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Article

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International Journal of Corporate Social Responsibility (JCSR)

Provided in Cooperation with:

CBS International Business School, Cologne

Suggested Citation: Nyssen Guillén, Viola Isabel; Deckert, Carsten (2021) : Cultural influence on innovativeness: Links between "The Culture Map" and the "Global Innovation Index", International Journal of Corporate Social Responsibility (JCSR), ISSN 2366-0074, Springer, Heidelberg, Vol. 6, Iss. 1, pp. 1-12,
<https://doi.org/10.1186/s40991-021-00061-x>

This Version is available at:

<https://hdl.handle.net/10419/297674>

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ORIGINAL ARTICLE

Open Access

Cultural influence on innovativeness - links between “The Culture Map” and the “Global Innovation Index”



Viola Isabel Nyssen Guillén¹ and Carsten Deckert^{2*} 

Abstract

In the ongoing debate on the relation of cultural differences and national innovativeness this research aims to find out which of the seven cultural dimensions of *The Culture Map* (communicating, evaluating, leading, deciding, trusting, disagreeing, scheduling) have a significant influence on a nation's ability and capacity to innovate. The findings show that cultural aspects as described by *The Culture Map* clearly influence the innovativeness of a nation. Based on these findings, tentative recommendations for fruitful monocultural and multicultural teams respectively are given.

Keywords: Culture, Innovation, Innovativeness, Cultural dimensions

Introduction

Against the backdrop of an increasing world population, which is expected to rise from 7.347 billion in 2015 to 10 billion by 2050, the world faces an increasing number of obstacles, in particular demographic, societal, environmental and economic challenges (The World Bank, 2016). These challenges could manifest themselves in a multitude of ways. For example, a global food crisis could arise as a result of climate change and resource scarcity if the agricultural sector fails to provide the needed foodstuffs (Cornell University, INSEAD, & WIPO, 2017, p. 89). Other challenges to increase humans' well-being are the provision of access to drinking water and the eradication of diseases (Cornell University, INSEAD, & WIPO, 2014, p. 69).

Innovation is one of the drivers to solve these challenges, by helping to change the status quo through implementing novel ideas. The OECD (Organisation for Economic Co-operation and Development) and World Bank (2012, pp. 10, 18) suggest that innovation is the foundation for sustainable economic growth and

prosperity and an important driver for competitiveness. Moreover, technology and technological progress are an important part of innovation; they increase productivity and contribute significantly to economic development. Additionally, innovation helps combat social and economic developmental challenges such as health and poverty through non-governmental means, and is crucial to human development (Cornell University et al., 2014, p. 69; Lloyd-Ellis & Roberts, 2002). Thus, in order to address these global and complex challenges, increased educational attainment, technology transfer, innovation and economic development are required. Higher degrees of education influence the economy by strengthening capabilities and abilities of human beings and, therefore, their productivity, efficiency, creativity and participation in economic life (UNDP = United Nations Development Programme, 2016). An additional point of interest is that the aforementioned population growth will mostly take place in less developed countries. Therefore, both advanced economies and developing countries believe that innovation is one of the main levers of competitiveness, economic value and human development. A closer look indicates that developing countries are no longer behind high-income countries in their efforts to generate

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measures and policies, which may increase their capacity to innovate (Cornell University, INSEAD, & WIPO, 2015, pp. ix–xi).

Trantow, Hees, and Jeschke (2011, p. 1–13) explain that innovations arise from complex thinking, actions and interactions of people. Therefore, it is extremely important that the perspective on innovation is developing into a more integrated perspective, recognising the key role of people (Cornell University, INSEAD, & WIPO, 2016, p. 119). Due to globalisation, intercultural literacy and understanding is becoming increasingly important as the demand for effective international and intercultural communication and collaboration inter alia concerning innovation is growing (House et al., 2004, p. 4). Globalisation has enhanced the mobility of human beings across geographic and cultural boundaries and has also helped to promote changes. As pointed out by the *Global Talent Competitiveness Index 2013*: “Today’s economy benefits from being global and mobile. [...] Ideas, know-how, and innovative and entrepreneurial people routinely cross borders and generate value locally and globally [...] The engine of this global and mobile world is talent. In all regions of the world, a growing number of countries have recognised the importance of talent competitiveness, focusing on educational reform, reducing gender and other gaps, and attracting qualified and entrepreneurial people from abroad” (INSEAD, Human Capital Leadership Institute, & Adecco Group, 2013, p. 7). Thus, companies create multicultural teams to benefit from the added creativity and greater understanding of global markets (Meyer, 2014, p. 114).

However, multinational teams face challenges, because of the individuals’ distinctive cultural traits. Culture defines, amongst others, the expectations regarding attributes, behaviours, roles and relations appropriate to and between superiors and elders. It includes how to communicate, evaluate and persuade effectively and by what means decisions are made, trust is built and disagreement is expressed. Cross-cultural collaboration needs to be managed closely and understood by all participants to be effective. Throughout the process it is necessary to understand the relative difference between the cultures involved instead of the absolute difference. Insight about the cultural context of a situation is needed to have a starting point from where to take steps towards an effective outcome. Hence, it takes more time than collaboration between people from one culture (Meyer, 2014, p. 114). In order to embrace the opportunities arising from multicultural teams regarding innovation one needs to know how to best manage these teams.

