How Does Culture Influence Innovation? A Systematic Literature Review

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Abstract

Purpose – The purpose of this paper is to conduct a systematic literature review of the studies that have analyzed the impact of culture on innovation.

Design/methodology/approach – We carried out a systematic literature review of peer-reviewed articles in the past 37 years (January 1980 - January 2017). Based on a total of 61 identified primary studies, we developed two clusters of culture definition studied in relation to innovation, including organizational culture and national culture.

Findings – After reporting the findings of the systematic literature review, we discuss how a variety of culturally related factors combine to facilitate or restrict innovation performance in their corresponding cluster. Our findings highlight the complex and idiosyncratic relationship between culture and innovation. Future research lines are recommended.

Research limitations/implications – We adopt a systematic literature review method to probe into existing literature, inevitably missing some empirical studies. Implications for future research are suggested.

Practical implications – The paper offers interesting implications for managers and academia. For business practitioners, this study can provide a useful reference regarding the role of cultures in the corporate internal management or international operations; for scholars, our study can provide a current research landscape and development process in this field.

Originality/value – The findings are derived from a systematic literature review that has studied the influence of culture on innovation. In addition, implications and insights as to where future research might be usefully inquired in this field are provided.

1. Introduction

In the era of globalization, economic competition is increasingly intensified and the technological progress that leads to product life cycles has compressed. In this circumstance, researchers, business practitioners, and policy makers have stressed the importance of innovation to create sustainable economic development and competitive advantage (Howells, 2005; Fagerberg and Srholec, 2008; Fagerberg et al., 2010; Banu and Miles, 2011; Brem et al., 2016; Naqshbandi, 2016). The Chinese government's policy of encouraging and building an innovative society in recent years has become one of the compelling evidences of this trend.

As one of the factors that influence the innovation, culture has been paid more and more attention in the broader sphere of business and management in recent years. The influence of culture on innovation has been recognized as a critical factor in international management and organizational development given its relevance and contribution to business and economic development (e.g., Verspagen, 2006; Rohlfer and Zhang, 2016). A large number of researchers have conducted researches in exploring the relationship between culture and innovation in the business area (Barnett, 1953; Goncalo and Staw, 2006; Parveen et al., 2015). Consequently, it is not difficult to find that some countries or enterprises within an idiographic cultural environment have the strong innovation ability and vice versa.

Although this proliferation of research has the potential to significantly improve our understanding of the roles of culture in innovation performance, there are several limitations in the current research. In essence, theorizing and research in this regard have lagged behind practical needs (Anderson et al., 2014). First, although researchers have investigated the influence of culture on innovation from a wide range of theoretical insights, extant studies are fragmented and disconnected. Therefore, it is important to take inventory of the work to date through a systematic literature review and identify key research themes and developmental patterns. In so doing, we can

consolidate and integrate extant knowledge and provide the main findings with regard to this relationship for further research to build on. Second, prior literature tends to take an absolutized propensity in treating the influence of culture on innovation. However, it is imperative to synthesize the conceptual developments and diverse empirical findings towards a more integrated and holistic understanding of the relationship between culture and innovation. Third, the current research development concerning the influence of culture on innovation in different stages is missing.

To overcome the above weaknesses, we conduct a systematic literature review to map the field and systematically identify gaps. The objectives of this paper are: (1) to shed light on the definition of culture and innovation; (2) to evaluate systematically the theoretical and empirical development of the influence of culture on innovation; (3) to propose a comprehensive insight into the influence of culture on innovation so as to identify the specific areas in critical need of further development; and (4) to provide recommendations for future research aimed at developing a more integrated research agenda on the influence of culture on innovation. For business practitioners, our systematic literature review can help develop a reliable knowledge base by accumulating knowledge from a range of studies (Tranfield *et al.,* 2003).

This work is organized as follows. First, we start with setting up a conceptual boundary so that we can confine the definition of culture and innovation. Second, we summarize the methodology that is used to systematically select and review the literature, with details of our search strategy, analysis and assessment of the quality of the studies provided. Third, we report our findings of our systematic literature review, followed by a relational diagram between different cultural dimensions and innovation. Finally, we discuss the implications and limitations of our studies and suggest some key areas for future research direction.

2. Conceptual boundaries

Before we elaborate our research method and process, it is necessary for us to clarify the concept of culture and innovation for our research objectives.

2.1. Culture

Although the definition of culture has been discussed and debated by anthropologists and sociologists for a long time, "few anthropologists are in agreement as to what to include under the general rubric of culture" (Hall, 1976, p. 12). In a pioneering study on cultural issues, House *et al.* (2002) define culture as a set of parameters of collectives which are related to "patterned ways of thinking, feeling and reacting that constituting the distinctive way of life of a group of people" (Kluckhohn, 1951, p. 86). In the same vein, culture consists of "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede *et al.,* 2010, p. 6), in which the life style and collective programming of the mind are "handed down from one generation to the next through means of language and imitations" (Adler, 2002, p. 16).

It is obvious that culture is a complex concept, and there is no commonly accepted definition of culture in the literature. In general, "culture seems to distinguish one group from another based on a certain set of values, beliefs, behaviors, and attitudes; which is shared, interpreted, and transmitted over time within a collective; and that makes the collective unique and distinguishes that collective from other collectives' (Bik, 2010, p. 72). Therefore, individuals in a particular cultural atmosphere are inevitably influenced by the cultural atmosphere they live in, at both national and organizational levels. In other word, "the various facets of culture are interrelated and you touch a culture in one place and everything else is affected", as well observed by Hall (1976, p. 16).

