" (Quinn, J.B. 1985) and (Christensen, C. M., Kaufman, S. P., & Shih, W. C. 2008). As Quin writes, publicly traded companies resist investing in high-risk innovation because they "more likely favour quick marketing fixes, cost cutting, and acquisition strategies over a process, product, or quality innovations that would yield much more in the long run” (Quinn, J.B. 1985). Christensen et al.’s solution is to go beyond simple "stage gate" innovation by breaking the sequence of product development into measurable components that reduce the risk threshold and financial exposure, and also by adding discovery-driven planning (Christensen, C. M., Kaufman, S. P., & Shih, W. C. 2008).

2.4 Culture: How We Act on New Ideas

Organizational culture is a vital part of engendering innovation (Ahmed, P. 1998), (Ekvall, G. 1996), (McLean, L. (2005), (Martins, E. and Terblanche, F. (2003) and (Naranjo-Valencia, J. C., Jiménez-Jiménez, D., & Sanz-Valle, R. 2011). An empirical study of 342 senior managers of UK large companies found that competitive and innovative forms of organizational culture have a direct, positive and strong connection to the firms’

performance (Ogbonna, E., & Harris, L. C. 2000). The literature gives different definitions of organizational culture including: “the way we do things around here” (Lundy, O. & Cowling, A. 1996, pp 13), the “social glue” that binds an organization together with common behaviours, norms and bounded actions (Hellriegel, D., Slocum J.W. & Woodman, R.W. 1998), and the organization's group character (Martins, E. and Terblanche, F. 2003). Each study provides a unique perspective on the impact of organizational culture on creativity, innovation and the innovation process. Ahmed declares companies must go beyond “lip service” and forge a deliberate “innovation culture” (Ahmed, P. 1998). Ekvall defines ten attributes to support a creative and innovative climate (Ekvall, G. 1996). Martins and Terblanche emphasize the importance of strategy, structure, support mechanisms and open communications (Martins, E. and Terblanche, F. 2003), and Naranjo-Valencia, Jiménez-Jiménez and Sanz-Valle explores different types of organization and their impact on the degree of innovation (Naranjo-Valencia, J. C., Jiménez-Jiménez, D., & Sanz-Valle, R. 2011).

2.4.1 Organizational Culture and Risk/Innovation Tolerance

A key concept in developing a culture, particularly in large, complex organizations, is the process of "socialisation." Individuals in the organization learn the organization’s acceptable behaviours, level of risk-tolerance, codification of values, structure of assumptions and beliefs, and policies and management practices (Martins, E. and Terblanche, F. 2003). The phenomenon of showing extreme intolerance of risk-takers, particularly in uncertain times, and labelling risk-takers distractions, troublemakers and

non-team players stifles creativity and encourages employees to avoid risks and resort to business routine (Quinn, J.B. 1985).

It is important to distinguish between the “visible” and “invisible” aspects of organizational culture as there may be a distinct disconnect between the declared “visible” culture and the “invisible” cultures of actual group behaviour and norms (Kotter, J. P. 2008). Leadership and its attributes also play a critical role (Bass, B. M., & Avolio, B. J. (1993). As Assink writes, “power structures of an organization determines which mental models are adopted" (Assink, M. 2006). Berson, Oreg and Dvir conducted an empirical study that collected data from 26 CEOs, 71 Senior Vice Presidents and 185 other organizational leaders. The researchers found a positive correlation between CEOs’ values and a positive work climate that stimulated innovation and company performance (Berson, Y., Oreg, S., & Dvir, T. 2008). The result is an organizational ecosystem in which "organizational culture affects the extent to which creative solutions are encouraged, supported and implemented" (Martins, E. C. and Terblanche, F. 2003).

In Martins and Terblanche’s opinion, the enabling of innovation through culture is a subtle mix of innovation embedded in strategy, flat work structures, employee autonomy, teams that promote innovation, and supporting behavioural systems that encourage risk taking and do not penalise failure (Martins, E. C. and Terblanche, F. 2003). Their insights are supported by Cameron and Quinn who developed a Competing Values Framework (CFV) which links organizational culture to the degree of innovation (Cameron, K.S and Quinn, R.E. 1999). This two dimensional model is based on two axes: degree of internal/external focus of the organization’s culture, and degree of

flexibility/control in the organization's culture. The two axes define four organizational culture quadrants: adhocracy, clan, market, and hierarchy. An adhocracy culture is externally and market focused and flexible. A clan culture is insular, but flexible. A market based culture is external and controlled. A hierarchical culture is inwards orientated and heavily controlled. This CFV has been used and validated in several empirical studies including 322 product firms in Hong Kong (Lau, C.M. and Ngo, H.Y. 2004), 22 religious based universities (Obenchain, A. M., Johnson, W. C., & Dion, P. A. 2004), and 500 US hospitals (Stock, G., McFadden, K. and Gowen, C. 2007). For our purposes, Naranjo-Valencia, Jiménez-Jiménez, and Sanz-Valle's study of 787 medium and large Spanish companies is the most useful. They found that adhocracy cultures were the most orientated to innovation, while internally focused hierarchical cultures adapted to imitate innovations from competitors (Naranjo-Valencia, J. C., Jiménez-Jiménez, D., & Sanz-Valle, R. 2011).

2.4.2 High Risks and Uncertainty in Disruptive Innovation

The sheer size of bureaucratic structures can impede and discourage innovation. As Drucker has written, the opportunities that lead to innovations are bound up in a knot of incongruities and discontinuities that do not fit the existing pattern (Drucker, P. F. 1985). However, as previously noted, bureaucracies' strength is their ability to provide stability and weather storms. While it is true that the bigger the problem the greater the opportunity for innovation (Hamel, G. 2006), bureaucracies invest in processes designed to mitigate risk and deaden the impact of market and environmental change. Inappropriate incentives further entrench risk aversion, as control systems, accounting

practices and rewards are designed to ***"minimise surprises"*** (Quinn, J.B. 1985). An example is brand management and the desire for stable profits in many consumer goods companies. This desire makes an incremental approach to new products the dominant business model. Radical shifts are discouraged as they might disrupt stable profits (Singer, R. 2000).

Another component of a large, complex organization's culture is the fact that culture is an incremental process built over time. As Singer writes, "cultures of most large companies act as powerful stabilizing influences" (Singer, R. 2000). As a result, large organizations' cultures are not built overnight, but forged through slow, accumulative growth and inhibiting behaviours. For example, in police services a focus on stability, certain practices, process and behaviours are justified (Paoline, E. A. 2003). The drawback is that centralised bureaucracies may change only if upset or provoked by an external crisis. The tension point centres around large bureaucratic organizations' prizing of "stability" is an organizing principle, whereas the "innovation process is uncertain" (Kanter, R. M., 1988). Some go as far as to say that innovation is essentially "controlled chaos," a complete anathema to a hierarchy fixated on order and stability (Quinn, J.B. 1985).

During the ideation stage, risk aversion in large organizations is a strong inhibitor of innovation. At the ideation stage, the source, scale and occurrence of innovation opportunities are inherently unpredictable (Quinn, J.B. 1985) and highly uncertain during radical and disruptive innovation processes (Tsoukas, H., & Chia, R. (2002). Christensen notes that with so many unknowns in the equation, large incumbent

companies are unlikely to invest and “bet all” on an unproven innovation (Christensen, C. M. 2003). The culture of certainty and “tangible” steady growth trumps the “uncertainty” of innovation. The result is a stifling status quo where the company prefers familiar stability that fulfils current market requirements in a, “proven” form over new untested opportunities (Assink, M. 2006).

2.4.3 Cultural Requirements to Enable Creativity and Innovation

Harvard researchers Amabile and Fisher and other researchers have written extensively on the *intrinsic motivations* of creativity and how to stimulate creativity in organizations (Amabile, T. M., & Fisher, C. M. 2000, 2009a, 2009b, 2014), (Amabile, T. M. & Kramer S. J 2007, 2012) and (Amabile, T. M., Goldfarb, P. & Brackfield S. C 1990). Amabile and Fisher define creativity within an organization “as the production of novel, appropriate ideas by individuals or in small groups” (Amabile, T. M., & Fisher, C. M., 2009a). They point out that "people will be most creative when they feel motivated primarily by their interests, enjoyment, satisfaction and challenge of the work itself – and not by external pressures” (Amabile, T. M., & Fisher, C. M. 2000). Empirical studies have supported Amabile and Fisher’s contention that intrinsic motivation is linked to creativity, and confirmed the finding that employees who are intrinsically motivated display greater creative performance (Tierney, T., Farmer, S. M. & Graen, G. B. 1999) and (Jaussi, K. S., & Dionne, S. D. 2003). Amabile, Goldfarb and Brackfield’s studies show that certain extrinsic factors inhibit intrinsic motivation and creativity (Amabile, T. M., Goldfarb, P. & Brackfield S. C 1990). These extrinsic factors are "killers of intrinsic motivation", and include excessive

evaluation, surveillance, financial based rewards, constrained work choices and peer competition (Amabile, T. M., & Fisher, C. M. 2009).