Research findings, especially using Hofstede’s cultural dimensions and the dimensions of the *Global Leadership and Organizational Behavior Effectiveness Research Program Study* (GLOBE) show that there are links between

culture and innovation. The main body of scientific research has been conducted using the Hofstede dimension and generally shows positive influences of low power distance, low uncertainty avoidance and high individualism in national innovativeness (Deckert & Nysen Guillén, 2017; Lubart, 2010). The work on the dimensions of the GLOBE study is less frequent, and the interpretation of the results is less clear, as the GLOBE study distinguishes between social practices and social values for each dimension (Deckert & Schomaker, 2018). Although the Hofstede dimensions and the GLOBE dimensions, which were partly based on Hofstede’s work, were meant to understand cultural impacts on organisation and leadership of businesses (Hofstede, Hofstede, & Minkov, 2010; House et al., 2004), the transformation of findings with regard to innovativeness into recommendations for managers are not always straightforward (Deckert & Schomaker, 2018).

To examine further cultural dimensions, which specifically impact the work environment, the following paper aims to provide, by means of quantitative research, the relationship between the cultural dimensions of *The Culture Map* by Meyer (2014) and the *Global Innovation Index* (GII). The eight dimensions of this model were specifically designed for cross-cultural management in a business environment and include “key area(s) that managers must be aware of” (Meyer, 2014, p. 15). These areas comprise clear management functions such as persuading, leading and deciding, and are, thus, closer to the actual management practices than the highly aggregated dimensions of Hofstede or the GLOBE study. Therefore, the authors expect to find clearer recommendations for managers complementing earlier findings with other cultural dimensions and filling existing explanatory gaps.

In this regard, this paper attempts to answer the following research question:

Which dimensions of “The Culture Map” have a significant influence on the innovativeness of a nation?

The research objective is to find out which of the seven investigated cultural dimensions of *The Culture Map* (communicating, evaluating, leading, deciding, trusting, disagreeing, scheduling) have a significant influence on a nation’s ability and capacity to innovate.

To lay the foundation for the paper’s empirical research, a detailed introduction to the two variables, culture and innovation, is given. The first two sections represent the theoretical framework of this paper including *The Culture Map* by Erin Meyer and the *Global Innovation Index*, an innovation performance barometer published by Cornell University, INSEAD (Institut Européen d’Administration des Affaires) and the World

Intellectual Property Organization. In the following section, previous research regarding the influence of national culture on innovation is outlined, with the intent to formulate hypotheses, which guide the investigation of the research question. [Data and methodology](#) section presents the used data and outlines the methodology used for the present paper.

The empirical analysis as well as the discussion of the results are conducted in [Discussion of the results](#) section. The regression analyses test the stated hypotheses and affirm or reject each hypothesis, and consequently aim to answer the overall research question. The last section of the paper provides an overall conclusion of the paper's results and issues recommendations that can be also derived from the previous findings. Additionally, applications and limitations are elaborated upon in addition to suggestions for further research.

Theoretical framework

Culture

In this paper, we understand the term culture as a “shared-meaning system [...] wherein members of the same culture are likely to interpret and evaluate situational events and practices in a similar way” (Erez & Earley, 1993, p. 18). These systems can be described using a set of cultural dimensions. Several models of cultural dimensions have been proposed for national cultures by various authors, amongst them Kluckhohn and Strodtbeck (1961), Hofstede and colleagues (Hofstede, 2003; Hofstede et al., 2010), Trompenaars and Hampden-Turner (2012), the authors of the GLOBE study (House et al., 2004) and Meyer (2014).

The focus of this paper lies on *The Culture Map* by Erin Meyer (2014), professor at INSEAD. Meyer specifically observes organisational culture and highlights the communication across cultures and its challenges. According to our knowledge, the dimensions of the Culture Map have not yet been used to examine national innovativeness.

Meyer ranks 64 countries on eight scales. When ranked, the first mentioned extreme has a ranking of 1 and the other extreme has a ranking of 61. The first scale is called *Communicating* and its extremes are *Low-Context*, meaning that communication is perceived as good, when the information given is precise, simple and clear. Messages are stated and understood at face value and repetition is appreciated if it helps clarify the conversation. *High-Context* communication is good, when sophisticated, nuanced and layered. Messages are both spoken and read between the lines and often implied but not simply expressed (Meyer, 2014, pp. 29–60, 2017). This dimension is based on Hall's dimension of *High* versus *Low Context* (Hall, 1976).

Evaluating is the second scale and its first extreme is *Direct Negative Feedback*, which means that negative feedback is given frankly, bluntly, honestly and provided

alone, not softened by positive messages. When criticising, absolute descriptions are often used and an individual may be criticised in front of a group. On the other hand, *Indirect Negative Feedback* is provided softly, subtly, diplomatically. Negative messages are wrapped in positive ones and criticism is given only in private. A lot of countries rank similarly to the *Communicating* scale, but this is not necessarily the case (Meyer, 2014, pp. 61–88, 2017). Since this dimension is about the directness of feedback, it has some overlap to the dimensions *Masculinity* by Hofstede (Hofstede et al., 2010) and *Assertiveness* by the GLOBE study (House et al., 2004).

The third scale is called *Leading* and its first extreme is *Egalitarian* meaning that the ideal distance between a boss and a subordinate is low. The boss is a facilitator among equals and therefore, organisational structures are flat, and communication often skips hierarchical lines. The *Hierarchical* extreme on the contrary defines the ideal distance between a boss and a subordinate as high. The best boss is a string director who leads from the front and status is important. Organisational structures are multi-layered and static, and communication follows set hierarchical lines. This dimension is based on Hofstede's and GLOBE's dimension of *Power Distance* (Hofstede & Hofstede, 2016; House et al., 2004; Meyer, 2014, pp. 115–142, 2017). Although not explicitly mentioned by Meyer (2014) this dimension resembles the dimension *Egalitarian* versus *Hierarchical* by Trompenaars and Hampden-Turner (2012).

