The Neo-Weberian contingency theory of innovation

Abhijit M. Patwardhan
Texas A&M International University

John B. Ford
Old Dominion University

George R. G. Clarke
Texas A&M International University

ABSTRACT

Scholars in the discipline of strategic management are revisiting the widely accepted notion of the necessity of an organic structure to facilitate innovation. By highlighting a brief history of the phenomenal scientific advancements which has occurred under mechanistic structures in the former socialistic countries, the authors develop a new positive theory entitled the "neo-Weberian contingency theory of innovation." This paper demonstrates that innovation can occur in both organic and mechanistic organizational structures and that national culture has a significant impact on the desired organizational structure that is conducive to innovation across the globe. The authors find empirical evidence for the suggested hypotheses and therefore, further propose a three-dimensional isometric Culture-Structure typology. Finally, they hope that scholars will refine this theory and typology by further empirical validation.

Keywords: National Culture, Organizational Structure, Econometrics, Soviet Science, Max Weber, Innovation

INTRODUCTION

Innovation is a topic that has been of great interest among scholars (Chandy & Tellis, 1998; Evanschitzky, Eisend, Calantone, & Jiang, 2012; Green & Cluley, 2014; Menguc & Auh, 2010; Sorescu, Chandy, & Prabhu, 2003). Sorescu et al. (2003) stated that radical innovation is the focus of study in industrial organizational economics, marketing, and management research. Chandy and Tellis (1998, p. 474) concluded that radical innovation is of great interest to managers because of its a) 'capacity to destroy the fortunes of firms' and 2) ability to 'be the source of competitive advantage' for the innovator. According to these authors, incremental innovations involve relatively minor changes in technology; whereas, radical innovations involve substantially new technology. Incremental innovations allow the maintenance of efficiencies which are lost when radical innovation occurs since major overhauls in plant, equipment and employee training may be necessary. Rubera and Kirca (2012, p. 143) mentioned that 'our meta-analysis also confirms that radical innovations consistently generate more positive performance outcomes than incremental innovations.'

Even though past researchers have suggested a negative association between centralization and innovation, the scholars in the strategic management discipline are revisiting this dominant view. In a comprehensive review of publications on the subject of organizational structure and innovation, Damanpour and Aravind (2012, p. 509) state that 'the effect of bureaucratic control (formalization of procedure and centralization of decision making) on innovation is not necessarily negative.' The argument of our paper is based on the fact that phenomenal scientific advancements were able to occur in the former soviet bloc countries, often referred to as the newly democratized countries (NDCs). Contrary to previously described study findings, Graham (1998, p. 70) studied Soviet science and scientific breakthroughs and raised the 'perplexing psychological issues' of the Soviet scientists' commitment, sympathy, and loyalty towards communist bureaucracy and 'the hierarchical Soviet scientific system' (p. 87). What is particularly interesting is that former communist or socialist countries have created powerful bureaucratic structures (e.g., Constas, 1961), and radical innovation still seems to have occurred in those centralized structures. Furthermore, there is a dearth of research which focuses on the impact of culture on organizational structure in order to facilitate innovation (Kessler, Nixon, & Nord, 2016). As a result, this article posits that national culture will have a significant impact upon the relationship among environmental uncertainty, organizational structure and innovation and further demonstrates favorable empirical results to the suggested relationship.

Hauser, Tellis, and Griffin (2006) lay out an agenda for research on innovation in which they point to the importance of organizational structure and culture to the innovation process. Certainly knowing what organizational structure will synergistically affect the process will have a profound effect upon both incremental as well as radical forms of innovation. Furthermore, Tellis, Prabhu, and Chandy (2009) made a strong argument for the vital link between corporate culture and radical innovation. Their data contains surveys collected from firms located in mostly developed capitalist countries, with the noted exceptions of China (31 no.) and India (28 no.). They argued that the wrong type of corporate culture will impede radical innovation. In a later published book entitled '*Unrelenting Innovation-How to Build a Culture for Marketing Dominance',* Tellis (2013) reviewed various macro-theories (i.e., religion, climate, geography, patenting, and education) and micro-theories (i.e., Wall Street effect, the size effect, disruptive technology effect, and S-curve effect) relating to innovativeness. After a thorough analysis, he concludes that 'the *internal culture of a firm is the most important driver of a firm's innovation*'

(Tellis ,2013, p. 7). We highlight that Tellis et al. (2009) study did not include *organizational structure* which is the focus of the present study. Interestingly, Rossiter (2011) thoroughly evaluated the methodology used by Tellis et al. (2009) and has reached the following conclusion:

> Tellis et al. (2009), in their article did not contribute any new marketing knowledge. Their study did not employ a valid measure of the construct of "corporate culture" nor a valid measure of "radical innovation," and accordingly they recorded implausibly weak- and untrustable- results' (p. 1584).

Wolfe (1994) reported that past research has concluded that the firm's organizational structure is a primary driver of innovation. Burns and Stalker (1961) coined the terms, organic and mechanistic structure, in their overview of organizational structure. According to these authors, a mechanistic management system is one which is formal and bureaucratic in nature with formalized rules and practices and is appropriate for stable environmental conditions while an organic form is informal and less strictly controlled and is appropriate when conditions are in flux. They further state that large firms tend to shift their product development systems to an organic rather than mechanistic structure in order to facilitate innovation. Calantone, Garcia, and Droge (2003, p. 90) stated that many 'firms adopt a less centralized, more organic structure in dynamic, uncertain environments' to facilitate innovation. Collins, Hage, and Hull (1998) argued that centralization is not conducive to innovation. Menguc and Auh (2010) suggest that a formalized structure enhances certain aspects of performance by improving efficiency and speeding up the decision-making process, but this would be better for incremental innovations rather than for radical innovations as it would improve innovation execution while hampering innovation development. Menguc and Auh (2010) found that as structure becomes more informal in nature, incremental product innovation increases while radical innovation does not improve. They found that regardless of firm size, if a firm has radical product innovation capabilities, then it should utilize an informal or decentralized structure to reap new product success, while incremental product innovation capabilities lead to greater new product success with a formalized or centralized structure. The point appears to be that there must be a fit between firm innovational capabilities and organizational structure to enhance firm performance. While Menguc and Auh (2010) found this relationship for Canadian firms, Prakash and Gupta (2008) found evidence of a positive relationship between formalization and perceived innovation for manufacturing firms in India.

One of the difficulties is that as these types of theoretical foundations involve a variety of complex variables, Damanpour (1996) argues that the limited predictability associated with innovation theory is a result of the complexity of the various factors involved. The need is for the introduction of new areas of study that will help explicate and improve the innovation process and subsequently firm performance. A promising, yet relatively unknown area is the potential role of national culture in the relationship of organization structure and its impact on innovation (Ettlie, Dreher, Kovacs, & Trygg, 1993; Evanschitzky et al., 2012; Goncalo and Staw, 2006; Kedia, 1992; Shane, 1993; Simpson, Kollmannsberger, Schmalen, & Berkowitz, 2002). Several authors have attempted to describe the influence of national culture on organizational structure (Hofstede, 1997; Zeffane, 1989), but little conclusive has yet been accomplished. A recent article by Evanschitzky et al. (2012) found that with a large meta analysis, culture should be considered as an important factor in investigating product innovation. This is an important area for research, especially given the paucity of conclusive findings relative to national culture and innovation.

Thus, this paper significantly contributes to the extant global marketing, innovation, and organization theory literatures by five ways. First, this paper conceptually contradicts the widely accepted notion of the necessity of an organic (informal/decentralized) structure for innovation. Second, we demonstrate, based on a brief historical analysis, that innovation can occur in both mechanistic and organic structures and explain conceptually how national culture can influence desired organizational structure. Third, we find empirical evidence for the suggested hypotheses through the use of novel methodology wherein innovative ways to employ secondary data proxies are shown. Fourth, we propose a new theory of innovation entitled *the Neo-Weberian Contingency Theory of Innovation*. Fifth, we offer a three-dimensional isometric Culture-Structure typology as a useful tool for scholars as well as practitioners when looking to design an organizational structure conducive to innovative forces.

THEORETICAL FOUNDATIONS

Contingency theory

According to Scott (2003, p. 96), Lawrence and Lorsch (1967) coined the term 'contingency theory.' Scott (2003, p. 96) further mentions that 'different environments place differing requirements on organizations.' According to them, 'environments characterized by uncertainty and rapid rates of change in market conditions or technologies present unique challenges (constraints as well as opportunities) for organizations as opposed to stable environments' (Scott, 2003, p. 96). Donaldson (2001) found that the focus of most of contingency theory research had been on organizational structure. Lawrence and Lorsch (1967) conducted empirical studies of various organizations to assess the relation between these types of environments- ranging from high to low uncertainty- and a variety of internal features of each type of organization. Scott (2003, p. 96) also states two assumptions underlying contingency theory: 'a) There is no one best way to organize and b) Any way of organizing is not equally effective.' He further formulates a third assumption to describe the contingency theory which is a branch of systems design: 'The best way to organize depends on the nature of the environment to which the organization relates' (Scott, 2003, p. 96). Donaldson (2001, p. 2) mentioned that 'the organization becomes shaped by the contingencies.' Schoonhoven (1981) also found some empirical support for the hypotheses relating to contingency theory though the author suggests more complicated relationships than are assumed by the contingency theorists. Clearly the type of environmental conditions faced by the organization will have a significant impact on the firm involved. While describing the core contingency theory paradigm, Donaldson (2001) states that there are three core elements in the contingency theory: a) 'association between contingency and the organizational structure' (p. 8), b) 'contingency determines the organizational structure' (p. 7), and c) 'there is a fit between the organizational structure and contingency that has a positive effect on performance' (p. 10). Donaldson (2001) also suggests that national culture can be one of the contingencies provided its causal linkage can be demonstrated to organizational structure. This view is consistent with 'the contingency functionalist explanation of direct causation' (Donaldson, 2001, p. 114) and therefore, we suggest readers not to consider the term contingency synonymous with moderator. We further attempt to advance this thought by incorporating the central concept of fit in the linkage in order to examine its impact on firm performance. To do so, we further highlight the neo-Weberian approach that needs to be included in this study.