In large bureaucracies, creativity enablers may be undermined by senior leaders' actions. Decisions, attitudes and behavioural norms can crush motivation by eroding the individual's inner work life (Amabile, T. M. & Kramer S. J. 2007, 2012). From her research on scientists working in 50 different organizational settings, Amabile found that creative scientists displayed universal creativity traits such as: ***a strong problem solver***, ***persistence***, ***curiosity***, ***independence*** and ***intellectual honesty*** (Amabile, T. M. 1988). The remedy to barriers to creativity, so important in the ideation stage of innovation, is the fostering of intrinsic motivation in large organizations (Amabile, T. M. & Kramer S. J. 2007). In addition, enabling innovation required robust cross-department collaboration (Amabile, T. M. & Kramer S. J. 2012).

Amabile and Fisher cite five contextual factors that can reverse organizational toxins and boost intrinsic motivation and creativity:

1. ***challenging work*** that is both significant and enriched;
2. ***autonomy,*** meaning a sense of personal control over an individual's job;
3. ***peer support*** from working in a diverse team that has a shared team commitment and supports new ideas and constructive feedback;
4. ***leadership encouragement*** that balances goal setting, open communication and support; and

5. ***organizational encouragement*** from the highest management echelons that encourages and recognizes creative work (Amabile, T. M., & Fisher, C. M. 2009).

Swedish creativity researcher Ekvall has developed a similar creativity taxonomy with the addition of ***openness to debate*** and ***positive conflict resolution*** (Ekvall, G. 1996). His framework has been used and validated in studies that include 770 nurses and medical staff in a large hospital (Sellgren, S. F., Ekvall, G., & Tomson, G. (2008), and 2,000 employees in large US and Swedish public and private organizations (Arvonen, J., & Ekvall, G. 1999).

2.5 Innovation Capabilities

2.5.1 Dependency on Core Competencies

Dependency on past success and core competencies represents a further expression of the "rational" view of organizations and their failure to embrace innovation. Core competencies pertain to distinctive capabilities that differentiate large organizations over the competition (Leonard-Barton, D. 1992) and (Peteraf, M. A. 1993). Core competencies can be defined as the collective business learning of an organization, especially on how to coordinate diverse products and services and how to integrate multiple streams of technologies (Prahalad C. K. & Hamel, G. 2003). Leonard-Barton's influence model has four dimensions of core capabilities that form a Venn diagram of interconnected factors: 1) employee knowledge and skills; 2) values and norms, the organization's knowledge; 3) management practices that steer the organization's

knowledge to the creation of value; and 4) technology which supports the organization's knowledge and enables innovation (Leonard-Barton, D. 1992).

Prahalad and Hamel use the example of Sony. They analyze how Sony's internal strength in electronic and miniaturization enabled the company to deliver a series of successful consumer products (Prahalad & Hamel, G. 2003). Another is example is 3M, a Fortune 50 company with more than 60,000 products in multiple markets. 3M has successful maintained a ratio of one product per employee, making it a highly innovative and diversified company (Figueroa, E., & Conceicao, P. 2000). It has achieved flexibility and diversity in Research and Development (R&D) and effective coordinates organizational capabilities such as research, product development, and experimentation (Hafeez, K., Zhang, Y., & Malak, N. 2002) into a distinct and dominant competitive advantage (Prahalad C. K. & Hamel, G. 2003).

The danger is that the "core competencies" that led to past successes can become over time *institutionalised* leading to "incumbent inertia" as the environment and market changes (Lieberman& Montgomery, 1988). Core competencies are inherently introspective, particularly for technology firms (Christensen, J. F. 2006). Innovation teams with outside information are critical to technology innovation, especially in large firms (Cohen, W. M., & Levinthal, D. A. 1990). If a corporation's core capabilities become liabilities, or "*core rigidities*" preventing the organization from being able to adopt new ideas and products, the organization's ability to respond to changing market conditions becomes limited(Leonard-Barton, 1992). A large organization's drift toward rigidities can cause: 1) limited financial resources that force the company to focus on a singular

discipline; 2) outdated technical systems; 3) management practices and behaviours driven by a narrow set of incentives; and 4) a competency trap where leaders convince themselves of the superiority of their current products and services over those of the disruptive entrant (Lucas, H. C. & Goh, J. M. 2009). An example of core competencies turned into liabilities is Motorola. An early provider of cellular phone technology, the company was 23rd in the Fortune 500 listing in 1994 with revenues of $22 billion. However, the advent of new competition and cell phone technologies left the company behind as it was unable leave its core business (Fishman, T.C. (2014). Rigidities appear when "knowledge" becomes set in stone, inhibits change, and halts an organization's willingness to embrace innovation (Leonard-Barton, D. 1992).

As Baker and Sinkula have demonstrated, these rigidities drives large organizations to fixate on the "single loop" of adaptive learning, meaning that operational improvements are modified to fit in with the current operational paradigm (Baker, W .E. and Sinkula, J. M. 1999). Baker and Sinkula conducted an empirical study of more than 400 executives from large firms (more than $500 million in revenue) across multiple sectors. Their results showed that incremental "process innovation" is tolerated, but mostly within the narrow rubric of the current operating model and its aligned market position. In contrast, large organizations that have a greater synergy, a strong market orientation that anticipates current and future demands, and a strong learning orientation have a much higher likelihood of sustainable competitive advantage (Baker, W .E. and Sinkula, J. M. 1999).

A recent empirical study looked at innovation “enablers” and how they foster individual and organizational learning and facilitate the sharing of employee knowledge within or across teams or organizations. The study selected 50 of the top firms in Taiwan and collected data from 172 participants. The results showed that employees’ willingness to contribute ideas is significantly related to the innovation capability of the company (Lin, H. F. 2007). An additional longitudinal and empirical study found institutional knowledge overwhelmingly supported incremental innovation over more radical forms of change (Gold, A. H., & Arvind Malhotra, A. H. S. 2001). Dynamic organizations are able to regenerate themselves because they have a "double loop" learning capacity that can change its "view of the world" and unlearn obsolete perspectives and methods, replacing them with more contemporary views that augment competitive advantage (Baker, W .E. and Sinkula, J. M. 1999). Slater and Narver conducted an empirical study that found that having a strong learning orientation undoubtedly stimulates innovation, but a strong learning orientation that is not moored to market demands may misjudge customer and client needs and lead to costly experiments (Slater, S. F., & Narver, J. C. 1995). An example of a dynamic organization that regenerated itself with a strong market orientation is McDonalds. As the Boston Consulting Group has pointed out, the global fast-food chain has progressively augmented its product offerings to reflect emerging consumer demand for “healthier” and more “natural” food selections, and the company has become more flexible by adapting its menu to accommodate regional preferences (Haanæs, K. and Goulet, K. 2013)

2.5.2 Learning Trap

For Ahuja and Lampert, radical or "breakthrough" innovations lie at the core of entrepreneurial activity and wealth creation. Disruption technologies not only assist market entrants, but also originate from them (Ahuja, G. and Lampert, C. M. 2001). Supported by an empirical and longitudinal study of 120 large companies, the researchers find that the constraints that prevent large firms from making breakthrough inventions stem from management and organizational practices (Ahuja, G. and Lampert, C. M. 2001). Large corporations that have become wedded to existing products and services have to "unlearn" the established routines that have given them past success. As Soren and Stuart describe a fixation with the current model guarantees replicable throughput and output, but the consequence is even more organizational formality and bureaucracy (Sorensen, J. and Stuart, T. 2000). As routines slide into rules-bound work, performance is increasingly judged by a narrow set of known variables (Kanter, R. M., 2000). As routines become associated with success, the propensity to replicate those routines becomes the organizational norm. The result is the "winnowing of unproductive" ideas and a growing rigidity that makes it difficult to explore new ideas (Ahuja, G. and Lampert, C. M. 2001).

Researchers outline three types of learning pathologies: 1) *maturity traps* where an existing technology has served the company well and achieved attractive financial returns (Hannan, M. and Freeman, J. 1989); 2) *familiarity traps* where routines and competencies have buttressed a current practice resulting in an unwillingness to

experiment; and 3) *propinquity trap*s in which employees only look for solutions within the field of known existing solutions (Ahuja, G. and Lampert, C. M. 2001).