Deciding, the fourth scale, can be *Consensual*, meaning that decisions are made in groups through common agreement or *Top-Down* decisions made by individuals, usually the boss. Most countries have a similar rank on the *Deciding* scale as on the *Leading* scale (Meyer, 2014, pp. 143–162, 2017). Although not explicitly mentioned by Meyer (2014) this dimension also bears relation to *Power Distance* by Hofstede et al. (2010) and House et al. (2004).

The fifth scale is called *Trusting* which is a critical element of business in every country. However, how trust is built differs from culture to culture. The first extreme is *Task-Based* in which trust is based on the confidence one feels in another person's achievements, skills and trustworthiness. If someone currently produces good work, is reliable and people enjoy working with them, they will trust them. Concerning the opposite extreme, *Relationship-Based*, trust is built through sharing emails, evening drinks, and visits at the coffee machine. Work relationships build up slowly over the long term resulting in knowing a person at a deep level, sharing personal time with someone and knowing others well who trust that person, so I trust the person as well. This dimension is based on Trompenaars and Hampden-Turner's (2012) dimension of *Specific* vs. *Diffuse* (Meyer, 2014, pp. 163–194, 2017). Since this dimension has a

link to a person's achievements, it also bears relation to the dimensions *Task-based* versus *Relationship-based* and *Achievement* versus *Ascription* by Trompenaars and Hampden-Turner (2012) as well as *Individualism* by Hofstede et al. (2010) and *Performance Orientation* by the GLOBE study (House et al., 2004).

The sixth scale *Scheduling* has on one side *Linear-Time*, where project steps are solved in a sequential manner, completing one task before beginning the next. One thing is done at a time, with no interruptions and the focus is on the deadline and sticking to the schedule. Emphasis is on punctuality and good organisation over flexibility. On the other side of the scale is *Flexible-Time*, where project steps are approached in a fluid way, changing tasks as opportunities arise. Many things are dealt with at once and interruptions accepted. The focus is on adaptability, and flexibility is valued over organisation (Meyer, 2014, pp. 219–242, 2017). This dimension is based on Hall's dimension of *Time* (*Monochronic* versus *Polychronic*) (Hall, 1989) and bears relation to the dimension *Sequential Time* and *Synchronic Time* by Trompenaars and Hampden-Turner (2012). A lot of countries rank similarly on the *Scheduling* scale and on the *Trusting* scale (Meyer, 2014, pp. 219–242, 2017).

Disagreeing is the seventh scale with its first extreme being *Confrontational*. Disagreement and debate are positive for the team or organisation and open confrontation is appropriate and will not negatively impact the relationship. On the other hand, in cultures that *avoid confrontation*, disagreement and debate are negative for the team or organisation and open confrontation is inappropriate and will break group harmony or negatively impact the relationship (Meyer, 2014, pp. 195–218, 2017). Since this dimension is about the directness and aggressiveness of disagreements, it has some overlap to the dimensions *Masculinity* by Hofstede et al. (2010) and *Assertiveness* by the GLOBE study (House et al., 2004) and

bears relation to the dimension *Affective* versus *Neutral* by Trompenaars and Hampden-Turner (2012).

The last scale *Persuading* only applies to western cultures and is therefore not used for the quantitative analysis of this paper (Meyer, 2017). This dimension bears relation to *Universalism* versus *Particularism* by Trompenaars and Hampden-Turner (2012).

To summarise some of the main models attempting to measure culture, an overview is given in Table 1.

National innovativeness

In this paper, we understand the term national innovativeness as “a country's potential [...] to produce a stream of commercially relevant innovations” (Porter & Stern, 2001, p. 29) respectively “the ability of a country to produce and commercialize a flow of innovative technology over the long term” (Furman, Porter, & Stern, 2002, p. 899). National innovativeness largely depends on the National System of Innovation (NSI) of a country, a system comprising national research policy as well as a network of related actors and institutions such as entrepreneurs, private enterprises with professional research and development facilities, public research institutes and universities. This system determines the creation, diffusion and use of knowledge and technology in a society (Freeman & Soete, 1997; OECD = Organisation for Economic Co-operation and Development, 1997). National innovativeness can be measured by national indexes such as the *Global Innovation Index* (GII) (Adam, 2013).

The *Global Innovation Index* (GII) is an innovation performance barometer of an economy and is offered as an instrument that any economy willing to enhance their innovativeness can make utilisation of (Cornell University et al., 2015, p. xi). Over the last 12 years, the Global Innovation Index has measured the ability of nations around the world to innovate. First published in 2007 by INSEAD, the GII is co-published by Cornell University

Table 1 Cultural dimensions of the Culture Map

Dimensions of Culture Map (Meyer)		Related Dimensions of other Authors
<i>Communicating</i>	Low vs. High Context	Low vs. High Context (Hall)
<i>Evaluating</i>	Direct vs. Indirect Negative Feedback	Masculinity vs. Femininity (Hofstede), Assertiveness (GLOBE)
<i>Leading</i>	Egalitarian vs. Hierarchical	Egalitarian vs. Hierarchical (Trompenaars/Hampden-Turner), Power Distance (Hofstede), Power Distance (GLOBE)
<i>Deciding</i>	Consensual vs. Top-down	Power Distance (Hofstede), Power Distance (GLOBE)
<i>Trusting</i>	Task vs. Relationship-based	Task vs. Relationship-based, Achievement vs. Ascription, Specific vs. Diffuse (Trompenaars/Hampden-Turner), Individualism vs. Collectivism (Hofstede), Performance Orientation (GLOBE)
<i>Scheduling</i>	Linear Time vs. Flexible Time	Sequential vs. Synchronic Time (Trompenaars/Hampden-Turner), Monochronic Time vs. Polychronic Time (Hall)
<i>Disagreeing</i>	Confrontational vs. Avoid Confrontation	Affective vs. Neutral (Trompenaars/Hampden-Turner), Masculinity vs. Femininity (Hofstede), Assertiveness (GLOBE)
<i>Persuading</i>	Principles vs. Applications	Universalism vs. Particularism (Trompenaars/Hampden-Turner)

