Effects of national culture on process management and technological innovation

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In the increasingly globalised international business environment, the effects of national culture on business operations abroad require careful study. This study examines the impact of national culture on process management and technological innovation by investigating major automakers in 14 countries. The findings reveal that uncertainty avoidance and long-term orientation positively influence innovation. Moreover, high uncertainty avoidance and low power distance enhance process management in global automakers.

Keywords: technological innovation; quality management; national culture; global automotive industry

Introduction

In the past decade, a substantial body of literature in international business has explored how national culture affects business management. Studies of R&D and production management have identified the factors affecting site location for R&D and manufacturing facilities abroad including expectations, motivations and decision processes (Allred & Swan, 2004; Kough & Singh, 1988). Given the continuing globalisation of business manufacturing, the need to clarify the relationship between culture and site selection is increasingly important. Surprisingly, this issue has not been adequately addressed. To a certain extent, business researchers and international managers are often inadequately informed when deciding where to invest in other countries. This study thus explores the cultural impact on innovation and production management by investigating the manufacturing facilities of major global automakers in 14 countries.

Since international firms constantly strive to expand market share, effective innovation management is vital for success in any multinational corporation. Increasing complexity and competition in the global business environment have increased the demand for and the pace of new product development, innovative manufacturing methods and technological innovation to increase competitiveness and exploit business advantages overseas (Chen & Chen, 2003; Dwyer et al., 2005). The growing importance of innovation management in cross-national subsidiaries makes site selection for R&D facilities among the most critical strategic decisions for top managers (Shane, 1995). Scholars have argued that international differences in innovativeness reflect differences in research infrastructure, education, social structure and national wealth; however, other studies have revealed that differences in personal values affect the inventiveness of some cultures (Shane, 1993).

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Accordingly, this study investigates how culture affects business innovation and how countries differ in factors that enhance R&D.

In addition to site selection for R&D facilities abroad, another essential decision for international firms is effectively locating production centres to minimise cost and maximise product quality (C.W.L. Hill, 2007). Outsourcing production to more efficient manufacturers elsewhere can reduce production cost. Firms implementing quality management strategies can reduce their production costs by minimising warranty liabilities and enhancing manufacturing productivity. Moreover, the total quality management (TQM) philosophy of continuous improvement can greatly enhance consumer satisfaction and loyalty. From a TQM perspective, this study explores the connection between national culture and the location of manufacturing facilities of international firms. The research sample in this international comparative study included 10 firms from Japan, three from the United States, three from Korea, five from Germany, three from Great Britain, two from Sweden, two from Italy, two from France, one from Spain, one from the Czech Republic, one from China, one from Russia, one from Malaysia and one from India.

**Theory and hypotheses**

**National culture and technological innovation**

This study explores the effect of foreign culture on the performance and technological innovation of companies operating abroad. National culture, referred to as ‘the collective programming of the mind which distinguishes the members of one group or category of people from another’ (Hofstede, 2001, p. 6); or as ‘the acquired knowledge that people use to interpret experience and to generate social behavior’ (Rugman & Hodgetts, 2003, p. 126). Since language, values, attitudes, ethics, manners, aesthetics and education are elements of national culture that impact behavioural differences, a collective view of culture is needed to clarify differences between national cultures. Some researchers have analysed cultural elements to categorise countries by cultural similarities. Alternatively, Ronen and Shenkar (1985) proposed a system of classifying all nations into nine groups: Nordic; Germanic; Anglo; Latin European; Latin American; Far East; Arab; Near Eastern; and Independent. Other researchers have considered dimensions of national culture reflecting similarities and differences between cultures.

In the cultural classification system developed by Hall (1976), two categorisations are high-context/low-context cultures and monochronic/polychronic cultures. The distinction between low- and high-context cultures is the style of communicating within a particular society. In a high-context culture such as Japan or China contextual clues are often implicit in the message communication and interpretation process; in a low-context culture such as Germany or Switzerland most information is explicitly presented in words and documents. Thus, those in high-context cultures wish to be informed by informal personal networks. Distinctions between monochronic and polychronic cultures are based on the prevailing towards time in a culture. People in monochronic cultures such as Germany or the USA (typically white Anglo-Saxon protestant), tend be task-oriented and work according to a predetermined schedule. In polychronic cultures such as those in Latin America or the Middle East, business is often conducted on a flexible schedule and with less documentation.

Although the two-dimension classification theory developed by Hall is clearly expressed in a rectangular co-ordinate system, this method was gradually replaced by a more refined system proposed by Hofstede and colleagues in the 1980s. The five-dimension cultural framework developed by Hofstede has been applied extensively by
researchers in international business and national culture (Nakata & Sivakumar, 2001). Nevertheless, although his conceptualisation of culture is by far the most widely adopted, it is not without its critics for falling short of containing all crucial aspects of national cultures (van Everdingen & Waarts, 2003). This classification system has also been criticised for its lack of clearly defined relationships between the five dimensions. The non-independent structure may produce multicollinearity among variables. For this reason, previous studies have focused on analysis of five or fewer dimensions (e.g. Lee & Dawes, 2005; Shane, 1995; Steenkamp et al., 1999).

