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RESEARCH ARTICLE

Cultural differences in global virtual teams: mapping knowledge and identifying research directions

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Abstract

This study examines research performance indicators and builds a structural overview of topics related to cultural differences in global virtual teams (GVT) in the period 2000-2020. A bibliometric analysis of 151 academic articles on the topic of cultural differences in GVTs, retrieved from Web of Science Core Collection and Scopus databases, was applied with the Bibliometrix package in R. The analyses reveal findings regarding the cultural differences in GVTs research, in particular, the most valuable sources, prolific authors, the geography of the research, as well as main scientific articles. The main research themes and their evolution were determined, as well as potential research directions. According to the revealed most relevant themes, the trend of the stream of research is heading towards individual dimensions of the topic, indicating a moved research focus from the organizational level of management and psychology to the individual one.

Keywords: bibliometric; cultural differences; cultural diversity; global virtual teams; GVT

Introduction

Constant technological development and rapid increase in the global integration processes have unavoidably led to the ultimate increase in forming and employing virtual teams (VT) (Gibson & Gibbs, 2006; Hertel, Geister, & Konradt, 2005; Morrison-Smith & Ruiz, 2020; Taras et al., 2019). Unsurprisingly, highly virtual teams tend to be culturally heterogeneous due to the international collaborations and a more extensive pool of professionals to choose from, despite geographical distance, nationality and other related issues (Dooly, 2017), fulfilling the characteristic of a team to be *global*. So-called global virtual teams (GVT), which can also be referred as globally distributed teams, physically dispersed teams, multinational or transnational teams among many other synonymic labels, is the model adopted by various multinational organizations, and the growing trend is predicted to be accelerated even further (Scott & Wildman, 2015; Selmer, Dickmann, Froese, Lauring, Reiche, & Shaffer, 2021). The digitalization of companies, projects and teams started even before the COVID-19 pandemic (Oztemel & Gursev, 2020; Stahl & Maznevski, 2021; Tran, Oh, & Choi, 2016) due to the reasons such as reduced travel time, stress, ecological purposes and costs (Dekker, Rutte, & den Berg, 2008; Morrison-Smith & Ruiz, 2020; Orlikowski, 2002; Pinnington & Ayoko, 2021). However, in the light of the changes brought by the COVID-19 situation, the implementation of remote working arrangements was basically imposed on a great number of organizations in an incredibly accelerated way (Ayoko, Caputo, & Mendy, 2021; Kniffin et al., 2021; Makarius & Mukherjee, 2020; Tavoletti, Stephens, Taras, & Dong, 2022). Additionally, during the last

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2–3 years, face-to-face international and cross-cultural team collaborations were complicated due to travel restrictions, which boosted the importance of virtual multicultural teamwork even further. These dynamics have unavoidably led to the development of virtual global mobility (VGM), which replaces face-to-face work-related international interactions with virtual international interactions (Selmer et al., 2021).

Researchers all over the world admit the ambiguous nature of the GVTs' implementation, recognising its great potential and inherent complexities (Jimenez, Boehe, Taras, & Caprar, 2017). Indeed, the research on GVTs is extensively growing (Scott & Wildman, 2015; Stahl & Maznevski, 2021), and cultural differences play a valuable part in the overall effectiveness of the GVTs (Connaughton & Shuffler, 2007). Despite the identified importance of cultural aspects in GVTs, the nature of the impact of virtuality on a team's cultural diversity is still equivocal (Scott & Wildman, 2015; Stahl & Maznevski, 2021). While some researchers portray cultural diversity as a highly possible cause for a GVT's low effectiveness (Zakaria, 2017), others find it a viable antecedent for prosperous team outcomes (Mortensen and Hinds, 2001), such as improved decision-making and innovation (Stahl & Maznevski, 2021). In fact, the impact of cultural differences on team dynamics in GVT may be described as positive, negative or indifferent depending on the particular context and situational variables (Scott & Wildman, 2015; Taras et al., 2019). Nevertheless, the impact of virtuality and cultural diversity can be both characterized in a similar way by inducing divergence and limiting a necessary team convergence (Stahl & Maznevski, 2021). According to Jimenez et al. (2017), the existing research also highlights that the combination of both (virtuality and multiculturality) effects tends to enhance each other's influence. Alternatively, Selmer et al. (2021) suggest that one of the main impacts of increasing VGM could be an opportunity for an expatriated individual to avoid getting adjusted to the new cultural context, as the virtuality of the collaboration allows to stay in a setting of the home culture. However, at the same time, a need for cross-cultural adjustment in international online work settings still takes place.

Due to the fragmented, interdisciplinary and relatively new nature of the topic of cultural diversity in GVTs, it is essential to build a realistic understanding of the field's development and dimensions in the stage of evolution (Mori, Cavaliere, Sassetti, & Caputo, 2022). Hence, a review with the implementation of bibliometric indicators is able to ensure high objectivity of data analysis to orient research on cultural issues in GVTs in comparison with traditional literature reviews. The bibliometric systematization of the previous knowledge is also expected to evolve new research ideas (Ayoko, Caputo, & Mendy, 2021; Pizzi, Caputo, Corvino, & Venturelli, 2020), which may clarify the role of cultural differences in GVTs' research and identify research avenues on an incredibly multidisciplinary topic.

The purpose of this study is to assemble a science map of the field of study on cultural differences in GVTs' context, aiming to contribute to the further integration of research between these two areas, and systematize the existing structural knowledge in order to aid present and future scholars in navigating the field, and to indicate the main topics and further research directions. Being guided by the established goal, the research questions are focused on examining the state of the art in the field: 'What are the main performance indicators of the research on cultural differences in GVTs?', 'What are the prominent research themes and sub-themes within the field?', 'What are the emerging research areas, that require additional research and interdisciplinary connections on the theme of cultural differences in GVTs?' and 'How is the research landscape evolving over time?'. In order to answer them, science mapping was implemented as well as performance analyses of the research field under investigation, which is able to provide current and future scholars with information regarding authorship, most influential papers, journals and main research themes of the cross-cultural facet of the GVT research. The present study adopts several quantitative bibliometric analyses in order to implement an overview of the scientific landscape in a comprehensive manner, ensuring a reduced level of subjectivism.

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Theoretical background

Over the last decades, the adoption and proliferation of GVTs as an organizational approach grew at a remarkable pace, outpacing the academic research focused on examining the underlying dynamics of this form of collaboration (Zander, Mockaitis, & Butler, 2012).