Source: Own illustration based on Hall, 1976, 1989; Hofstede et al., 2010; House et al., 2004 and Meyer, 2014; Trompenaars and Hampden-Turner, 2012

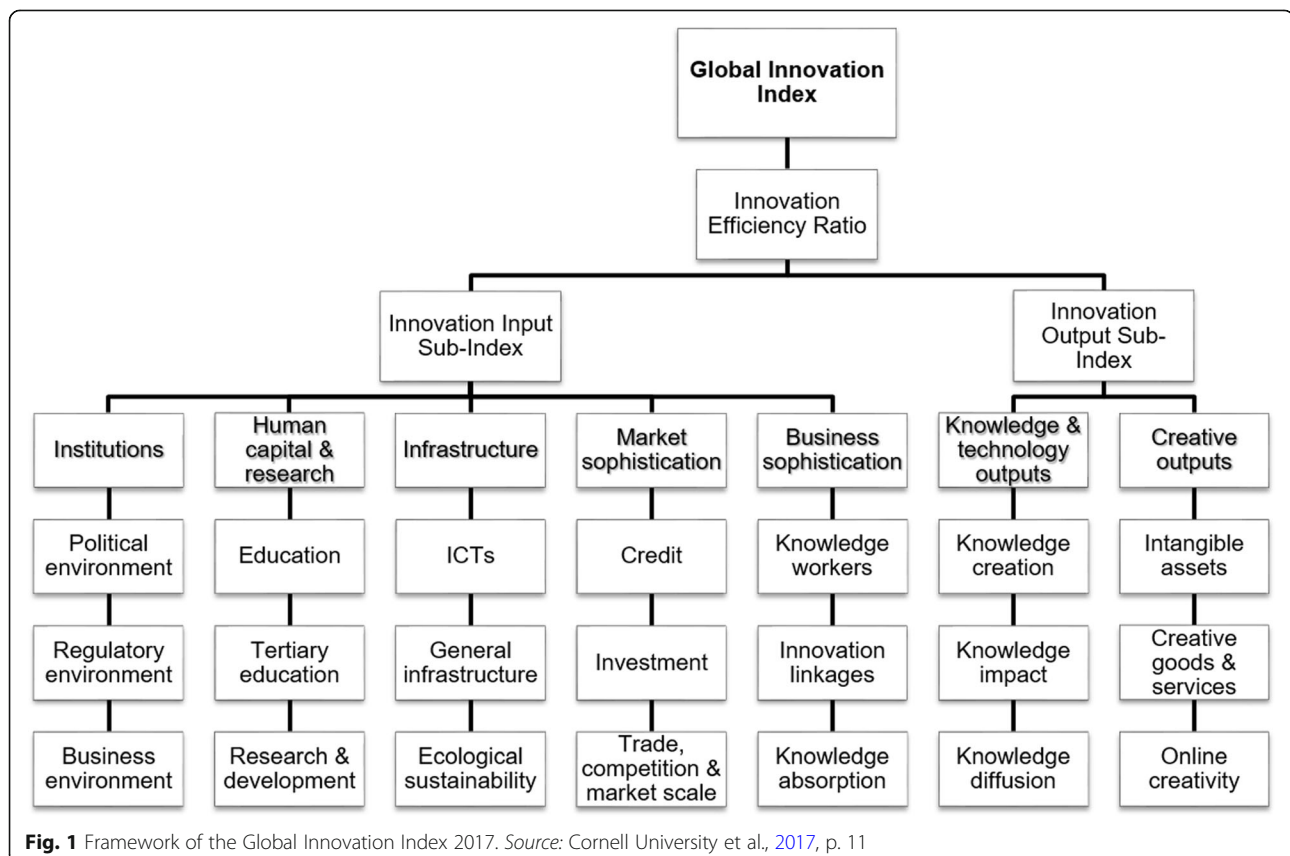
and the World Intellectual Property Organization (WIPO), a specialised agency of the United Nations which has introduced a comparative analysis that helps to comprehend the differences in national competences. The Global Innovation Index was initiated with the intention to identify approaches and metrics which better capture societies' innovation, surpassing the traditional innovation measures, for example, the quantity of research articles and expenditures (Cornell University et al., 2014, p. 41). The GII's goal is to upgrade the use of the GII to help the developing nations in enhancing their innovation systems (Cornell University et al., 2015, p. v). The GII recognises the key role of innovation as a driver of prosperity and economic growth. Besides, it contemplates to converge the multi-dimensional parts of innovation and to apply them equally to developed and emerging economies. In this way the GII helps business pioneers and politicians to achieve a more encompassing examination of innovation levers and results, rather than a one-dimensional model focussing solely on input factors (Cornell University et al., 2014, p. v).

The Global Innovation Index 2017 framework is based on two sub-indices: The *Innovation Input Sub-Index* and the *Innovation Output Sub-Index*. The five input pillars of the Innovation Input Sub-Index recognise elements of the national economy which enable innovative activities.

The Innovation Output Sub-Index captures two types of innovation outputs that are the product of innovative activities within the economy. Each pillar has three sub-pillars consisting of individual indicators, amounting to a total of 81 indicators. The overall GII score is the average of the Input and the Output-Sub-Indices. Furthermore, the *Innovation Efficiency Ratio*, the ratio of the Output Sub-Index over the Input Sub-Index, is calculated. It represents how much innovation output a nation is achieving for its inputs (Cornell University et al., 2017, pp. 11–12). The GII model is being updated every year to improve the measurement of innovation. The overview of the framework of the Global Innovation Index of 2017 is visualised in Fig. 1.