2.2. Innovation

Similar to culture, 'there are many different definitions of innovation in current research, and overall the number and diversity of definitions leads to a situation in which there is no clear and authoritative definition of innovation' (Baregheh *et al.,* 2009, p. 1324). Moreover, in the existing literature, a proxy for innovation is widely used for the measurement of innovation. These proxies for innovation include new and innovative ideas (Dedahanov *et al.,* 2016), research and development (R&D) intensity (Allred and Swan, 2004), patents, scientific and technical journal articles (Efrat, 2014), new product development (Ettlie *et al.,* 1993; Rhyne *et al.,* 2002; Yang and Li, 2011), new technology or design (Griffith and Rubera, 2014), per capita numbers of inventions (Shane, 1992) or per capita numbers of trademarks granted (Shane, 1993), and the process of the introduction and implementation of a variety of ideas, products, services, plans, rules, procedures, and patent (Kaasa and Vadi, 2010). Whatever the purpose of innovation proposed by different researchers, there are two obviously points of views that could be identified. On the one hand, innovation involves the generation of new ideas; it is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes (Baregheh *et al.,* 2009). On the other hand, innovation refers to the use of a series of new and novel things, for example, new products or services, new technology, new organizational structures or administrative systems, new plans and new programs, with the purpose of increasing organizational performance and growth, keep the organization sustainable, and achieve organizational success (Rujirawanich *et al.,* 2011). Therefore, in this study we bring creativity and new products into a wide range of innovation concepts.

3. Methodology and review process

Following our study purpose, we adopt a systematic literature review method to probe into existing scholarly articles on culture and innovation. The advantage of systematic literature review is that it provides transparent and explicit protocols by which researchers search for and assess the field of studies relevant to a specific research topic; it has been widely used in the business and management field (e.g., Macpherson and Holt, 2006; Deng, 2012). We defined our systematic literature review method with the following criteria so as to set our search boundaries as protocol of the search strategy, as shown in Figure 1.

Insert Figure 1 about here

First, we limit our review of the literature published between January 1980 and January 2017. This time-frame was deemed appropriate due to the sporadic and patchy evidence of relevant articles prior to 1980. Then, we search for peer-reviewed English-language articles in the following databases: EBSCO, ProQuest, Science Direct, and Web of Science, the most frequently used in the field of business and management as academic publication searching sources. Second, we choose a narrow and fuzzy search criterion by using keywords (cultur*), (creativ*), (innovat*) and (new product) in the "title" of academic articles in order to include potential variations of innovation, but limit to these articles explicitly interested in addressing the issue of culture and innovation. Although there are several weaknesses associated with the "title search", this search method is useful when a systematic review faces an overwhelming list of references to review in a short time-frame (Pittaway *et al.,* 2004). Third, the filtered results were exported to the reference management program EndNote for further analysis. Finally, by means of analyzing the title, research issues and key conclusions in the abstract of these selected literatures, we select the most relevant literatures

to report the field of culture and innovation.

In line with the inclusion and exclusion criteria (Appendix 1 and 2), our search process yields 1087 articles after retrieving the search results and filtering (Appendix 1). These references were exported to the reference management software EndNote, which allows us to identify and eliminate the irrelevant literatures. During this stage we identify and eliminate 398 duplicate studies, seven non-English language and proceeding papers, five anonymous authors, and three book reviews. After this process, we exported the remaining 674 retrieved studies to excel document. Then, we conducted a thorough analysis of these articles by using the categorization criteria from Macpherson and Holt (2006), where the retrieved articles are further reviewed against the inclusion and exclusion criteria (see Appendix 1 and 2) in an iterative process using keyword searches and title and abstract analysis. We adopt this categorization criteria mainly due to its several advantages: 1) it develops standardized process of categorizing relevant references which enhance the efficiency of carding and identifying the most important and relevant literature, thus enhancing the rigor of a review by providing systematically generated evidence supporting the arguments closely related to the research questions; 2) this criteria improves the objectiveness of judging the quality of the relevant documents and reduces the limitations caused by subjective evaluations; and 3) the criteria can be followed for potential duplicated studies in the future.

Based on this categorization criteria, we conducted a thorough analysis of the title and abstract of the 674 articles. Our systematic review categorized 257 articles as secondary reference because the information on theory or findings and/or the relevance to culture and innovation included in their title and abstract was ambiguous. We also categorized 356 article as the partially relevant reference because their title and abstracts included theories and concepts which were marginal or not clearly linked to culture and innovation. Furthermore, it should be stressed that "the relevance assessment was relative, to the extent that our judgements were focused on aspects contained

within the review scope" (Thorpe *et al.*, 2005, p. 260). For instance, if an article examines the influence of culture on the innovation of pedagogies or teaching methodology in a business school, but without explicit reference to a business organization, we exclude the article in the review. Through such an iterative process involving keyword searches, title and abstract analysis, we got 61 primary articles, and the full-text of these articles was found for further analysis.

4. Reporting the findings

In this section, we present the findings of these 61 identified scholarly works. Based on our systematical analysis of our sample articles, we classified the type of culture that each of the studies has focused on into two categories: organizational and national culture. Thirty-six (36) of our sample articles are on organizational culture (59% of the sample size), whereas twenty-five (25) of them concentrate on national culture (41%). Our review articles are consistent with a widely recognized observation that national and organizational cultures are the two most relevant level of analysis for cultural studies (Hofstede 1984).

4.1. Organizational culture and innovation

Organizational culture has been considered as the foundation of organizational systems by sharing the base of values (Saffold, 1988), which establishes the principles of management for employees to follow (Schein, 1992), and defines the way in which a firm conducts its business (Barney, 1986). In studying its influence on innovation, Martins and Terblanche (2003) argue that organizational culture seems to be a critical factor in the success of any organization, lying at the heart of organizational innovation (Tushman, 1997). It is not surprising, therefore, that the largest body of our sample articles addresses this level of cultural studies and its relations with innovation. Scholars have been using different dimensions of organizational culture to study innovation in the

identified literature. One of the most commonly used theoretical models is competing value framework (Quinn and Rohrbaugh, 1983; Quinn and Spreitzer, 1991; Cameron and Quinn, 2006). By focusing on four quadrants of cultural values and norms (i.e., the hierarchical culture, the clan culture, the adhocracy/developmental culture, and the rational/market culture), the competing value framework has been widely used in empirical studies which investigate the relationship between organizational culture and innovation in different contexts (e.g., Cameron and Quinn, 1999; Deshpande and Farley, 1999).

In addition to using these cultural dimensions as independent variables that influence innovation outputs, innovation-oriented culture (Brettel and Cleven, 2011) and learning culture (Škerlavaj *et al.,* 2010) are also considered as pertinent independent variables in affecting innovation outcomes. Based on a systematical content analysis of the thirty-six empirical studies of organizational culture and innovation, we develop an organizing framework and highlight the relationship between diverse cultural dimensions and innovation, as shown in Figure 2.