The neo-Weberian perspective emphasizes that certain societal and cultural values need

to be present for economic growth (Lipset, 1967). The notions of culture and value-neutrality are insisted by all neo-Weberians (Billig, 2000). While describing the renewed interest of scholars in understanding the cultural paradigm, Harrison (2000, p. xxi) highlights Max Weber's argument that the rise of capitalism was 'essentially a cultural phenomenon rooted in religion.' Interestingly, Patwardhan (2013) argues that cultural values *cause* certain behavior of members of a society. Furthermore, Triandis (2004) states that scholars have traced the existence of the idea of collectivism for past 3,750 years. To the best of our knowledge, these fundamental values such as individualism/collectivism have not changed significantly despite globalization. The central argument of this paper is based on the fact that innovation seems to have occurred in multiple countries having different economic systems. Therefore, we need to examine whether there are any cultural factors associated to the *development* of those economic systems and whether and why innovation was possible in those different economic systems. Consistent with the Weberian thesis, we suggest that the formation of organizational structure can be an unintended consequence of national culture.

Theories of innovation

Chandy and Tellis (1998, p. 474) suggest that 'much of the research relating to radical innovation is rooted in Schumpeter's (1939) seminal work.' A fundamental Schumpeterian hypothesis suggests that 'large firms innovate more "intensively" than small firms do' (Chandy & Tellis, 1998, p. 475). Researchers have tended to study the factors conducive to radical innovation rather than incremental innovation. Chandy and Tellis (1998) also noted that much of the focus is on firm size as a key organizational variable affecting this type of innovation. Evidence in support of this contention can be seen in the fact that more than 100 articles have studied the effects of firm size on innovation (e.g., Acs & Audretsch, 1991). Economies of scale in research and development, stability, and greater access to financial resources are described as the types of advantages that accrue for large firms over small firms. However, Schumpeter (1939, p. 404) himself notes that 'mere size is neither necessary nor sufficient' for superior innovative performance of a large firm. Based on a book written by an economist Abbott Payson Usher (1954), Robertson (1967, p. 14) describes various theories to account for the innovation process. According to him, the scholars in the economics discipline suggest the "transcendentalist" approach that indicates innovation is due to *inspiration of genius* (Robertson, 1967, p. 15). He further states the mechanistic theory was suggested in the sociological thinking. According to Robertson (1967, p. 15), innovation, in sociological thinking, represents 'an accumulation of many individual items over a relatively long period of time.' Robertson (1967, p. 15) further concludes that economist Usher proposed a combination of these views by suggesting the following four steps as key to the innovation process:

a) Perception of the problem: for innovation to occur, a problem must first be felt to exist.
b) Setting of the stage: some particular configuration of events to be brought together.
c) The act of insight: where the solution is found.
d) The critical revision: the innovation is analyzed for its practical use.

Furthermore, Wolfe (1994, p. 406) mentions the convergence among innovation researchers as follows:

a) There can be no *one* theory of innovation, as the more we learn, the more we realize that 'the whole' remains beyond our grasp;
b) Several adequate, circumscribed, theories of innovation exist, but each

applies under different conditions; therefore,
c) Researchers' efforts should be directed at determining the contingencies that govern when various innovation theories hold.'

Environmental uncertainty, organization structure and innovation

Burns and Stalker (1961) describe two contrasted forms of management system: mechanistic and organic. They suggest that the mechanistic management system is suitable for stable conditions and is characterized by clear *hierarchical* structure, task specialization and clear understandings of rules and responsibilities by all operating within the system. They then suggest that the organic form is 'appropriate to changing conditions, which give rise constantly to fresh problems and unforeseen requirements for action which cannot be broken down or distributed automatically arising from the functional roles defined within a hierarchic structure' (Burns & Stalkers, 1994, p. 121). This management system is characterized by collaboration across ranks and the continual reshaping of tasks and decision making as conditions change.

Damanpour (1996) highlighted commonly cited contingency factors such as environmental uncertainty, organizational size, and the nature of the industrial sector. He further mentions that organizations need to process more information for decision-making when environmental uncertainty is high. According to the author, environmental uncertainty would positively impact the rate of innovation. When the environmental uncertainty is low, organizations would not be innovative and/or structurally complex. However, variety in both innovation and structural complexity in organizations increases due to increase in the environmental uncertainty. Damanpour (1996) further provides an example of the result of higher environmental uncertainty. He suggested that it may be possible that some organizations will try to develop expertise by creating "specialized staff positions and units to secure and evaluate relevant information" (Damanpour 1996, p. 696). Due to higher environmental uncertainty, some organizations 'may adopt a flexible structure and reduce their size by decentralizing decision making to the lowest levels' by creating impendent, specialized, and smaller units (Damanpour, 1996, p. 696). In other words, the author suggests that environmental uncertainty would most likely lead the organization to adapt to an organic type of management structure. This was corroborated by a study by Menguc and Auh (2010) in which the authors found that for high tech firms in Canada, an informal or organic structure aids in the development of incremental innovation.

According to Russel (1990), there is empirical support for higher levels of innovation when environmental uncertainty is high. He also suggests that higher levels of innovation are linked with decentralization and lower levels of formalization in organizations. Damanpour (1991) reviews various literatures relating to organizational attributes and innovation. While describing the independent variable *formalization*, the author predicts a negative effect on innovation. In support of this prediction, he cites the literature that describes low levels of formalization as an important factor for openness which encourages new ideas. While further predicting negative impact of the independent variable *centralization* on innovation, the author states that 'the concentration of decision-making authority' negatively impacts innovation whereas 'the dispersion of power' positively affects innovation (Damanpour, 1991, p. 558). Khan and Manopichetwatana (1989) also state that there is an inverse relationship between innovation and both formalization and centralization.

Damanpour and Aravind (2012) later updated studies relating to organization structure and innovation. According to them, Damanpour (1991) covered pre-1990 empirical studies in this area wherein the author had concluded negative associations between centralization and innovation. Those results were consistent with the dominant view that the characteristics relating to mechanistic structure (based on Burns & Stalker, 1961) were less conducive to innovation. Interestingly, Damanpour and Aravind (2012, p. 503) also reviewed articles published from 1990 to 2009 and conclude that 'bureaucracy may not necessarily inhibit innovation.' According to them, the focus of scholars has now shifted from an organic to an ambidextrous structure. They further suggest that more scrutiny is required in the prevailing argument whether one type of innovation requires more of an organic structure than another type. We attempt to contribute in this debate by highlighting the role of national culture and history of innovation in Soviet Union. We also attempt to empirically test suggested relationships by using data gathered from former communist or predominantly socialist countries.

National culture, organizational structure, and innovation

In a seminal article, Hofstede (1980, p. 43) defines culture as 'the collective mental programming of the people in an environment.' He further states that 'culture is not a characteristic of an individual; it encompasses many people who were conditioned by the same education and life experience.' Hofstede (1980) argues that national culture refers to the collective mental programming that is different from that of other groups in other nations that these people have in common. While describing the concept *national culture*, Hofstede (1980) suggests operationalizing it using four dimensions: Power Distance, Uncertainty Avoidance, Individualism-Collectivism, and Masculinity-Femininity. Power Distance indicates 'the extent to which a society accepts' (Hofstede, 1980, p. 45) the unequal distribution of the power among the members of society. Uncertainty Avoidance indicates 'the extent to which a society feels threatened by uncertain and ambiguous situations and tries to avoid these situations by providing greater career stability, establishing more formal rules, not tolerating deviant ideas and behaviors, and believing in absolute truths and the attainment of expertise' (Hofstede, 1980, p. 45). He further describes the third dimension i.e., individualism and collectivism. According to Hofstede (1980, p. 45), individualism indicates 'a loosely knit social framework in which people are supposed to take care of themselves and of their immediate families only' whereas collectivism implies 'a tight social framework in which people distinguish between in-group and out-groups; they expect their in-group (relatives, clan, organizations) to look after them, and in exchange for that they feel they owe absolute loyalty to it.' For Hofstede (1980, p. 46), masculinity is 'the extent to which the dominant values in society are seen as "masculine"- that is, assertiveness, the acquisition of money and things, and not caring for others, the quality of life, or people' as opposed to societies in which the predominate values are feminine in nature such as nurturing and concern for quality of life, the environment, and the concern with other people. Hofstede's operationalization of culture is considered as 'ground-breaking contribution to the field of cultural research' (Venaik & Brewer, 2010, p. 1295). Because Hofstede's cultural dimensions are still widely used in the cross-cultural marketing research (e.g., Engelen & Brettel, 2011), we consider it as the most appropriate for our research.

Various researchers have explored the relationships among national culture, innovation, adoption or diffusion of technology, new product development and creativity. Shane (1993) observed differences in the rates of innovation depending on the cultural values of citizens.

Ralston, Holt, Terpstra, and Yu (1997) assessed the relationship between national culture and economic ideology. They suggested that certain cultures are more conducive to a specific economic ideology. This linkage can have an impact on the formation of desired organizational structures in various cultures and innovation. Goncalo and Staw (2006) revealed that individualistic values may be particularly beneficial for creativity. Waarts and Everdingen (2005) found that National Culture affects even the adoption of technology within organizations. These authors argued that employees belonging to the organizations in individualistic countries get more opportunities and free hand to develop new products compared to those in collectivistic societies. Based on a study published by Hofstede (2001), they further mention that more numbers of patents are awarded in individualistic countries than in collectivistic countries (Waarts & Everdingen, 2005). Kedia and Bhagat (1988) described how culture can influence the absorption and diffusion of technology. This has been extended to the role of national culture on new product innovation in the studies of Nakata and Sivakumar (1996) and Rhyne, Teagarden, & Panhuyzen (2002). Taylor and Wilson (2012) analyzed various datasets of variables relating to culture and innovation from 62 countries covering almost two decades. They found robust, significant, strong and positive effect of individualism on innovation. However, Taylor and Wilson (2012, p. 234) also note that 'a certain type of collectivism (i.e., patriotism and nationalism) can also foster innovation at the national level.'