Literature review and hypothesis development

In order to discover the influence of culture on innovation mainly the cultural dimensions of *Hofstede* (Hofstede, 2003) and the *GLOBE* study (House et al., 2004) have been used. Findings are amongst others that in more hierarchical countries, change needs to be driven by the top of the hierarchy, as decisions made by the top are accepted easier and less disputed. But the top consists only of a few people that can drive change and therefore egalitarian countries are more innovative (Busse, 2014; Deckert & Nyssen Guillén, 2017; Deckert, Scherer, & Nyssen Guillén, 2015;



Halkos & Tzeremes, 2013; Kaasa & Vadi, 2008; Rossberger & Krause, 2013; Shane, 1992, 1993; Sun, 2009).

Another finding is, that the exchange of ideas enhances innovation and new inventions. Furthermore, in cultures where decisions are made in a consensual way, superiors have trust in their employees and therefore give them space for creativity and innovation (Busse, 2014; Deckert & Nyssen Guillén, 2017; Deckert et al., 2015; Halkos & Tzeremes, 2013; Kaasa & Vadi, 2008; Meyer, 2014; Shane, 1992, 1993; Sun, 2009).

In *Low-Context* cultures good communication is given when conversations are transparent, clear and specific; when all information is stated up front and questions are asked for clarification. Whereas, in *High-Context* cultures the interlocutors “read the air” or in other words read between the lines. The shared history and context make it possible to understand each other without having to communicate explicitly. In both cases communication works well, given that the interlocutors are from the same high-context culture. When people come from different cultures, the history and context are not the same anymore and explicit communication is necessary. Communication enhances innovation and new inventions, as ideas are divulged and criticized (Meyer, 2014, pp. 29–60; Shane, 1992, pp. 31–33). But future research could investigate if low-context communicating has a significant positive influence to the innovativeness of multi-cultural teams, as would be expected.

In every culture trust is important, but there are different kinds of trust and ways of how trust is created. Part of this differences arise, because not in every culture it is possible to do business with someone if one does not trust that person. In a culture with a consistently reliable legal system a contract is enough to ensure the trade without having to trust the other person. On the contrary in a culture with no reliable legal system one must find another way to know that one’s business is safe and that is done over trust built over a personal relationship (Meyer, 2014, pp. 163–194). The same argumentation holds for *Linear-Time* vs. *Flexible-Time*. People in less stable cultures must be flexible because they need to adapt to changing circumstances (Meyer, 2014, p. 227). But a certain level of stability is needed for a society to become innovative (Deckert et al., 2015, p. 29).

Finally, disagreeing is important to come up with as many ideas as possible to find the best ones, but the way in which disagreement is expressed varies from culture to culture. In some cultures, confrontations are avoided and in others they are even desired, but ultimately there are techniques for both to express disagreement (Meyer, 2014, pp. 195–218).

From the current research the following hypotheses can be directly deduced:

H1: *Hierarchical Leading* has a significant negative influence on national innovativeness.

H2: *Top-Down Deciding* has a significant negative influence on national innovativeness.

H3: *Relationship-based Trusting* has a significant negative influence on national innovativeness.

H4: *Flexible-Time Scheduling* has a significant negative influence on national innovativeness.

Data and methodology

The *Global Innovation Index* published by Cornell University, INSEAD and WIPO (World Intellectual Property Organization) contains values starting from the year 2007, which were also published in the respective reports. The values from the report of the year 2017 will be used in this paper. The scores and not the ranks are used in the present paper, to obtain a more accurate result of the influence of culture on innovation. Universally, the Global Innovation Index of 2017 includes 127 economies, which represent 92.5% of the world’s population and 97.6% of the world’s GDP (Gross Domestic Product), measured in current US dollars. The index is measured on a scale from 1 to 100. The higher the score the more innovative is a country (Cornell University et al., 2017).

The Culture Map published by Erin Meyer in 2014 contains eight scales from which the following seven will be used for the quantitative analysis: communicating, evaluating, leading, deciding, trusting, disagreeing and scheduling. Furthermore, it includes 64 societies worldwide. In the present paper the 61 overlapping countries have been used (see Appendix 1). *The Culture Map* does not offer country scores or ranks. Therefore, a ranking from 1 to 61 has been defined for every country and scale with the help of the graphical scale provided (Meyer, 2017) and consistent with the rules of the *Spearman Rank Correlation*, which is a measure of rank correlation.

The GDP per capita 2016 is used as control variable and taken from The World Bank for all countries (The World Bank, 2018).

In the present paper, the regression analyses attempt to investigate which cultural dimensions of *The Culture Map* influence the *Global Innovation Index*.

Discussion of the results

In the following section, the theoretical assumptions will be empirically tested to prove the stated hypotheses as well as the overall research question. Furthermore, the results of the several regression analyses between the dimensions of national culture of *The Culture Map* and the *Global Innovation Index* will be presented.

The descriptive statistics of the data can be found in Appendix 2 and a *correlogram* in Appendix 3. The results show that five regression analyses are needed to err on the side of caution, because of high imperfect multicollinearity of above 70% (Wissmann, Toutenburg, & Shalabh, 2007). *Consensual* vs. *Top-Down Deciding*, *Direct Negative Feedback* vs. *Indirect*

Negative Feedback and *GDP per capita 2016*, as control variable, are admitted in one regression analyses. The second regression analysis consists of *Egalitarian vs. Hierarchical Leading*, *Confrontational vs. Avoids Confrontation* and *GDP per capita 2016*, again as control variable. *Low-Context vs. High-Context Communicating* and *GDP per capita 2016*, as control variable, are tested in the third regression analysis. The fourth and fifth regression analysis consist only of *Task-based vs. Relationship-based Trusting* and *Linear-Time vs. Flexible-Time Scheduling*, respectively, as *GDP per capita 2016* is not allowed, because of a correlation of above 70% and therefore, these two regression analyses do not have a control variable. This results in heteroskedastic errors, because the regression analyses are no longer controlled for omitted variables. On the other hand, *Task-based vs. Relationship-based Trusting* and *Linear-Time vs. Flexible-Time Scheduling* show the highest correlations to the GII scores 2017 meaning that when *Task-based Trusting* or *Linear-Time Scheduling* increase, there is a 79% and 85% chance respectively that the GII increases as well. The results of the regression analyses underline these findings.