Insert Figure 2 about here

4.1.1. Innovation-oriented culture

Innovation-oriented culture is defined as a set of organizational cultural values, norms, and artifacts which supports a company's innovativeness (Stock *et al.,* 2013). As an intangible strategic resource, it emphasizes innovation, take risks, future market orientation, open-mindedness and learning (Brettel and Cleven, 2011; Wang *et al.,* 2012). Within this environment, firms frequently invest in research and development (R&D) projects so that their talented employees could implement their creative ideas to promote the new product development (Jassawalla and Sashittal, 2002; Miron *et al.,* 2004; Leeet *et al.,* 2017), service, administrative and process innovation

(Kenny and Reedy, 2006; Lyons *et al.,* 2007; Kalyar and Rafi, 2013). Additionally, innovation-oriented culture emphasizes participation of all members and shared responsibility (Kenny and Reedy, 2006) based on which the value of human capital is maximized and promotes the member of organization to strive for innovation (Martín-de Castro *et al.,* 2013; Wang *et al.,* 2012). From these empirical studies, it is apparent that the innovation-oriented culture can be a key organizational innovation resource, and it is conducive to a firm's growth and performance (Stock *et al.,* 2013; Meyer, 2014; Gomes *et al.,* 2015; Ali and Park, 2016). However, it is also worth noting that there are several more research questions that require further investigation and fine-grained analysis. For instance, what organizational contexts are more conducive to establish an innovation-oriented culture? In the context of innovation-oriented culture, how should companies recruit and train employees so as to adapt to innovation-oriented culture and maximize their innovative ability?

4.1.2. Learning culture

Learning plays a crucial role in innovation. Škerlavaj *et al.* (2010) finds that organizational learning culture is composed of three constructs: information acquisition, information interpretation and behavioral and cognitive changes. These constructs support in-depth and systematic approaches aimed at achieving higher-level organizational learning (Cerne *et al.,* 2012; Tran, 2008), thereby creating appropriate learning and knowledge transfer climates to enhance and facilitate innovation (Bates and Khasawneh, 2005; Darvish and Nazari, 2013) and new product development (Brettel and Cleven, 2011). On top of that, organizational learning culture moderates the positive relationship between transformational leadership and group creativity, and this relationship is stronger for organizations that possess a strong learning culture (Phipps *et al.,* 2012). Overall, studies in this research stream describe the positive linkage between learning culture and innovation. However, in the process of constructing a learning organization, future research may address some under-studies research questions, including in a rapidly changing business

environment, how to establish an effective and impeccable technology and system infrastructure to promote learning? How to transform the tacit and explicit knowledge into practical innovation through learning culture? And does the company have the suitable system to ensure the smooth completion of the process of knowledge transfer in a learning culture?

4.1.3. Adhocracy/developmental culture

On the basis of the commonly adopted competing values framework, we integrate the adhocracy and developmental organizational culture for their closeness in flexibility and external focus. The adhocracy/developmental culture emphasizes future orientation, risk-taking (Ahmed, 1998), flexibility (Kitchell, 1995), openness, rewards for change (O'Reilly, 1989; Ruvio *et al.,* 2014) and organizational learning (Naranjo-Valencia *et al.,* 2010; Liao *et al.,* 2015). These cultural characteristics are supportive of firms to adapt the new environment and bring critical resources together to engage in innovative and creative ventures. Moreover, developmental culture also plays a moderator role between strategic human resource management (SHRM) and innovation. For example, SHRM has a positive impact on firms' product innovation and this relationship is stronger for firms with a developmental culture (Wei *et al.*, 2011). In sum, the organization with the adhocracy/developmental culture is more responsive to innovation (Knosková, 2015; Brettel *et al.,* 2015) and new product development (Dayan, *et al.,* 2016). Nevertheless, what is not clear is how an adhocracy/developmental culture closely fits the direction and strategy of a particular organization as it confronts its own issues and the challenges of a particular time. The underlying reason is that an organization characterized by an adhocracy/developmental culture might place too much emphasis on flexibility so that future growth orientation might be easy to ignore the potential risk factors and lack of market research. These factors may decrease the risk management capabilities. As a consequence, enterprises might be trapped in operational difficulties when they

encounter the uncertain events.

4.1.4. Hierarchical culture

In contrast to adhocracy culture, the hierarchical culture is characterized by a formalized and structured place to work, emphasizing stability, predictability, and efficiency (Cameron and Quinn, 2006). In the hierarchical culture, a company stresses internal control; this internally orientated governance and practice may reduce external idea stimulation, information gathering, organizational learning, and thus be detrimental to innovation (Büschgens *et al.,* 2013; Lemon and Sahota, 2004; Naranjo-Valencia *et al.,* 2010). Given that hierarchical culture is not all disadvantages for innovation and for the purpose of fostering innovation, companies should try to avoid hierarchical cultures. Nevertheless, future studies should explore potentially positive significance of the hierarchical structure; such research endeavor might be   beneficial us to establish clear lines of communication by which employees can know their duties and goals, and send information about their work as well as their ideas to direct superior directly and speedy.

4.1.5. Clan culture

Clan culture is typically featured with a friendly place to work where people can be easy to share ideas among themselves. An organization with a clan culture normally emphasizes the long-term benefit, high cohesion and morale, human development and participation (Cameron and Quinn, 2006). Hurley (1995) finds that the more the culture emphasizes people and career development, the higher the groups' innovativeness will be, and the more the culture emphasizes participation and open decision making, the higher the groups' innovativeness will be. On top of that, Barczak *et al.* (2010) suggested that team emotional intelligence promotes team trust. Trust, in turn, enhances the creativity of the team. For this reason, it is necessary to build a harmonious, interpersonal atmosphere in the organization and encourage employees to work together for long-term common goals (Barczak *et al.*, 2010). However, the extant research on the disadvantage of

clan culture is inconclusive. In particular, in-depth studies on how a firm with a clan culture tends to be a homogeneous organization are missing. Similarly, we have not yet identified empirical works on how employees who have common beliefs, goals, but lack of diversity and dissent, could lead to the employees becoming overly concerned with maintaining group harmony with little challenge to the status quo.

