Cultural Configurations for International Innovativeness: A review and theoretical proposal

Yingying Zhang Zhang
International University of Japan

Sylvia Rohlfer
CUNEF University

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IUJ Research Institute
International University of Japan

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By Yingying Zhang-Zhang, International University of Japan

Sylvia Rohlfer, CUNEF University, Spain

Abstract

The accelerated international business context with the multiple sourced dynamic factors such as technology, emerging market rules and COVID-19 alike crisis demands innovativeness to survive and sustain competitive advantages. Culture as a complex construct adds complications to the international business, but may also provide a response as a soft organizational element. In this paper we explore the relationship between two the culture and innovation with systematic literature review to identify cultural configurations in affecting innovation. We deployed quality social science citation indexed journal publications identified in the Web of Science (WoS) database with a set of keywords. The identified search results were reduced to 697 articles from an initial 7,097 items with inclusion and exclusion criteria. Utilizing Python machine learning tools and PHP language scripting, we clustered 697 items into 7 topic groups with 94 keywords spotted. We further analyze the seven clusters, with a comprehensive theoretical framework to unfold the underlying influences of culture on innovation in an international business context. Research gaps are also recognized for future research directions.

Keywords: Cultural distance, corporate culture, national culture, innovation, knowledge, R&D, globalization, creativity, new product development, multinationals

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Introduction

The recent interests in understanding culture and its effects on innovation has been rising, in an implicit or explicit manner (Minbaeva, Fitzsimmons & Brewster, 2021; Tian, Deng, Zhang & Salmador, 2018). It is not only because that innovation is the source for competitiveness (Lederman, 2010; Liu, Tan & Song, 2021; Yu & Hang, 2010) but also that culture plays a critical role for the success in international business (Leung et al., 2011; Peterson, Sondergaard & Kara, 2018; Rohlfer & Zhang, 2016). While both domains are on their own courses of theoretical evolution with a rising complexity and potential paradigmatic shift, we intend to explore the effects of culture and its configuration on innovation in the international business context as they play an important role for firm competitiveness and performance. In spite of the growing application of culture concepts in innovation studies, the configuration of culture for international innovativeness and relationship between these two increasingly important domains have been less explored. The relatively recent review work of Tian et al., (2018) has corroborated this cumulative interest to understand their relationships, but it was not focused in an international business context, and it also falls into the shortage by mainly stressing on the cultural dimension with no exploration on the definition and variation of innovation.

We aim to systematically review, analyze and explore the relationships between culture and innovation in an international business context, to propose a cultural confirmation for international innovativeness, as this latter is the main framework for the relationship between culture and innovation with the culture as a precedent for innovation (Tian et al., 2018). Furthermore, we reinforce the understanding of innovation dimension and its variations which hasn't been weakly explored in Tian et al. (2018). In this way, we attempt to improve the knowledge pool of the effects of culture on innovation in international business for multinationals to enhance their strategy and practices.

The rest of this paper is structured as the follows. First, we present the systematic literature review method with the search results from the Web of Science. Then, we extend the analytical results deploying Python Sklearn library's machine learning tools with seven topic clusters and PHP language scripting with keywords frequency identification. A categorization of relationship between culture and innovation with a comprehensive theoretical framework proposed for the field mapping. Further proposal of a cultural configuration on international innovativeness is presented with propositions exhibited. Finally, we debate on the lines of research and future research direction.

Review Methodology

Following most of systematic literature review work (e.g. MacPherson & Holt, 2006), we first identify the review sources, then apply keywords to create the article database of the research topic, followed with the initial results filtering with a set of inclusion and exclusion criteria to approximate the desirable outcomes. Afterwards, analytical tools are applied to generate outcomes for interpretation and presentation.

Due to the interest on accessing quality journal publications for our further analysis, we adopted the use of Thomson Reuter's Web of Science (WoS) which contains all Social Science Citation Index (SSCI) journals. The usage of SSCI journals offers a quality guarantee of the identified research work, and has been popularly used in previous review works (e.g. Zhang-Zhang, Rohlfer & Rajasekera, 2020). We made some initial searches and preliminary analysis with WoS and three additional popular journal databases in the area of business and management: EbscoHost Business Complete, Science Direct and ProQuest's ABI/Inform multiple search tests in 2017 and 2018. Our preliminary results indicated large overlaps of journal publications between these three databases and WoS. Therefore, we adopted solely employing WoS, and applied again in an iterative manner the refined keywords out of these tests to WoS Core Collection's SSCI Index and made the search in 2019, 2020, and 2021. The employed keywords were: TOPIC: (Cultur*) AND TOPIC: (Innovat*) AND TOPIC: (International* OR multinational* OR transnational* OR global* OR cross*border).

The final search gave an initial result of 7,097 articles, which was reduced to 697 articles published in the period of 1991 to 2021 (including early access) after several rounds of inclusion and exclusion criteria application embedded in the WoS functionality (See Table 1). These 697 items and their relative information were exported to EndNote and Excel for further analytical treatments.

Insert Table 1 about here

Figure 1 exhibits different images on the distribution of identified articles by year and their top rankings in terms of country, journal, funding agencies, organization, and authors. We can observe a general pattern of increasing number of publications over years on the studied topic. The automatized citation report created by WoS also suggests the field is prosperous with a high impact factor: *h*-index=77, and the sum of times cited=31,730, with an average citation of 45,52 per item (WoS, 2021). As well, the field is dominated by Western countries led by the USA, with the exception of China. In terms of journal ranking, *Journal of Business Research* and *Journal of International Business Studies* are leading, followed by international-focused journals, or international journals of area specialization like marketing, product, innovation or human resource focused. In contrast to the Western country dominance, the funding agency ranking is more diversified with Chinese and Japanese agencies leading, ahead of the UK, European Commission and Russia. However, when it turns to the affiliated organization, Western countries' universities again dominate. In this case, the top ranked organizations are distributed among the USA, UK and Canada, which somehow reflects on the top ranking of authors.

Insert Figure 1 & 2 about here

We first clustered the 697 articles into different topic groups and identified associated key concepts by respectively using Python Sklearn library's machine learning tools and PHP language scripting applied to the title and abstract. The details of the analytical methods are described in the next subsection. The research team conducted an in-depth thematic content analysis and review of the title, abstract and full text of these articles with the field mapping presented in below.

Topics Clustering and Key Concepts

With the increasing popularized big data exploration methods, we intend to apply machine learning tools to a large sized qualitative data analysis. We first used Python to cluster the 697 articles related to culture, innovation and international business into different topic groups, and then employed PHP language scripting to identify the frequent keywords related to these concepts. Python is currently the fastest growing programming language in the world with numerous high-quality packages for data science and machine-learning (Vallat, 2018). Using K-means, a partitional clustering technique, we divided the data items into non-overlapping groups. K-means algorithm is an iterative method that assigns n data items into K clusters that ensures the minimum distance of each item in a cluster with its centroid (Shukla & Naganna, 2014).