While analyzing relationship between culture, creativity, and innovation, Westwood and Low (2003, p. 253) suggest that scholars should adopt a contingency view and conclude with the following:

> There are different processes, mechanisms, and structures through which creativity and innovation can emerge. Cultures are creative and innovative within the context of their own systems and to the extent that circumstances require creative and innovative solutions. No one culture is best for innovation and no one culture can claim a superiority of ideas.

Interestingly, Ambos and Schlegelmilch (2008, p. 202) found some empirical support for the relationship between culture and R&D performance and have urged multinational corporations to give national culture 'a more prominent role in deciding where to locate an overseas R&D laboratory.'

We highlight the fact that Hofstede's original project did not include countries then under a state of socialism. Similarly, most of the studies relating to the topic of innovation and scientific advancements seem to have conducted in the western countries (Graham 1998). This limitation necessitates exploring the possible factors that might have caused the phenomenal scientific advancements in the former socialistic countries. Numerous studies have described how bureaucracy became powerful in those countries, and the USSR (the Soviet Union) was not only a socialist state but was also considered a superpower during the cold war. This certainly supports the logic of its inclusion in this important research.

Soviet culture and science

Graham (1998) stated that Soviet science was very strong in particular areas. According to him, the USSR was the world's first country a) 'to build an atomic power plant' (Graham, 1998, p. 85), b) 'to launch an artificial satellite' (Graham, 1998, p. 85), c) 'to launch a human being into the space' (Graham, 1998, p. 85), and d) to suggest the popular model for nuclear

fusion. The USSR was seen as a world leader for many decades in mathematics and in some areas of theoretical physics. Graham (1998) also mentioned that the USSR made strong contributions in various fields such as solid-state chemistry, oceanography, theoretical seismology, metallurgy, theoretical astrophysics, climate research, and magnetohydrodynamics. The country had almost one million engineers those are more than any other country in the world. Eighty percent of those engineers worked for the military-industrial complex, and most of them were strongly sympathetic towards the system. A senior research associate at the Institute for History of Science and Technology at the Russian Academy of Sciences stated that the Soviet Union, a country with limited resources, could compete primarily in the military technology due to the Cold War (Moore, 2006). However, Graham (1998, p. 56) further described his experience in working on a panel for the National Academy of Sciences in Washington, D.C. that was charged with *evaluating the quality of Soviet Science*. Many distinguished American natural scientists, who were familiar with Soviet science in their particular fields, were appointed to the panel. Graham (1998) further notes that those outstanding American scientists provided *strong evaluations regarding the quality of the Soviet work.*

Constas (1961) described how the Communist bureaucracy was part of Soviet culture. The author further stated that the Communist party controlled all major social institutions along with the universities, the state and the economic system. Bailes (1978, p. 409) described the conflict between the Soviet techno-structure and the Communist party by pitting the technical specialists, who were mostly from the urban middle class, against 'a sea of peasants and working class people' in the Communist party. Graham (1998, p. 55) mentioned in his work that 'probably half of the engineers in the Soviet Union in the late 1920s were eventually arrested' and persecuted. Still the author further questions how the Soviet scientists could possibly remain loyal toward the system. It is the contention of this study that exploring the effect of national culture on organizational structure might provide some explanation for the seemingly inconsistent loyalty of Soviet scientists towards the hierarchical system.

Ralston et al. (1997, p. 187) found that national culture in Russia is more *individualistic-oriented*. However, they suggest that economic ideology in Russia is more collectivistic in nature. Ralston et al. (1997) cite a study in which scholars found mixed results surrounding the nature of individualism in Russia. One of the reasons for these mixed results can be found by analyzing the geographic location of Russia which is in both Asia and Europe. Regional cultural impact has produced European Russians with a significant individualistic orientation while Asian Russians demonstrate a more collectivistic orientation. The study also suggests higher uncertainty avoidance and somewhat higher power distance in Russian culture. We have used history of innovation in the former Soviet Union just as an example to elucidate our point that there is a need to explore the role of national culture on the formation of organizational structure conducive to innovation.

HYPOTHESES

Even though we have reviewed the past literature regarding environmental uncertainty, the emphasis of this study is to explore impact of national culture on the organizational structure that is conducive to innovation. Therefore, we do not suggest any hypothesis relating to the environment. Instead, we have included control variables capturing competitive environment in the empirical analysis. It seems that the masculinity-femininity dimension is not relevant in an examination of the impact of national culture on organizational structure. Shane (1993, 1995)

found that the rates of innovation are more heavily associated with uncertainty avoidance. Hofstede (1997) argued that Power Distance (PD) and Uncertainty Avoidance (UA) are more important dimensions to be used while studying the impact of national culture on the structure of organizations. High PD and high UA should *lead* to a centralized structure; whereas, low PD and low UA should *lead* to a decentralized structure. Burns and Stalker (1994, p. 120) characterized the mechanistic structure by the 'insistence on loyalty to the concern and obedience to superiors as a condition of membership.' These authors also characterized the organic structure as 'commitment to the concern's tasks and to the technological ethos of material progress and expansion are more highly valued than loyalty and obedience' (Burns & Stalker, 1994, p.121). Both these descriptions suggest collectivism and individualism respectively. We also note that the countries that are predominantly socialistic tend to have higher power distance, higher uncertainty avoidance and medium to higher collectivism [please see cultural scores for countries such as Bulgaria, Poland, Romania, Russia, Serbia (Hofstede website)]. Based on the detailed descriptions of mechanistic and organic structures (Burns and Stalker, 1961, 1994), the findings of Waarts and Everdingen (2005) and Menguc and Auh (2010), along with the definitions of individualism and collectivism (Hofstede, 1980), the following hypotheses are posited:

H1: A higher level of collectivism is a significant determinant of a mechanistic organizational structure in a country.

H2: A higher level of power distance is a significant determinant of a mechanistic organizational structure in a country.

H3: A higher level of uncertainty avoidance is a significant determinant of a mechanistic organizational structure in a country.

H4: In a firm located in predominantly socialistic country, where power distance, uncertainty avoidance and collectivism tend to be higher, a mechanistic structure is a significant determinant of higher levels of innovation.

EMPIRICAL ANALYSIS

In this section, we use country and firm-level data to look at the effect of culture on firm organization (mechanistic versus organic) and the effect of firm organization on various measures of innovation. We have analyzed the relationship suggested above in two steps. First, we test the effect of various dimensions of national culture on organization structure at the country level. In the second step, we test the effect of organizational structure on innovation at the firm level. The decision to conduct this analysis in two steps was strictly based on availability of secondary sufficient data. Additionally, we are able to demonstrate two ways to operationalize organizational structure through the use of secondary data proxies. Houston (2004) enthusiastically encouraged marketing researchers to consider this widely accepted practice in disciplines such as finance, economics, and health care administration. We further describe the data that we use and then present the empirical models and the results of the estimation.

Data

To look at the first question – the impact of culture on firm structure—we use country-level data from the Global Competitiveness Report (Schwab, 2010). Although most of the data in the Global Competitiveness Report is derived from a firm-level survey (the Executive Opinion Survey), the report only presents data at the country-level (i.e., averaged across all surveyed the firms from the Executive Opinion Survey for that country). The focus on country-level data is, however, appropriate given that culture is measured at the country level (Hofstede, 1984). Huang, Rode, and Schroeder (2011) have highlighted the lack of consensus among scholars while operationalizing organizational structure described in the seminal work of Burns and Stalker (1961). In the present study, we attempt to demonstrate the ways to measure organic and mechanistic structures. In this step, the dependent variable is a measure of organizational structure. It is based on a question from the Executive Opinion Survey that asks "In your country, how do you assess the willingness to delegate authority to subordinates? (1=low—top management controls all important decisions; 7=high—authority is mostly delegated to unit heads and other lower-level managers). We classify firms' organization as more organic when delegation is high and as more mechanistic when delegation is low. This is consistent with the description of mechanistic and organic structures and, therefore, satisfies the criterion of content validity. In fact, such single item measurement is sufficient when a construct is precise and focused [Bergkvist & Rossiter, 2007; please also see Rossiter (2011) for details]. Additionally, there are many studies that have used secondary data proxies in an innovative way. For example, Craig, Greene, and Douglas (2005) used 'the number of McDonald's outlets per capita in a country' to measure *the degree of Americanization*. Therefore, we emphasize that our novel ways to operationalize organizational structure in the available secondary data are most appropriate. The main independent variables of interest are Hofstede's cultural dimension variables, which were obtained from Hofstede's website. Even though, we have not stated any hypothesis relating to masculinity-femininity dimension, we have conducted regression analysis just to explore relationship. In addition, we include several additional economic variables to control for other country-level differences that might affect organizational structure. These were obtained from the World Bank's World Development Indicators database (World Bank, 2011).

Empirical studies of firm-level data have often found that subjective data from firm surveys is correlated with objective measures of the same phenomena. Hallward-Driemeier and Alterido (2009), for example, find that many subjective measures of the investment climate from the World Bank's Enterprise Surveys are significantly correlated with objective data. Using similar data from firm surveys in Africa and Europe and Central Asia, Gelb, Ramachandra, Kedia-Shah, & Turner (2007) and Hellman, Jones, Jaufmann, & Schankerman (1999) also find that objective and subjective measures of the business environment are correlated. Other studies, however, have found that subjective measures from firm surveys can be affected by things unrelated to phenomena that the questions directly address. In particular, Kaplan and Pathania (2010) find that perceptions appear to be affected by the business cycle. Clarke (2011a) also found that in addition to affecting managers' perceptions about power infrastructure, a major power crisis in South Africa also affected perceptions about other areas of the investment climate. That is, rather than reflecting their opinions of firm organization, managers responses might also reflect their overall opinions about the business climate in the country. To avoid any problems with short-term shocks or the business cycle affecting managers' subjective opinions about firm organization, we average responses over a ten-year period (2001-2010) to lessen these

effects. Given that culture is thought to change slowly over time, this seems appropriate. Moreover, to the extent that this affects our estimation, any noise associated with measurement error is likely to make it more difficult to find statistically significant results.