4.1.6. Rational/market culture

The competing values framework sheds light on the rational culture as an external and control-based values; this market-oriented culture emphasizes competitiveness, goal achievement and environment exchange. Although rational culture promotes an external focus by emphasizing the role of external forces on the innovation, organizations with a rational culture continues to increase the degree of innovativeness within the organization (Demirci, 2013). In addition, while organization is regarded as a rational system by listing the goals and the formal rules, more research is needed to examine the irrational aspects of organizations and individuals. For instance, the sales department in an organization might have the goal of ensuring maximum sale, but the customer service department might have an opposite goal that focuses on achieving customer satisfaction regardless of sale growth. Given that there are very few studies in terms of rational/market culture and innovation, more research is needed in this line of research in the future.

4.2. National culture and innovation

Similar to organizational culture, national culture plays a vital but complex role in influencing innovation at the national level. In line with the above section, based on a systematical content analysis of the twenty-five empirical studies of national culture and innovation, we develop an organizing framework and highlight the relationship between a variety of commonly studied cultural dimensions and innovation, as shown in the Figure 3.

4.2.1. Power distance

Power distance is the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (Schwartz, 1999; Hofstede, 2010; House *et al.,* 2002). Scholars generally agree that in a low power distance culture, there are less rigid hierarchies and it is beneficial for people to break down power barriers, and thus demonstrate a higher level of novelty in idea generation than individuals in a high power distance culture (Shane, 1992; Erez and Nouri, 2010; Kassa and Vadi, 2010; Bradley *et al.,* 2013).

In the same vein, individuals in the high power distance culture have a sense that they lack resources or opportunities to make decisions on innovativeness, which lower their incentives of solving problems through innovation (van Everdingen and Waarts, 2003; Waarts and Van Everdingen, 2005; Hsu *et al.,* 2010), thus stifling consumer innovation (Steenkamp *et al.,* 1999; Singh, 2006; Lim and Park, 2013), technology innovation (Allred and Swan, 2004; Puia and Ofori-Dankwa, 2013) and national innovation rate (Shane, 1993; Taylor and Wilson, 2012; Rujirawanich *et al.,* 2011).

Although previous studies have suggested and empirically verified that the power distance enhances innovation performance, the process of innovation is like making a great film, and the choice of the best drama plays a very important role in the whole process of action. Despite in the environment of low power distance everyone feels like a scriptwriter, and everyone would like their opinion being included in the final result, filming process had to be delayed because there may be substantial differences of opinion between scriptwriters. Therefore, if an innovation project that has not produced results for years, that will dampen the enthusiasm of individual innovation.

As a consequence, a national culture with high power distance culture probably will have certain positive effects. Therefore, more empirical research is needed to examine the positive influence of power distance on innovation.

4.2.2. Individualism/Collectivism

In general, individualism refers to a society in which the ties between individuals are loose, independent, focusing on himself and his intimidate relation. In contrast, the people in collectivism are integrated into strong, cohesive in-groups (Hofstede, 2010). Moreover, the collectivism can be categorized into different subtypes. For instance, Realo *et al.* (1997) classify collectivism into the family (*Familism*), peers (*Companionship*) and society (*Patriotism*), whereas House *et al.* (2002) categorize the collectivism as in-group collectivism and social collectivism.

In an individualistic culture, people are more likely to make decisions independently in pursuit of their own goals or achievements; hence, an individualistic culture is supposed to foster risk taking and reward entrepreneurial behaviors (Allred and Swan, 2004; Bradley *et al.,* 2013). In the circumstance, the individuals are apt to generate novel and creative ideas (Erez and Nouri, 2010) and promote innovation (Griffith and Rubera, 2014; Desmarchelier and Fang, 2016). Moreover, homologous consumers in more individualist cultures would be more receptive to innovations because these innovations allow them to be distinctive from others (Steenkamp *et al.,* 1999; Lim and Park, 2013), and that is propitious for consumers to put forward innovative suggestions for new product development and increase the market share (Singh, 2006; Morris and Leung, 2010; Engelen *et al.,* 2014). In contrast, the characteristics of a collectivist culture where individual aspirations and initiatives are subordinate to the group priority are typically believed to be detrimental to innovation (Jones and Davis, 2000).

Nevertheless, there are several empirical studies that indicate the positive role of collectivism on innovation. A certain type of collectivism, for example, patriotism and nationalism

(Taylor and Wilson, 2012), friends-related and social-related collectivism (Kassa and Vadi, 2010) can also foster innovation at the national level. On top of that, Shane (1993) empirically finds that there is a negative relationship between individualism and innovation. Furthermore, there are several Asian nations embedded with collectivist and hierarchical cultures are becoming increasingly innovative. Apart from previous two controversial discussions, some other studies suggest that individualism has no significant and direct effect on innovation (Waarts and Van Everdingen, 2005; Lin, 2009; Kassa and Vadi, 2010; Engelen *et al.,* 2014). Therefore, there is a generally accepted consensus that the differences between individualism and collectivism have a profound influence on innovation performance. However, in view of the existing conflicting findings from empirical studies, the mixed and sometimes contradictory findings warrant for further research inquiries.

4.2.3. Masculinity/Femininity

Compared with a femininity society, a masculinity society is expected to be more achievement- and success-oriented (De Mooij and Hofstede, 2010). Obviously, the people in the masculinity society are confident, positive, and willing to take challenges and have a strong sense of being initiative and assertive, thus being more likely to bring on more innovative orientation (Efrat, 2014). Therefore, the higher the level of the masculinity dimension, the higher will be the level of new product innovation (Rhyne *et al.,* 2002). However, on the contrary, Kassa and Vadi (2010) indicate that masculinity is negatively associated with innovative activity, because in feminine societies the focus is on people and the climate is warm, with low conflict, and with high trust; these friendly elements are in favor of employees to cope with the uncertainty related to new ideas. Therefore, future research needs to pay more attention to the impact of gender role on innovation so as to identify convincing rationale for taking into account of which cultural type is more conducive to innovation.