The following table presents the results of the regression analyses between the cultural dimensions of *The Culture Map* and the *Global Innovation Index* (Table 2).

Nearly all results are in line with previous research, only *Egalitarian Leading* could not be proven to have a significant influence on innovativeness (H1). To be a good leader it is necessary to be flexible and adapt to one's followers, to make them feel comfortable sharing their ideas, depending on how they were raised. Therefore, *Egalitarian Leading* is necessary in egalitarian cultures and

Hierarchical Leading in hierarchical cultures to achieve innovativeness. Otherwise followers will feel that their leader is behaving inappropriately, and the cooperation will deteriorate (Meyer, 2014, pp. 115–142, 156).

Top-Down Deciding has a significant negative influence on national innovativeness (H2). Consensual Deciding leaves all doors open for creativity and only after visiting all ideas the decision is made. This method in comparison to quick Top-Down decisions allows everyone involved to take a longer but predefined time to come up with and try out new ideas (Boden, 1998, p. 347; Bossink, 2011, p. 66; Meyer, 2014, pp. 143–161).

Relationship-based Trusting has a significant negative influence on national innovativeness (H3). Trust is crucial in every culture, but the different types of trust indicate that the circumstances in every culture are different. In cultures with a stable environment Task-based Trusting is sufficient to seal a deal as contracts are reliable. On the other hand, when the environment is unstable good relationships are more reliable. As a certain level of stability is needed for a society to become innovative, Task-based cultures have the better framework to create innovations (Deckert et al., 2015, p. 29; Meyer, 2014, pp. 163–194).

Flexible-Time Scheduling has a significant negative influence on national innovativeness (H4). One could think that flexibility should encourage innovativeness and sure it does, but in this context Flexible-Time is too flexible. In Flexible-Time cultures no real deadlines exist, because a partnership will go on “forever”, but deadlines are a key element of innovation processes. A second reason why Flexible-Time is contra-productive concerning

Table 2 Results of the regression analyses: The Culture Map to GII

Dependent variable: Global Innovation Index					
Regressors	(1)	(2)	(3)	(4)	(5)
Intercept	41.01*** (3.01)	37.46*** (3.14)	36.31*** (2.99)	59.66*** (01.97)	60.99*** (1.68)
Consensual vs. Top-Down Deciding (X ₁)	−0.17* (0.07)				
Direct vs. Indirect Negative Feedback (X ₂)	−0.05 (0.05)				
Egalitarian vs. Hierarchical Leading (X ₃)		−0.09 (0.08)			
Confrontational vs. Avoids Confrontation (X ₄)		−0.06 (0.06)			
Low-Context vs. High-Context Communicating (X ₅)			−0.11 (0.06)		
Task-based vs. Relationship-based Trusting (X ₆)				−0.55*** (0.06)	
Linear-Time vs. Flexible-Time Scheduling (X ₇)					−0.59*** (0.05)
GDP per capita (X ₈)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)		
Summary Statistics					
F krit	0.0000	0.0000	0.0000	0.0000	0.0000
Standard error of the regression	6.17	6.52	6.55	7.59	6.48
Adjusted R square	0.75	0.72	0.72	0.62	0.72
N	61	61	61	61	61

Source: Own illustration

Heteroskedasticity-robust standard errors are given in parentheses under coefficients. The individual beta coefficient is statistically significant at the *** 0.1% significance level or ** 1% significance level or * 5% significance level or not significant when without asterisk, using a two-sided test

innovation is again the stability of countries. Clear structures and regulations are needed to be creative and drive innovations. Consequently, the need for a stable environment, politically, financially but also concerning for example natural disasters. But this is not possible in countries where people follow a Flexible-Time Scheduling precisely because of lack of a stable situation (Boden, 1998, p. 347; Bossink, 2011, p. 66; Deckert et al., 2015, p. 29; Meyer, 2014, pp. 219–241; Trompenaars & Hampden-Turner, 2012, p. 166; Volberda, 1998, p. 73).

Consistent with previous research, *Low-context* vs. *High-Context Communicating* has no significant influence on national innovativeness. Communication enhances innovation and new inventions, as ideas are shared and criticised. This holds true for both extremes of the scale. The difference is that Low-Context cultures say openly and very clearly what they mean and in High-Context cultures people have learned to implicitly speak and understand from the context, body language, atmosphere and how something is said or not said (Meyer, 2014, pp. 29–60; Shane, 1992, pp. 31–32).

Direct vs. *Indirect Negative Feedback* as well has no significant influence on national innovativeness. Giving negative feedback and therefore criticising ideas is crucial to improve and have better results. But as with the *Communicating* scale, the *Evaluating* scale consists of different forms of how to give feedback. In cultures with Direct Negative Feedback it is conventional to state discontentment straightforward or make an open negative evaluation without having to say much positive. Moreover, upgraders like “absolutely”, “totally” or “strongly” are often used to make the point even clearer. On the contrary, in cultures with Indirect Negative Feedback downgraders like “kind of”, “a little” or “maybe” are used together with understatement. Sometimes even further blurring of the message and no feedback in public is required. Be that as it may in both cases people from the same culture know how to interpret the feedback and will evolve accordingly (Blohm, 2013, p. 277; Fischer, Revilla Diez, & Snickars, 2001, p. 3; House et al., 2004, p. 12; Meyer, 2014, pp. 61–88).