The definition and understanding of GVTs have evolved significantly over time (Gilson, Maynard, Young, Vartiainen & Hakonen, 2015). Initially, virtual teams were primarily defined as geographically dispersed teams that leveraged technology for communication and collaboration (Massey, Caisy Hung, Montoya-Weiss, & Ramesh, 2001). However, as research progressed, it became evident that cultural factors, rather than geographical dispersion, play a crucial role in shaping the dynamics and outcomes of virtual teams. Such a shift allowed discovering a further distinct set of characteristics. The technologically mediated (virtual) interactions between members (Poole & Zhang, 2005), and the culturally diverse nature of a team (Scott & Wildman, 2015) simultaneously brought potential antecedents of GVTs' effectiveness (Shachaf, 2008) and dysfunction (Tirmizi, 2008) due to the multicultural feature of teams.

This study defines a GVT as 'an interdependent virtual team whose members are geographically and time dispersed across cultural and national boundaries' (Scott & Wildman, 2015: 15). In the dimension of teams and teamworking, cultural diversity does not invoke exclusively national diversity (Gibbs, Sivunen, & Boyraz, 2017) or linguistic diversity (McDonough, Kahn, & Griffin, 1999), but appertain to the broader concept of cultural backgrounds inherent to GVT's composition (Kankanhalli, Tan, & Kwok-Kee, 2006). According to the social identity theory (Tajfel, Turner, Austin, & Worchel, 1979), culture-related issues and cultural differences create substantial challenges and opportunities for effective team functioning (Stahl, Maznevski, Voigt, & Jonsen, 2010), as cultural identity forms expectations, behaviour, assumptions, social norms and goals, beliefs, that normally are different from the representatives of other cultures (Jarvenpaa & Leidner, 1999). These differences may impact team dynamics and processes in a negative way, such as subgroup formations (Cramton & Hinds, 2009; Lahti, 2015), language-related issues (Sarker, Nicholson, & Joshi, 2005), communication breakdowns (Gibson & Gibbs, 2006), misunderstandings and conflicts (Caputo, Kargina, & Pellegrini, 2022; Maznevski, Davison, & Jonsen, 2006; Paul, Seetharaman, Samarah, & Mykytyn, 2004; Stahl et al., 2010). A positive impact may include mutual intercultural learning (Cramton & Hinds, 2004) and innovation (Gibson & Gibbs, 2006; Lahti, 2015), which may subsequently influence team effectiveness, success and outcomes (Scott & Wildman, 2015). However, the recent research on GVTs allows a possibility of downsizing the negative role of social categorization processes in physically distributed settings in comparison with the collocated (Han & Beyerlein, 2016) due to the reduced verbal and non-verbal cultural cues (Peñarroja, Orengo, Zornoza, & Hernández, 2013).

In the fields of international management, global mobility and cross-cultural management, it is crucial to understand the impacts and roles of diversity, including cultural differences (Stahl & Maznevski, 2021). Similar to the collocated team settings, the literature on GVTs shows inconsistent, and often controversial findings regarding the role and impact of cultural differences on team processes and outcomes. While the concept of cultural diversity is considered to be a double-edged sword for GVTs' dynamics and effectiveness; the proportions of positive, negative or neutral impacts significantly depend on a number of contextual and situational factors (Scott & Wildman, 2015). These nuanced dynamics and meaningful role of combinations of various mediators and moderators should be taken under consideration linking the cultural differences and GVT effectiveness (Stahl & Maznevski, 2021).

The research on cultural diversity in GVTs encompasses a wide range of disciplines. Given the wide range of perspectives, fields and approaches, identifying main topics, performance indicators and research trends may be challenging. Consequently, the research on the cultural aspect

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in the context of GVTs requires clarification and systematization of the previous knowledge, starting with the performance indicators of the field and establishing the main themes, which can constitute a solid, rigorous and quantitatively built foundation for the further potential intensive qualitative research of each subtheme and building an appropriate multifaceted framework in further research.

Method

In order to ensure a comprehensive performance analysis and science mapping of the literature on cultural differences in GVTs, a set of bibliometric analyses was conducted in accordance with the current trends in bibliometric research (Ayoko, Caputo, & Mendy, 2021; Mori et al., 2022). Aiming to map the landscape of the research, the search was conducted in the databases of Scopus and Web of Science Core Collection (WoS) to ensure the data set comprehensiveness in Spring 2021.

The first step of the search protocol included the adoption of a Boolean multilevel search string in databases, looking for the published manuscripts contained in their title, abstract or keywords the specified words: cultur*, AND team* OR group*, AND global* OR international* OR multinational* OR multi-national* OR transnational*, AND virtual* OR distributed OR dispersed OR idt* OR tnt*. The final string was established after the set of attempts using alternative words and word combinations, and it was selected as the most thorough and accurate for the subject under investigation. In particular, the extensive search of the synonyms of the terms related to virtuality and culture of the teams was accomplished to ensure the formation of the comprehensive and accurate content of the data set. For instance, aiming to assemble papers related to the concepts of culture in GVT, Scott and Wildman (2015) suggest employing the terms like virtual, dispersed, distributed, international, transnational, etc. The including criteria for both databases referred to the journal source type, final publication stage, document type of a peer-reviewed academic article, English language and timespan of 2000–2020. The retrieved results of the initial sample were found as 532 from Scopus and 314 from WoS.

In the second step, taking into account the broad multidisciplinary range of the final search string, the filtering stage was decided to be undertaken to secure adherence to the research question (Bartolacci, Caputo, & Soverchia, 2020). The filtering process included two stages: before and after merging the conducted datasets. Table 1 summarizes the process of manual cleaning of the dataset. A thorough reading of the papers' titles, keywords and abstracts was done, and the reason for every excluded paper was indicated and grouped to the appropriate criterion. The substantial number of excluded papers may be explained by the broad and multidisciplinary nature of the cultural diversity concept in GVT, which can be approached from different angles of perspectives and disciplines. Being guided by our research aim, the scope of the study is limited to the role of cultural differences in GVTs' dynamics, processes and settings. Hence, the articles that did not explicitly consider cultural differences, team virtuality or were not applicable to the area of management and teamwork were excluded from the dataset. Finally, after merging the datasets (Caputo & Kargina, 2021) and removing duplicates, further brief filtering and excluding of the articles not aligned with the search criteria due to errors and inconsistencies were done, reaching a total of 151 articles for further analyses.