We employed the random_state parameter in Kmeans() function in order to make the results reproducible (i.e., fixed seed value) from the Sklearn library in python. In order to determine the optimal number of clusters, the Elbow Method, a visual method, is used (Kodinariya & Makwana, 2013). The application of this method suggests a proxy of seven clusters as optimal for the clustering of the studied data after several rounds of program testing. Table 2 shows the result of this clustering.

Insert Table 2 about here

5

We can observe that the largest cluster is Global Culture and Knowledge Management, with a leading position of total 319 articles and a large distance from the second largest cluster. This cluster is especially related to innovation-related knowledge, its management and transfer, in relation to culture, both organizational culture and national in the global context. Multinational corporations and especially Japanese one plays certain role in this cluster of studies though the frequency is not high. We can also observe that many clusters apply innovation concepts related to open innovation, product innovation, technological innovation, global innovation and innovation capability, which will be further discussed in below about key concepts. All clusters contain explicitly or implicitly all three domains' keywords or their relative key concepts, e.g. the smaller cluster Global New Product Development has no keywords of innovation but new product development is used as a close term to conceptualize innovation as the development of new products to be launched and commercialized. A novel cluster is the smallest one - Social and International Innovation, which only contains 27 articles. This clusters containing social elements like social entrepreneurship, corporate social responsibility and social value didn't appear in the preliminary analysis which shows it as a recent trend. In spite of its small size, this cluster highlight a recent interesting tendency and attention on the social aspects in the international innovation and cultural association.

Not only Japanese related innovation is reflected in the cluster (1), but also Chinese related innovation is shown in another cluster (2) as a keyword. There seems to be a great interest on the innovation related to Japan and China. Saying so, it is not because there are no other geographic areas in the studies but these are not reflected in the keywords identified by the machine learning as a significant group. Other potential geographic areas such as Korea and India could be due to the frequency is not high enough to be remarked. And the countries in the West like the USA and UK could be the automatic omission, either by the authors of their corresponding papers, or by the request of journal. As results showed earlier, the publication rakings of country, organization, and author are dominated by the Western; consequently, stating these country names in topics may not be attractive or adding value in

the review, search or publication process. Consequently, such an omission is a natural consequence of this reflective process.

As stated in the above, while we defined the keywords for culture, innovation and international business in a relatively narrow manner to control the study focus, even then the identified results still suggest a wide range of inclusion of conceptual variations. Therefore, we applied PHP scripting language method to identify the frequent keywords of these articles to have a better understanding of these concepts closely associated with the study topic. From the automatically generated keyword sets of one, two and three words, we grouped them into ten categories of total 94 concepts as shown in the Table 3.

Insert Table 3 about here

The identified 94 key concepts are associated to the study topic in different manners. Three categories are identically termed as the search domain keywords: innovation, international and culture/cultural, in addition to other seven categories such as knowledge, product, management/managing, and strategic/strategy. Under the category of innovation, innovativeness, R&D, creativity, product innovation, open innovation, technology/technological, and new product development are some of the frequently associated concepts. Similarly, multinational, foreign, global, cross-border and internationalization are associated with the domain of international; and national culture, cultural distance, cross-cultural, organizational culture, cultural values and cultural intelligence with the domain of culture/cultural.

The most closely related to the category of innovation is the category of knowledge with associated keywords of knowledge management, knowledge transfer, transfer, diffusion, and learning. The above is also intimately tied to product, especially referring to new product, service, global new product and new product performance. The categories of market(s) and distance/ differences are relevantly associated to the category of international along with their

7

associated keywords. The category of market(s) contains marketing, emerging markets, and market orientation; and the category of distance/differences with institutional, industry and context.

Other three categories of firm(s)/organizational, management/managing, and strategic/strategy seem to closely correlate among them. Corporate, enterprises, subsidiaries and small and medium-sized are key concepts in the category of firms/organizational. The category of management/managing has key concepts such as business, economic, leadership, teams, diversity, human resource management, supply chain, etc. Meanwhile, and the category of strategic/strategy also holds multiple keywords like capabilities, dynamic, future, challenge, change, alliance, impact, entrepreneurial/entrepreneurship, success, performance, etc. These three categories indicate the focus of attention in these identified articles to manage and perform strategically around the topic of culture, innovation and international business. while entrepreneurial orientation, capabilities, strategic alliance and impact are of attention of strategic category among others.

Culture and innovation relationships

The review of existing research works unfolds four types of relationship between culture and innovation (See Figure 3). In the first type (A), the culture is treated as a precedent of innovation. This is the most common study mode among the current researches, as described by Tian et al. (2018) though in an implicit manner. There is a generalized ambiguity in the definition of culture and innovation when it comes to the conceptualization and measuring. Culture can be referred to organizational culture like relational (Demirci, 2013) or hierarchical culture (Narranjo-Valencia et al., 2010), or national culture dimension like power distance (Lim & Park, 2013) or masculinity/femininity (Efrat, 2014). Innovation, as suggested in the key concept's identification in the above, it can refer to the correlated concepts like new product development (Brem & Wolfram, 2017), knowledge management (Pauleen & Murphy, 2005) or innovativeness (Lee et al., 2012), or innovation adoption

behavior (La Ferle et al., 2002). In this type researchers attempt to figure out how culture impacts on innovation.

Insert Figure 3 about here

The second type (B) of relationship is under-explored and there are very few researches exploring this relationship. Some example could be Terziovski's (2010) improved product innovations embedded as a measure of small and medium enterprises (SMEs) performance to mutually influence innovation culture. In this way, it implicitly indicates the effects of the improved product innovation on the innovation culture.

Third type (C) addresses innovation as embedded in culture in different forms. Some refers the "innovative advances in culture" which claims the innovativeness in the cultural changes per se (Leung et al., 2005), or innovative culture (Yeh & Xu, 2010) or innovation culture (Markham & Lee, 2013), both at organizational (Suh & Badrinarayanan, 2014) and national level (Shane, 1992). Other variations of these two embedded together but also understudied is taking culture as an industry which is also called as creative industry (e.g. Sasaki, Nummela & Ravasi, 2021; Wang, Gu, Glinow & Hirsch, 2020).

The fourth (D) is that both innovation and culture appear as separate constructs in the research which reflects an independent relationship. For example, the theoretical model of Terziovski's (2010) enlists innovation strategy and innovation culture as parallel independent constructs without any interconnection. This inactive relationship will not be further discussed.