4.2.4. Confucian dynamism

Confucian dynamism or long-term orientation 'stands for the fostering of virtues oriented toward future rewards, in particular, perseverance and thrift' (Hofstede, 2010, p. 239). Given that the majority of technological developments require long term planning and investment, characteristics normally associated with the positive role of the Confucian dynamism dimension should be more likely to be associated with higher levels of innovation (Jones and Davis, 2000; Rujirawanich *et al.,* 2011). Using the framework of House *et al.* (2004), Rossberger (2014) find out that the performance orientation not only has direct and positive relation to innovation, but also positively mediate the relationship between innovation-related national personality profiles (agreeableness and openness to experience) and innovation. Although the overall long-term orientation is conducive to innovation, we need to pay more attention to the fact that a fast obsolescence of products, increasing customer demands and pressures to deliver products at lower prices can intensify competition. As a result, when companies are under high pressures to deliver innovative products to the market fast while controlling their costs, they are more likely to deliver radical innovations fast within a short and allotted time. Therefore, a short-term orientation may also have positive significance in an exceptive situation; such observation needs to be further empirically examined particularly in different contexts.

4.2.5. Uncertainty avoidance

Uncertainty avoidance is the extent to which members of a society feel threatened by uncertainty and ambiguity; they strive to mitigate such uncertainty and unpredictability of future events by relying on social norms, rituals and bureaucratic practices to (Hofstede, 2001; House *et al.,* 2002). People that 'are high on uncertainty avoidance feels threatened by ambiguous situations and try to reduce the risk of unforeseen through consensus, formal rules, protectionism and procedures, these activities will stifle innovation' (Allred and Swan, 2004, p. 86). By contrast, a culture with weaker

uncertainty avoidance is typically represented by an acceptance of competition and dissent, which is necessary for generating novel ideas and innovative product and service (Jones and Davis, 2000; Erez and Nouri, 2010; Bradley *et al.,* 2013; Lim and Park, 2013; Efrat, 2014). In other words, the higher the uncertainty avoidance acceptance, the more likely that the people prefer champions to overcome organizational inertia to innovation by violating organizational norms, rules and procedures (Shane, 1993; Shane, 1995). Furthermore, as the uncertainty avoidance increases, the positive effect of technology innovation on changes in market share tends to be weakened (Griffith and Rubera, 2014). Overall, low uncertainty avoidance is beneficial to innovation. However, there are some research questions that require further investigation. For instance, how people in cultures characterized by high uncertainty avoidance tend to be more risk averse, which, in turn, will create the necessary environment for innovation?

4.2.6. Indulgence

Indulgence is related to the gratification versus control of basic human desires and it is also related to enjoying life (Hofstede, 2011). Up until now, as a new cultural dimension, there exist extremely limited studies of indulgence. We are only able to identify one empirical study on indulgence carried out by Griffith and Rubera (2014); they investigate the influence of indulgence on the relationship between technology and design innovation, and market share. Their empirical results highlight the positive effects of design innovation on changes in market share are strengthened as indulgence culture increases, whereas the positive relationship between technological innovations and market share is weakened as indulgence culture increases. With a limited study on the topic, more empirical studies are needed to explore the relationship between indulgence and innovation in the future.

5. Discussion and conclusion

Replying on a systematic literature review, our study integrated previously fragmented and disconnected research results. Our findings reveal that there exist significant influences of both organizational and national cultures on innovation and different cultural dimensions have different effects on innovation. We also find that the influence of culture on innovation presents different characteristics in different historical stages, clearly indicating the influence is continuous and varied. By applying systematic literature review and disentangling contradictions in existing literature, we identify research gaps, challenges, and opportunities for future studies, which can be particularly relevant for both researchers and business practitioners.

First, through the systematic literature review, this study found that different dimensions of both organizational culture and national culture have a general or overall impact on innovation. In particular, studies addressing the distinct role played by cultural dimensions in different innovation process, including new product development (Jassawalla and Sashittal, 2002), service innovation (Kenny and Reedy, 2006), administrative innovation (Kenny and Reedy, 2006) and process innovation (Lyons *et al.,* 2007; Kalyar and Rafi, 2013). However, findings from the majority of previous empirical studies are relatively absolutized and there is a limited dialectical point of view on either positive or negative impact of cultural dimensions on innovation. Put differently, most of existing empirical studies are only addicted to determining whether the p value is significant or not, leading to ignorance of the true underlying logic of the impact of culture on innovation. For example, Jones and Davis (2000) and Rujirawanich *et al.* (2011) concluded that the Confucianism has a positive influence on innovation, but they ignore the positive impact of short-term orientation on the radical innovation.

Second, on the basis of quantitative studies from 1980 to 2017, we may conclude that the topic of culture's influence on innovation has been evolving over time and dynamically. In the 1980s when the study of the impact of culture on innovation just emerged, scholars mainly use case study

(i.e., Feldman, 1988) and theoretical or conceptual methods (O'Reilly, 1989) to carry out the research. Studies found that culture and its characteristics (e.g., openness and avoidance) have an impact on innovation, however, there was a limited systematic study in investigating the relationship between specific cultural dimensions and innovation. In the1990s, the research on the influence of culture on innovation has increased significantly with qualitative and quantitative methods becoming the main research methods. During this period, the study began to explore the impact of specific cultural dimensions on innovation, such as entrepreneurial culture (Deshpandé and Farley, 1999). In the 2000s, with the deepening of economic globalization, enterprises are facing increasing challenges of innovation; consequently, innovation-oriented culture began to receive special attention and achieved numerous fruitful results (Kenny and Reedy, 2006). In the 2010s, the global financial crisis seriously affected the traditional manufacturing industry, prompting a large number of enterprises to transfer themselves to the direction of high-tech and focus on building their capability of continuous learning. At the same time, innovation-oriented and learning-oriented culture occupies the key position of research, and the competing values model has been widely used in this period (Demirci, 2013). In addition, in contrast to earlier studies which concentrated on the direct impact of culture on innovation, recent empirical studies gradually started to explore the role of culture in the complex relationship between innovation and other factors, including transformational leadership and innovation (Phipps *et al.*, 2012) and absorptive capability and innovation (Ali and Park, 2016). On the other hand, because national culture has little change in a short period of time, studies on the impact of national culture on innovation has not changed much over time. In the 1990s and 2000s, the mainstream academic research continued to rely on the Hofstede's cultural dimensions and explored the influence of national culture on innovation, conceptually and empirically. In the 2010s, researchers began to explore different roles of national culture on innovation, including the role of mediators (e.g.,

Rossberger, 2014) and moderators (e.g., Griffith and Rubera, 2014). On top of that, whether in a study of national culture or organizational culture, before 2010 the study is more concentrated in Europe and the North America. However, in recent years, with an increasing importance of emerging market economies in the global marketplace and competition and enterprises increasingly showing a strong innovation capability, more and more studies began to appear particularly in Asia, such as China and India.