To look at the second question—the impact of firm structure on innovation—we use data from the Management, Organization and Innovation (MOI) survey, a joint initiative of the Enterprise Survey group at the World Bank and the European Bank for Reconstruction and Development. This data is preferable to the country-level data from the Global Competitiveness Report because it is available at the firm-level and so we are able to associate microeconomic differences in firm organization directly with the firms' own activities related to innovation. The Management, Organization and Innovation (MOI) survey was administered to about 1800 manufacturing firms with between 50 and 5000 employees in 12 countries in late 2008 and early 2009. The survey questionnaire was designed based on the World Bank's Enterprise Survey and a management survey designed by Bloom and Van Reenen (2007; 2010). The sample was randomly selected from a sample frame that was based on the Orbis database produced by the Bureau van Dijk for most countries and was supplemented with official lists in Kazakhstan and Uzbekistan. The 12 countries included ten transition economies in Europe and Central Asia (Belarus, Bulgaria, Kazakhstan, Lithuania, Poland, Romania, Russia, Serbia, Ukraine and Uzbekistan), India and Germany [please see World Bank (2010) for more details on the survey]. The constitution of India clearly describes India as a socialist country (National Portal-Government of India website). The inclusion of India and Germany with the group of former communist countries is also justifiable considering the stronger bureaucracies found in those countries [e.g., Economist 2003; India's Year 2013 ranking at 134 on the World Bank's (2014) "ease of doing business" factor]. Sample characteristics are provided in Tables 1(a) and 1(b) (Appendix).

Because data on culture relating to Hofstede's (1980) methodology are only available for seven out of 12 countries (i.e., Bulgaria, Serbia, Germany, India, Poland, Romania and Russia), we do not attempt to merge these two sources of data for this analysis. As mentioned earlier, we test the relationships suggested in the hypotheses in two steps.

Country-level empirical analysis

Before we use the firm-level data to assess the link between organizational structure and innovation, we first look at the link between culture and organizational structure using the country level data from the Global Competitiveness Report. To estimate the impact of culture on organizational structure, we regress the measure of organizational culture (willingness to delegate) on the four indices of culture and several economic control variables. The model, which is estimated using ordinary least squares, is:

$$\text{Willingness to Delegate}_i = \alpha + \beta Culture_i + \gamma Controls_i + \epsilon_i$$

Willingness to delegate i is the average rating between 2001 and 2010 of country i on the measure of willingness to delegate from the Global Competitiveness Report. As discussed above, the average is used to reduce the impact of the business cycle on firm perceptions. Since culture changes slowly, it seems appropriate to use an decade average rather than a single year. More mechanistic organizational structures are associated with less delegation. The main variables of interest are the measures of culture in country i, Culture i. The four indices of culture represent individualism, masculinity, power distance, and uncertainty avoidance.

Control Variables: To control for other country differences, several macroeconomic variables are included. To avoid the potential for reverse causation, we measure the macroeconomic variables in 2000 (i.e., in a period prior to the period used for the measure of firm structure). The one exception is the secondary enrollment rate that is the ratio of total secondary enrollment to the population of the age group that officially corresponds to the level of secondary education (World Bank, 2011). We measure it as an average between 1998 and 2002 because data on enrollment rates is often missing. Therefore, measuring this variable in 2000 would result in a large drop in sample size.

The first economic variable, per capita Gross Domestic Product (GDP), is included to allow for differences between high and low income countries. As discussed below, market size will generally be larger in richer economies. Firms operating in small domestic economies might tend to be smaller than firms in larger economies. Because delegation is more necessary in large firms, market size might affect the extent of delegation. A second reason to include per capita GDP is that workers in high income countries are better educated than workers in poorer economies. Because of this, it might be easier to delegate authority in these countries. For the same reason, we also include a direct measure of educational attainment in some specifications: the secondary enrollment rate. Competition might also affect firms' willingness to delegate and so we include a measures associated with openness: exports and imports as percent of GDP. We expect competition in local product markets to be higher in countries that are more open to trade. Inclusion of openness also captures environment. Finally, we include population as an additional measure of market size.

Results

a) National Culture and Organization Structure: As indicated in Table 2 (Appendix), the results are consistent with hypotheses H1-H3. Column 1 in the table 2 indicates regression results without controls. Column 2 provides results with two control variables such as per capita GDP and populations. Column 3 shows regression results with additional control variables such as openness (i.e., environment) and secondary enrollment. The coefficients on all dimensions of national culture are statistically significant at conventional significance levels. Delegation is higher in countries where individualism is higher, power distance is lower, and uncertainty avoidance is lower. This suggests that higher levels of collectivism, higher levels of power distance, and higher levels of uncertainty avoidance are associated with more mechanistic organizational structures. These results are robust to the inclusion of the macroeconomic variables.

b) Macroeconomic controls: The coefficients on per capita GDP and population are positive and statistically significant. As discussed above, the positive coefficient on per capita GDP could reflect that organic structures become more common when educational attainment is higher or that they are more common in large domestic markets. The positive coefficient on population could also reflect market size. The coefficients on the other two variables are statistically insignificant at conventional significance levels.

Firm-level empirical analysis

To estimate the impact of firm structure on innovation, we regress four measures

of innovation on our measure of firm structure and a series of control variables. They are: (i) a dummy variable indicating whether the firm introduced new products or services between 2006 and 2008; (ii) a continuous variable indicating the percent of sales in 2008 that were new products introduced between 2006 and 2008; (iii) a dummy variable indicating that the firm had a patent in their home country; and (iv) a dummy variable indicating that the firm had a patent in another country. Many scholars, such as Hasan and Tucci (2010), Schoenmakers and Duysters (2010), Sivakumar, Roy, Zhu, and Hanvanich (2011) have used and cited past studies that indicated appropriateness of patent data as a proxy for radical innovation.

Because three of the four variables are dummy variables, the ordinary least squares is not appropriate. We, therefore, model the propensity to innovate in the following way. First, we assume that the propensity to innovate for firm i in sector j in country k is:

$$\text{Propensity to Innovate}_{ijk} = \delta_1 \text{Organization}_{ijk+} \beta X_{ijk} + \gamma_j + \eta_k + \epsilon_{ijk}$$

We then assume that the firm actually innovates (i.e., gets a patent, starts a new product line) when the propensity is high enough:

$$\text{Innovation}_{ijk} = \begin{cases} 0 \\ 1 \end{cases} \quad \text{if} \quad \begin{matrix} -\infty \\ 0 \end{matrix} < \text{Propensity}_{ijk} \leq \begin{matrix} 0 \\ \infty \end{matrix}$$

The error term, ε, is assumed to have a normal distribution and so the model is estimated using standard maximum likelihood estimation (i.e., probit). Bliss (1934) introduced these models. The final variable is a limited dependent variable (i.e., new products make up zero percent of firms for many firms). To account for this, we estimate the model as a standard Tobit model (Tobin, 1958). That is, we assume the error term is normally distributed and we estimate using standard maximum likelihood estimation. Maddala (1983) provides a recent introduction to the literature on these models. In addition to the error term, the propensity to innovate is assumed to vary across sectors and across countries (γj and ηk) and so we include country and sector fixed effects in all regressions. This controls for country-level differences that affect innovation (e.g., government tax or regulatory policies that encourage or discourage innovation) and sector-level differences that do the same (e.g., innovation might be less common in mature sectors of the economy).

The main variable of interest is the variable representing organizational structure. This variable is a continuous variable representing the number of reporting levels between the average factory worker and the factor manager. This information was collected in the survey by asking a series of questions starting with "Who does the typical production employee report to?" If the typical production worker reports to the top manager in the factory, then the chain is complete and the variable is coded as 0. If not, then the interviewer asks who the employee that the production worker reports to reports to. If that employee reports to the top manager, the variable is coded as "1" (i.e., 1 level between a production worker and the top manager). If not, the interviewer asks who that employee reports to until the top manager is reached. The World Bank's manual describing the survey questionnaire gives the following example of how the interview might be conducted for this question (World Bank, 2008):

Interviewer: "Who does the production employee report to?"
Manager: "The factory manager."
Interviewer: "Who does the factory manager report to?"
Manager: "The operations manager."
Interviewer: "Who does the operations manager report to?"

Manager: "The VP of Operations."
Interviewer: "Who does the VP of Operations report to?"
Manager: "The Top Manager." '

Once the interviewer reached the top manager, the information is complete. In this case, there are three levels between a production worker and the top manager (the factory manager, the operations managers, and the VP of Operations) and so the variable would be coded as "3".

On average, there were 3 levels between the average production worker and the top manager in the factory. The greater the number of levels, the more mechanistic the organization is assumed to be. Here again, this operationalization satisfies the content validity criterion referring to organizational structures described by Burns and Stalker (1961) and therefore, is sufficient and most appropriate for our research. A positive coefficient on this variable would therefore indicate that firms with a mechanistic organizational structure innovate more, while a negative coefficient would indicate the reverse.

Although the survey was administered to both single- and multi-plant establishments, we restrict the analysis to single-plant establishments. We do this because of the difficulties of comparing organizational structure between multi-plant establishments, with some with plants in multiple countries, and simpler single plant establishments. In particular, the reporting chain is likely to be quite different for multi- and single-plant establishments.

It should also be noted that we do not include the variables representing national culture directly in the regression nor do we try to use them as instruments for organizational structure in a first-stage regression. There are two practical reasons for this. First, although we have data for over 700 firms, these firms are from only 12 countries. Since the variables representing national culture are the same for all firms within a country, there is not enough variation in the variables representing national culture to estimate precise coefficients in either a first-stage or second-stage regression. Second, since the variables representing national culture are measured at the country level, they would be co-linear with country dummies. This prevents us from including them in either a first- or second-stage regression.