Some articles may contain two types of relationships explicitly or implicitly as the example of Terziovski's (2010) used in the above. Other examples are, when the research addresses the effects of culture on innovation, the type of culture is also called as innovation culture (e.g. Balsano et al., 2008); or vice versa, innovation culture lead to innovativeness (e.g. Baruah & Ward, 2015). In this case, both relationship of type A and C between culture

and innovation have been examined in the research by the authors. The type A is the most addressed relationship among the studies, and we present our further field mapping in below.

Mapping the Field:

Three domains of the study field are identified, corresponding to our initial study purpose. Figure 4 shows a comprehensive field map, which exposes the framework of the interrelationship between culture and innovation in an international business context. The category of international business domain includes: (1) international comparison, internationalization process, and global innovation, with the first as the most frequently researched. The key categories of culture dimension are: (2) national culture, (3) organizational culture, and other culture. This latest is less studied containing several varied elements fragmented to be clustered into their own. The key categories of innovation domain are (4) creativity (5) technology innovation, (6) R&D, (7) innovation adoption and diffusion, and (8) innovation capability and process. The three dashed metrics of Figure 4 represent these areas which were not sufficient investigated or significantly under-researched. Consequently, they provide potential for future research opportunities and directions as research gaps exist, which we will devote discussions in the section of Directions for future research.

Insert Figure 4 about here

We can observe that the major categories are in the cluster of innovation, where all categories were frequently discussed; while one category of culture and two categories of international business (IB) are under-studied. All the identified Python clustering are highly related to the innovation concept while relatively weaker with other two domains. Nonetheless, the identification and distribution of the themes has been quite explicit and clear in the domain of international business and of culture, while it is somewhat arbitrary and

10

ambiguous (e.g. Werner, 2002; Yang et al., 2006; Deng, 2012) in the domain of innovation. We describe and discuss these relations in the next subsections following the schema shown in Figure 4.

Innovation

Innovation has been widely studied and clustered into different manners according to research's focal interests. In our culture and IB related study, we uncover five types of innovation concepts when scholars study innovation, partly reflecting the identified key concept themes under the category of innovation: creativity, technological innovation, research and development (R&D)/ new product development, innovation adoption and diffusion, and innovation capability and process.

Creativity: As a closely associated concept to innovation, creativity is more associated to individual or team level than project (Suh & Badrinarayanan, 2014), organizational (e.g. State & Iorgulescu, 2014) or national level (Shane, 1992), as well with knowledge creation and spillover (e.g. Bogilovic et al., 2017), and to ensure new product development (Elliot & Nakata, 2013). Creative innovation is also a term used sometime to co-word these two terms without clear distinction (e.g. Godart et al., 2015; Pratono, 2019). Or similarly, researchers simply locate creativity and innovation together (e.g. Bodnar & Hawley, 2001) while others distinguish them (Iqbal, 2011). Some scholars even stress explicitly that creativity as an antecedent of innovation (Cremer & Loebbecke, 2020). Creative entrepreneurship, talents and class are some of the alternative used for this individual level foci (Audretsch et al., 2018). Creative or innovative behavior (e.g. Du et al., 2017; Herzog & Leker, 2010; Tsegaye et al., 2019), creative/creativity value (Kyvik et al., 2012; Pratono, 2019), creative engagement, idea, task, work or performance (Chua et al., 2015) are some terms used in expressing and managing creativity. Idea pluralism, inclusiveness, open-mindness, diversity, and tolerance are associated with creativity, and matters for new idea generation, innovation and R&D (Audretsch et al., 2018; Cushing, Florida & Gates, 2002).

Technological innovation: Technology or technological innovation (TI) is a popular term used in innovation studies (e.g. Fraccastoro et al., 2021). There is a large group of researches treating innovation equally to technological one and specifically using patents as the measure of innovation performance (e.g. Audretsch et al., 2018; Cremer & Loebbecke, 2020; Shane, 1992). In spite of its challenges and critiques, this widely adopted practice continues for its advantages of accessibility and reliability of data sources, based on the assumption that patents are the crucial component for radical and profitable innovative products, processes or service (Barrutia & Echebarria, 2010). Some exceptions are Alberti-Alhtaybat et al. (2019) on business model sharing to deal with disruptive technological innovation; Laurell (2018) on studying the commercialization of medical technology innovation; and Martin (2012) on foreign women in Japan reflecting cultural changes due to global trade and communication technology innovation where TI is not a quantitatively studied variable. Alternatively, Cheng and Yang (2017) use survey questions like "technical staff of my company often introduce new technologies to improve production" to measure technological innovation capability; and Penz (2006) employs focus group participants in understanding the sociocultural context of technological innovation.

R&D / New product development: R&D or new product development as innovation has been widely studied by scholars (e.g. Suzuki et al., 2002; von Zedtwitz, 2003; Xiong et al., 2021). For R&D, it is typically studied in team, project, program or network level (Ambos & Schlegelmilch, 2004; Xiong et al., 2021), in relation to the international location of R&D activities, laboratories or subsidiaries (e.g. von Zedtwitz, 2004; Wolfram et al., 2018; Wu, 2007). R&D expenditures are used as a proxy for efforts in knowledge creation (Audretsch et al., 2018) as it is considered to positively associate with innovation-driven growth (Fagerberg & Srholec, 2008). Consequently, host country R&D as a key determinant for MNE's entry strategy in a globalized innovation context (Williams & Vrabie, 2018). R&D human capital (Wang et al., 2019) and capacity (Xu et al., 2011) are also of concern.

Innovation adoption and diffusion: This conceptualization is much taken from the perspective of markets or consumers (Ma et al., 2014) and often is also called as consumer innovativeness (Sadik-Rozsnyai, 2016). Most time innovation adoption refers to the market

or consumer acceptance of an innovative product or service though it could also be an industry's adoption of new technology. Therefore, the success or performance of innovation adoption or diffusion mostly is measured by the sales of new products or willingness of pay in marketing literature (e.g. Lee & Johnson, 2017; Yalcinkaya, 2008). The sales takeoff from commercialization stage to confirmation stage in innovation diffusion is also concerned (Islam & Meade, 2018).

<u>Innovation capability and process:</u> This also sometimes refers to the general organizational innovation capability could be broadly defined as covering all kind of innovation related to organization (Goby & Alhadhrami, 2018; Zhao & Du, 2012), including these like technology innovation (e.g. Cheng & Yang, 2017). Here we provide a more narrowly focused version, more on strategic innovation issues such as business model innovation, process innovation, innovation strategy and capabilities. Business model innovation is a type of organizational innovation, through which firms adjust novel opportunity portfolio (Teece, 2010). While large body of literature existing on business model innovation, there have been less studies to consider the cultural relations to business model innovation with a few exceptions like Bock et al. (2012).