Third, while the nature of this study is to systematically review of the current literature, and its results might be preliminary, there are several theoretical and practical implications for both business practitioners and scholars. For the practitioners, because various dimensions of organizational culture are not isolated and are often interacting with each other, enterprises should take into account both the positive and negative effects of an organizational culture, and try to find the balance between positive and negative effects of a specific cultural dimension, thus improving the efficiency and effectiveness of decision making. For example, in an enterprise with prevailing individualistic culture, the effectiveness of collective-related innovation policies tends to be weak. At the same time, due to lack of teamwork spirit, the members within the culture of individualism are more likely to stick to their own point of view of innovation, which will hinder the efficiency of innovation and prohibit truly group-oriented innovative ideas. Additionally, with the increasing globalization of R&D activities, questions regarding where to locate the center of R&D and how to judge the capability of consumer's innovation in different national cultural background have become vital to the success of multinationals. Accordingly, companies should carefully consider different national cultural dimensions when entering the international market, determining the location of R&D centers, and launching new product and service offerings in different countries and through different modes of entry (Moon *et al.,* 2013; Deng and Yang, 2015),

For the academics, our study provides scholars with an updated and comprehensive research

landscape and development process in this important field, thereby arousing greater research interest and enthusiasm for future research. We identify some of contradictory views of the previous research so that future researchers can think more deeply about the relationship between culture and innovation. For instance, not all cultural influences on innovation can be explicitly categorized into black or white; also, simply using quantitative questionnaire method and using the regression equation to find the p value cannot make a finer-grained analysis of the complex relationship between culture and innovation. In addition, the introduction of the development process of the impact of culture on innovation provides a clear research context for future research from the perspective of historical development.

When considering the implications of our work, future researchers should also recognize some of its limitations. First of all, although we attempt to maximize the coverage of the relationship between culture and innovation, the restriction of our search on keywords, titles and abstracts might miss some of empirical studies on the topic. Moreover, while we pinpoint that the impact of different levels of cultural dimensions on innovation is various, including both positive and negative or even mixed effects, given the scope of our research, we cannot carry out a deeper and more thorough-paced study of these complex issues, warranting scholars in the future for further investigations. Furthermore, although we have described the research on cultural impact innovation by different historical stage scholars, we simply describe the research context and possible reasons on the impact of cultures on innovation at the different historical stage. Therefore, future research need to verify and reveal the real reason by means of longitudinal empirical research. Such kind of longitudinal study of the influence of culture on innovation along the lines of historical development may be highly promising in terms of pointing out the future research direction by posing a number of challenging questions.

In the same vein, future scholars should pay more attention to innovation in emerging

countries and regions. With the rise of emerging market countries such as China, a large number of successful and innovative emerging market companies have emerged, such as Huawei and Alibaba, which have been bringing innovative ideas and disruptive technologies to the world (Deng *et al.*, 2017). Whether the Confucian or Taoist culture prevailing in the majority of East Asian countries provides the necessary intellectual support for innovation needs to be further researched by future scholars. For example, individualism may be more conducive to innovation, whereas collectivism is not devoid of any merit for promoting innovation, as demonstrated in Asian countries like China, Singapore and Hong Kong. Moreover, with the increase of the international mobility, the cultural traditions and values are permeated with each other. Accordingly, future study should develop a new cultural dimension measurement scale so as to measure the cultural characteristics of various countries and regions and also the people and ethnic groups with multi-cultural background. future research should also explore the impact of the interrelationship between organizational culture and national culture on innovation, for example, what type of corporate culture favors the innovation of multinational corporations (MNCs) in the host country which characterized by uncertain avoidance, and how MNCs make the workers who has different culture adapt to and accept the corporate culture. Finally, a meta-analysis may provide a statistical integration of the accumulated research on the relationship between specific cultural dimension and innovation.

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The content of this article does not reflect the official opinion of the European Union. Responsibility for the information and views expressed lies entirely with the authors.

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*An asterisk denotes that the study was part of the literature review.