Being guided by the main goal of this research, which is an overview of the topic of cultural diversity in GVTs, the set of bibliometric analyses was included in the third step of the applied method. Bibliometric is a segment of scientometrics that employs statistical methods to the data set in order to evaluate a scientific activity of the research field/topic under investigation in a mathematic (Si, Shi, Wu, Chen, & Zhao, 2019), quantitative and meta-analytical fashion (Broadus, 1987; Derviş, 2019; Seyedghorban, Tahernejad, Meriton, & Graham, 2020). Bibliometrics implement two main operations: science mapping and performance analysis (Aria & Cuccurullo, 2017). Science mapping is grounded on first-generation and second-

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Table 1. Filtering protocol of the data set

Manual cleaning			
	Excluding criteria	Number of the excluded papers from the Scopus' data set	Number of the excluded papers from the WoS' data set
Criterion	Non-related topics	169	42
Criterion	Education, students, training	65	55
Criterion	Do not mention cultural issues, teams' virtuality or both	101	72
Criterion	Medical research	32	19
Criterion	Methodological papers	3	2
Criterion	Marketing research	13	11
Criterion	Expatriates, immigration research	12	8
Criterion	Heritage and tourism research	13	3
Criterion	No DOI, not English, not peer-reviewed papers, etc.	9	7
Total number of papers remained after the manual cleaning		115	95
Merging the data sets			
Number of the papers			
Articles removed	49		
Unique articles remained	161		
Cleaning after merging			
	Excluding criteria	Number of the excluded papers from the merged data set	
Criterion	Date of publication 2021	1	
Criterion	Book chapters (WOS)	6	
Criterion	Early access	1	
Criterion	Proceeding paper	1	
Criterion	Not identified duplicate due to the DOI difference	1	
Total number of the remained articles in the data set	151		

generation relation indicators, which construct a spatial representation of interrelations between scientific elements (Iwami, Ojala, Watanabe, & Neittaanmäki, 2020). The aim of science mapping is to highlight the dynamic and structural composition of the particular research field. In turn, performance analysis contains activity indicators, which deliver the data about impact, volume and distribution of the investigated research field through various techniques (Bartolacci, Caputo, & Soverchia, 2020).

According to the previously published research (Caputo, Pizzi, Pellegrini, & Dabić, 2021, 2022; Chabowski, Samiee, & Hult, 2013) papers provide a substantial sample size for conducting a

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robust bibliometric analysis. This sample size allows for meaningful insights into the state of the art, trends and patterns within the field, ensuring a comprehensive examination of the literature and enabling reliable conclusions to be drawn. Bibliometrics analysis is valuable even for a relatively small number of papers in emerging fields because it provides a systematic and quantitative approach to understanding the research landscape. Such a method can reveal valuable insights and help researchers gain a deeper understanding of the current state of research in these emerging fields, facilitating future directions and decision-making.

The goal of implementing a bibliometric analysis within the present research is to produce an overview of the knowledge structure along with a performance analysis of a cultural issue in GVTs' research. Following recent best practices, several complementary bibliometric analyses were conducted (Ayoko, Caputo, & Mendy, 2021; Caputo et al., 2021). The bibliometric analysis was conducted with the Bibliometrix package in R Studio (Aria & Cuccurullo, 2017), which allows employing both sets of indicators (Derviş, 2019), to ensure statistical integrity, provide the reliability of outcomes, as well as produce visualization of the outcomes.

Results

Performance indicators

Descriptive statistics of an intercultural issue in GVT research

Table 2 presents the main information regarding the dataset of the intercultural issue in GVT research dated from 2000 until 2020. It is evident that 345 authors contributed 151 articles published in 93 journals, with an average citation per article of 39.95. It is considered a significantly high number of citations, which emphasizes the importance and relevancy of the intercultural issue in GVT research. Additionally, a relatively high number of authors and journals indicates a decidedly interdisciplinary nature of the research field investigating and reviewing cross-cultural concepts in GVTs. Due to the rather high collaboration index of 2.65, only 21.6% of articles were published single-handedly, indicating collaboration as the main strategy of the publishing authors on the topic of the intercultural issue in GVT.

Regarding annual scientific production, Figure 1 demonstrates the tendencies in publications in the research field based on the analysis implemented with the Bibliometrix R package. In general, the evolution of the field from 2000 until 2020 is described by medium fluctuations, and despite the uneven evolution of the field's scientific production, the annual growth of 14.11% persists. In the period of 2000–2006, we can see the lower fluctuating dynamics as virtual collaboration was limited due to the not widely spread yet but growing (Cascio, 2000) use of advanced ICT such as videoconferencing, cell phones, etc. It is expected that the maturity stage of the field is not reached yet, particularly in light of the COVID-19 circumstances that enhance further rapid and forced adaptation to the hybrid and virtual work arrangements (Klonek, Kanse, Wee, Runneboom, & Parker, 2021), and therefore required research. Considering the limited number of papers in the research field, the study of the intercultural issue in GVT could be claimed as a niche one.

Analysis of sources

Analysis of the most relevant sources provides a list of the journals, which contributed most to the development of the research of cultural diversity in GVTs. The information on the most relevant journals is meaningful for a decision on which outlets to subscribe to and read, especially when conducting a literature review on related topics (Rey-Martí, Ribeiro-Soriano, & Palacios-Marqués, 2016). The results indicate (Table 3) that top-7 out of 93 outlets incorporate a total of 42 (27.81%) articles. It is evident that *IEEE Transactions on Professional Communication* ($n = 10$; 6.62%) and *Journal of International Management* ($n = 10$; 6.62%) are the most relevant journals with the largest number of published papers in the dataset. Interestingly, among all the outlets in the dataset,

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Table 2. Main information about the data set

Description	Results
Timespan	2000–2020
Sources (journals)	93
Articles	151
Average years from publication	8.7
Average citations per article	39.95
Average citations per year per article	3.37
References	8,576
No. of author's keywords	474
Authors	345
Single-authored articles	33
Articles per author	0.43
Authors per article	2.28
Co-authors per article	2.56
Collaboration index[a]	2.65

[a]The collaboration index (CI) is calculated as total authors of multi-authored articles/total multi-authored articles (Aria & Cuccurullo, 2017).

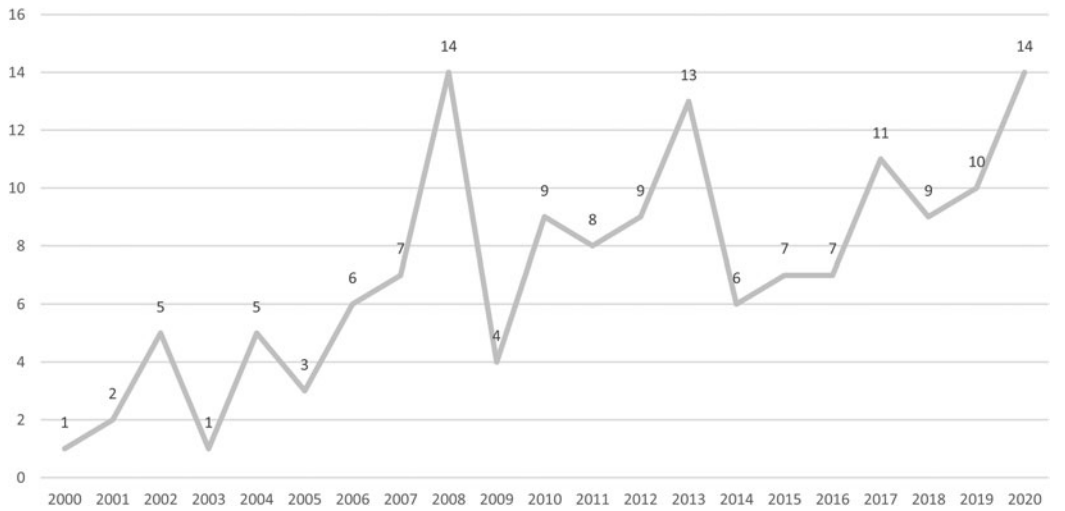


Figure 1. Annual scientific production.