Many studies combine various innovation concepts and their associated variations in their work. Sometimes, the definition is ambiguous and uncertain. For example, Andonova et al. (2013) study entrepreneurial learning and identify the ability to manage innovation and support creativity linked to productivity as one of four organizational capabilities for long term business survival. A combination of innovation in the production process and new product adaptation to customer's needs are followed as survival strategy. Innovation capacity is largely referred to the efforts in R&D investment for new product or market developments, which in turn indicates good knowledge and innovation management. These efforts of innovation often go to product and process innovation. However, though supporting creativity is mentioned in the abstract and the first paragraph, it does not appear any more in the rest of the text. Another example could be Bock et al (2012) on business model innovation describing it as a highly creative and innovative exploratory process (Johnson et al., 2008), as well as discussing innovation capability and so on.

Culture

Coinciding with Tian et al.'s (2018) review work, two categories in this domain have been frequently researched to study their influence on innovation in an international context: national culture and organizational culture. This is also consistent with what Hofstede (1994) indicates as these two levels of culture play the most relevant role in management and organizational study.

National culture: At this national level, the most applied cultural dimensions are these corresponding to Hofstede's dimensions, as Tian et al. (2018) have extensively described in their review. Generally national culture is considered to explain a sizeable amount of variation of innovation, both in terms of technology innovation, R&D, and innovation diffusion (e.g. Dwyer et al., 2005; Lin, 2009; Shane, 1992; Van Slyke et al., 2010). Cultural dimensions like individualism, masculinity, power distance, uncertainty avoidance, and long-term orientation have been empirically tested to link to various innovation outcomes (Dwyer et al., 2005; Klein et al., 2021; Lin, 2009). For instance, long-term orientation is believed to positively influence innovation; high uncertainty avoidance and low power distance enhance process management (Lin, 2009); However, contradictory results also occur. While Klein et al. (2021) corroborate with the finding of power distance, they find that uncertainty avoidance and long-term orientation especially have a significant negative effect on and technological innovativeness. Other scholars like Hoegl et al. (2012) argue for a low level of power distance and a high level of assertiveness in the national climate for creativity. At national level, cultural distance is another significant measure to test innovation in an international context, which also largely apply the Hofstede dimensions' value to the empirical investigation.

While the Hofstede's dimensions continue with their dominant position in empirically testing the influence of culture on innovation, cultural tightness and looseness (Gelfand et al., 2011) seems to become an alternative cultural measure, which taps the degree to which social norms are clear, pervasive, and reliably imposed in a given country. The study of Chua et al. (2015) find that individuals from tight culture are less likely to engage in and succeed

at foreign creative tasks than these from loose cultures, as well as being less receptive to foreign creative ideas. Similarly, Cremer and Loebbecke (2020) and Uzuegbunam and Geringer (2021) discover that innovators in loose culture source knowledge of higher breadth and depth than these in tight culture, and correspondingly with the adoption of technological innovation.

While cultural aspects are generally believed to support an innovation-friendly environment, culturally diverse and tolerant places also draw creative class of human capital and talents (Audretsch et al., 2018; Florida, 2004). However. Many other dimensions of culture have been much less investigated on affecting innovation performance. Since culture may appear in multiple facets (e.g. in the form of trust) to shape the relationship between tolerance and innovation (Audretsch et al., 2018), further exploration on this less-travelled path seems desirable and necessary. For instance, Hoegl et al. (2012) study on the value or national climate that promote creativity, or so-called creativity promoting values. The sixth dimension of Hofstede on indulgence versus restraint, and other general national culture dimensions such as time, space, and context (e.g. high context culture versus low context culture) may also deserve further attention for investigation.

Organizational culture: Several organizational cultures have been highlighted in studies as critical for innovation, for instance, creative or innovative culture, learning culture, entrepreneurial culture, and supportive and achieve culture, among others. Creative/Innovation culture is the most frequently used one with multiple examples. For instance, Manohar and Pandit (2014) find the innovation culture to be propitious to developing new technologies and services; the innovation culture positively influences the firm's new product development performance (Brettel & Cleven, 2011); Herzog and Leker (2010) specifically address innovation culture as the underlying people side of equation in the business model for open and closed innovation.

An alternative term for innovation culture is creative culture, which is a main consideration in the study of Bock et al. (2012) on strategic flexibility and business model innovation, which supposedly facilitates innovative solutions (Amabile & Khaire, 2008), as

an important prerequisite capability to innovate (Plambeck and Weber, 2009). Considering creativity as a complementary capability (Tellis et al., 2009), it is indeed treated by asking if there is a climate for creativity existed within the organization (Bock et al., 2012). That is, indeed, there is no clear distinction between climate, culture, and capability in this case. Indeed, Newman et al. (2020) term innovation climate in their systematic literature review. A further clarification between creativity and innovation culture, climate and capability are needed to seriously consider their measurement validity and rigor.

Other cultures: The alternative cultural paradigm to explore the relationship between culture and innovation is less clear besides the above- mentioned two levels. Other levels of culture such as professional, religion, industrial and ethnical culture have been largely under-explored to understand innovation phenomenon in an international business context. An angle of exploration may be the culture industry is also often called as creative industry (Florida, 2004) as the creativity is the most critical element for the success in such an industrial context. As well, it is in the study of Godart et al. (2015) though the latter does not explicitly enlist it as culture industry. In the work of Kregzdaite et al. (2020), it is more explicit in terms of evaluating cultural sectors with multiple creativity indices. As Jaw et al. (2012) state, that many innovations in the creative industries have not been captured fully by technological innovation or product and process innovation mainly thought for manufacturing sectors. Cultural production and innovations need a wider perspective on innovation within the creative industry and identity may play a special role in this process. Further exploration in this unique culture and creative industry would be significant to study global culture effects.

Moderating or Mediating effects

With the four types of relationship identified between innovation and culture in an explicit or implicit way, we also find a more complex moderation and mediation effects existing in their complex relationship, which is difficult to draw in a simplified figure given its

complexity bringing in many other third-party variables. Hereafter we intend to make some illustrations on this complexity.

Moderating or mediating effects of culture between a variable X and innovation: Some examples of this type are Chua et al.'s (2015) uncovering cultural distance positively moderates the effects between cultural tightness and creativity in a global innovation context. On the other hand, Tsegaye et al. (2019) also find that cross-cultural adjustment level mediates the relationship of personal value orientation fit with the host country's national culture's impact on expatriates' innovative behavior.