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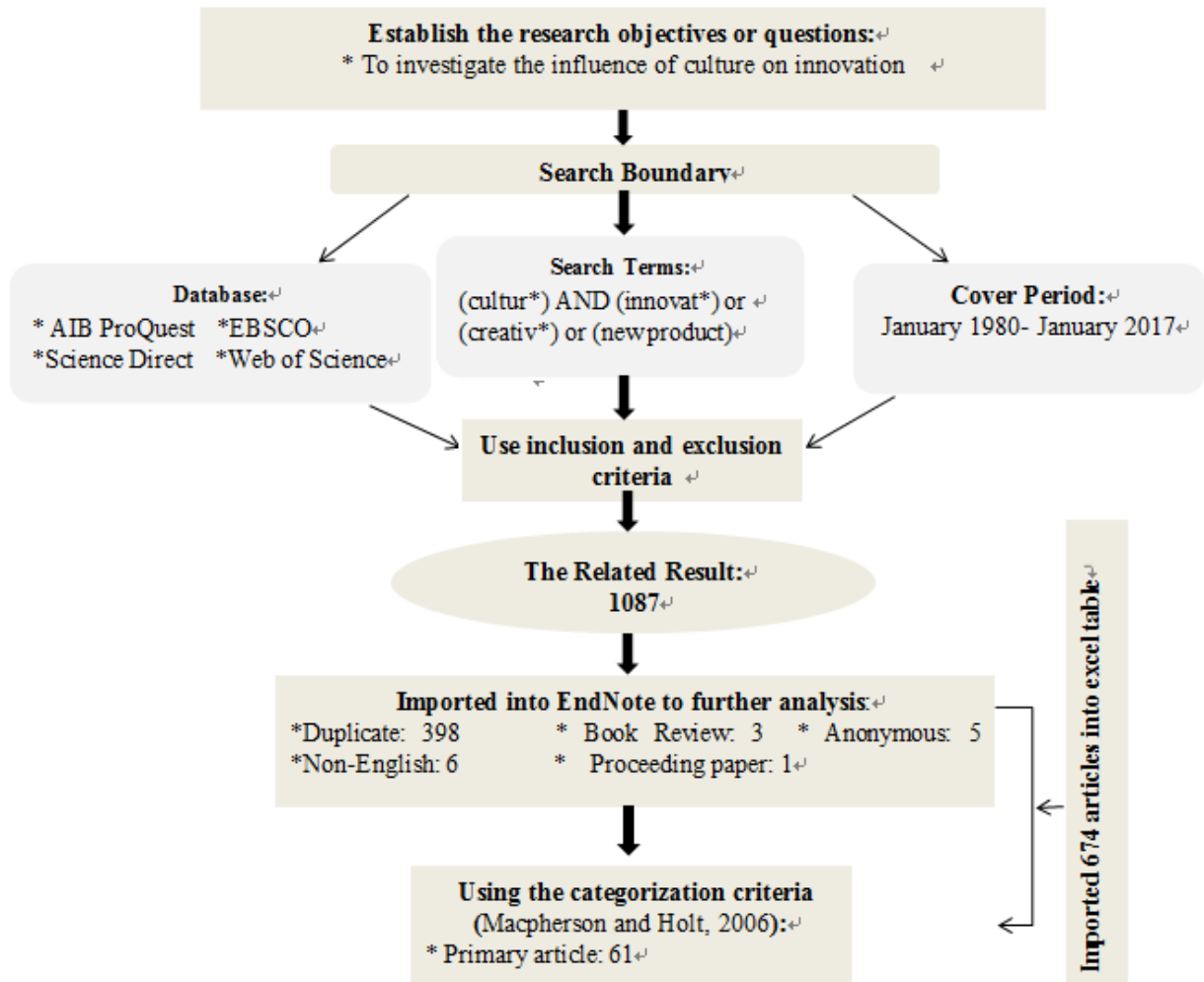
Establish the research objectives or questions:
* To investigate the influence of culture on innovation

Search Boundary

Database:
* AIB ProQuest   *EBSCO
*Science Direct   *Web of Science

Search Terms:
(cultur*) AND (innovat*) or
(creativ*) or (newproduct)

Cover Period:
January 1980- January 2017

Use inclusion and exclusion criteria

The Related Result:
1087

Imported into EndNote to further analysis:
*Duplicate: 398   * Book Review: 3   * Anonymous: 5
*Non-English: 6   *   Proceeding paper: 1

Using the categorization criteria
(Macpherson and Holt, 2006):
* Primary article: 61

Imported 674 articles into excel table

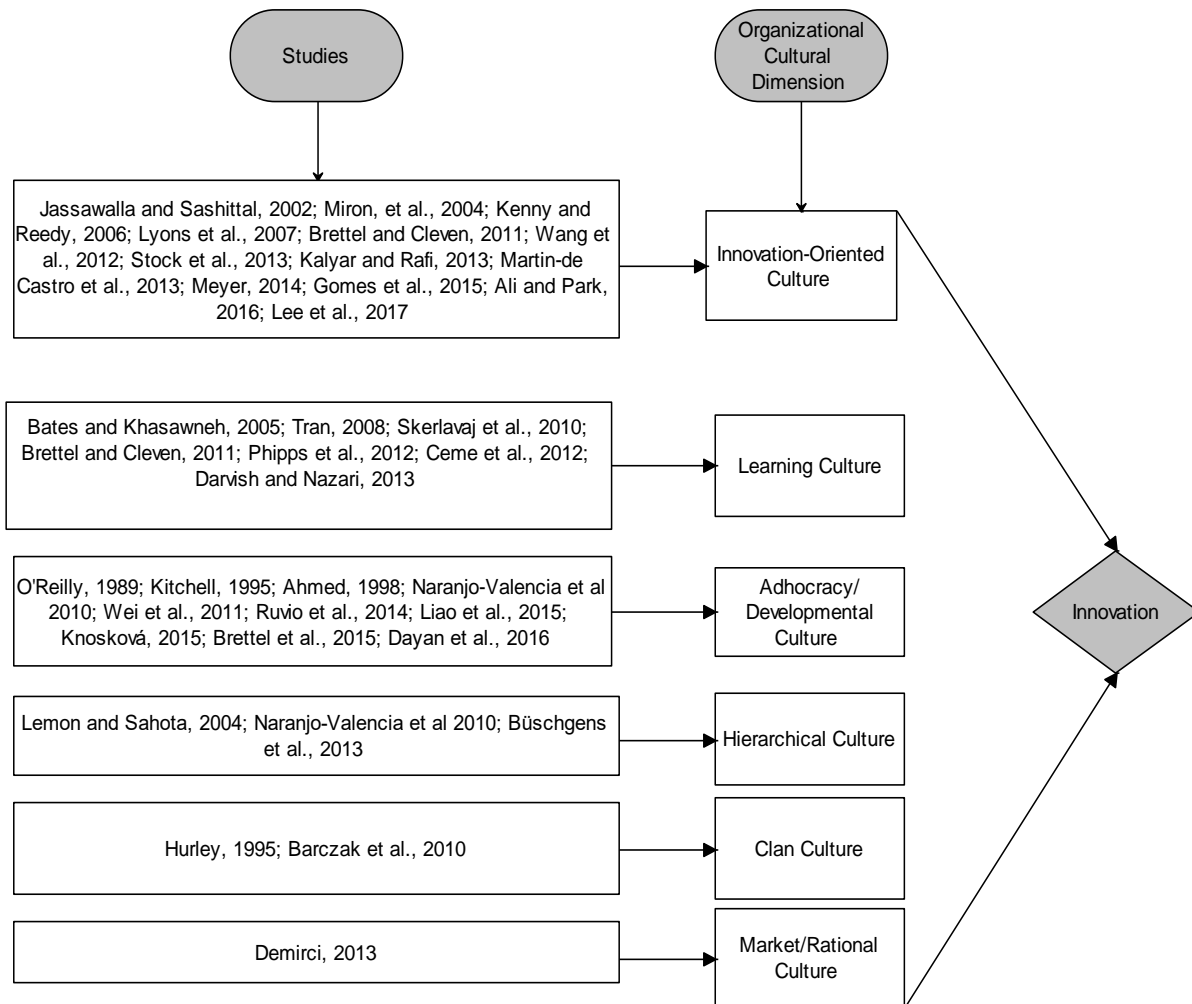**Figure 1.** Defining search protocol for the systematic literature review