Journal of Management Information Systems, five papers of which were cited 862 times have the greatest number of total citations in the whole dataset, what could be explained by the early start of publications in comparison with other journals, as well as the high significance of the published materials for the field of intercultural agenda in GVT. Besides the mentioned journals, the analysis revealed *Team Performance Management*, *International Journal of Human Resource Management*, *International Journal of Networking and Virtual Organizations* and *International Journal of Project Management* as the most prolific.

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Table 3. Top-7 most relevant sources

Rank	Sources	No. of articles	h_index[a]	g_index[b]	m_index[c]	TC[d]	PY_start[e]
1	*IEEE Transactions on Professional Communication*	10	7	10	.33	479	2001
–	*Journal of International Management*	10	8	10	.66	219	2010
2	*Journal of Management Information Systems*	5	5	5	.25	862	2002
–	*Team Performance Management*	5	5	5	.31	106	2006
3	*International Journal of Human Resource Management*	4	3	4	.18	67	2005
–	*International Journal of Networking And Virtual Organisations*	4	1	2	.06	7	2007
–	*International Journal of Project Management*	4	4	4	.28	321	2008

[a]The Hirsch index (H-index) is a journal's (or author's) number of published articles (h) each of which has been cited in other articles at least h time (Hirsch, 2005).
[b]'…the highest number g of papers that together received g^2 or more citations' (Egghe, 2020: 1).
[c]'…the median number of citations received by papers in the Hirsch core' (Bornmann et al., 2008: 832).
[d]Total citations.
[e]Publication year.

The most locally cited sources, that is, the sources publications of which were cited by the papers included in the dataset collection (Aria & Cuccurullo, 2017), are presented in Table 4. Interestingly, only the *Journal of Management Information Systems* is both: one of the most relevant sources and one of the most locally cited ones. Unsurprisingly, *Academy of Management Journal* appeared to be the most locally cited outlet, what may pinpoint a significant level of scientific reliability of the research results and solid foundations of the topic of the intercultural issue in GVT in general.

The authors and geography

The present research dataset on the intercultural issue in GVT includes 345 authors in the period of 2000–2020, out of whose only nine key scholars published more than three research bodies, constituting about 17.2% of the whole dataset. Studying the theme of cultural differences in GVTs, it is helpful to know the most prolific authors on the topic, and hence, to be attentive to new research published by these scholars, as well as to build some useful professional collaborations (de Oliveira, da Silva, Juliani, Barbosa, & Nunhes, 2019), boosting the internalization practices of academic research groups even further. Tables 5–7 specify the performance of the most prolific authors in the field, based on a number of published articles (Table 5), a number of local citations (Table 6), as well as the rating according to the academic indexes (Table 7). The most productive authors (Table 5) contributed consistently to the research body in the field. According to the received results, Norhayati Zakaria is the leading author in terms of the authorship quantity of the published studies. However, taking into account the high collaboration rate of the scholars in the data set (single-authored articles – 33 out of 151; collaboration index = 2.65), the parameters of the fractionalized authorship and *h*-index disclose that Alfred Presbitero (articles fractionalized = 2.50; *h*-index = 3) is one of the most principal authors as well, albeit his scientific co-authorship and number of published research on the topic are more limited. Nevertheless, the comprehensive, three-side evaluation has indicated that Norhayati Zakaria, who started publicising research activities about cultural diversity in GVT in 2004, can be considered the most prolific and influential author in the field by the main indicators.

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Table 4. Top-10 most local cited sources

Rank	Sources	Articles
1	*Academy of Management Journal*	151
2	*Organization Science*	133
3	*Journal of Applied Psychology*	98
4	*Journal of Management*	88
5	*Journal of Management Information Systems*	84
6	*Academy of Management Review*	76
7	*Administrative Science Quarterly*	75
8	*Journal of International Business Studies*	65
9	*MIS Quarterly*	60
10	*Small Group Research*	54

Table 5. Top-9 most productive authors

Rank	Authors	Articles	Articles fractionalized[a]
1	Zakaria N	5	2.42
2	Erez M	3	1.17
–	Glikson E	3	1.00
–	Jimenez A	3	0.58
–	Lisak A	3	1.00
–	Mockaitis AI	3	1.00
–	Presbitero A	3	2.50
–	Taras V	3	0.75
–	Ward W	3	2.00

[a]'Fractional authorship quantifies an individual author's contributions to a published set of papers (following the hypothesis of uniform contribution of all co-authors at each document)' (Aria & Cuccurullo, n.d.).

According to the extracted data from WoS and Scopus databases, Norhayati Zakaria has produced a total of five articles, which were locally cited 15 times and earned a global citation count of 250, having the highest *h*-index and *g*-index.

The distribution of publications from authors affiliated in different countries can assist in building a panoramic view of where research is important and pertinent, and where it is not well studied and contributed to the world-wild field of cultural diversity in a virtual environment. According to the analysis, out of 32 countries, where the corresponding authors were affiliated, only 10 produced three or more publications on the theme (Figure 2). Almost half of the research on cross-cultural dynamics in GVT was published by researchers from the US universities (n = 65; 43.05%), followed by Australia (n = 15; 9.93%) and the UK (n = 9; 5.96%). Curiously, only one country on the list falls under the definition of developing countries (India), which despite being among productive countries in terms of the volume of articles, has only 2.67 average article citations, which is among the lowest 20% of total citation indicators of countries in the data set. On the one hand, this phenomenon may be related to the insufficient degree of relevancy of studies on the topic of cultural diversity in GVT. That may be explained by other, more compelling

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Table 6. Top-9 most locally cited authors

Rank	Author	Local citations[a]
1	Zakaria N	15
2	Ward W	13
3	Anacabe GG	10
–	Elguezabal IZ	10
–	Given LM	10
–	Mohd Yusof SA	10
–	Toro MM	10
4	Li W	8
–	Lockwood J	8

[a]Local citations measure 'how many times an author included in this collection has been cited by other authors also in the collection' (Aria & Cuccurullo, n.d.).