Moderating effects of culture on the impact of innovation on a variable X: Rarely studied as in the case of type B relation between culture and innovation, but cultural distance could also negatively moderate the relationship between technological innovation capability and performance of cross border M & As (Cheng & Yang, 2017). Du et al. (2017) also identify the national culture (i.e. espoused power distance) has a significant positive moderating effect on the relationship between exploitative learning-innovative behavior and the state-owned and private firms while another cultural dimension (i.e. espoused collectivism) has a significant moderating effect only in state-owned firms in China.

Moderating effects of innovation between culture and a variable X: This is not common, neither; but Bock et al. (2012) discover that business model innovation effort positively moderates the relationship between creative culture and strategic flexibility.

International Business:

Though cultural studies largely contain international elements given the majority focus on national culture aspects, this subsection provides specific understanding of culture and innovation studies in an international business perspective. A large group of studies are international comparison, not of international business nature in a strict sense though their results help in comprehend international differences in the study topic. Classical examples could be the highly cited paper by Shane (1992) or any comparative nature of studies

discussing national cultural differences and their effects on innovation, which do not necessarily involve any international business or management. In this group of studies, cross-country or cross-national-cultural differences are the main issues of research, which usually influence in one way or another (e.g. moderate) the input or outcome of innovation, which may be reflected in multiple facets like technological innovation performance.

Less studied but with high potential for exploration are the second and third groups. The second cluster is about the internationalization process when conducting international business. Innovation as the source for competitive advantages, how to transfer these advantages to the overseas expansion and transform it into performance is a critical task for managers at all levels. This is reflected in some existing studies on internal alliances which often are formed to strengthen the innovation capability, either for business model innovation, enhancing innovation adoption in a new market or for technological innovation or developing new products. Related to the item of R&D international location, the localization of innovation in general, where, who and how to lead the certain specific type of above-mentioned innovation deserve further attention and exploration. In this process, how does culture intervene to enhance innovativeness in multiple senses? Besides a comparative perspective culture which is popularly used in the reviewed work, a dynamic perspective of culture or acculturation may be worthwhile for exploration, to look into the internationalization process for the business expansion, and the consumers' adoption of newly developed products or the adoption of existing products in the new international markets where the products may be viewed as novel. This latter is especially relevant in the emerging markets expansion since the rule of games and consumer behavior may vary significantly.

The third group stresses on the global innovation in concrete. There are some increasing studies on this topic, centering on the characteristics and features global new product development team, global technological alliances or the commercialization of global new products. The rising complexity of global business environment and its relative dynamism, uncertainty and ambiguity suggest challenges of volatile, as the majority is experiencing nowadays. Culture as a soft element without a rigid form may enhance strategic

flexibility, and therefore, building a global innovation culture is essential for MNCs (de Brentani and Kleinschmidt, 2014; Chen, 2011).

Integrative Cultural Configuration Proposal, Conclusions and Discussions:

While we observe the ambiguity and complexity presented in the above on the definitions, conceptualizations and relationship of culture and innovation, further integrative view of the view is much of need. We consider it is necessary to start with the higher level of constructs on culture and innovation to test further its international viability. Figure 5 is our simplistic vision of an integrative cultural configuration mode to affect innovation for international performance. This proposal needs further exploration however the relevance and contribution of our proposal is the building of a holistic cultural configuration mode to work with international innovativeness. Zhang-Zhang, Rohlfer and Varma (2022) recently argue that culture as a key constituent of dynamic strategic people management capability may contribute significantly to the performance in the contemporary highly dynamic VUCA contexts. The complexity of the international business environment demands a complex configuration of culture instead of the traditional set. Some propositions of this work result for further empirical test may be the followings, but not exhaustively listed as the implication could be much wider.

Insert Figure 5 about here

Proposition 1: The combination of the configured culture may have a much more significant effect on the international innovativeness than the separate effects of each cultural set.

Proposition 2: A combined view of international innovativeness may have a more accurate measure of international performance than the independently separate measure of innovation.

19

Proposition 3: Due to the data availability of traditionally employed cultural dimensions from Hofstede model, it is dysfunctional when empirical researches intend to tackle less developing countries with cultural distance measure adoption. Consequently, a complementary measure with other levels of culture may reflect better the emerging market reality.

Proposition 4: Due to the novelty of this integrative cultural configuration proposal, an initial qualitative study may be more effective than quantitative methods due to the ambiguity of the underlying constructs.

This preliminary analysis of the 697 articles searched from quality journals at the social science citation index of Web of Science contributes threefold. First, we applied innovative analytical method of machine learning tools with Python and PHP language scripting to systematically treat a relatively large volume of qualitative dataset generated from a reliable source commonly employed by social scientists. The usage of this tool allows the interpretation of large-volume qualitative data in a more systematic manner. On the other hand, we have also iteratively repeated the process during years by observing the evolution of the field and theory over time. The familiarization of the field and data with continuous analysis provides us the confidence of the accuracy of the analysis result, differentiating from the common traditional sense-making on a limited number of review articles to ensure the handleability of the volume.

Secondly, the suggestion of the culture and innovation relationship typology is novel in the field. The continuation of further exploration, and especially in the areas of shortage will be a gap opportunity for future research directions. The further exploration of multiple possibilities on the moderation and mediation effects may also be desirable. In specific, the relative lack of studying culture and innovation in the cultural and creative industries provide a huge research opportunity for comprehensively understanding the complex culture and innovation relationship at multiple levels, dimensions and facets. It is especially that many culture industries are global like video game, fashion and film industries for exploring the international business dimensions.

Thirdly, the proposed theoretical framework provides multiple research opportunities to explore the interrelations and interactions among these three domains of international business culture and innovation. For example, the dashed lines are generally these have been less explored and studied. Till which extent does the introduction of technological innovation to a nation change the national culture? At organizational level, will the imposition of creating innovative performance drive to a more innovative culture? How should an MNE create global innovative culture while balancing national cultural differences? Does innovative acculturation process occur in the internationalization process and how to address it in a systematic manner as part of organizational strategy instead of individual intelligence?

Multiple research questions have been proposed and suggested in the process through the text though this is not the end of question mark. For instance, as Van Slyke et al. (2010) figure out earlier that, national culture influences consumers' intention to purchase online, and in addition, e-commerce beliefs also mediate the influence of culture. The digitalization has supplemented additional complexity to the classical technological innovation, the globalizing business world. The recent pandemic creates the highly dynamic VUCA context full of volatility, uncertainty, complexity, and ambiguity, and pushes for paradigmatic shifts in the new global scenario.