Confrontational vs. *Avoids Confrontation* has no significant influence on national innovativeness. Disagreeing is important to engage in a discussion and come up with as many ideas as possible to find the best ones, but the way in which disagreement is expressed varies from culture to culture. In Confrontational cultures interlocutors question what the person presenting is saying in front of the group and state if they think something is not correct. It is understood that confrontation leads to improvement and validation of a concept. Whereas in cultures where confrontation is avoided, it is avoided because the most important goal is to preserve group harmony. In this case ideas can be discussed in a person-to-person talk or in a group but anonymously for example with the help of a mind map. Hence, in both

cases disagreeing is possible if the rules of the culture are considered (Meyer, 2014, pp. 195–218).

Although not all four hypotheses of this study are supported in their totality, the overall research question “Which dimensions of “The Culture Map” have a significant influence on the innovativeness of a nation?” could be answered.

Conclusion

Theoretical implications

The current study was conducted to gain a better understanding of the influence of culture on innovativeness. Therefore, regression analyses have been used for measurement. The results of the regression analyses reveal which cultural dimensions of *The Culture Map* influence the innovativeness of a nation. *Top-Down Deciding*, *Relationship-based Trusting* and *Flexible-Time Scheduling* have a significant negative influence on national innovativeness. *Egalitarian* vs. *Hierarchical Leading*, *Low-Context* vs. *High-Context Communicating*, *Direct Negative Feedback* vs. *Indirect Negative Feedback* and *Confrontational* vs. *Avoids Confrontation* have no significant influence on national innovativeness. These results do not mean that the four cultural traits are irrelevant to innovation, but these cultural dimensions might impact innovativeness within a culture rather than between cultures, i.e. different solutions to these issues are possible in different cultures.

All in all, the quantitative investigations can affirm all but one of the four hypotheses of this study, as well as answer the overall research question, and are reinforced by previous research. Cultural aspects clearly influence the innovativeness of a nation.

Practical implications

The empirical work confirmed the significance of the link between culture and innovativeness. In the following section, recommendations for fruitful monocultural and multicultural teams respectively will be given.

Trompenaars and Hampden-Turner (2009, p. 76) point out that innovative teams are diverse, but at the same time inclusive. In a similar way, Deckert (2019) argues that creative teams have a tension of team coherence balancing team diversity and team safety. Therefore, even if work in monocultural teams can be done faster and more efficient, because no cultural clashes occur, multicultural teams per se are beneficial for innovations and creativity. However, the team must be managed and monitored closely in order to detect cultural dilemmas and solve them before they escalate.

Power Distance by Hofstede (2003) usually has a negative relation to innovativeness (Deckert & Nyssen Guillén, 2017). This dimension bears relation to both leading and deciding by Meyer (2014). We only found a negative relation to *Top-Down Deciding* of the dimension deciding. For the leadership style (*Egalitarian* vs. *Hierarchical*) no relation could be found. This means that *Consensual Deciding* is beneficial for

innovativeness, since a decision of a team despite taking longer to achieve is usually more creative as it combines the perspective of the different members of a team. This finding is in line with the research on creative teams where participatory decision-making is seen as one influential factor, especially if minority dissent is included in the process (Deckert, 2019). So, it seems that cultures with a lower Power Distance are more innovative due to their inclusive decision processes. For multicultural teams this means that the team needs to agree on some form of participatory decision-making even if it includes members from Top-Down Deciding cultures.

The leadership style does not affect the innovativeness of a team if the leader adapts to the culture of his subordinates. Nevertheless, a multicultural team needs to agree to a certain leadership style. Whereas egalitarian cultures will prefer open communication with their managers, hierarchical cultures may not be able to adapt to open communication towards their leader. Therefore, team members of the same hierarchical level may meet beforehand to discuss and then pass on their opinions or ideas may be collected anonymously. It will take longer than open communication, but innovativeness is nevertheless achievable and with time hierarchical team members may even get used to talking across hierarchical levels to speed up the process.

For monocultural teams *Low-Context* and *High-Context Communicating* work well, but in multicultural teams *Low-Context Communicating* is necessary. *High-Context* communication in the respective cultures works well because everyone has the same history and context, but in multicultural teams this is not the case. The biggest misunderstandings happen between members of two *High-Context* cultures that think that they are correctly reading between the lines, but actually they are not (Meyer, 2014). Consequently, rules for *Low-Context* communication must be developed and applied in order to set the ground for clear communication conducive to exchanging ideas.

Similar considerations need to be made regarding *Direct Negative Feedback* and *Indirect Negative Feedback*. In monocultural teams, everything along the scale works fine, as long as it fits the national culture, but in multicultural teams someone might feel attacked because of *Direct Negative Feedback* or misunderstands *Indirect Negative Feedback* as praise. Thus, cultural awareness is needed to adapt within the team to every team member and how feedback can be given. The same applies for the dimension *Confrontational* vs. *Avoids Confrontation*.

Limitations and further research

This paper uses the cultural dimensions of the Culture Map by Meyer (2014) to find influences of culture on innovativeness and derive recommendations for management. In this regard, the dimensions of the Culture Map

are a valuable complement to the more aggregated dimensions of Hofstede and GLOBE. For example, it could be shown that power distance exerts its influence probably via the decision process and not via leading. Furthermore, through the use of the Culture Map the concepts of Trompenaars and Hampden-Turner (2009, 2012) and Hall (1976, 1989), for which no data is available, are partly included, as there is a considerable conceptual overlap between some of the dimensions. Concerning the data, a limitation is that *The Culture Map* neither offers a methodology how the ranks are created nor an open source for the exact scores, if there are any, or at least ranks. It seems that Meyer (2014, 2017) used her own experience abroad and of her students in INSEAD to create a ranking. Furthermore, it seems that not for all countries an in-depth analysis was made, especially for the countries on the right side of the scales, as a lot of them are ranked identically. It is to be hoped that this missing information will be published at some point in time. Apart from these points, using the Culture Map suffers from the same methodological drawbacks as using other cultural dimensions, namely a limited set of data points (number of countries for which data for both cultural dimensions as well as innovativeness are available), and the general criticism about measuring culture as a set of quantitative dimensions (see e.g. de Mooij, 2013).