Power distance (PDI) is ‘the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally’ (Hofstede, 2001, p. 98). This dimension measures how far inequality is accepted by a culture. Diffusion of innovative products used by powerful individuals in high power distance cultures influences the purchasing decisions of others (Dwyer et al., 2005). However, characteristics of power distance influencing successful innovation management are characterised by organisational hierarchy, top down control, formal rules and Standard Operating Procedure (SOP) and resistance to change (Jones & Davis, 2000). To become an important factor in improving innovation performance, decentralisation may be related to low power distance because it transmits trust in the organisation and helps to equalise participants by providing information about new product development (Nakata & Sivakumar, 1996). The literature reveals that low power distance facilitates technological innovation because organicist organisations, which are organised by decentralised hierarchy, tend to have higher R&D budgets than mechanistic organisations (Azumi & Hull, 1990). Shane (1992, 1993) further suggested that higher levels of power distance tend to dampen innovation by investigating the patent and trademark registrations of firms. This study thus proposes that reduced power distance encourages innovation through centralisation/decentralisation.

Uncertainty avoidance (UAI) is ‘the extent to which the members of a culture feel threatened by uncertain or unknown situations’ (Hofstede, 2001, p. 161) and affects how members of a culture address future unknowns. Cultures with low UAI tend to meet basic demands, are ‘tolerant of various behaviors and feel relatively secure’ (Nakata & Sivakumar, 1996, p. 65) and are ‘more prepared to give the benefit of the doubt to unknown situations, people, and ideas’ (Hofstede, 1991, p. 118). Several studies have explored the relationship between uncertainty avoidance dimension and innovation. Rogers (1983) elucidated the effects of uncertainty on the innovation diffusion process. Hofstede (2001) noted that high uncertainty avoidance is related to the resistance to innovative change. Dwyer et al. (2005) suggested that uncertainty avoidance is negatively related to diffusion of technological innovation. People in cultures characterised by high uncertainty avoidance tend to be more risk averse, and those in cultures with low uncertainty avoidance tend to be less so. In a survey of hundreds of managers in different industries, O’Reilly (1989) strongly suggested that risk taking is a key factor for promoting innovation. After a series of in-depth interviews with automobile manufactures, Sasaki (1991) concluded that innovation is greater in cultures that encourage risk taking and even constructive failure. Thus, this study suggests that uncertainty avoidance profoundly affects technological innovation.

Masculinity (MAS) is an ‘assertive or competitive orientation, as well as a sex-role distinction, and its inverse (femininity) is a more modest and caring attitude toward others’ (Franke et al., 1991). This dimension is defined as the extent to which a culture is characterised by assertiveness versus nurturance based on the international sociological and anthropological data gathered by Hofstede (1980). Hofstede (2001) described a masculine
culture as one in which ‘people live to work’ and a feminine culture as one in which ‘people work-to-live’. Previous studies of the relationship between masculinity and innovation differ markedly in their findings. In an investigation of national cultural antecedents of marketing innovation, Steenkamp and his colleagues (1999) reported a high positive relationship between this factor and marketing innovation. In a study of the association between masculinity and formalisation, Nakata and Sivakumar (1996) suggested that a less masculine approach emphasising a warm and supportive climate positively influences the success of new product development projects. However, this study argued that the relationship between masculinity and formalisation has not been sufficiently elucidated to determine the effect of masculinity on innovation.

**Individualism (IDV)** refers to the ‘relationship between the individual and the collectivity which prevails in a given society’ (Hofstede, 1980, p. 213), and ‘the tendency of individuals primarily to look after themselves and their immediate families, and its inverse (collectivism) is the integration of people into cohesive groups’ (Franke et al., 1991). A common example of individualism–collectivism is the ‘me’ society versus the ‘we’ society (Hofstede, 2001). Previous studies have demonstrated that less individualism in innovative companies actually enhances the probability of success in new product development (Shane, 1995). Dwyer and his colleagues (2005) proposed that increased collectivism in a culture provides communication context and enhances acceptance of technological innovation. From the perspective of organisational structure and group orientation, a key factor in new product development is the matrix structure and project team, and co-operation between marketing and R&D departments has increased importance (Nakata & Sivakumar, 1996). Larson and Gobeli (1988) also concluded that the performance of teams and matrices is better than functional structure according to an investigation of hundreds of new product development projects. Given the communication between individuals and integrated functions needed to promote innovation, collectivism is more appropriate than autonomous individualism in a business enterprise requiring innovation. Thus, in an organisation promoting co-operation, communication and a supportive climate, the possibilities for producing outperforming innovations and successful new products are greater (Sounder, 1988). This study therefore proposes that innovation is enhanced in organisations characterised by less individualism.