Control Variables: In addition to the variable representing organizational structure, the model also includes several control variables. First, several recent firm-level studies that have looked at innovation in the transition economies of Europe and Central Asia have found that competition affects firms' ability and willingness to innovate (Carlin, Fries, Schaffer, & Seabright, 2001, 2004; Clarke, 2011b; Gorodnickenko, Svejnar, & Terrell, 2010; Hall, Jaffe, & Traajtenberg, 2001; World Bank, 2004;). Since competition might also affect organizational structure, we include several variables to indicate the level of competition in local markets. First, we include an index variable indicating the number of competitors that the firm competes against in local markets. The index takes four value (1-no competitors; 2-a single competitor; 3- between 2 and 5 competitors; and 4-more than five competitors). Results for the main variables of interest are similar in terms of size and statistical significance of the main coefficients when we replace the index with four dummy variables representing each group separately.

We include two dummy variables to further explore interaction between competition and firm performance. These variables indicate whether the firm competes against multinationals and whether it competes against imports. Competition with foreign-owned firms appears to be particularly important for innovation (Clarke, 2011a; Gorodnichenko et al., 2010). This could be because foreign-owned firms from developed economies tend to be more advanced than local firms and therefore, encourage their competitors to innovate.

The controls also include a number of variables indicating ownership for foreign and state-owned firms. State-owned firms, in particular, might be less likely to innovate if they have less resources for investing in research and development or if they are protected against competition by regulatory or trade barriers (Gorodnichenko et al., 2010). Although previous studies have not found strong evidence that foreign ownership encourages firms to be innovative, many studies include this as a control variable (Ledermann, 2011; Clarke, 2011a). Because privatized firms in the transition economies often behave differently from firms that were formed as private firms (Djankov & Murrell, 2002), we include a dummy variable indicating whether the firm is a de novo private enterprise. Finally, the regressions include two variables indicating firm age and size. On average, larger firms are likely to have more layers of management than smaller firms and are also more likely to innovate. But previous studies have also found that they are more innovative (Carlin et al., 2004; Clarke, 2011b; Ledermann, 2010). It is, therefore, important to control for this in the empirical analysis. Firm age might also affect organizational structure and the likelihood of innovation (Carlin et al., 2004; Gorodnichenko et al., 2010).

Results

a) Organizational Structure and Innovation:

As indicated in Table 3, the coefficients on the organizational variable are positive and statistically significant in all four regressions. This indicates that firms with a more mechanistic structure (i.e., with more layers) are more likely to produce new products, are more likely to have local and foreign patents and that new products introduced in the past three years account for a greater share of their sales. All of these results are consistent with the idea that firms in predominantly socialistic countries are more innovative.

The differences are relatively large. The coefficient estimates from the model suggest that for the average firm in the sample, increasing the number of layers between the top manager and a production worker from three layers (just below the mean) to four layers (just above the mean) would increase the likelihood that the firm has introduced a new product by four percentage points (from 69 percent to 73 percent), that the firm has a local patent by four percentage points (from 33 to 37 percent), that the firm has a foreign patent by two percentage points (from 8 to 10 percent) and increases the share of sales made up by new products by four percentage points (from 11 percent to 15 percent).

b) Control Variables:

Ownership: For the most part, the coefficients on the ownership dummies are statistically insignificant at conventional significance levels. The only exceptions to this is that the coefficient on the dummy variable indicating that the firm is state-owned is negative and statistically significant in the regression indicating whether the firm has introduced a new product. The point estimate suggests that state-owned firms are about 18 percentage points less likely to have introduced a new product in the three years before the surveys (52 percent compared to 70 percent from private firms). New products also accounted for a lower share of output for state-owned firms—but the coefficient was not statistically significant.

Firm Size and Age: The coefficients on the variable indicating firm size (i.e., number of workers) are positive in all four regressions and are statistically significant in

three of the regressions. Large firms are more likely to have introduced a new product and are more likely to have local and foreign patents. For the average firm in the sample, increasing the number of workers from the mean value (about 226) by 10 percent would increase the probability that the firm develops a new product by 0.5 percentage points, the probability that it has a local patent by 0.75 percentage points, and the probability that it has a foreign patent by 0.3 percentage points. The coefficients on firm age are also positive indicating that older firms are more likely to innovate than younger firms. In two cases, the coefficients on firm age are statistically significant.

Competition: The coefficients on the index variable indicating the level of competition in local markets are positive but statistically insignificant in all four regressions. There is, however, some evidence that competition from multinational enterprises and imports might encourage innovation. For the average firm in the sample, competing with multinationals increases the likelihood that the firm introduced a new product by nine percentage points and increased the share of new products in sales by six percentage points.

The coefficients on the dummy variable indicating that the firm competes with imports are positive and statistically significant in all four regressions. For the average firm, competing with imports increases the likelihood that the firm introduces a new product, has a local patent, and has a foreign patent by seven percentage points, ten percentage points, and five percentage points respectively.

GLOBE DATA AND COUNTRY LEVEL ANALYSIS

There appears to be an ongoing debate between Hofstede and GLOBE proponents. Due to space limitations, we do not discuss details of this debate in this paper. However, we repeated the first step of analysis i.e., impact of national culture on organization structure, by using the GLOBE data (Table 4, Appendix) to check robustness of our results.

We used the as-is Globe measures of culture and found interesting results. Similar to Hofstede's masculinity measures, the coefficient on gender egalitarianism (as is) is statistically insignificant. The coefficient on in-group collectivism (as-is) is statistically significant and positive. Since higher scores on this measure indicate greater collectivism, whereas higher scores on Hofstede's index indicate greater individualism, this is consistent with the results using Hofstede's measures. For the other two variables, the results using the Globe measures are not consistent with the results using Hofstede's measures. The coefficient on the as-is power distance measure is statistically insignificant. Moreover, the coefficient on the as-is uncertainty avoidance measure has the opposite sign to the coefficients using Hofstede's measures and is statistically significant. It is, however, important to note that Hofstede's measure of uncertainty avoidance is negatively and significantly correlated with the Globe measure of uncertainty avoidance. (Hofstede, 2006; Vernaik & Brewer, 2010).

It is noteworthy that when the various dimensions of Hofstede have been tested psychometrically, the only characteristic that appears to hold up in repeated comparative testing is individualism-collectivism (Smith, Dugan, & Trompenaars, 1996). This supports the contentions of Harry Triandis that the only relevant national cultural characteristic that seems to be consistent across all approaches to national cultural characteristics is individualism-collectivism (Triandis, 1989, 1993, 1995). In fact it is important to reflect on the fact that Hofstede's own approach to the identification and validation of several of his national characteristics indicated close relationships among several of his dimensions, particularly

individualism-collectivism and power distance, and there was also a connection in his original measurement scales with individualism-collectivism and masculinity-femininity (Smith et al. 1996). This really raises the question about whether individualism-collectivism is the driver of many of the other identified national cultural characteristics found in Hofstede's original 1980 work.

Interestingly, Shenkar (2001) and Tung and Verbeke (2010) have stated that individualism-collectivism and uncertainty avoidance are more critical in analyzing managerial phenomenon. Because innovation is a managerial phenomenon (Cerne, Jaklic, & Skerlavaj, 2013), the consistency in our results by analyzing both Hofstede and the Globe measures significantly contributes to the relevant literature.

DISCUSSION AND MANAGERIAL IMPLICATIONS

It seems that there was consensus among various scholars about the need for an organic structure for innovation to occur (c.f., Calantone et al., 2003; Damanpour, 1996; Menguc and Auh, 2010). Hauser et al. (2006, p. 694) suggested that 'as organizational improvisation has been found to increase design effectiveness in situations of high environmental turbulence, such as is frequently found in high technology industries, less bureaucratic or more organic forms may be more useful organizational mechanisms in these instances.' Various authors also agreed about the detrimental effect of mechanistic structure on innovation (c.f., Burns & Stalker, 1961; Damanpour, 1991). This dominant view seems to have changed now from organic to ambidextrous (Damanpour & Aravind, 2012). We draw attention to the fact that Soviet Scientists were able to innovate under a mechanistic structure. The real question that now arises due to recent findings by Menguc and Auh (2010) and Prakash and Gupta (2008) is that the difference may lie in the nature of the innovation as a contributor. Incremental innovation may be more apt to spring from a mechanistic structure as opposed to radical innovation which can spring from an organic structure. This may differ, however, in a national cultural setting as it would be hard to argue that Russian innovation was not radical in nature. Soviet Scientists were clearly innovative. One of the authors notes his own personal observation of the excellent evaluations given by American scientists to the work of Soviet scientists (Graham 1998). Baumol (2002) also provides evidence of abundant inventions in the Soviet Union. We reveal the dearth of literature that studies the effect of the variable "national culture" on the desired organization structure and innovation. We further empirically demonstrate that national culture may have a significant effect on the relationships among environmental uncertainty, organizational structure, and innovation. To do so, we have used firm-level data collected from 12 former communist or socialist countries. We further propose a three-dimensional isometric culture-structure typology as a useful tool for scholars as well as practitioners while predicting the potential for innovation in a particular nation (Figure 1, Appendix).This typology is based on the previously-discussed literature along with Hofstede scores for the cultural dimension for various countries (Geert Hofstede website). For example, Hofstede scores on cultural dimensions for the United States, India and Russia are as below:

	U.S.	India	Russia
Power Distance	40	77	93
Individualism	91	48	39
Uncertainty Avoidance	46	40	95

Therefore, the United States can be shown somewhere between rectangles 7 and 8, India can be shown somewhere between rectangles 3 and 4, and Russia may be shown in rectangle 2. It is the hope of these authors that further cross-cultural and cross-national studies be conducted that includes former socialistic countries across the globe.