This paper investigates the influence of national culture on the innovativeness of a nation. Therefore, further research needs to be made concerning the influence of national culture on the innovativeness of teams, especially multicultural teams. Tentative explanations about the role of *Low-Context Communicating*, *Indirect Negative Feedback* and *Avoiding Confrontation* have been given, but ultimately it would be interesting to research if one of the extremes of these dimensions would be favourable for innovativeness in multicultural teams. *Task-based Trusting* and *Linear-Time Scheduling* is advantageous for innovation on a national level, because of the stable environment of the nation. In multicultural teams, however, if located in a stable environment, *Relationship-based Trusting* and *Flexible-Time Scheduling* could be beneficial. *Relationship-based Trusting* combines cognitive and affective trust and the affective relationships may be as valuable for innovativeness as the *Task-based* structures. It is even conceivable that relationships on a deeper level lead to receptiveness concerning *Direct Negative Feedback* and confrontation. Similarly, the flexibility coming from *Flexible-Time Scheduling* could promote creativity embedded in a *Task-based* framework. Therefore, no recommendations were given concerning this issue because it still needs to be researched what the effects in teams are.

Appendix 1

Table 3 Countries used for quantitative analyses between The Culture Map & Global Innovation Index

Argentina	France	Mexico	Singapore
Australia	Germany	Morocco	Spain
Austria	Greece	Netherlands	Sweden
Belgium	Hungary	New Zealand	Switzerland
Bolivia	India	Nigeria	Tanzania
Botswana	Indonesia	Norway	Thailand
Brazil	Ireland	Pakistan	Tunisia
Canada	Israel	Peru	Turkey
Chile	Italy	Philippines	Uganda
China	Japan	Poland	Ukraine
Colombia	Jordan	Portugal	UAE
Czech Republic	Kenya	Qatar	United Kingdom
Denmark	Korea (Republic of)	Romania	USA
Egypt	Kuwait	Russia	Viet Nam
Ethiopia	Malaysia	Saudi Arabia	Zimbabwe
Finland			

Appendix 2

Table 4 Descriptive statistics – The Culture Map & GDP per capita 2016 & GII Score 2017

	Mean	Standard deviation	Skewness	Kurtosis
Egalitarian / Hierarchical	31	17.73	−0.01	−1.21
Consensual / Top-Down	31	17.72	−0.01	−1.21
Low- / High-Context	31	17.71	−0.00	−1.21
Direct- / Indirect Negative Feedback	31	17.74	−0.00	−1.2
Task- / Relationship-based	31	17.72	−0.01	−1.22
Linear- / Flexible-Time	31	17.72	−0.01	−1.22
Confrontational / Avoids Confrontation	31	17.74	−0.00	−1.20
GDP per capita 2016	22,886.77	21,390.07	0.77	−0.51
GI Score 2017	42.61	12.32	0.19	−1.10

Appendix 3

Table 5 Correlogram - The Culture Map & GDP per capita 2016 & GII Score 2017

	Egalitarian / Hierarchical	Consensual / Top-Down	Low- / High-Context	Direct- / Indirect Negative Feedback	Task- / Relationship-based	Linear- / Flexible-Time	Confrontational / Avoids Confrontation	GDP per capita 2016	GI Score 2017
Egalitarian / Hierarchical	1								
Consensual / Top-Down	0.86	1							
Low- / High-Context	0.91	0.75	1						
Direct- / Indirect Negative Feedback	0.67	0.55	0.76	1					
Task- / Relationship-based	0.88	0.83	0.88	0.72	1				
Linear- / Flexible-Time	0.75	0.82	0.75	0.62	0.92	1			
Confrontational / Avoids Confrontation	0.67	0.54	0.77	0.96	0.71	0.61	1		
GDP per capita 2016	-0.68	-0.67	-0.65	-0.4	-0.70	-0.72	-0.41	1	
GI Score 2017	-0.68	-0.72	-0.64	-0.47	-0.79	-0.85	-0.46	0.84	1

Abbreviations

GDP: Gross Domestic Product; GI: Global Innovation Index; GLOBE: Global Leadership and Organizational Behavior Effectiveness Research Program; INSEAD: Institut Européen d'Administration des Affaires; NIS: National Innovation System(s); OECD: Organisation for Economic Co-operation and Development; SER: Standard error of the regression; SI: System(s) of Innovation; UNDP: United Nations Development Programme; WIPO: World Intellectual Property Organisation

Acknowledgements

Not applicable.

Authors' contributions

Viola Isabel Nyssen Guillén and Carsten Deckert jointly designed the research, and analysed and interpreted the country data. Viola Isabel Nyssen Guillén collected the data and conducted the statistical calculations. The author(s) read and approved the final manuscript.

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Funding

Open Access funding enabled and organized by Projekt DEAL.

Availability of data and materials

The datasets analysed during the current study are available in Meyer, E. (2014). *The Culture Map. Decoding how people think, lead, and get things done across cultures*. New York: Public Affairs.

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Declarations

Competing interests

The authors declare that they have no competing interests.

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Received: 1 December 2020 Accepted: 18 April 2021

Published online: 08 May 2021

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