**Long-term orientation** (LTO), or Confucian dynamics, is ‘an acceptance of the legitimacy of hierarchy and valuing of perseverance and thrift, all without undue emphasis on tradition and social obligations which could impede business initiative’ (Bond et al., 1987; Hofstede & Bond, 1988). Although the Hofstede study of 40 countries did not consider long-term orientation, Bond et al. (1987) applied this concept in a subsequent analysis of 22 countries. This dimension, which represents a range of Confucian philosophy, measures the difference between a dynamic, future-oriented culture (positive pole/long-term perspective) versus a static, tradition-oriented culture. Van Everdingen and Waarts (2003) argued that organisational focus is on the past and tradition in a culture emphasising short-term value. Thus, such cultures are expected to be unfavourable for innovation. Echoing this perspective, Allred and Swan (2004) in a study of 536 firms in 10 countries concluded that the Confucian dynamic is more favourable to organisational innovation. The Confucian characteristic most relevant to innovation is work ethic (Nakata & Sivakumar, 1996). A strong work ethic enhances the perseverance and motivation to complete projects successfully. As stated by one Japanese CEO, work ethic is essential for competitiveness: ‘We are very different from the rest of the world. Our only natural resource is the hard work of our people’ (Peters & Waterman, 1982, p. 39). Long-term
orientation is thus suggested for promoting new product development projects in all stages by focusing on future possibilities (Nakata & Sivakumar, 1996). One example of the importance of this cultural dimension is the rapid introduction of 113 new motorcycle models by Honda within only 18 months during the 1980s. Thus, this study proposes that a long-term orientation enhances business innovation. The following hypotheses summarise the discussion in this section:

H1a: Power distance affects technological innovation.
H1b: Uncertainty avoidance affects technological innovation.
H1c: Individualism affects technological innovation.
H1d: Long-term orientation affects technological innovation.

National culture and quality management
Concerning the improvement of product quality, the concept of quality management has been applied previously in theories of process management (Benner & Tushman, 2002), continuous improvement (Detert et al., 2000) and total quality management (e.g. Hackman & Wageman, 1995; Noronha, 2003; Prajogo & Sohal, 2006; Tuckman, 1994). The philosophy of total quality management was first addressed two decades ago by Deming, Juran and Ishikawa (Nakata & Sivakumar, 2001). In the 1980s, TQM, which was initially applied in manufacturing, became fashionable in business management in general and was widely adopted in service-sector companies, the healthcare sector, public welfare organisations, non-profit organisations and education (Hackman & Wageman, 1995). Oliver and Wilkinson (1989) observed that almost all of British manufacturing firms and all Japanese firms were implementing TQM strategies. Some management consultants went so far as to suggest that firms would have difficulty competing without implementing TQM (Tuckman, 1994).

However, other studies (S. Hill, 1991; Sewell & Wilkinson, 1992) viewed TQM as a phenomenon within Just-in-Time (JIT)/Total Quality Control (TQC) regimes and addressed how Japanese competency has prompted western companies to become more competitive by streamlining inventories and improving quality of management. Whether TQM is viewed as a tool for promoting an innovative business culture or just another example of ‘Japanisation of western industry’, TQM has been important in the restructuring of organisations. Linking cultural difference and TQM philosophy, Detert and his colleagues (2000) observed that improvement initiatives and organisational culture/values are highly correlative. For example, informed decision making should be based on truth and rationality in an organisational culture; the idea that quality problems are caused by poor management rather than by poor workers is supported by studies of motivation in organisational culture. Thus, the cultural impact on quality management requires thorough investigation.

Being prescriptive rather than imperative, the theory and practice of TQM should be different according to the context of organisation (Dean & Bowen, 1994). From a sociology perspective, values in a sub-value system are dominated by its super-ordinate system (Parsons, 1956). Thus, the super-ordinate system in turn influences the operational system of policy and decision making. National culture, as the super-ordinate system, affects organisational culture which implements the philosophy of TQM (Noronha, 2003). Based on the theories of institution school, population-ecology school and contingency school, Nelson and Gopalan (2003) argued that organisational culture often
value-added activity, especially in cultures with high uncertainty avoidance. Further, co-operation is important in a TQM organisation because any effective business organisation is a system of highly interdependent components. Co-operation and member participation is promoted in cultures with low power distance since employees are empowered to improve themselves and the processes.

Finally, this study suggests some possible directions for future studies. First, studies of the cultural impact on international business operations are still in an early stage. Further research is needed to clarify cultural aspects of human resources and marketing management in multinational firms operating abroad. Second, some researchers and managers have noted that increased quality promotes innovation which can in turn enhance quality. As quality continuously improves, TQM offers a systematic approach and associated techniques for increasing efficiency by effectively organising functional departments and employees in manufacturing companies. Thus, the connection between process management and technological innovation is worthy of further studies of international manufacturing and R&D management.

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References