Ultimately, the narrowing of the aperture of ideas and approaches can lead to rigid adherence to an obsolete mental model or "theory in use" (Assink, M. 2006). The organization's tacit knowledge is internally prized and valued within the bureaucracy, but forms a barrier to the acceptance of alternatives and the development of disruptive innovations. Core beliefs, enshrined by professional status and positional authority, are rarely relinquished easily (Brown, J. S. 1998). The music industry, for example, tried hard to maintain its business model and cling to its dated mindset with high priced CDs despite the arrival of Apple iTunes (Assink, 2006) and illegal downloading (Molteni, L., & Ordanini, A. 2003). Organizational-wide beliefs on how the world works may be entrenched, but are likely to be superseded by the realities of a changing competitive situation or environment (Assink, M. 2006).

2.5.3 Absorptive Capacity: Ability to Adopt New Ideas

The learning and experience that support large organizations' resistance to innovation, and in particular their resistance to disruptive innovation, is very compelling. Corporations that find a winning formula are predisposed to mine a rich seam until it is exhausted. The success leads to the solidification of the operational and business practices, routines and processes that have developed around the success story. As the short to medium term rewards from the existing products or services continue, resistance to abandoning a "winning formula" becomes almost inevitable. Cohen and Levinthal coined the term "absorptive capacity" to describe the ability of a company to

use new ideas. The authors note that an organization's absorptive capacity depends on the collective cognitive capacity within the organization (Cohen, W. M. and Levinthal, D. A. 1990). Their empirical research in 318 large companies with R&D innovation departments identified "path dependency" as the primary barrier preventing the assimilation and exploitation of new knowledge. They defined "path dependency" as the willingness to deviate from accumulated cognitive structures (Cohen, W. M. and Levinthal, D. A. 1990). There are many examples of large corporations where being wedded to yesterday's success has chained the organization to the past and prevented it from seeing, let alone embracing, innovation. Kodak failed to harness its own digital camera technology because it was wedded to film (Lucas, H. C. & Goh, J. M. 2009), and Blackberry was unable to perceive and accept the next evolution of the smart phone because it was wedded to its existing product (McNish, J. & Silcoff, S. 2015).

2.6 Market/ Sector (Monopolies and Disruption)

2.6.1 Level of Competition in Market/Sector

Schumpeter his ground-breaking 1942 book, *Capitalism, Socialism and Democracy*, argued that monolithic size gives corporations unique advantages and opportunities to dominate a market. Market Titans and their concentration of capital create insurmountable barriers to any new entrant (Schumpeter, J. A. 1942). Schumpeter argued that dominant firms are the "most powerful engine of progress and ... long-run expansion of total output". He continued by saying that "perfect competition is inferior, and has no title to being set up as a model of ideal efficiency." (Schumpeter, J. A. 1942). The idea that a monopoly's power and capital concentration hold the keys to innovation

because resources are not wasted on unnecessary competition was highly influential in both government and large corporations in the post-war era (Nelson, R. R. 2012).

Chesbrough and Teece argued against this belief by understanding the distinction between systematic innovation and autonomous innovation. Systematic innovation occurs when diverse and huge resources are harnessed and centralised control is used to settle conflicts and coordinate activities (Chesbrough, H. W., & Teece, D. J. 2002). They cite the ability of integrated companies or government agencies to advance a new standard by simply adopting a new technology. Corporate examples like Microsoft and Intel show that big business must make enormous investments to enhance their capabilities. The idea that firm size is correlated to innovation investment has empirical support (Archibugi, D., Evangelista, R., & Simonetti, R. 1995). In Chesbrough and Teece's (2002) view, large companies can only achieve strategic leverage and systematic innovation by leveraging their centralised model (Chesbrough, H. W., & Teece, D. J. 2002). This view is supported by empirical evidence that large firms with "dynamic capabilities" and resources are more likely to engage in innovation than firms without these assets (Geroski, P. A., Van Reenen, J., & Walters, C. F. 1997). Other empirical studies have supported the assumption that large firms invest more in innovation, but introduce caveats related to market sector and company ownership (Shefer, D., & Frenkel, A. 2005). However, it is noted from other studies that large firms are less likely to adopt "radical" and ambiguous innovations, preferring "process" innovation improvement (Ettlie, J. E., & Rubenstein, A. H. 1987).

Arrow takes the opposing view, as do other economists. They argue that competition favours innovation. They suggest that competition acts as an incentive to innovate and that innovation is stymied if a dominant monopoly operates without competition (Arrow, K. 1962), (Gilbert, R. 2006) and (Breschi, S., Malerba, F., & Orsenigo, L. 2000). Empirical studies have shown a positive correlation between the level of competition and innovation production (Nickell, S. J. 1996) and (Geroski, P. A., Van Reenen, J., & Walters, C. F. 1997). The logic of the impact of competition on innovation is simple. "A firm that has a monopoly position in a market has a flow of profit that it enjoys, if no innovation takes place" (Gilbert, R. 2006). A similar phenomenon exists in government institutions operating in legal monopolies. Lack of competition tends to stifle the need for change (Koch, P. & Hauknes, J. 2005).

Key to understanding competition's effect of large organizations willing to engage in innovation is the level of intensity of competition. A comprehensive empirical study shows that where competition is intense and current rival offerings sit "neck and neck," large firms' R&D aims to "escape" the competitors through radical innovations. Conversely, where competition is not intense, large firms seek to dominate with their existing products (Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. 2020). Other writers have noted the appearance of dominant new designs that combine process innovation with a market "breakthrough" product. These new designs have been initiated by large and small companies. Longitudinal studies of major consumer products, show that a "market shake down" occurs when competitors are forced to respond to the dominant design or lose their market share. The shake down helps to

establish a new stability in process integration and the market (Utterback, J. M., & Suarez, F. F. 1993). Contemporary examples[11] of new designs include Apple's iPod, iTunes and (most spectacularly) iPhone. The introduction of the iPhone made all rival cellular phones seem obsolescent and created high-growth markets which generated huge profits for Apple Inc. (Wessel, M., & Christensen, C. M. 2012).

In other words, when current "steady" profits satisfy the economic motive of an organization, research into new technologies and approaches is seen as a diversion from the organization's market. As Assink has written, management's unwillingness to foster radical or disruptive innovation can be increased when an organization fears that investments in innovation may detract from the organization's stable of growth and sustained profits (Assink, M. 2006). Nagji and Tuff's research found that most firms optimise their existing "core" products and services as "cash cows" with about 70% of income going to resources, 20% to expanding adjacent market categories, and less than 10% going to transformational "breakthrough" innovations (Nagji, B., & Tuff, G. 2012). When new innovation requires high-capital investments, management may regard the required investment as an insurmountable barrier to entry (Christensen, C. M. 1997), or may will lessen the barriers to entry for competition (Baker, J. B. 2007).

Conversely, in a competitive market, a rival has an incentive to invest in innovation because the rival wishes to capture market share from the dominant actor. As Baker mentions, in a "patent race" market where companies are driven to compete through incremental and disruptive innovation, the companies try to win by making a dedicated

[11] Utterback and Suarez's work was based on an examination of the entry of transistors, type writers and televisions (Utterback, J. M., & Suarez, F. F. 1993).

commitment to innovation (Baker, J. B. 2007). Christensen noted that in competitive markets, marginal companies can capitalise on new "leap-frog technologies" that upset dominant market players because the new firms were not wedded to big company revenue structures (Christensen, C. M., 1997). In the competitive process, the existence of rivals producing an existing product encourages firms to find ways to lower costs, improve quality, or develop better products (Baker, J. B. 2007). The race to compete is even more intense in the digital economy (Hirt, M., & Willmott, P. (2014) which is subject to high speed changes in technology, customer demand, competition and markets. Authors cite the example of the Apple iPad2 which was released before competition had developed for the iPad1 (Radjou, N., Prabhu, J., & Ahuja, S. 2012).

2.6.2 Scale of Disruption

Perhaps large, established institutions' aversion to change and innovation comes from a fear of disruption. Christensen, in his award winning book *The Innovator's Dilemma*, discusses two streams of technology: sustaining and disruptive (Christensen, C. M., 1997 & 2000). Sustaining technologies are inherently incremental (process innovation). Disruption comes from entrants who displace established incumbents. Currently dominant companies improve "the performance of established products… (to meet current)…mainstream customers." Disruptive technologies are a rarer breed. In the short-term, disruptive technologies result in "worse product performance," but these technologies contain the seeds of an entirely "new value proposition" (Christensen, C. M., 1997 & 2000). Top examples include Space X (private space exploration), Moderna

Therapeutics (bio-tech engineering), and Uber (taxis and transportation) (Ioannou, L. 2015).