So what does this mean for marketing management? It means that there are opportunities for structuring the organization that will facilitate innovation which can be determined more effectively by examining the type of innovation sought, the nature of the various levels of culture involved (both national as well as corporate), the nature of the competitive environment, and the level of management cross-boundary commitment. The point here is that the former Soviet States provide an anomaly to the preponderance of the evidence about organic vs. mechanistic structure and innovation, and this raises new strategic options for firms in improving the success of new product offerings and enhancing form profitability, and innovativeness being such an important element of corporate image, this raises the bar for brand/corporate image management. The picture is more complex than was once thought, but marketers will have more opportunities in their strategic decision toolbox than they had before. As marketing gains credibility in corporate boardrooms, the potential for impact on overall corporate organizational structure and refinement will increase. Certainly as Hauser et al. (2006) have suggested, cross-functional boundary spanning is essential for the health and well-being of the organization, and marketing's role in organizational structure has an important bearing on new product development and success.

CONCLUSION

We examine the nature of innovation and contexts in which it occurs. Even though various scholars suggested the need for an organic (decentralized) structure for innovation to occur, this paper highlights the fact that significant innovation was able to occur under centralized (bureaucratic) structures in the former socialistic countries. The premise of this paper is that innovation can occur in both organic and mechanistic structures depending on the national culture. We further state the widely-accepted definition of theory (Hunt, 2010, p. 173) as below:

> A theory is a systematically related set of statements, including some law-like generalizations, that is empirically testable. The purpose of theory is to increase scientific understanding through a systematized structure capable of both explaining and predicting phenomena.

Our suggested conceptual model attempts to explain and predict how national culture affects the desired organizational structure that is conducive to innovation. We have developed various law-like generalizations which are empirically testable. In fact, we have empirically demonstrated that innovation does occur even in the mechanistic structures in the former communist and predominantly socialist countries. We have employed a novel methodology by the use of secondary data. Therefore, we claim to have developed the neo-Weberian contingency theory of innovation.

One area of limitation for this research involves the subjective nature of the data. That is, rather than being based on an objective measure of firm organization, the country-level data are based on opinions of managers. Some studies have questioned the usefulness of subjective

opinion or perception-based data. Bertrand and Mullainthan (2001), for example, argue that cognitive problems, the acceptability of some responses and wrong, non- and soft attitudes might affect whether subjective survey responses provide useful information.

In spite of limitations of secondary data, we sincerely hope that this research will inspire scholars to extend, critically evaluate and replicate, wherein different measures are used, covering additional countries.

REFERENCES

Acs, Z. J., & Audretsch, D. B. (1991). *Innovation and technological change: An international comparison.* Ann Arbor, MI: University of Michigan Press.

Ambos, B., & Schlegelmilch, B. B. (2008). Innovation in multinational firms: Does cultural fit enhance performance? *Management International Review, 48*(2): 189-206.

Bailes, K. E. (1978). *Technology and society under Lenin and Stalin: Origins of the Soviet technical intelligentsia*. New Jersey: Princeton University Press.

Baumol, W.J. (2002). *The free-market innovation machine: Analyzing the growth miracle of capitalism.* New Jersey: Princeton University Press.

Bertrand, M., & Mullainathan, S. (2001). Do people mean what they say? Implications for subjective survey data. *American Economic Review: Papers and Proceedings, 91*(2): 67-72.

Bergkvist, L., & Rossiter, J. R. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs. *Journal of Marketing Research, 44*(2): 175-184.

Billig, M. S. (2000). Institutions and culture: Neo-Weberian economic anthropology. *Journal of Economic Issues, 34*(4): 771-788.

Bliss, C. I. (1934). The method of probits. *Science, 79* (2037): 38–39.

Bloom, N., & Reenen, J.V. (2007). Measuring and explaining management practices across firms and countries. *Quarterly Journal of Economics, 122*(4): 1351–1408.

Bloom, N., & Reenen, J.V. (2010). Why do management practices differ across firms and countries. *Journal of Economic Perspectives 24*(1): 203–224.

Burns, T., & Stalker, G. M. (1961). *The management of innovation* (1st ed.). London: Tavistock Publications Limited.

Burns, T., & Stalker, G. M. (1994). *The management of innovation* (3rd ed.). New York: Oxford University Press Inc.

Calantone, R., Garcia. R., & Droge. C. (2003). The effects of environmental turbulence on new product development strategy planning. *Journal of Product Innovation Management, 20* (2): 90-103.

Carlin, W., Fries, S., Schaffer, M., & Seabright, P. (2001). Competition and enterprise performance in transition economies: Evidence from a cross-country survey. *European Bank for Reconstruction and Development Working Paper, 63*, London UK.

Carlin, W., Fries, S., Schaffer, M., & Seabright, P. (2004). A minimum of rivalry: Evidence from transition economies on the importance of competition for innovation and growth. *B.E. Journal of Economic Analysis and Policy: Contributions to Economic Analysis & Policy, 3*(1): 1–43.

Cerne, M., Jaklic, M., & Skerlavaj, M. (2013). Decoupling management and technological innovations: Resolving the individualism-collectivism controversy. *Journal of International Management, 19*(2): 103-117.

Chandy, R. K., & Tellis, G. J. (1998). Organizing for radical product innovation: The overlooked role of willingness to cannibalize. *Journal of Marketing Research, 35*(4): 474-487.

Clarke, G. (2011a). Are managers' perceptions about constraints reliable? Evidence from a natural experiment in South Africa. *Journal of Globalization and Development, 2*(1): 1–28.

Clarke, G. (2011b). Competition policy and innovation in developing countries: Empirical evidence. *International Journal of Economics and Finance, 3*(3): 38–49.

Collins, P.D., Hage, J., & Hull, F. M. (1988). Organizational and technological predictors of change in automaticity. *Academy of Management Journal, 31*(3): 512-543.

Constas, H. (1961). The U.S.S.R.- from charismatic sect to bureaucratic society. *Administrative Science Quarterly, 6*(3): 282-298.

Craig, C. S., Greene, W. H., & Douglas, S. P. (2005). Culture matters: Consumer acceptance of U.S. films in foreign markets. *Journal of International Marketing 13*(4): 80-103.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal, 34*(3): 555-590.

Damanpour, F. (1996). Organization complexity and innovation: Developing and testing multiple contingency models. *Management Science, 42*(5): 693-716.

Damanpour, F., & Aravind, D. (2012). Organizational structure and innovation revisited: From organic to ambidextrous structure. In Mumford, M. (Ed.), *Handbook of Organizational Creativity,* London: Academic Press/Elsevier.

Djankov, S. & Murrell, P. (2002). Enterprise restructuring in transition: A quantitative survey. *Journal of Economic Literature, 40*(3): 739–792.

Donaldson, L. (2001). *The contingency theory of organizations.* Thousands Oak, CA: Sage Publications, Inc.

The Economist. (2003). Germany's bureaucracy: Breathe or be strangled, the government declares war on red tape- and may win a skirmish or two. 9 October.

Engelen, A., & Brettel, M. (2011). Assessing cross-cultural marketing theory and research. *Journal of Business Research, 64*(5): 516-523.

Ettlie, J.E., Dreher. C., Kovacs, G. L., & Trygg, L. (1993). Cross-national comparisons of product development in manufacturing. *The Journal of High Technology Management Research, 4*(2): 139-156.

Evanschitzky, H., Eisend, M., Calantone, R., & Jiang, Y. (2012). Success factors of product innovation:An updated meta-analysis. *Journal of Product Innovation Management, 29* (S1): 21-37.

Geert Hofstede cultural dimensions. no date. Accessed 11 June 2016 from http://geert-hofstede.com/countries.html

Gelb, A., Ramachandran, V., Kedia-Shah, M., & Turner, G. (2007). What matters to African firms? The relevance of perceptions data. *Policy Research Working Paper 4446*, Washington DC: World Bank.

Goncalo, J.A., & Staw, B. M. (2006). Individualism-collectivism and group creativity. *Organizational Behavior and Human Decision Processes, 100* (1), 96-109.

Gorodnichenko, Y., Svejnar, J., & Terrell, K. (2010). Globalization and innovation in emerging markets. *American Economic Journal: Macroeconomics, 2* (2), 194-226.

Graham, L. R. (1998). *What we learned about science and technology from the Russian experience?* Stanford, CA: Stanford University Press.

Green, W., & Cluley, R. (2014). The field of radical innovation: Making sense of organizational Cultures and radical innovation. *Industrial Marketing Management, 43*(8): 1343-1350.

Harrison, L. E. (2000). Why culture matters. In Harrison, L.E. and Huntington, S.P. (Eds.), *Culture matters: how human values shape human progress,* New York: Basic Books.

Hasan, I., & Tucci, C. L. (2010). The innovation-economic growth nexus: Global evidence. *Research Policy, 39*(10):1264-1276.

Hauser, J., Tellis, G. J., & Griffin, A. (2006). Research on innovation: A review and agenda for *Marketing Science*. *Marketing Science, 25*(6): 687-717.

Hall, B. H., Jaffe, A. B., & Trajtenberg, M. (2001). The NBER Patent citations data file: Lessons, insights, and methodological tools. *NBER Working Paper 8498*, ambridge, MA: National Bureau of Economic Research.

Hallward-Driemeier, M., & Aterido, R. (2009). Comparing apples with...apples: How to make (more) sense of subjective rankings of constraints to business. *Policy Research Working Paper Paper 5054*, Washington, DC: World Bank.

Hellman, J. S., Jones, G., Kaufmann, D., & Schankerman, M. (1999). Measuring governance and state capture: The role of bureaucrats and firms in shaping the business environment. *EBRD Working Paper 5,* London, UK: European Bank for Reconstruction and Development.

Hofstede, G. (1980). Motivation, leadership, and organization: Do American theories apply abroad? *Organizational Dynamics, 9*(1): 42-63.

Hofstede, G. (1984). *Culture's consequences, international differences in work-related values*. Newbury Park: SAGE Publications, Inc.