Table 7. Authors' impact

Author	h_index	g_index	m_index	TC	NP	PY_start
Zakaria N	3	5	0.167	250	5	2004
Erez M	3	3	0.333	188	3	2013
Glikson E	3	3	0.333	144	3	2013
Lisak A	3	3	0.333	168	3	2013
Mockaitis AI	3	3	0.3	116	3	2012
Presbitero A	3	3	0.75	31	3	2018
Taras V	3	3	0.6	52	3	2017

barriers to efficient virtual collaboration such as technological obstacle in terms of its availability, connectivity and usage (Oyedotun, 2020; Zettinig, Mockaitis, & Zander, 2015), which require substantial attention from scholars (Kossaï & Piget, 2014). On the other hand, one among many other reasons could be a lack of research funds and investment in the issue of intercultural communication in GVT, which may be not the most prioritized one for developing countries.

According to the intra-country and inter-country collaboration rates (Figure 2), international collaboration, where a corresponding author was affiliated to a university in the USA takes only one-fifth of the whole number, one-quarter in Australia and one-eighth in the UK. Frankly, one might expect that international cooperation and exchange in cultural diversity research could be greater, as researchers may build reliable samples, framework, study and innovative results mostly implementing a comprehensive, diverse and intercultural approach to the topic (Bercovitz & Feldman, 2011; Lee, Walsh, & Wang, 2015). Theoretically, the possible improvement of the research on the topic of an intercultural issue in GVTs could be an expansion of the scientific network over countries and borders to increase the level of generalizability of the research findings, in particular, collaborations between the countries with well-developed research corpus and the ones with limited research (Gomes & Barbosa, 2018). As the concepts of cultural differences and cultural diversity lose their sense if only a limited number of cultures and technological means are taken into consideration.

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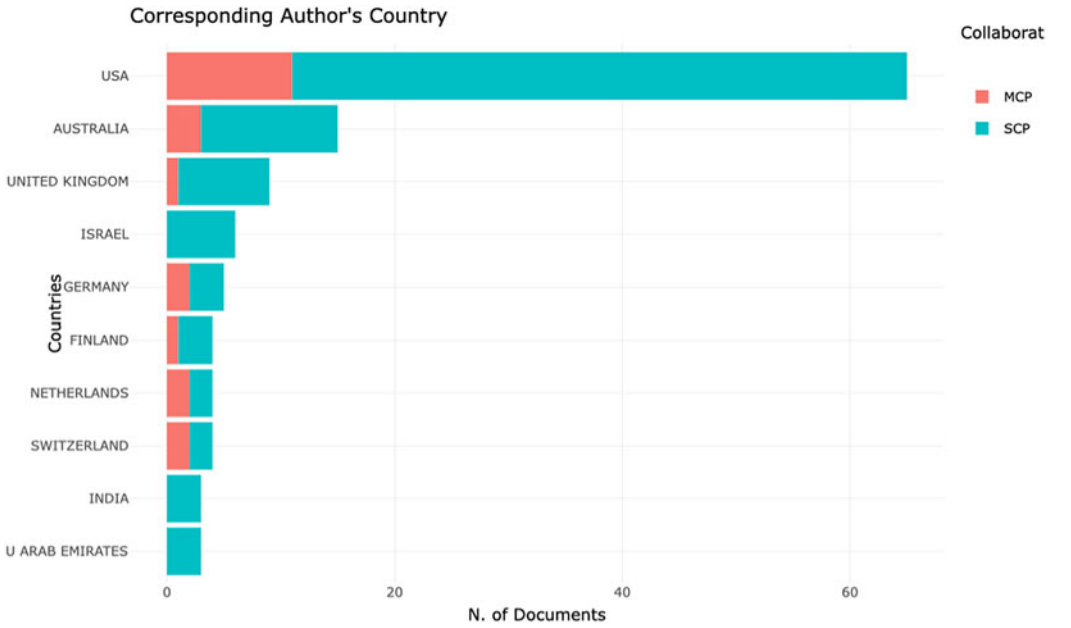


Figure 2. Corresponding authors' countries. Intra-country (SCP) and inter-country (MCP) collaboration during 2000–2020.

The articles

The data on the most relevant research on the topic can assist a researcher in building a relevant reading portfolio to study the theme and not to miss the most prominent articles (de Oliveira et al., 2019). Regarding the relevant research articles on cross-cultural issues in VTs, the present study focuses on both global and local citations of the published articles. It is worth mentioning that while the age of a paper can influence its citation count, it does not neglect the importance of recognising highly cited articles within a field. Regardless of their publication date, these articles continue to be frequently referenced and have a lasting impact on subsequent research and scholarly discourse.

Global citations indicate the number of citations the published body received from the whole database (Aria & Cuccurullo, 2017), which, in our case, is merged of WoS and Scopus databases. Hence, the indicator of global citations demonstrates the impact of a particular article in the interdisciplinary context. Whilst local citations indicate the number of citations an article received from other articles in the dataset (Aria & Cuccurullo, 2017). Thus, local citations specify the impact of the article in the exact research area. In such wise, Tables 8 and 9 show top-10 most global cited articles and top-10 most local cited articles on the theme of cross-cultural issues in GVT, accordingly. Within the present section, it is intended to discuss the papers appeared in both lists, as this research has a high level of significance for the intercultural issues in GVT theme, as well as for studies in other fields. In terms of the most global cited articles of the data set, the first place takes the paper '*Unraveling The Effects Of Cultural Diversity In Teams: A Meta-Analysis Of Research On Multicultural Work Groups*' authored by Stahl et al. (2010). This paper is also included in the list of locally cited papers, however taking the fifth position. Referring to the previous section, the article by Stahl, who at the moment of the issuing of the publication, was affiliated to Vienna University of Economics and Business in Austria, and colleagues, received 429 citations out of 436 citations attached to the publications affiliated to Austria. Indeed, the implemented research investigated the impact of cultural diversity on teams, being based on a meta-analysis of 108 empirical studies, and has a high value for the

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Table 8. Top-10 most global cited articles

Rank	Paper	TC	TC per year	Normalized TC
1	Stahl et al. (2010)	429	35.75	5.48
2	Kayworth and Leidner (2002)	417	20.85	3.15
3	Shachaf (2008)	238	17	4.69
4	Kayworth and Leidner (2000)	234	10.63	1
5	Kankanhalli, Tan, and Kwok-Kee (2006)	229	14.31	2.98
6	Zakaria, Amelinckx, and Wilemon (2004)	219	12.16	1.85
7	Suchan and Hayzak (2001)	144	6.85	1.35
8	Pinjani and Palvia (2013)	140	15.55	3.13
9	Lee-Kelley and Sankey (2008)	134	9.57	2.64
10	Daim et al. (2012)	132	13.2	3.71