Christensen's depiction of disruption is not without its critics (King, A. A., & Baatartogtokh, B. 2015) and (Lepore, J. 2014). Other researchers have questioned whether incumbents failed to respond to disruptors, had overshot customers' needs, or had been displaced by a disruptive technology. They also questioned whether disruptive firms had the capabilities to sustain a trajectory to unseat their established rivals (King, A. A., & Baatartogtokh, B. 2015). Christensen responded that his theory has expanded into a normative theory that has anomalies but holds true as a predictive business model (Christensen, C. M. 2006). The model's value is in understanding the disconnect between large, incumbent organizations and the ability to react to changing customer demands and respond to new product performance trajectories exploited by dynamic, nimble and disruptive entrants (Christensen, C., Raynor, M. E., & McDonald, R. 2015).

Singer believes that large organizations attempting to manage radical and disruptive innovation ignore the innovation potential because they perceived it as inferior (Singer, R. 2000). Tidd agrees. Tidd's research examined management reaction to innovation and their acceptance of it. In large firms, heavily vested in their current product paradigm, management tended to be "blind to potential disruptive innovation" because their current customers have affinity with the existing product offering and because management then undervalues innovation (Tidd, J. 2001). As a result, the bureaucracy vets product improvements and tolerates them improvements as "good ideas," but the widespread adoption of "untested" and "unproved" new ideas becomes highly unlikely

(Singer, R. 2000). Christensen shows that top industry leaders are often ill-equipped as individuals or company leaders to perceive the value of disruptive technologies. With a dominant market share, significant investment in the current "traditional" models and products, and an aversion to the uncertainty in the new disruptive innovation, leaders hedge their bets and settle for the modest, but safer path of proven technology (Christensen, C. M. 2000).

Christensen's insights into leaders' reactions and subsequent studies to disruptive entrants trying to promote an unproven product are particularly interesting. Typically, the innovation is dismissed as an inconsequential threat to the market of the dominant company (Christensen, C.M. 2000), (Christensen, C. M. & Overdoff, M. 2000) and (Christensen, C. M., Raynor, M. E., & McDonald, R. 2015). Christensen shows in the case of the US steel industry, the steel industry's leaders saw that small companies were climbing the value chain, but the leaders were unable to respond because of their large organization's the constraints and difficulties in reallocating resources fast enough to capitalise on an emerging opportunity (Christensen, C.M. 1997 & 2000). This kind of situation makes modest, evolutionary and incremental innovations more likely than disruptive innovations in formal and highly centralized organizations (Kanter, R. M., 1988).

Figure 5 summarizes the findings presented in Section 2.

Figure 5: Barriers to Innovation in Large, Complex Organizations

Organizational Research Areas	Innovation Barriers
1. Organizational Model	• Rigid and multi-layered bureaucratic organization (distinct and segregated functions)
	• High level of bureaucratic control through rules-based management model
	• Culture of compliance over creativity with low personal accountability/autonomy
	• Absence of dualism: excessive focus on efficiency on current products and services
	• Dependent on a fixed set of products and services with low creative contributions
	• Strong verticals: decision-making and approvals stress vertical and positional authority
2. Leadership	• Absence of innovators in senior leadership which relies on well tested mandates
	• Reflective intolerance of "change agents" and innovators
	• Entrepreneurship attributes weak amongst leaders. Weak change receptivity.
	• Leaders have low scores for novelty seeking, low tolerance for ambiguity and limited openness to new ideas and cognitive innovativeness
	• Leaders manifest high levels of cognitive rigidity, dogmatism and power status
	• Leadership bias toward analysis, planning, detail orientated implementation and disciplined execution
3. Mindset	• Group think in business, product development and resource allocation
	• High attitudinal conformity, behavioural conformity and doctrinal conformity
	• Low tolerance for intellectual diversity, stimulation of creative abrasion, and probing core assumptions
	• Close alignment between hierarchy and perceptions of status and expertise
	• Closed communications with information sharing guarded and contained
	• Focus on a narrow set of short-term financial results as performance indicators
4. Culture	• Closed culture with a low-risk tolerance for uncertainty. Penalties for risks
	• Strict processes designed to “minimize surprises” and mitigate risks

	• Status quo and stability prized over unpredictable/uncertain innovation opportunities
	• Low levels of intrinsic motivation, repetitive work, high control, isolation and absence leadership encouragement
	• High external evaluation and surveillance; financial based rewards; constrained work choices and peer competition
5. Capabilities	• Overdependence on core set of capabilities that has given past success
	• Management, process and products solidified into “core rigidities” in processes and products
	• Single loop learning aimed at incremental process improvements to products
	• Limited "double loop" learning of market trends, challenges organization's "worldview" of its place in the market/environment
	• High sunk costs in current model. Wedded to existing products and services. Need to "unlearn" established routines that produced success in the past
	• High maturity traps where established technology has served the company well and achieved good financial returns
	• Low absorptive capacity for adopting new ideas and new diversity. Dependent on past paths
6. Market/ Sector	• Low competition: long-term dominant or monopolistic position in the marketplace
	• High capital investment (or legislated mandate) acts as a significant barrier to entry
	• Few opportunities for "leapfrog technologies" that might enable entrants to contest dominant organizations
	• Dismissal of marginal, half-formed technologies. Preference for proven (substantial) revenue streams
	• Organizational predisposition toward incremental process over disruptive innovation

Section 3: Conceptual Model of Innovation Barriers in Large, Complex Organizations

When reviewing the multitude of barriers and forces that inhibit and resist innovators and the innovation process and innovation in large, complex organizations, it is possible to discern numerous threads and patterns that need to be included in a comprehensive conceptual model and framework. The sections that follow discuss the implications of innovation barriers in large, complex organizations for organizational models (Section 3.1), leadership (Section 3.2), mindsets (Section 3.3), culture (Section 3.4), innovation capabilities (Section 3.5), and market competition (Section 3.6). Table 6 presents the summarizing conceptual model.

3.1 Implications of Innovation Barriers for Organizational Models

Hierarchal and bureaucratic large organizations appear to present a *structural barrier* to the pursuit of innovation. Rigid hierarchies become top-down models of authority, while innovation requires horizontal collaboration. Many researchers noted that the existence of structural vertical rigidities in decision-making processes, procedures, communications and departmental organization can impede the innovation process (Chisholm, T. A. 2007), (Assink, M. 2006), (Christensen, C. M. 1997 & 2000). As organizations grow and become large, leadership often becomes entrenched with the structure influencing and limiting innovation (Smith, K. Mitchell, T. & Summer, C. 1985). Ideation, coalition building and, most importantly, innovation creation and action all require the mobilization of resources across organizational “silos” (Kanter, R. M. 2000). As Kanter has demonstrated, compartmentalised control and separation act as deliberate barriers that prevent collaboration between different teams and

departments. In highly dysfunctional bureaucracies, internal competition between an organization's departments can mean that budget, other resources and even information are hoarded, magnifying the basic organization's structural problems (Kanter, R. M. 2000).

The high degree of vertical control designed to impose organizational discipline through rules and procedures (Chisholm, T. A. 2007) can become *deterring barriers.* Employees default to the rules-based orthodoxy and a reactive culture may develop and take precedent over the exploration of new ideas and approaches (Quinn, J.B. 1985), (Assink, M. 2006) and (Chisholm, T. A. 2007). As by-products of the hierarchal structure, these deterring barriers are further amplified by limitations of business models where an excessive efficiency focus (Quinn, J.B. 1985) and narrow desire to exploit existing products and services (Paap, J. & Katz, R. 2004).

Large, complex organizations built on past success and huge investment may experience a special *deterring barrier* to pursuing radical or disruptive innovation (Paap, J. & Katz, R. 2004). If a large company that depends on its current established products for its financial successful is to overcome the "tyranny of success" and be able to innovate, the company may need to embrace a "dualism" in resource allocation. The company needs to continue to benefit from the products and processes that provide financial stability while investing in innovative ideas (Paap, J. & Katz, R. 2004). Innovations are likely to occur in large organizations, as long as they do not appear to jeopardize current products and processes. Incremental improvements are permissible if they are being made to existing products and processes. Some of these deterring barriers it seems can

also manifest as interruptive inhibitors to innovation the “path dependency” where individual and organizational learning is restricted toward the current core competencies, manifest in Cohen and Levinthal work’s as cognitive structures (Cohen, W. M. and Levinthal, D. A. 1990).

Various organizational models are available for overcoming organizational barriers to innovation. For example, a small internal "innovation team," or *Skunkworks*, may be created and tasked with managing the innovation process for radical and disruptive innovations (Quinn, J.B. 1985) and (Christensen, C. M. and Overdorf, M. 2000). Key requirements include an eclectic group (including, for example, engineers, technicians, designers and product developers) (Quinn, J.B. 1985), dedication to the new business challenges, personal accountability for projects (Christensen, C. M. & Overdorf, M. 2000), and relative autonomy from bureaucratic rules and procedures (Quinn, J.B. 1985). Senior leadership sponsorship is also vital. This leadership must provide “seed money,” compel other business divisions to collaborate in the coalition building stage of innovation, and mobilize resources in the product production and commercialization stages of the new product(s) (Singer, R. 2000).