Hofstede, G. (1997). Linking structure to culture. In Clark, T. (Ed.), *Advancement in Organizational Behavior*, Brookfield: Ashgate Publishing Company.

Hofstede, G. (2006). What did globe really measure? Researchers' minds versus respondents' minds. *Journal of International Business Studies, 37*: 882-896.

Houston, M. B. (2004). Assessing the validity of secondary data proxies for marketing constructs. *Journal of Business Research, 57*: 154-161.

Hunt, S. D. (2010). *Marketing theory: Foundations, controversy, strategy, resource-advantage theory.* New York: M. E. Sharpe, Inc.

Huang, X., Rode, J. C., & Schroeder, R. G. (2011). Organizational structure and continuous improvement and learning: Moderating effects of cultural endorsement of participative leadership. *Journal of International Business Studies, 42*(9): 1103-1120.

Kaplan, D.S., & Pathania, V. (2010). What influences firms' perceptions? *Journal of Comparative Economics, 38*(4): 419–431.

Kedia, B. L., & Bhagat, R. S. (1988). Cultural constraint on transfer of technology across nations: Implications for research in international and comparative management. *Academy of Management Review, 13*(4): 559-571.

Kedia, B. L. (1992). Dimensions of national culture and the productivity of R&D units. *The Journal of High Technology Management Research, 3*(1): 1-18.

Kessler, S. R., Nixon, A. E., & Nord, W. R. (2016). Examining organic and mechanistic structures: Do we know as much as we thought? *International Journal of Management Reviews*, (In press)

Khan, A. M., & Manopichetwattana, V. (1989). Innovation and noninnovative small firms: Types and characteristics. *Management Science, 35*(5): 597-606.

Lawrence, P. R., & Lorsch, J. W. (1967). *Organizations and environment: Managing differentiation and integration.* Harvard University, Boston: Graduate School of Business Administration.

Lederman, D. (2010). An international multilevel analysis of product innovation. *Journal of International business Studies, 41*(4): 606-619.

Lipset, S. M. (1967). Values, education and entrepreneurship. In Lipset, S.M. and Solari, A. (Eds.), *Elites in Latin America*, New York: Oxford University Press.

Maddala, G. S. (1983). *Limited dependent and qualitative variables in econometrics*. Cambridge, UK: University Press.

Menguc, B., & Auh, S. (2010). Development and return on execution of product innovation capabilities: The role of organizational structure. *Industrial Marketing Management, 39* (5): 820-831.

Moore, T. (2006). Then and now: Where did Soviet scientists go? available at: http://www.cnn.com/SPECIALS/cold.war/experience/technology/then.now (accessed 10 November 2006).

National Portal of India. no date. retrieved April 23, 2016 from http://india.gov.in/my-government/constitution-india

Nakata, C., & Sivakumar, K. (1996). National culture and new product development: An integrative review. *Journal of Marketing, 60*(1): 61-72.

Patwardhan, A. M. (2013). Consumers' intention to adopt radically new products: A conceptual model of causal cultural explanation. *Journal of Customer Behaviour, 12*(2-3): 247-259.

Prakash, Y., & Gupta, M. (2008). Exploring the relationship between organization structure and perceived innovation in the manufacturing sector of India. *Singapore Management Review, 30*(1): 55-76.

Ralston, D. A., Holt, D. H., Terpstra, R. H., & Yu, K. (1997). The impact of national culture and economic ideology on managerial work walues: A study of the United States, Russia, Japan, and China. *Journal of International Business Studies*, *28*(1): 177-207.

Rhyne, L. C., Teagarden, M.B., & Panhuyzen, W. V. (2002). Technology-based competitive strategies-The telationship of cultural dimensions to new product innovation. *Journal of High Technology Management Research, 13*(2): 249-277.

Robertson, T.S. (1967). The process of innovation and the diffusion of innovation. *Journal of Marketing, 31*(1): 14-19.

Rossiter, J. R. (2011). Marketing measurement revolution: Why C-OAR-SE method and why it must replace psychometrics. *European Journal of Marketing, 45*(11/12): 1561-1588.

Rubera, G., & Kirca, A. H. (2012). Firm innovativeness and its performance outcomes: A meta-analytic review and theoretical integration. *Journal of Marketing, 76*(3): 130-147.

Russel, R. D. (1990). Innovation in organizations: Toward an integrated model. *Review of Business*, *12*(2): 19-26.

Schwab, K. (2010). The global competitiveness report 2010-2011. *World Economic Forum*, Geneva, Switzerland.

Schoonhoven, C. B. (1981). Problems with contingency theory: Testing assumptions hidden within the language of contingency "theory".*Administrative Science Quarterly, 26*(3): 349-377.

Schumpeter, J. A. (1939). *Business cycles: A theoretical, historical, and statistical analysis of the capitalist process.* New York: McGraw Hill Company.

Schoenmakers, W., & Duysters, G. (2010). The technological origins of radical inventions. *Research Policy, 39*(8): 1051-1059.

Sivakumar, K., Roy, S., Zhu, J., & Hanvanich, S. (2011). Global innovation generation and financial performance in business-to-business relationships: The Case of Cross-border Alliances in the Pharmaceutical Industry. *Journal of the Academy of Marketing Science, 39*(5): 757-776.

Scott, W.R. (2003). *Organization: Rational, natural, and open Systems* (5th ed.). New Jersey: Pearson Education, Inc.

Shane, S. (1993). Cultural influences on national rates of innovation. *Journal of Business Venturing, 8*(1): 59-73.

Shane, S. (1995). Uncertainty avoidance and the preferences for innovation championing roles. *Journal of International Business Studies, 26*(1): 47-64.

Shenkar, O. (2001). Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *Journal of International Business Studies, 32*(3): 519-535.

Simpson, J.T., Kollmannsberger, C., Schmalen, H., & Berkowitz, D. (2002). New product development in German and US technology firms. *European Journal of Innovation Management, 5*(4): 94-207.

Smith, P.B., Dugan, S., & Trompenaars, F. (1996). National culture and the values of organizational employees. *Journal of Cross-Cultural Psychology, 27*(2): 231-264.

Sorescu, A.B., Chandy, R. K., & Prabhu, J. C. (2003). Sources and financial consequences of radical innovation: Insights from pharmaceuticals. *Journal of Marketing 67*(4): 82-102.

Taylor, M. Z. & Wilson, S. (2012). Does culture still matter?: The effects of individualism on national innovation rates. *Journal of Business Venturing, 27* (2), 234-247.

Tellis, G. J., Prabhu, J. C., Chandy, R. K. (2009). Radical innovation across nations: The preeminence of corporate culture. *Journal of Marketing, 73*(1): 3-23.

Tellis, G. J. (2013). *Unrelenting innovation: How to build a culture for market dominance,* San Francisco, CA: Jossey-Bass, John Wiley & Sonc, Inc.

Tobin, J. (1958). Estimation of relationships for limited dependent variables. *Econometrica*, *26* (1): 24–36.

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review, 96*: 506-520.

Triandis, H. C. (1993). Collectivism and individualism as cultural syndromes. *Cross-Cultural Research, 27*: 155-180.

Triandis, H. C. (1995). *Individualism and collectivism.* Boulder, CO: Westview Press.

Triandis, H. C. (2004). Foreword. In House *et al*. (Eds.), *Culture, Leadership, and Organization: The GLOBE Study of 62 Societies*. Thousand Oaks, CA: Sage Publications, Inc.

Tung, R. L., & Verbeke, A. (2010). Beyond Hofstede and Globe: Improving the quality of the cross-cultural research. *Journal of International Business Studies, 41*: 1259-1274.

Usher, A. E. (1954). *A history of mechanical inventions.* Cambridge, MA: Harvard University Press.

Venaik, S., & Brewer, P. (2010). Avoiding uncertainty in Hofstede and GLOBE. *Journal of International Business Studies, 41*(8): 1294-1315.

Waarts, E., & Everdingen, Y. V. (2005). The influence of national culture on the adoption status of innovations: An empirical study of firms across Europe. *European Management Journal, 23*(6): 601-610.

Westwood, R., & Low, D. R. (2003). The multicultural muse: Culture, creativity and innovation. *International Journal of Cross Cultural Management, 3*(2): 235-259.
Wolfe, R. A. (1994). Organizational innovation: Review, critique and suggested research directions. *Journal of Management Studies*, *31*(3): 405-431.
World Bank. (2004). World development report 2005: A better investment climate for everyone. *World Bank*, Washington, DC.
World Bank. (2008). Management and innovation survey: Understanding the questionnaire, *World Bank*, Washington DC.
World Bank. (2010). The management, organization and innovation (MOI) survey 2009: A report on methodology and observations. *World Bank* Washington DC.
World Bank. (2011). World development indicators. *World Bank* Washington DC.
World Bank. (no date), http://data.worldbank.org/indicator/IC.BUS.EASE.XQ (accessed April 23, 2016).
Zeffane, R. M. (1989). Organization structures and contingencies in different nations: Algeria, Britain, and France. *Social Science Research, 18*(4): 331-369.