Table 9. Top-10 most local cited articles

Rank	Document	Local citations	Global citations	LC/GC ratio (%)	Normalized local citations
1	Zakaria, Amelinckx, and Wilemon (2004)	10	219	4.57	2.38
–	Kayworth and Leidner (2002)	10	417	2.40	3.33
2	Daim et al. (2012)	8	132	6.06	3.43
–	Dekker, Rutte, and den Berg (2008)	8	64	12.50	4.48
3	Zander, Mockaitis, and Butler (2012)	7	81	8.64	3.00
–	Shachaf (2008)	7	238	2.94	3.92
4	Jimenez et al. (2017)	6	37	16.22	4.40
5	Paul et al. (2004)	5	131	3.82	1.19
–	Stahl et al. (2010)	5	429	1.17	3.75
–	Hardin et al. (2007)	5	67	7.46	4.38

research field due to the thorough systematization of the previous knowledge and drawing further research directions. The moderator analysis showed that geographically dispersed teams lead to more social integration and less conflict in comparison with traditional face-to-face teams. Interestingly, Stahl and Maznevski (2021) published a retrospective research on the topic, reflecting on the evolution of the research over the previous 10 years. Regarding cultural diversity in the context of GVT, they indicated that the research interest over the last decade was mostly concentrated on the motivational side of the team members and their keenness to collaborate effectively despite the situational barriers. Another research paper titled '*Cultural Diversity And Information And Communication Technology Impacts On Global Virtual Teams: An Exploratory Study*' by Shachaf (2008) takes the third position in the global citation ranking and the same position in the local citation ranking list. The exploratory study led by Pnina Shachaf investigated the influence of ICT and cultural diversity on team effectiveness, and the major finding from the analysis was determined as the influence of team members' cultural diversity on media selection. Interestingly, all three top papers from the local citation ranking list in the field of a cross-cultural issue in GVT were also indicated in the global citation list. In this vein, the research article

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'*Working Together Apart? Building A Knowledge-Sharing Culture For Global Virtual Teams*' written by Zakaria, Amelinckx, and Wilemon (2004) examined the ways of building a knowledge-sharing culture in GVTs, what was found to be more challenging than in co-located teams due to the lack of informal environment among other reasons. The review emphasized significant dissimilarities in challenges caused by team dispersion settings and provides a set of suggestions for the effective work of virtual teams. As well as the previous research, ten local citations belong to the research of Kayworth and Leidner (2002) titled '*Leadership effectiveness in global virtual teams*'. Kayworth and Leidner studied the role of a leader in GVT settings and indicated an inherent behavioural complexity of a leadership role, combining the characteristics of empathy, asserted but not imposed authority, and prompt communication. Another paper included in both lists of most cited papers is a study '*Exploring the communication breakdown in global virtual teams*', where Daim et al. (2012) investigate communication breakdowns in GVTs and the factors influencing them. The factors were divided into five main areas such as technology, trust, leadership, interpersonal relations and most importantly in the scale of this study, cultural differences.

Science map

Three Fields Plot

The relations between authors, author keywords and sources are visualized in the Sankey diagram (Figure 3) using Three Fields Plot analysis by Bibliometrix. In terms of this analysis, the authors keywords were interpreted as research topics/themes (Janik, Ryszko, & Szafraniec, 2020). Figure 3 demonstrates which authors most frequently contributed to the research topics, and which sources of publications committed most to the research and development of these topics in

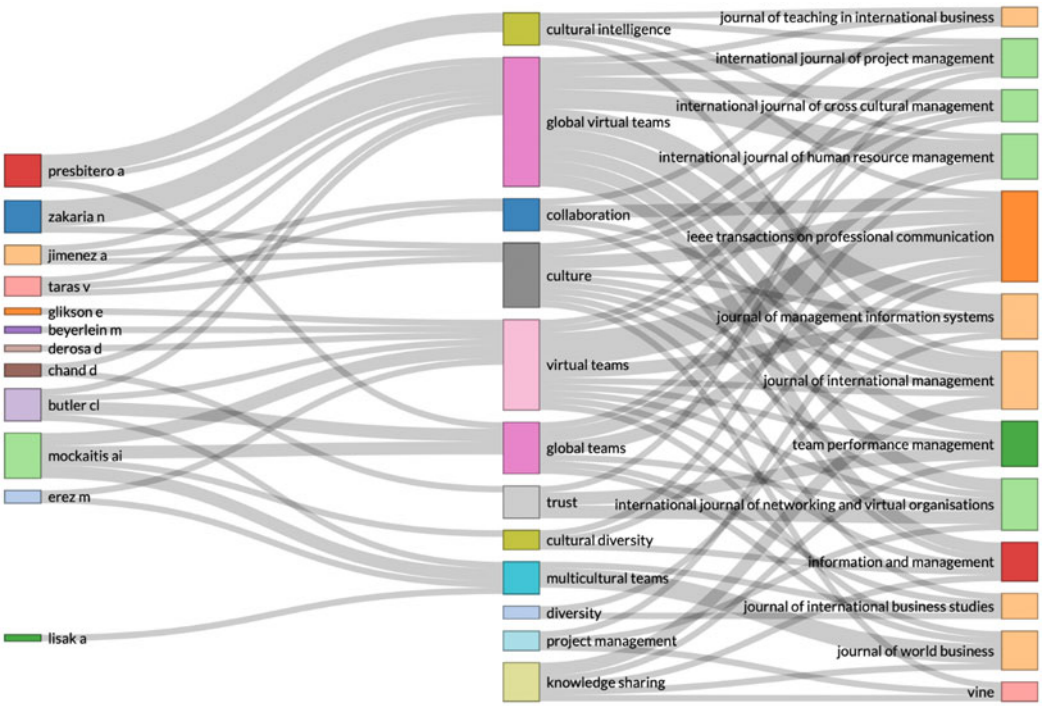


Figure 3. Three-fields plot. Relations between authors (left), keywords (middle) and sources (right).

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cross-cultural theme in GVT. The analysis revealed that among the most prolific authors, Norhayati Zakaria is mostly publishing on the themes of GVTs and culture, while Alfred Presbitero is focusing on global teams and cultural intelligence in the field under investigation. In terms of the top sources of the published research, *IEEE Transactions on Professional Communication Journal* is mostly covering the themes of cultural intelligence, collaboration, culture, cultural diversity, GVTs and project management, while the *Journal of International Management* similarly includes the topics of cultural intelligence, GVT, collaboration, culture and also, unlike the former source, knowledge sharing.