A second organizational model strategy for jump-starting innovation is the creation of a "spinout organization." A spinout organization is an organization set up as a new venture separate from the hierarchy and typically tasked with developing radical and even disruptive innovations (Chesbrough, H. W. (2006) and (Chesbrough, H., Vanhaverbeke, W., & West, J. 2006). The purpose of creating a new venture almost entirely outside the control of the parent company is to allow the spinout organization

to be galvanised by a fresh spirit that creates a separate dynamic culture and set of incentives (Chesbrough, H. W. 2006). Large corporations have often chosen to establish spin-off organizations to address the challenges created for their traditional business model by e-commerce channels (Christensen and Overdorf, 2000). Disney Inc. has successfully deployed this strategy within its digital channels. (McKinsey Insights, February 2015).

A third organizational model and business strategy for a large organization is the acquisition of an emerging, disruptive competitor. Reasons for acquiring an innovative competitor include: allowing the large organization to enter an adjacent market (Prabhu J.C., Chandy, R. K. & Ellis, M. E. 2005); filling a core competency "gap" in the large organization's technology; and responding to emerging demographic consumer trends that affect the large organization's business (Christensen, C. M., Alton, R., Rising, C., & Waldeck, A. 2011). Examples include: ING Direct (renamed Tangerine), a branchless online bank acquired by Scotia Bank for $3.1 billion (Greenwood, J. 2013); Ben & Jerry's, a premium ice-cream producer, acquired by Unilever for $236 million[12] (Caligiuri, P. 2012); and Mojang, the creator of the disruptive Minecraft hit game platform, acquired by Microsoft for $2.5 billion (Ovide, S. & Rusli, E. 2014, September 14). The key to unlocking sustained and significant market value and innovation from a disruptive acquisition hinges on ensuring that the values, culture and market orientation of the acquisition do not become subsumed by the large, parent company (Cohn, J. Katzenbach, J. & Vlak, G. 2008). As Christensen and Overdorf point out, the temptation

[12] Ben and Jerry's Ice Cream is an example of an radical innovator selling high-priced, distinctive flavours and a creative culture (Caligiuri, P. 2012).

to integrate the acquisition to create cost savings or and/or regularize the acquisition's internal procedures can vaporise the management process and values which originally made the acquisition attractive (Christensen, C. M. & Overdorf, M. 2000).

3.2 Implications of Innovation Barriers for Leadership

The critical role of leadership in supporting innovators, the innovation process and different types of innovation is clearly demonstrated in the literature. In large organizations, a traditional leader's actions, behaviours and culture created can create barriers that deter innovation especially when the innovation is perceived as high risk and beyond the processes currently used in product improvement (Crossan, M. M., & Apaydin, M. 2010), (Matzler, K., Schwarz, E., Deutinger, N., & Harms, R. 2008) and (Birkinshaw, J., Hamel, G. G., & Mol, M. J. 2008). Conversely, a transformational leaders with strong entrepreneurial traits can act as a corporate "change agent" significantly removing barriers to innovation by building collaboration, reducing complexity and reducing fears associated with uncertainty (Birkinshaw, J., Hamel, G. G., & Mol, M. J. 2008). Leaders clearly play an important role in shaping the culture and mindset of their organization. Transformational leaders can inspire and motivate the internal innovators and creative thinking vital to ideation (Bass, B. M. 1990) & (Bass, B. M., & Avolio, B. J. 1993).

Although an empirical link between large, hierarchical organizations and change resistant leaders has not been conclusively substantiated, the normative research reviewed lends credence to the assumption that leaders in large, complex organizations are predisposed to certain *interpretative barriers* to innovation. The normative evidence

indicates that senior leaders in large, complex organizations may: 1) tend to be intolerant of intellectual diversity, "trouble-makers" (Quinn, J.B. 1985) and "new" ideas (Singer, R. 2000); 2) have a short-term "delivery focus" that elevates financial performance over entrepreneurial traits, 3) be unlikely to embrace uncertainty embodied in radical and disruptive innovation (Quinn, J.B. 1985) and (Christensen C. M., Kaufman S.P. & Shih W.C. (2006); and 4) see themselves are "guardians of order" through control, power from a distance and the underlying rules-based hierarchy (Kanter, R. M. 2000), (Gibson, R. 2015) & (Van de Ven, A. H. 1986).

Leaders in large, complex organizations face *structural barriers* that may reinforce interpretative barriers. For example, the distribution of power in hierarchies is intrinsically "top-heavy," and the multiple hierarchal layers create a power distance that can isolate leaders from changes in customer and business interactions, reducing leaders' ability to anticipate and initiate the innovation process (Hamel, G. 2006). In addition, large corporations often choose to replicate and promote employees who have institutionalized the organization's managerial behaviours, knowledge, values and motivations (Cohn, J. Katzenbach, J. & Vlak, G. 2008).

Interpretative and structural barriers to innovation are likely to affect the ideation (initiating), coalition building and product realization stages (resource mobilization) of innovation. All three stages require leadership that recognizes the need for change and drives the necessary action. Evidenced in studies in the private sector (Davila, T., Epstein, M., & Shelton, R. 2012) and public sector (Brown, K., & Osborne, S. P. 2012). In Kotter's view, leaders bringing about change in a large company need to have

receptivity to change, a sense of urgency driven by crisis, and clarity about the change's outcome(s) and (Kotter, J. P. 1996).

This contention would seem to be supported by Dyer, Gregersen and Christensen's work on the characteristics that distinguish innovative founder CEOs and non-founder CEOs. The researchers find transformational, innovative CEOs have higher "discovery" skills than other CEOs. These skills lead transformational, innovative CEOs to seek disruptive and radical innovation. This group of CEOs represents only 15% of the senior leadership pool (Dyer, J., Gregersen, H., & Christensen, C. M. 2013). Other analysts agree. Some have estimated that only about 5 or 10% of high-potential managers in large companies have the skills, attributes and behaviours of innovators (Cohn, J. Katzenbach, J. & Vlak, G. 2008).

Some attempts have been made to overcome the scarcity of innovative leaders in senior roles in large organizations. At Citibank, for example, Ed Hoffman (then President of Citibank's Western Hemisphere Consumer Group) deliberately hired a cadre of entrepreneurial consumer products executives, many of whom had no banking expertise, to "break the rules" and rethink the conventional world of retail banking (Stringer, 2000). As a result, Citibank harvested several short-term breakthrough successes at the time (Stringer, 2000).

The cornerstones of transformational leadership are intellectual diversity, entrepreneurship and an ethically based leadership model that integrates (and inspires) commitment to values to optimize long-term wealth creation (Caldwell, C., Dixon, R. D.,

Floyd, L. A., Chaudoin, J., Post, J., & Cheokas, G. 2012). Such a transformative leadership style can be an enabling creative force multiplier (Sharma, R. 2010) where leadership exists not to exercise power (as in the traditional bureaucratic and hierarchal fashion), but to increase the sense of empowerment among those led and encourage all to strive for more dynamic and innovation solutions (Greenleaf R. K. & Spears, L. C. 2002) and (Godin, S. 2008). Similarly, Sharma notes that transformational leaders can inspiring others to peak performance (Sharma, R. 2010) Godin discusses the building of modern "tribes" where leaders create a change narrative that connects and mobilises everyone in the organization (Godin, S. 2008).

3.3 Implications of Innovation Barriers for Mindsets

Hamel points out that large organizational units numbering in the hundreds or thousands are the type of organization most susceptible to "group think" on a grand scale (Hamel, G. 2009). Indeed, this literature review has noted many examples in which the dysfunctional results of group-think led to misguided or even unethical decision-making processes in large, hierarchical organizations (Janis, I. L. 1971), (Ferraris, C., & Carveth, R. 2003), (Eichenwald, K. 2005) and (Entman, R. M., Livingston, S., & Kim, J. 2009). It is important to note that the degree of group-think varies across organizations. Its severity depends on the level of conformity (Bénabou, R. 2012), leadership predisposition (Ahlfinger, N. R., & Esser, J. K. 2001), and insularity of the organizational culture (Ferraris, C., & Carveth, R. 2003). For example, Ahlfinger and Esser's empirical study found that leaders who promote their own solutions over others are more

susceptible to group-think than leaders who sought a diversity of perspectives and data (Ahlfinger, N. R., & Esser, J. K. 2001).