APPENDIX

Table 1(a): Average values of independent variables, by country

	Total	Belarus	Bulgaria	Germany	India	Kazakhstan
Number of firms	1,275	74	137	126	37	103
Firm Characteristics						
Age (in years)	35	49	23	74	12	26
Number of Workers	231	738	147	248	223	217
Levels to Top Manager	2.1	2.4	2.0	2.2	1.5	3.0
Ownership						
Foreign Owned (% of firms)	9.8%	2.7%	12.4%	7.1%	0.0%	1.9%
State Owned (% of firms)	9.0%	56.8%	1.5%	0.0%	0.0%	2.9%
Originally private (% of firms)	59.6%	12.2%	72.1%	95.2%	0.0%	52.4%
Competition						
Competition (index)	3.5	3.4	3.7	3.4	0.7	3.3
Competes with multinationals (% of firms)	68.7%	63.3%	73.5%	85.3%	50.1%	57.3%
Competes with imports (% of firms)	70.6%	85.7%	64.8%	75.7%	45.5%	63.8%
Sectors (% of firms)						
Textiles	4.2%	4.1%	2.2%	2.4%	34.7%	4.9%
Garments	12.5%	16.2%	32.8%	2.4%	31.5%	13.6%
Food and Beverage	15.7%	13.5%	16.8%	13.5%	22.9%	22.3%
Chemicals and Chemical Products	4.7%	5.4%	1.5%	5.6%	22.9%	2.9%
Construction Materials	5.8%	5.4%	6.6%	4.0%	0.0%	13.6%
Wood and Furniture	4.9%	5.4%	8.8%	2.4%	0.0%	3.9%
Metals	13.0%	10.8%	11.7%	17.5%	41.7%	10.7%
Paper and Publishing	8.5%	4.1%	3.6%	9.5%	22.9%	7.8%
Plastics and Rubber	5.4%	0.0%	5.8%	7.1%	37.4%	2.9%
Machinery	10.1%	17.6%	5.8%	13.5%	22.9%	9.7%
Electronics	8.7%	9.5%	2.2%	12.7%	27.7%	5.8%
Motor Vehicles and Parts	3.8%	5.4%	0.7%	7.9%	27.7%	1.9%
Other Manufacturing	2.6%	2.7%	1.5%	1.6%	0.0%	0.0%

Source: Authors' calculations based on data from World Bank Enterprise Surveys.

Table 1(b): Average values of independent variables, by country

	Lithuania	Poland	Romania	Russia	Serbia	Ukraine	Uzbekistan
Number of firms	80	68	132	173	101	129	115
Firm Characteristics							
Age (in years)	28	35	16	28	43	41	29
Number of Workers	139	257	187	261	177	241	174
Levels to Top Manager	1.1	1.7	3.3	2.5	1.2	2.4	1.0
Ownership							
Foreign Owned (% of firms)	7.5%	11.8%	25.0%	1.7%	9.9%	5.4%	24.3%
State Owned (% of firms)	3.8%	8.8%	0.0%	7.6%	16.8%	10.9%	12.2%
Originally private (% of firms)	68.8%	57.4%	79.5%	58.1%	36.6%	42.6%	43.5%
Competition							
Competition (index)	3.6	3.6	3.6	3.6	3.5	3.4	3.2
Competes with multinationals (% of firms)	68.3%	86.0%	79.5%	76.7%	67.1%	70.4%	40.2%
Competes with imports (% of firms)	79.1%	75.0%	80.2%	70.1%	78.7%	63.7%	58.0%
Sectors (% of firms)							
Textiles	5.0%	4.4%	8.3%	1.2%	5.9%	0.0%	7.0%
Garments	10.0%	4.4%	27.3%	1.2%	11.9%	6.2%	11.3%
Food and Beverage	8.8%	8.8%	12.9%	11.6%	21.8%	16.3%	27.8%
Chemicals and Chemical Products	2.5%	8.8%	1.5%	7.5%	4.0%	4.7%	7.8%
Construction Materials	0.0%	2.9%	0.8%	7.5%	3.0%	4.7%	14.8%
Wood and Furniture	12.5%	7.4%	5.3%	3.5%	2.0%	4.7%	2.6%
Metals	22.5%	11.8%	14.4%	11.6%	11.9%	10.9%	8.7%
Paper and Publishing	8.8%	10.3%	3.8%	14.5%	14.9%	11.6%	4.3%
Plastics and Rubber	11.3%	8.8%	6.1%	5.2%	5.0%	2.3%	2.6%
Machinery	10.0%	17.6%	6.1%	13.9%	5.9%	11.6%	5.2%
Electronics	5.0%	2.9%	9.1%	13.3%	7.9%	17.8%	3.5%
Motor Vehicles and Parts	2.5%	7.4%	0.0%	4.0%	5.0%	6.2%	1.7%
Other Manufacturing	1.3%	4.4%	4.5%	5.2%	1.0%	3.1%	2.6%

Source: Authors' calculations based on data from World Bank Enterprise Surveys.

Table 2: Country-level regressions of enterprise organization on culture and control variables

Column	(1)	(2)	(3)
Dependent Variable	**Willingness to Delegate**		
Observations	77	76	71
Culture Variables			
Power Distance	-0.012***	-0.008**	-0.008**
	(-2.78)	(-2.11)	(-2.23)
Individualism	0.016***	0.007**	0.006*
	(4.59)	(2.15)	(1.73)
Masculinity	-0.008*	-0.010***	-0.010***
	(-1.67)	(-2.80)	(-2.69)
Uncertainty Avoidance	-0.009***	-0.012***	-0.012***
	(-2.93)	(-4.96)	(-3.35)
Country level controls			
Per capita GDP		0.416***	0.467***
(2000, natural log)		(8.68)	(4.96)
Population		0.092**	0.120**
(2000, natural log)		(2.50)	(2.43)
Openness (imports + exports)			0.146
(2000, natural log)			(0.97)
Secondary Enrollment			-0.186
(natural log)			(-1.21)
Constant	5.086***	0.213	-0.508
	(11.43)	(0.23)	(-0.39)
R-Squared	0.56	0.72	0.74

Source: Authors' calculation.
*****,**, * Significant at 1,5, and 10% significance levels. Note: t-statistics are in parentheses**

Table 3: Firm-level regressions of measures of innovation on firm structure

	(1)	(2)	(3)	(4)
	Probit	Probit	Probit	Tobit
	Firm developed new product	Firm has local patent	Firm has foreign patent	New products as % of sales
Country Dummies	**Included**			
Sector Dummies	**Included**			
Observations	755	737	533	713
Firm structure				
Levels between production employee and manager	0.475***	0.399***	0.538*	13.561***
(natural log)	(3.51)	(2.85)	(1.90)	(4.17)
Ownership				
Foreign-owned	0.244	0.027	-0.711	2.666
(dummy)	(1.08)	(0.13)	(-1.12)	(0.54)
State-owned	-0.565***	-0.050	-0.751	-4.878
(dummy)	(-2.83)	(-0.24)	(-1.44)	(-1.01)
De novo private firm	0.209	-0.005	0.263	-0.923
(dummy)	(1.32)	(-0.03)	(0.87)	(-0.25)
Firm-level controls				
Firm age	0.201**	0.081	0.352**	1.970
(natural log)	(2.49)	(1.03)	(2.33)	(1.01)
Number of workers	0.199***	0.240***	0.297**	2.719
(natural log)	(2.63)	(3.32)	(2.27)	(1.57)
Competition				
Competition in local markets	0.060	0.007	0.186	1.849
(index -- higher number means more competition)	(0.79)	(0.10)	(1.20)	(1.01)
Firm competes with multinationals	0.295**	-0.102	-0.382	6.246**
(dummy)	(2.30)	(-0.77)	(-1.57)	(1.98)
Firm competes with imports	0.243*	0.361***	0.462*	6.864**
(dummy)	(1.87)	(2.65)	(1.66)	(2.14)
Pseudo R-Squared	0.167	0.134	0.247	0.0228
Log-Likelihood	-394.4	-402.2	-112.4	-2436
Log-Likelihood (H_0)	-473.6	-464.4	-149.5	-2493

Source: Author's calculation based on data from the World Bank's management, organization, and innovation surveys for all available countries.
***,**, * Significant at 1,5, and 10% significance levels

Note: T-statistics in parentheses. To ensure comparability of measures of levels between production employees and managers, multi-establishment firms are omitted. Sector dummies are included for: garment manufacturers; textile manufacturers; food and beverage manufacturers; chemical and pharmaceutical manufacturers; construction material manufacturers; furniture and wood manufacturers; metal and metal product manufacturers; paper, printing and publishing manufacturers; plastic manufacturers; electric equipment manufacturers; motor vehicle manufacturers; other manufacturing; retail and wholesale trade; hotels and restaurants; construction; transportation; and other services. Country dummies are also included in all regressions

Table 4: Country-level regressions of enterprise organization on culture and control variables with Globe variables

Column	(1)	(2)	(3)
Dependent Variable	**Willingness to Delegate**		
Observations	77	76	71
Culture Variables			
Power Distance (Globe)	-0.020	-0.043	-0.062
	(-0.09)	(-0.22)	(-0.32)
In-Group Collectivism (Globe)	-0.649***	-0.559***	-0.633***
	(-5.06)	(-4.87)	(-4.95)
Gender egalitarianism (Globe)	-0.090	-0.067	-0.219
	(-0.60)	(-0.51)	(-1.63)
Uncertainty Avoidance (Globe)	0.646***	0.626***	0.499***
	(5.04)	(5.20)	(3.12)
Country level controls			
Per capita GDP		0.131**	0.042
(2000, natural log)		(2.35)	(0.53)
Population		0.065	0.102**
(2000, natural log)		(1.54)	(2.19)
Openness (imports + exports)			0.245**
(2000, natural log)			(2.14)
Secondary Enrollment			0.302
(natural log)			(1.36)
Constant	5.227***	2.570	1.929
	(3.01)	(1.41)	(0.84)
R-Squared	0.794	0.828	0.839

Source: Authors' calculation.
*****,**, * Significant at 1,5, and 10% significance levels. Note: t-statistics are in parentheses**

Figure 1
A Partial Orthographic and Isometric Typology

	High UA		Low UA		
	O	**M**	**O**	**M**	
High PD	1	2	3	4	Collectivism
Low PD	5	6	7	8	Individualism

UA: Uncertainty Avoidance
PD: Power Distance
O: Organic Structure
M: Mechanistic Structure

Rectangle No. 2: Latin, Mediterranean, Japan, Korea
Rectangle No. 4: Asia, especially China
Rectangle No. 6: German-speaking, Finland, Israel
Rectangle No. 7: Anglo, Scandinavian, and Netherlands

- USA can be shown somewhere between rectangles 7 and 8.
- India can be shown somewhere between rectangles 3 and 4
- Russia can be shown in the rectangle 2; however, nearer to rectangle 6.
- France can be shown somewhere between rectangles 2 and 6.