Theme mapping. Another method to characterize the conceptual structure of the field is the thematic mapping technique. In order to highlight different research themes of the field under investigation and, most importantly, to evaluate their relevancy and development degrees, the clustering algorithm on the keyword network was implemented. Figure 4 shows the thematic map, based on author keywords of the articles, revealing 15 identified themes from the given dataset, presenting a conceptual structure of the field. The title of every bubble is a term/word/expression with a higher occurrence value of the cluster. The size is proportional to the cluster word occurrences and the location is determined according to the cluster's density and centrality. In Figure 4, the *y*-axis (vertical) of the graph displays the density, that is, cohesiveness among the nodes (Esfahani, Tavasoli, & Jabbarzadeh, 2019). The indicated density could be taken as a proxy for the development scale of the theme. The *x*-axis (horizontal) implies centrality, the nodes with the highest quantity of links in the network (Scott, 1988). The centrality is considered as a proxy for the relevance of the thematic cluster in the research field. According to the indicators of density and centrality, every identified theme is allocated between the four quadrants of the strategic map: motor themes, highly developed and isolated themes, emerging or declining themes, and basic and transversal themes (Aria & Cuccurullo n.d.):

(1) Motor themes. Being located in the upper-right quadrant, the themes are portrayed as driving ones, as they are characterized by both high density and centrality. Hence, the themes of *knowledge sharing*, *culture*, *trust* and *leadership* are leading, the most developed and relevant themes (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011) in the field of cultural diversity in GVTs. The cluster of *culture* is associated with such concepts as conflict management and communication, among many others. Indeed, the virtuality of the work dynamics (Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015), technologically mediated interactions (Klitmøller & Lauring, 2013) and cultural diversity (Raghuram, Hill, & Gibbs, 2019) were proved to have a diverse impact on in-team communication processes, often leading to conflicts (Jimenez et al., 2017) and the needs of implementation conflict management techniques (Schiller & Mandviwalla, 2007) accordingly.
(2) Basic and transversal themes. The lower-right quadrant accommodates the themes characterized by low density and high centrality, which means that these themes are commonly used general topics, connecting different research areas of the field. Unsurprisingly, the core inherent themes of *virtual team*, *GVTs*, *team working* and *cultural diversity* are located in this part, assimilating the fundament of the whole research area. It is worth noting that as the analysis is run based on author keywords, unlike the Keywords Plus they are not normalized, hence, overlapping between the clusters may appear, such as happened in the present quadrant with the clusters of 'virtual team' and 'virtual teams'. Most importantly, these clusters of topics are not characterized by the opposite settings of density and centrality, signifying the propinquity of the clusters' essence. Interestingly, the theme of *cultural intelligence*, even if located in the middle of the thematic map, taking place in all four quadrants, is mostly situated in the transversal themes' quadrant, what emphasizes the tight and relevant link between the research of CQ and cultural differences in GVTs.

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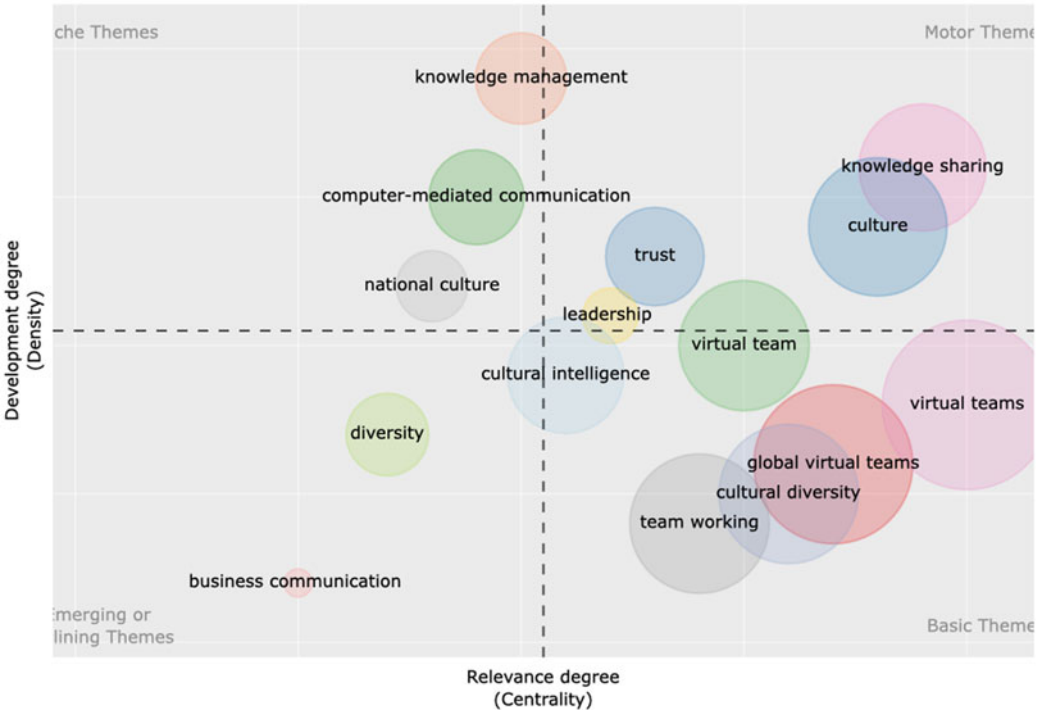


Figure 4. Thematic map.

(3) Emerging and declining themes. The analysis revealed the themes of *business communication* in the lower-left quadrant, which is described by low density and low centrality. Due to the steadily growing proliferation of intercultural communication, intercultural business communication, being a relatively young field of study (Bargiela-Chiappini & Nickerson, 2003), has been developed into a complex and challenging discipline for modern managers and leaders, especially in the settings of team's virtuality (Chmielecki, 2021). The issue of virtual work arrangements is recently imposed by the pandemic circumstances to a variety of intercultural working teams, companies and groups, which did not intend to imply a frame of virtuality, but had to implement VGM in a full or hybrid form (Selmer et al., 2021). Hence, the theme of business communication in the context of cultural differences in GVT is on the rise. Regarding the theme of *diversity*, the strong debate on differences and similarities between cultural and national diversity is prevailing more and more in the research articles on cultural issues in GVTs. While some researchers are decisive to equate national and cultural differences (Hofstede, 1994), others are certain about the national aspect to be only a part of more extensive cultural dissimilarities (Gibson & McDaniel, 2010; Leung, Bhagat, Buchan, Erez, & Gibson, 2011; Morrison-Smith & Ruiz, 2020). In one nationally diverse team, there could be representatives of different subcultures (Gibson, Huang, Kirkman, & Shapiro, 2014), hence, a VT with a low level of national diversity may be a highly culturally diverse one and vice versa.