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Table1. Inclusion and Exclusion Criteria

Search Stage	Key Procedure	Search Results (Articles)
1	Database: WoS Core Collection AND TOPIC: (cultur*) AND TOPIC: (Innovat*) AND TOPIC: (International* OR multinational* OR transnational* OR global* OR cross*border) [Inclusion]	7,097
2	Index: SSCI [Inclusion]	2,857
3	WoS Categories choice: Managemet OR Business [Inclusion]	866
4	Langue: English [Inclusion]	865
5	Document type: Book Chapter Or Proceedings Paper [Exclusion]	837
5	Research Areas: (Social Sciences Other Topics OR Public Administration OR Information Science Library Science OR Development Studies OR Science Technology Other Topics Governmenat Law OR History Philosophy of Science OR Arts Humanities Other Topics OR OR Education Educational Research OR Nursing Geography) [Exclusion]	697

Table 2: Generation of unique clusters

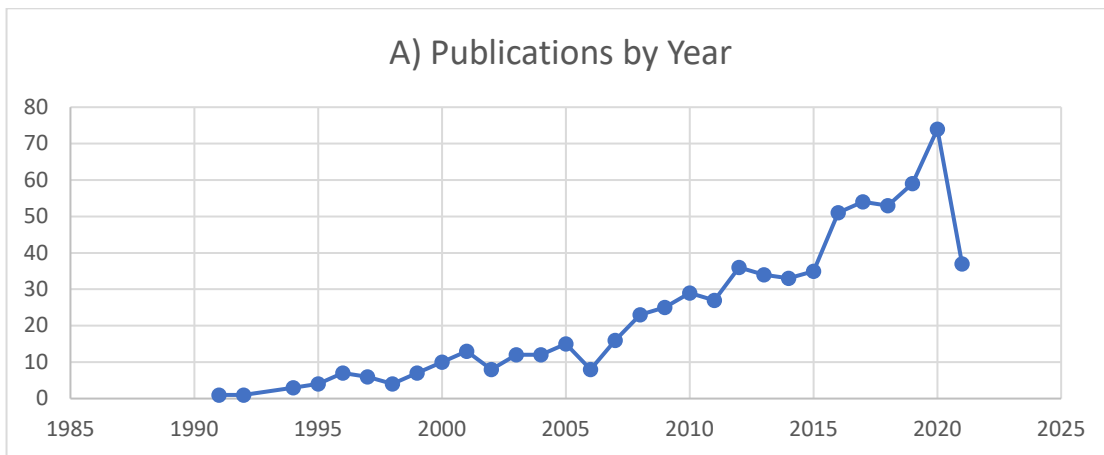| Cluster Number	Cluster Topic	Cluster Keywords	Article Number
1	Global Culture and Knowledge Management	Global, culture, management, knowledge, multinational, organizational, innovative, supply chain, knowledge transfer, market orientation, knowledge management, emerging market, organizational culture, dynamic capabilities, national culture, multinational corporation, Japanese	319
2	Innovation in Multinationals	Innovation, open innovation, product innovation, global innovation, innovation capability, Chinese, multinational, technological innovation, innovation in multinational	101
3	Global Cross Cultural Innovation	Cultural, cross-cultural, global, innovation, cultural distance, cultural intelligence, cultural differences, knowledge management, cross-cultural analysis, cross-cultural management, knowledge transfer	81
4	International Innovation and Culture	International, Innovation, Culture, entrepreneurial, international business, international entrepreneurial, international marketing, international knowledge, international customer-supplier relationships, international entrepreneurial culture, international marketing research	65
5	Global Innovations	Innovations, global, global markets, foreign MNCs, multi-national firms, cross-country, firm performance, cross-country difference	54
6	Global New Product Development	New product development, global, culture, national culture, international, cross-culture, knowledge, technology, product performance,	50
7	Social and International Innovation	Social, international, innovation, cultural, entrepreneurship, social entrepreneurship, corporate social responsibility, social value	27

Table 3: Key concepts associated to the study topic

Innovation(s)	International
innovativeness	multinational
R&D	international business
creativity	internationalization
innovative	multinational corporations
new	foreign
technology/ technological	global
innovation in multinational	national
product development	cross-national
new product development	cross-border
open innovation	country(ies)
research	China/ Chinese
development	Japanese

Knowledge	Market(s)
knowledge transfer	marketing
transfer	emerging markets
diffusion	market orientation
knowledge management	**Distance/ Differences**
learning	institutional

Product	industry
new product	context
global new product	**Firm(s)/ Organizational**
service	enterprises
new product performance	corporate

Culture/Cultural	subsidiaries
national culture	small and medium-sized
cultural differences	**Strategic/Strategy**
cultural distance	*orientation*
cross-cultural	capabilities
organizational culture	dynamic
value(s)	challenges
cultural values	future
cultural intelligence	open
Management/ Managing	change

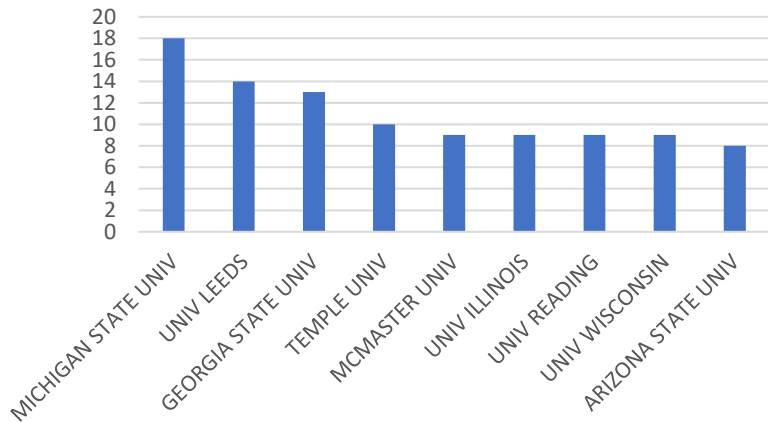|	
business	alliances
economic	integration
leadership	social
teams	emerging
diversity	influence
human resource management	effect(s)
manufacturing	impact
supply	entrepreneurial/entrepreneurship
chain	international strategic alliances
supply chain	International joint ventures
supply chain management	success
practices	performance
process	innovation performance