Group-think acts as a major barrier in the pursuit of innovation. Group-think manifest in organizations as closed-mindedness, self-censorship, illusions of invulnerability, active discouragement of dissenters, and self-appointed mind guards (Rose, J. D. 2011) are seemingly irreconcilable with the search for dynamic ideas and solutions. Group-think impacts the innovation process by manifesting itself in the form of profound deterring and interpretative barriers: individuals and decision-makers are deterred from seeking change and constrained to interpret read market signals only within the collective frame of reference. Bénabou writes about "Mutual Assured Delusion" in which individuals may subsume fixed and irrational beliefs passed down through the hierarchy. Examples include cases where employees absorbed the mindsets and beliefs of their leaders and became caught up in a contagious exuberance that led to an evidence-resistant investment frenzy followed by a deep crash (Bénabou, R. 2012).

This literature review, based on empirical and normative studies, has shown a strong link between large hierarchies and high conformist, rules-based organizational cultures characterized by low-participation in decision making (Basadur, M. S. 1995), (Basadur, M. S., & Head, M. 2001) and (Basadur, M. S., Pringle, P. F., Speranzini, G. W., & Bacot, M. 2000). Compared with conformist cultures, organizations that displayed high participation in decisions, intellectual diversity and openness to minority dissent (De Dreu, C. K., & West, M. A. 2001) and (Basadur, M. S., & Head, M. 2001) and tolerated divergent voices that questioned core assumptions (Leonard, D. A., & Swap, W. C. 1999)

had higher levels of the applied creativity vital to ideation (Basadur, M. S., & Head, M. 2001).

Large, complex organizations with strong conformist attributes tended to develop significant deterring and interpretative barriers to innovation including, for example, a narrow focus on short-term financial results. These organizations were uncomfortable with the ideation (creativity) phase as it is so often a “messy” process (Skilton, P. F., & Dooley, K. J. 2010), uncomfortable with open communication (Kanter, R. M., 1988) and uncomfortable with adopting ideas generated from beyond the organization (Dougherty, D. 1992).

Some researchers have identified strategies to overcome the detrimental effects of group think, intellectual conformity and short-term thinking in large, complex organizations. Christensen, Kaufman and Shih proposed an alternative sequenced financial framework that measures the value of future innovations value as an antidote to the need for immediate financial results (Christensen C. M., Kaufman S.P. & Shih W.C. 2006). Others have proposed in-depth change and knowledge management strategies to overcome group-think and conformity. These strategies hinge on leaders and their organizations undertaking intensive exercises that highlight dysfunctional mindset behaviours and seek to break detrimental patterns through candid discussion, experimenting and values attunement (Barczak, G., Smith, C., & Wilemon, D. 1987).

3.4 Implications of Innovation Barriers for Culture

The literature review confirmed the importance of organizational culture to innovation and showed that culture can act as an enabler and as a barrier to innovation.

Organizational culture plays a vital role in socializing individuals to the values, behaviours and risk tolerance of the organization (Martins, E.C. & Terblanche, F. 2003). As both Assink and Quin noted, dysfunctional cultures can stifle innovators, innovation and the innovation process by dismissing people regarded as "trouble-makers," having a low risk-tolerance, and adopting a power based hierarchy (Quinn, J.B. 1985) and (Assink, M. 2006). These contentions have been supported by various studies. Berson, Oreg and Dvir, for example, found a positive correlation between positive work cultures, increased innovation and company performance (Berson, Y., Oreg, S., & Dvir, T. 2008).

A large organization's culture may inhibit creativity when the organization's bureaucracy is driven by extrinsic motivations that counter the intrinsic motivations that drive creativity and innovation (Amabile, T. M., & Fisher, C. M. 2009a, 2009b & 2014), (Amabile, T. M. & Kramer S. J 2007, 2012) and (Amabile, T. M., Goldfarb, P. & Brackfield S. C 1990). Similarly, large, complex organizations often tend to minimize surprises, minimize risks and avoid the uncertainty embodied in radical and disruptive innovation. As a result, the innovation process for radical and disruptive products and services faces severe deterring barriers in hierarchal, internally focused organizations (Assink, M. 2206) & (Christensen, C. M. 2003). Cameron and Quinn found that hierarchical cultures with an internal focus were generally not conducive to innovation (Cameron, K.S and Quinn, R.E. 1999). The process of innovating product imitations was an exception (Naranjo-Valencia, J. C., Jiménez-Jiménez, D., & Sanz-Valle, R. 2011).

Shifting a traditional management culture wedded to rules, routines and practices to a more change receptive and dynamic culture is an enormous task, but can be

accomplished. One strategy is to start with leadership and the organization's underlying management model. Hamel points out that leaders and staff need to be empowered to break down risk aversion. Leaders must be encouraged both to embrace ad hoc and incremental improvements and to undertake bold moves (Hamel, G. 2006). He suggests four keys to launching a management innovation revolution within a large corporation: 1) giving managers and staff "bewitching problems" that demand fresh thinking; 2) supporting new principles and paradigms that "illuminate novel approaches;" 3) carefully deconstructing conventions and dogmas that have constrained creative thinking; and 4) using examples and analogies from similar enterprises to help redefine the art of possible (Hamel, G. 2006).

The concept of "corporate camouflage" builds on Hamel's suggestions. In an atmosphere that promotes conformity and craves order over disruption, innovators can learn to disguise themselves and their innovative drive. According to Hamel, when the great majority of people (98%) think about the future, they take the current industry orthodoxy as a given (Hamel, G. 2002). In such an environment, new ideas can make innovators seeking change vulnerable to the orthodoxy as they disrupt the organization's prevailing culture and desire for a familiar sense of order. These innovators must maintain their belonging of the organization with its established code of conduct and visible manifestations of seniority, but they must also be true to themselves and work to make innovation acceptable. For innovators working to push their ideas in a big organization, understanding "corporate camouflage" techniques is vital to thriving in the bureaucratic structure.

The first camouflage strategy is *crypsis*, the ability to blend into the environment. It might include "flying under the radar," talking the corporate dialect, dressing to be unnoticed and not causing a stir in the boardroom. The second camouflage strategy is *mimesis,* appearing to be something very different. The aim is not to be deceptive, but to be flexible and responsive to the needs of different corporate stakeholders. As unusual behaviour is not welcome in a bureaucratic structure, it is important for innovators to know how to maintain connections with the organization and its values. Innovators hoping to bring about significant change need to develop a deft approach to different perspectives, manage hesitation among doubters, and recruit corporate allies.

3.5 Implications of Innovation Barriers for Innovation Capabilities

Understanding a large, complex organization's "core competencies" and how they can enable or inhibit innovation is critical to an organization's ability to develop internal innovation and respond to external competitive threats (Prahalad C. K. & Hamel, G. 2003), (Leonard-Barton, D. 1992), (Peteraf, M. A. 1993), (Christensen, J. F. 2006), (Chandy, R. K., & Tellis, G. J. 2000), (Teece, D. J. & Pisano, G. 1994) and (Lawson, B., & Samson, D. 2001). The empirical and normative literature widely supports the idea that a large organization's management systems, employee knowledge and skills, technical capabilities, and values and norms can deteriorate into "rigidities" that can prevent an organization from reconfiguring its capabilities (Leonard-Barton, D. 1992) (Christensen, J. F. 2006), (McNish, J. & Silcoff, S. 2015), (Lucas, H. C. & Goh, J. M. 2009) and (McNish, J. & Silcoff, S. 2015).

Core “rigidities” in large, complex organizations may be *structural*, *revealing*, *deterring* and *interpretive* barriers to innovation. A structural barrier refers to the institutional inertia that arises when enormous resources have been expended to achieve a high level of proficiency in core competencies. The result is a preference for incremental product improvements over radical and disruptive innovations (Leonard-Barton, D. 1992), (Fishman, T.C. 2014), (Lieberman, M & Montgomery D. B (1988), (Baker, W. E. & Sinkula, J. M. 1999), (Lucas, H. C. & Goh, J. M. 2009) and (Gold, A. H., & Arvind Malhotra, A. H. S. (2001). Revealed barriers emerge during the innovation process as the organization realizes it does not have key capabilities need to successfully turn an idea into a commercial product (D’Este, P., Iammarino, S., Savona, M., & von Tunzelmann, N. 2012) & (Cannon, M. D., & Edmondson, A. C. 2005). Deterring barriers refer to the “theory in use.” Past success and steady financial returns achieved with a particular approach may make organization resistant to ideation. The successful ways of the past become “learning traps” entrenched by routines and characterized by narrow search innovation within known fields (Ahuja, G. and Lampert, C. M. 2001). Interpretive barriers are linked to deterring barriers, but refer to “single loop” learning. Single loop learning restricts the breadth of the organization’s “world view” (Baker, W .E. and Sinkula, J. M. 1999) and limits the organization’s ability to absorb new ideas (Cohen, W. M. & Levinthal, D. A. 1990).