Figure 2. Organizing framework derived from content analysis of the literature related to organizational culture and innovation
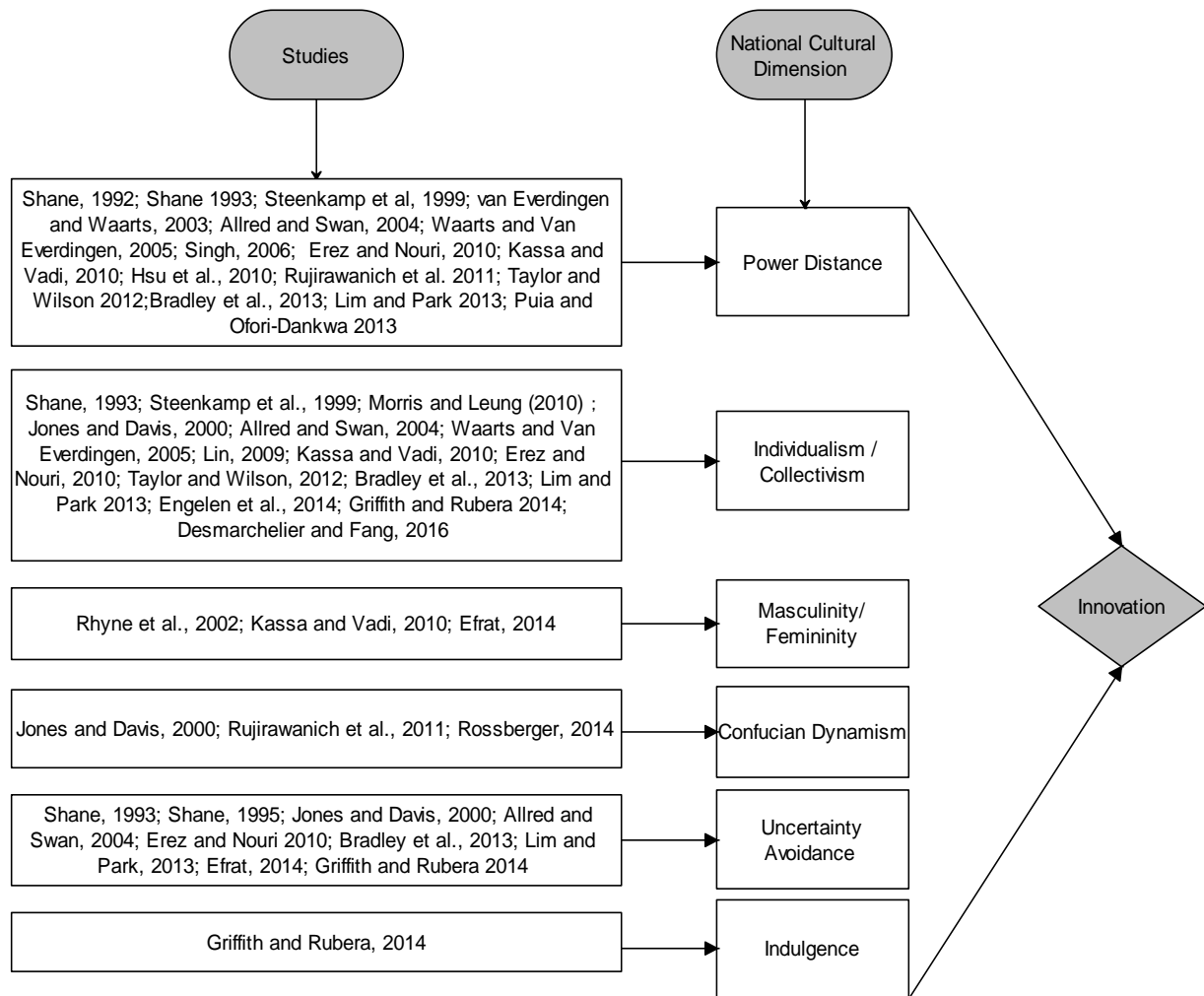
Figure 3. Organizing framework derived from content analysis of the literature related to national culture and innovation

Appendix 1. Inclusion criteria

All sector	Examine how culture influences innovation within and across industry sector(s)
All ages	Organizations of differing stages of development/demise
Empirical studies	Capture all empirical evidence
Theoretical papers	Provide the working assumptions and conceptual underpinnings used in research
Private business organization	Include all for-profit businesses that are not owned or operated by the government

.

Appendix 2. Exclusion criteria

Criteria	Reason for exclusion
Pre-1980 articles	The majority of databases does not contain earlier papers
Education	This does not refer to the management of business organizations
Public sector or NGO	Organizations with different corporate governance principles and/or business objectives
Foreign language	Exclude articles not written in English because scholars were not multi-lingual
Education (pedagogy and teacher training or teacher education)	No interference with business management
Urban or city, household and community building and development	Does not refer to the management of businesses
Art and Music	This does not refer to business management
Crime and law	This does not refer to business management
Linguistic	This does not refer to business management
Philanthropy	This does not refer to business management
Politics	This does not refer to business management
Individual psychology and multicultural exposure	Not directly related to business management)
Sociology and anthropology	This does not refer to business management
Environment protection	This does not refer to business management
Medical and health care	This does not refer to business management

Appendix 3. Description of search results in each database

Search Protocal	Search String	Scope	Date of Search	Date Range	Number of Entries	Number of Relevant	
ProQuest	(cultur*) And (innovat*) or (creativ*) or (new product)	Title	01 January 2017	1980-2017	2151	442	
EBSCO	(cultur*) And (innovat*) or (creativ*) or (new product)	Title	01 January 2017	1980-2017	2163	212	
Web of Science	(cultur*) And (innovat*) or (creativ*) or (new product)	Title	01 January 2017	1980-2017	3011	337	
ScienceDirect	(cultur*) And (innovat*) or (creativ*) or (new product)	Title	01 January 2017	1980-2017	289	96	
Total						*1087*	