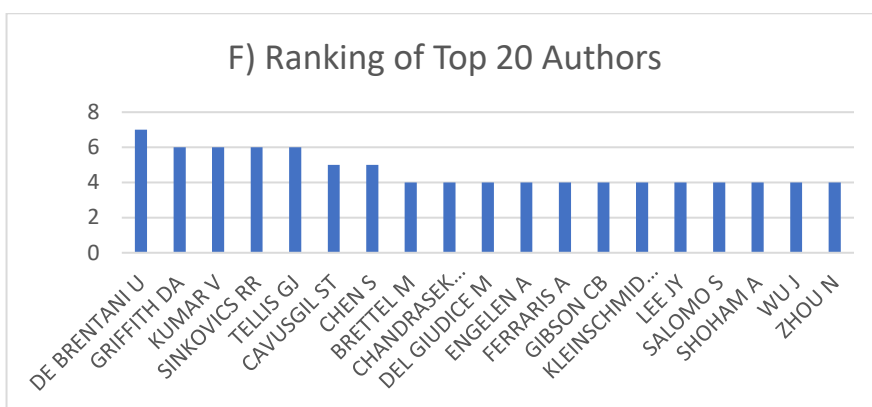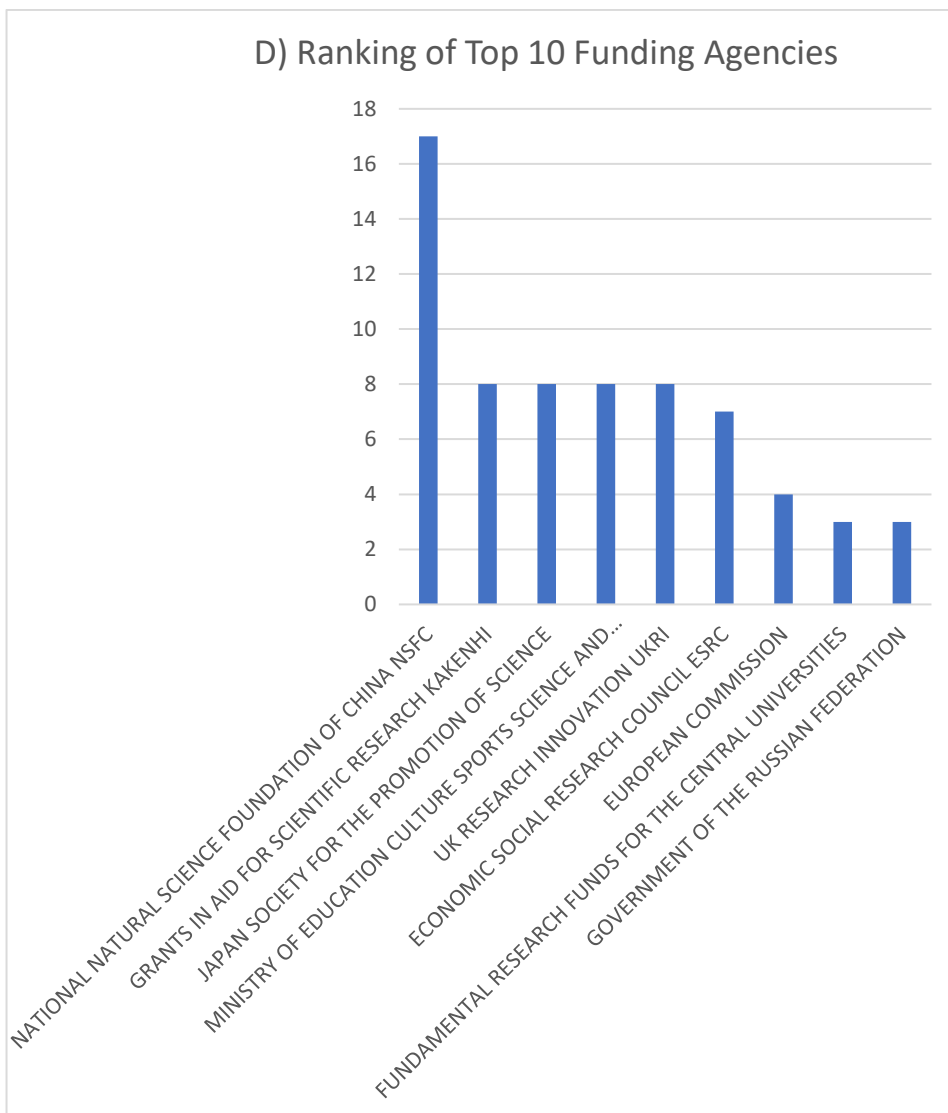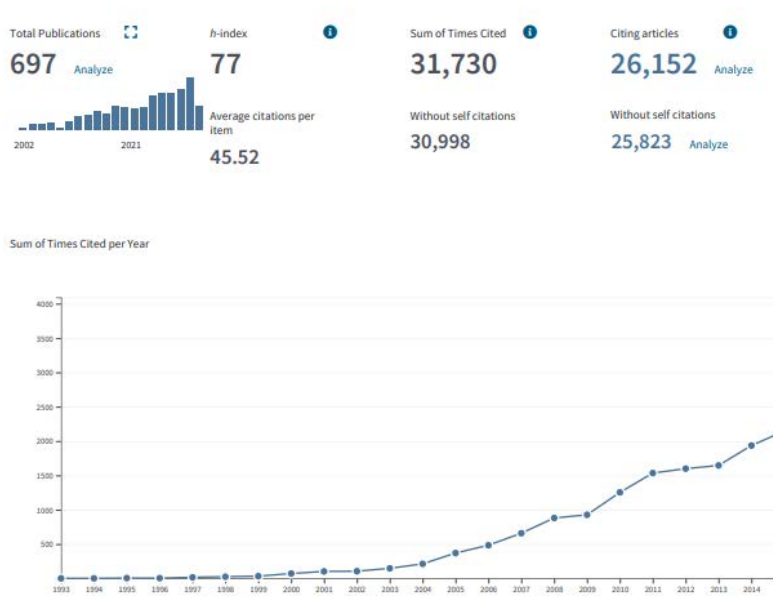**Figure 1: Distribution of Studied Articles**

A) Publications by Year

B) Ranking of Top 10 Countries

A bar chart titled "B) Ranking of Top 10 Countries" with a y-axis ranging from 0 to 300 (increments of 50). The categories and approximate values are:

Country	Value
USA	~270
ENGLAND	~120
PEOPLES R CHINA	~82
FRANCE	~47
AUSTRALIA	~45
CANADA	~44
GERMANY	~43
ITALY	~35
SPAIN	~32

C) Ranking of Top 10 Journals

A bar chart titled "C) Ranking of Top 10 Journals" with a y-axis ranging from 0 to 40 (increments of 5). The categories and approximate values are:

Journal	Value
JOURNAL OF BUSINESS RESEARCH	36
JOURNAL OF INTERNATIONAL BUSINESS STUDIES	32
INTERNATIONAL BUSINESS REVIEW	20
INTERNATIONAL MARKETING REVIEW	20
JOURNAL OF PRODUCT INNOVATION MANAGEMENT	19
JOURNAL OF INTERNATIONAL MARKETING	18
TECHNOVATION	17
INTERNATIONAL JOURNAL OF HUMAN RESOURCE...	15
JOURNAL OF WORLD BUSINESS	14