The literature proposes several strategies to break the “learning traps” associated with barriers to innovation in large organizations. Stringer is clear that simply exhorting people to "think different" and support “big ideas” does not work as this approach is

rejected as mere rhetoric. Stringer also dismisses linking corporate incentives to revenues derived from new products and services (Stringer, R. 2000). A better strategy appears to be seeking out a new or modified product that begins to reduce an organization's dependency on its existing core capabilities. Breaking the cycle of core rigidities by the gradual introduction of new product lines, if even at first only on the periphery, can begin to unwind the closed loop of organizational learning and can foster new capabilities (Leonard-Barton, D. 1992). Depending on the speed of external change in the organization's environment and the strength of the core rigidities, this might be a fruitful strategy. As Nagji, and Tuff note, a large corporation can ensure a funded pipeline of future integrated products and services by using the deliberate allocation of resources to each innovation to place its footprint on each type of innovation investment (Nagji, B., & Tuff, G. 2012).

A more dramatic strategy for overcoming the "barrier" of core competencies is self-disruption. Self-disruption occurs when a large company deliberately launches itself into an adjacent space (possibly through acquisition of new capabilities) to revolutionize its thinking and competiveness and restore its market dominance (Christensen C. M. and Overdorf, M. 2000) & (Christensen, C. M., Alton, R., Rising, C., & Waldeck, A. 2011). The global sports apparel giant Nike is a great case study. The company's transformative CEO, Mark Parker, wanted to ignite a digital revolution at Nike. In 2012, Nike launched Fuelband, a high-end electronic wristband that tracks the wearer's activity. The result, as one analyst put it, is that "Nike is now included in conversations around technology—it's shifted into an adjacent industry, breaking out of apparel and into tech, data, and

services" (Carr, A. 2013). Another, strategy big companies have done to stimulate self-disruption is to make "bold" investment decisions in new emergent markets. Google's $500million investment in self-drive cars is a prominent example (McKinsey Insights, February 2015). Cohn, Katzenbach and Vlak have noted that the self-disruption can lead to further innovation when innovators from the more creative work environments work in the traditional business areas further stimulating change, new ideas and greater market orientation (Cohn, J. Katzenbach, J. & Vlak, G. 2008).

3.6 Implications of Innovation Barriers for Market Competition

Research into the barriers that contribute to the failure of large organizations to adapt to new market conditions is extensive (Chandy, R. K., & Tellis, G. J. 2000), (Tellis, G. J. 2006), (Paap, J. & Katz, R. 2004), (Christensen, J. F. 2006), and (Tushman, M. L., & O'Reilly, C. A. 2002). Schumpeter's view is that large monopolies (or oligarchies) have an advantage when managing complex innovations that require massive capital investment (Schumpeter, J. A. 1942), (Gilbert, R, 2006), Chesbrough, H. W., & Teece, D. J. 2002) and (Archibugi, D., Evangelista, R., & Simonetti, R. 1995), but most contemporary research concludes that competition is essential to drive the process of radical and disruptive innovation (Nickell, S. J. (1996) & (Geroski, P. A., Van Reenen, J., & Walters, C. F. 1997). The impact of competition and business cycles on innovation in different sectors is a vast field that has engendered much heated debate that goes beyond the limitations of this study. To summarize the research, this literature review found that large organizations in less dynamic markets have little incentive to innovate beyond incremental product improvements. Intense competition, however, is associated with

organizations finding ways to better the competition through radical and even disruptive innovation (Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. 2002).

For large companies, the strength and effects of *deterring* barriers can be gauged by the companies' response to changing market conditions. The literature review found that large organizations that have managed to overcome "incumbent inertia" and pursue process, radical or disruptive innovation are characterized by: 1) a high degree of market orientation and the ability to read and anticipate market signals (Paap, J. & Katz, R. 2004) and (Chandy, R. K., & Tellis, G. J. 2000); 2) robust competitive conditions (King, A. A., & Baatartogtokh, B. (2015); 3) the existence of disruptive entrants (Christensen, C. M. 2000); 4) dynamic and transformational leadership (Tellis, G. J. 2006); and/or 5) fast technological change (Chandy, R. K., & Tellis, G. J. 2000).

Being highly responsive to changes in the market and environment enables a large organization to be successful in the long-term. Where market conditions are changing quickly and leading to uncertainty, and when the organization is technology-driven, relying solely on ideas generated internally can be dangerous (Prabhu J.C., Chandy, R. K. & Ellis, M. E. 2005). As McKinsey & Company stress, rapid and major market change is upon us. Digitalization accelerates change, lowers barriers to entry and revolutionises products, channels and customer experience breaking long-established boundaries between sectors. When the speed of change means that "radical is normal," organizations must create a strategic approach to innovation or run the risk of becoming the next Blockbuster video store chain (McKinsey Quarterly, 2014).

A strategy for overcoming bureaucratic and structural barriers that slow or impede an organization's responsiveness to a rapidly changing market conditions is to dissolve the hierarchy into a network based structure with customer-centric and project groups. Deloitte estimates that more than 70% of large companies with more than 50,000 employees are already attempting to decentralize authority and establish more dynamic sub-divisions (McDowell, T., Agarwal D., Miller, D., Okamoto, T. & Page, T. 2016). The public sector has also began in a limited fashion to move toward network type organizations (Considine, M., & Lewis, J. M. 2007). For example, in the hierarchical US military has adopted a similar dynamic responsiveness its own fast changing environment. Faced with new security threats, such as terrorism, the US military established a Joint Special Operations Command within the military hierarchy (Skelton, T. S. 2004). Drawing resources from every branch of the military, the military moved away from its top-down organizational structure to a largely autonomous network of teams able to respond to local threats (Niva, S. 2013).

Netflix, the online video streaming company, presents another strategy for overcoming barriers to market competition. The company used market foresight on digitalization and shifting consumer viewing habits to disrupt itself. As Christensen, Raynor and McDonald have noted, Netflix fits the definition of an innovative self-disruptor. Starting as a postal DVD rental company that appealed to a narrow market segment, Netflix "leap-frogged" into the online movie streaming model by offering older movies. It has since branched out into movie production. Netflix's success has depended on its creative and technological culture, its transformational leadership and its strong market

orientation (Christensen, C. M., Raynor, M. E., & McDonald, R. (2015). Chandy and Tellis' study discusses how large firm wishing to introduce new disruptive products by, for example, "cannibalizing" existing profitable product lines require a robust strategy with high market and technology orientation to succeed (Chandy, R. K., & Tellis, G. J. 2000). Steve Jobs' willingness to cannibalize Apple's iPod revenues to develop the iPhone is an example of a large, complex organization making bold investment decisions that enable it to operate in adjacent or entirely new markets (McKinsey Insights, February 2015).

Figure 6, Impact of Innovation Barriers on Large, Complex Organizations, summarizes Section 3's discussion. The first part summarizes the impact of innovation barriers on the six organizational research areas and their impact on the innovation process, innovators and overall market competitiveness. The second part (Figure 7) summarizes innovation strategy to overcome these structural, deterring, revealed and interpretative barriers to innovation.

Figure 6: Impact of Innovation Barriers on Large, Complex Organizations

Organizational Research Areas	Innovation Barriers and Impact on Innovation Process	Likely Motivational Impact on Innovators and Intrapreneurs	Impact on Competitiveness
1. Structure	• **High** • Significant barrier to ideation (orthodoxy), coalition building (silos/verticals), realization (efficient focus) and dissemination	• **Very Low** • Major barrier to innovators' acceptance, sponsorship and success. • Little creativity, autonomy peer support or encouragement	• **Low** • Pre-existing dominant role/ monopoly • High potential for decline • Vulnerable to new disruptive entrants
2. Leadership	• **High** • Strong "mindset" barrier inhibiting innovation • Process and complex innovation	• **Low** • Short-term focus on existing markets/products • Intolerance of ambiguity, change and "radical" innovators	• **Unpredictable** • Version improvement innovation to sustain market/sector position
3. Mindset)	• **Moderate to High** • Low creative abrasion • Depends on the level of conformity and groupthink • Strong innovation realisation	• **Low-Medium** • Doctrinal conformity an absolute disincentive. Attitudinal conformity is more malleable • Depends on ability to navigate organizational. practices	• **Low-Medium** • Conformity can give a focus cohesion and efficiency • Robust ability to execute • Disruptive ideas perceived as beyond credible or realisable
4. Culture	• **Moderate** • Resistant to ideation and collaborative stages • Supportive once "tipping point" reached	• **Medium** • Rules can become oppressive & restrictive • Persistence in coalition building vital • Reduce the perceived uncertainty of change	• **Medium** • Allows for limited process & complex innovation to offset inertia • Variable inhibition to change and innovation
5. Capabilities	• **Medium**	• **Low- Medium**	• **Medium**