E) Ranking of Top 10 Organizations

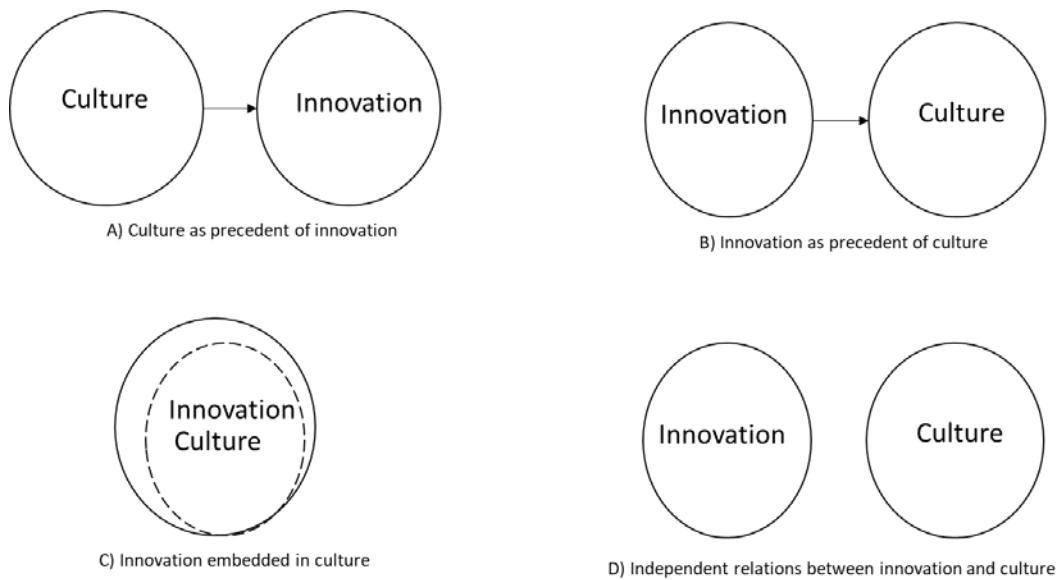D) Ranking of Top 10 Funding Agencies
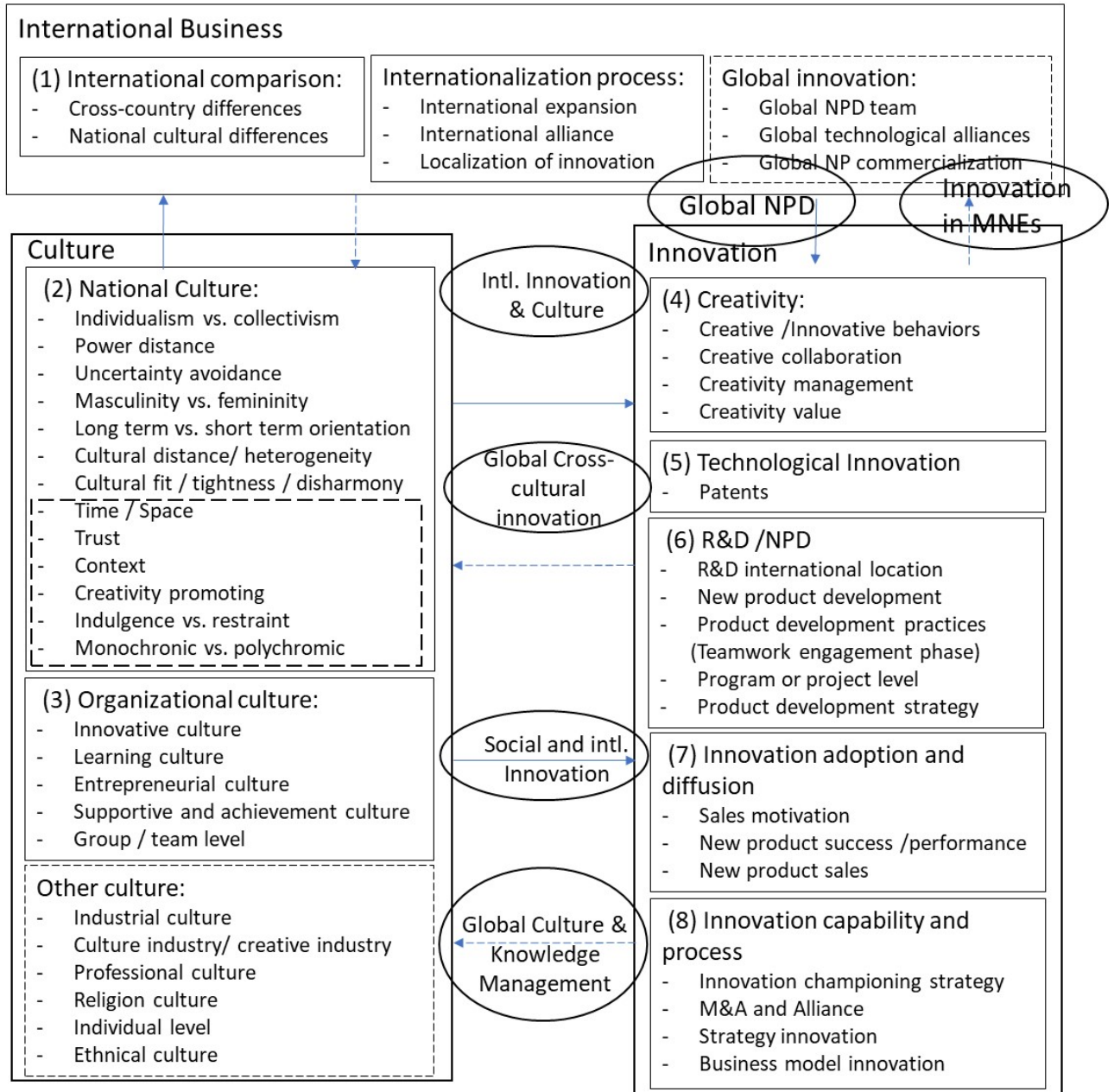

F) Ranking of Top 20 Authors

Figure 2: Citation Report

Source: WoS Auto-generated Report (2021)

Figure 3: Typology of relationships between culture and innovation

A) Culture as precedent of innovation

B) Innovation as precedent of culture

C) Innovation embedded in culture

D) Independent relations between innovation and culture

Figure 4: Framework of culture and innovation in the context of international business

Note: The dash line refers to a less explored area in the study focus.

Figure 5: An integrative cultural configuration effects on international innovativeness

Culture

- National culture
- Organizational culture
- Industrial culture
- Professional culture

Innovation

- Creativity &Technology innovation
- R&D /New product development
- Innovation adoption and diffusion
- Innovation capability and process

International Performance