	• Dominance of a "single loop" of process innovation • Innovation aperture low but process exists	• "Theory in use" barrier to divergent thinkers • Reinforces conformity • Dominance of set assumptions	• New products and services realised (within model) • Disruptive innovation unseats core advantages
6. Market/ Sector	• **Low-Medium** • Absence of competition creates complacency • Search for new ideas stifled • Entrepreneurial impulse low. • Modest process and complex innovation possible (if mandated)	• **Medium** • Large institutions have the resources to dedicate to process and complex innovation. • The timing of initiating innovation top-down • Incentives toward improvements	• **Medium** • Dominant actors can have long tenure and resources to acquire competition • Potential for catastrophic failure • Disruptive entrants face resource wall

Figure 7: Strategies to Overcome Barriers to Innovation

Innovation Strategy	Impact on Innovation and Commercialization Process	Likely Motivational Impact on Innovators *and* Intrapreneurs	Impact on Competitiveness
1. Distinct Innovation Capabilities (internal and external innovation teams/ acquisition of new capabilities)	• **High** • Removes barriers. Innovative and entrepreneurial mindset. High experimentation and product development focus	• **Medium-High** • Requires high degree of leadership support • Cultural cordon protects unique capabilities	• **Medium-High** • Careful balance of value extraction and maintaining innovation pipeline.
2. Hire Innovative Leaders (increase the number entrepreneurial and innovators in leadership positions)	• **High** • Liberates the creative "mindset." Confronts dogmas and path dependency • Sets a tone of creativity and fresh ideas/approaches	• **High** • Raises intellectual diversity and reduces fixation on the status quo • Creates a critical mass of energy, ideas and new management approaches	• **Unpredictable** • Enables a greater "dualism" to create new value and maintain stable revenue. • Challenge of engaging wider bureaucracy in commercializing new products
3. Changing Mindsets (balance innovation and financial incentives/ deconstruct group think through robust internal dialogue)	• **High** • Reduces adherence to the past through desire to "break the rules" to create new value. • Enables the evaluation of innovation ROI	• **High** • Confront dysfunctional behaviours, values and decision-making processes • Resistance from incumbent leaders likely	• **Medium-High** • Create an environment to enable greater innovation. • Slow process: competitive pressures. • Challenge of retaining innovators
4. Management Innovation (create a more nimble and risk tolerant management culture)	• **Medium** • Internally focused reform to increase the receptivity to change and innovation.	• **Medium** • Provides a more supportive environment for innovators and creative solutions.	• **Medium** • Increases but does not guarantee successful innovations.

5. Corporate Camouflage (indirect influence strategies to navigate resistance)	• **Moderate** • Enables innovation process during its early stages • Requires patience to assess the right intervention point	• **Medium** • Requires innovator to have high organizational acuity, high influence skills and token deference to conformity	• **Medium** • Provides a non-threatening approach to ideation and change
6. Incremental & Deliberate Innovation Investments (gradually breaking the learning traps and defined resource allocation)	• **Medium** • Infusion of resources into innovation initiatives creates a pipelines of new products and services. • Gradual learning beyond current capabilities.	• **Medium-High** • Provides innovators resources and organizational focus to the innovation process. • Provides leadership a balanced portfolio of process to disruptive innovation.	• **Medium** • Incremental product improvements in stable markets. In high velocity markets process innovations may not be sufficient to sustain competitive advantage.
7. Self-disruption (break away from "core competencies" through bold investments in adjacent or new markets)	• **High** • Strategic investments to pivot the organization into new competencies. • Linked to strategy 1: distinct internal or acquired innovation capabilities	• **High** • Strong leadership support to innovators to disrupt established core competencies. • Provides an energy of renewal to internal change.	• **High** • Self-disruption can transform an incumbent's competitive position. • New capabilities can filter back and revitalize residual business lines.
8. Market Driven Network Sub-organizations (devolve hierarchies in market orientated internal networks)	• **Medium** • Enables "flatter" organizations responsive to changing market/ environment conditions • Streamlines	• **Medium-High** • Provides focal points for innovators to coalesce around customer (speciality)-centric	• **Medium** • Greater flexibility should lead to more dynamic and flexible market responsiveness. • Allows for the development of

	decision-making and ideation through to adaption.	networks. • Challenges: development of micro-bureaucracies	local and market centric solutions.
9. Cannibalize Existing Revenue (In fast-changing markets be willing to jeopardize established revenues streams to "leap-frog" into a new channel or product offering)	• **High** • High-risk strategy that needs a strong and discovery based leader. • Provides an urgency to innovate within the organization beyond the current products and services.	• **Medium-High** • Provides a compelling narrative for realigning resources away from core capabilities. • Transforms the organization and the role of innovators in its success.	• **High** • Can be a "game changer" to transform an organization beyond its market niche. • Ensures its dominance as a market leader for innovative products. • Provides an innovation pipeline of adjacent and transformative products.

Section 4: Limitations of the Research and Topics for Future Research

The scope of this study of barriers to innovation in large, complex organizations was very broad, but it is important to acknowledge the limitations of the study. Firstly, the research was based on a systematic and comprehensive literature review. It is not an empirical study. Secondly, the study highlights the complex interplay between the various internal and external "barriers" that impede or prevent innovation, innovators and the innovation process in large organizations, but cannot provide a detailed analysis of each barrier. Thirdly, the study could not undertake a detailed sector-by-sector analysis of barriers to innovation in large, complex organizations.

It is clear from the limitations mentioned and from the many issues discussed in this research that many issues would make valuable topics for future research. Topics include (in no particular order):

- Methodical and empirical studies of individual barriers designed to increase understanding of the influences that may drive or inhibit innovation;
- A study of how to overcome the detrimental effects of "group think," intellectual conformity and short-term thinking in large organizations;
- A study of how to conduct an effective innovator's camouflage strategy;
- An examination of the rise of network based organizational forms within the hierarchy of large companies. It would be useful to understand the impact of

"network" based organizational forms in stimulating innovation and improving large company performance;

- A study of the universal and unique barriers to innovation that face organizations operating in different sectors;
- A study of the universal and unique barriers to innovation that face organizations operating in a particular industry;
- A study examining how the barriers to innovation discussed in this research are perceived by leaders and staff in large organizations;
- A comparison of barriers to innovation in different jurisdictions; and
- A comparison of barriers to innovation in developed versus emergent nations.

Section 5: Conclusions

This paper contributes to the study of innovation "barriers" in large, centralised bureaucratic organizations by conducting a systematic and comprehensive literature review that provides the basis for creating a conceptual model of barriers to innovation. The study notes that the impediments to innovation in large organizations are both complex and interdependent with no single cause or set of causes.

This study examines barriers to innovation in large, complex organizations in a systematic way. It focuses on: 1) six organizational research areas that define the internal and external environment of large organizations; 2) a broad barrier taxonomy that identifies what underlies the drivers of inhibitors to innovation; 3) considering whether certain apparent barriers to innovation work to enable or deter innovation; and 4) considering when in the innovation process the intrinsic nature of a large, complex organization begins to present impediments. The study adds to existing empirical and normative research on barriers to innovation by cataloguing the barriers and possibly unforeseen difficulties that large, complex organizations must overcome when confronted with the necessity of making changes that will encourage or sustain attempts to innovate.

It is clear from this study that innovation in large hierarchal public and private organizations faces significant barriers. The dominant bureaucratic model that delivered enormous value in terms of mass production and large-scale societal transformation seems ill-adapted to the needs of modern citizens and new markets. The old model has

become too inflexible, too risk adverse and too rules-based to seize innovation opportunities. Disruptive or radical innovation is particularly difficult in an organization with a complex array of rigid structural barriers and a rules-based culture that together act as a powerful disincentive to leaders and innovators who wish to diverge from established orthodoxies. Where innovative leadership exists, it is often corralled or ignored because the organization is focused on delivering existing products known to deliver stable financial results. A "group think" mindset may develop, leading to a conformity that stifles intellectual diversity, creativity and innovation. The large bureaucracy may depend increasingly on the core capabilities that gave the organization success in the past, but these core competencies often lose their dynamism and, as rigidities develop, it becomes increasingly difficult to respond to market changes.

The study of barriers to innovation is an important field worthy of further research with additional knowledge and understanding based on verifiable and observable results; it should be possible to develop a comprehensive and detailed theoretical model. It may also be possible to develop a statistically supported predictive framework that can be used by innovators and leaders in large organizations for the appropriate and successful promotion of innovation within their organizations. It is certainly especially important that we find ways to empower innovators to give our large organizations the ability to thrive in this time of fast-moving and possibly accelerating change.

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