(4) Niche themes. The themes in the quadrant are highly developed but isolated. The cluster of *national culture* has shifted over time to the niche themes due to the switch in the research from the categorical essence of culture (classification by a nationality) to the more complex and multifarious nature of culture (Connaughton & Shuffler, 2007), what was also discussed in terms of the diversity cluster in the previous quadrant. The

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computer-mediated communication theme comprises the topic of language and media choice, which are found to be related in several studies. The role of appropriately selected media choice (Klitmøller & Lauring, 2013) and language diversity (De Guinea, Webster, & Staples, 2012) may impact a team's dynamics and processes due to the set of cultural and virtual features. Similarly, the *knowledge management* theme is highly researched due to the difficulties in its process under the circumstances of physically distributed communication, increasing the probability of subgroups creation (Boh, Ren, Kiesler, & Bussjaeger, 2007), as well as reducing team members' attention (De Guinea, Webster, & Staples, 2012), what in combination with cultural differences and associated different knowledge sharing exchange patterns, may lead to substantial misunderstandings and conflicts (Cramton, 2001; Kayworth & Leidner, 2002), complicating the knowledge management processes.

Discussion and conclusion

To the best of our knowledge, the present research is the only bibliometric study regarding the cultural diversity in GVTs. The bibliometric analyses were conducted to determine both a science mapping and performance analysis of the cultural aspect of the GVT research in the period of 2000–2020. Taking into account the limited number of articles included in the dataset of the study, it shows that the maturity stage of the research field is not reached yet, leaving several opportunities for future research. Even if the pandemic situation seems to be over, it can be expected that previously introduces lockdowns and remote working arrangements may leave a pattern of global virtual work, which is hard to reverse. Nevertheless, to date, it is difficult to predict the temporality of virtual teamworking and virtual global mobility (VGM) (Selmer et al., 2021). Withal, a significant growth of research on cultural differences in GVTs can be expected, and future researchers are called to investigate further these topics.

The present paper is based on a set of bibliometric analyses and contributes to the field in several ways. Although of practical relevance and answering practical questions associated with the virtuality of work, the main contributions and insights revealed in this study are theoretical in nature.

First, the theoretical implications refer to identifying the knowledge structure of the research investigating the GVTs' research regarding cultural differences, cross-cultural dynamics and cultural diversity. The analyses conducted on the merged dataset from Scopus and WoS databases resulted in a set of vital and comprehensive insights about the most prolific authors, articles, collaborations, keywords, themes and journals for the field under investigation. These results together with the visual outcomes of the analyses may also be used by future authors to adopt an appropriate strategy regarding further research avenues, collaborations and main sources to read and publish at.

Secondly, a significant value and contribution of this research lies in the identification of clusters and establishing the evolution of the theme, allowing scholars to understand where the field is going. According to the thematic mapping, the core leading topics of leadership, knowledge sharing, trust and culture are extensively researched and are considered the most meaningful for the field. However, according to the density (development degree) indicators, the potential research avenues could be related to identifying the impact of cultural differences on trust and leadership in GVTs, as well as to reviewing the roles of more nuanced cultural variables, such as subcultures in GVTs' dynamics. Whilst the cluster of business communication is on its rise and requires additional research. The intensive emergence and increasing relevancy of such a theme can be explained by the concept of VGM, which was often imposed as a substitute for physical global mobility due to the worldwide pandemic (Selmer, 2021). It may be worth exploring if ad hoc international virtual teams, which previously worked in the face-to-face setting, experience cultural differences differently being located in the setting of the home culture but

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dealing with cross-cultural issues in a virtual workplace. Likewise, it is hard to overestimate the importance of the cultural intelligence cluster in the intellectual structure of the mapped field. A possible research opportunity may be developing a theoretical model of the role of cultural intelligence in dealing with multicultural issues in GVTs.

The third contribution is related to the navigational aspect of where the research is going. With a spread of ad hoc and voluntarily formed GVTs, it is possible to trace the counter-trend, where people do not have to move for work, but instead, work moves to people (Selmer et al., 2021), ensuring a proper balance between the organizational interest in having a particular team composition and employees' decision on where to live, how to work and how much to travel. With the rise of VGM, virtuality may impact categories of global workers (Jooss, McDonnell, & Conroy, 2021; Shaffer, Kraimer, Chen, & Bolino, 2012) in different ways (Selmer et al., 2021). It would be interesting to investigate if these categories perceive and are affected by cultural diversity differently, and if so, how exactly. Indeed, according to the revealed most relevant themes, the trend of the stream of research on cultural differences in GVTs is heading towards individual dimensions of the topic. Clusters of trust, leadership, knowledge sharing and knowledge management as well as others may indicate a moved research focus from the organizational level of management and psychology to the individual one. As Gilson et al. (2015) concluded in their review of virtual teams research, the topic of the team members' well-being is one of the main research opportunities. Similarly, Selmer et al. (2021) consider the issue of work–life balance and well-being as one of the most prominent future research directions. Hence, a view through a personal lens of a GVT member is needed.

Regarding the practical implications, the performance-related indicators of the field as well as discovered thematic clusters can aid academic and non-academic researchers to build an accurate research strategy when studying cultural diversity and its role in the virtual context. Furthermore, this study may be also useful for practitioners, whose number has expanded dramatically due to the post-COVID spreading of VGM, as a starting point in adjusting to the new cross-cultural virtual working arrangements.

Despite the equivocal character of research finding in the field of cultural diversity in GVTs, one point is shared by the majority of authors – more research is needed. Increasing immigration flows, refugees and the pandemic boost the importance of GVTs and cross-cultural aspects more than ever (Stahl & Maznevski, 2021).

Bibliometric analysis provides an overview of a field of studies, where future studies are expected to build on the findings and develop the investigation on the roles of cultural differences in GVTs. The goal of this research was to establish a science map of the cultural diversity in GVTs' theme. This study constructed an abstraction based on reality, thus, it cannot be as complicated as reality itself, as the map is not a territory (Korzybski, 1998).

As with all studies, this manuscript has its limitations. Firstly, in order to pursue homogeneity, the data collection process did not include books, book chapters, conference proceedings and reports, which could be improved in further research projects for complementing the results of the present study. Also, as the methodology relies on the titles, abstracts and author keywords, some relevant papers may have been missed due to a lack of emphasis on cultural differences in GVTs. Secondly, it is worth noting that clustering keywords-based techniques are having its significant limitations, such as every keyword could be possibly associated only with one thematic cluster, and most importantly, there is no opportunity to use themes for article categorization using the Biblioshiny application for bibliometric analysis (Aria & Cuccurullo n.d.). Thirdly, even if bibliometric analyses provided the number of the results and characteristics of the research field of cultural differences in GVT being based on the carefully selected data set consisting of 151 papers, the intention of the authors was to receive a wide panoramic view of the field. However, in order to systematize the previous research and draw a more detailed and accurate picture of the knowledge of the field, it is crucial to evaluate not only the structure, and the bird's eye view of the field under investigation, but also take a more in-depth and expanded look into the research.

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In order to systematize the knowledge in a more comprehensive and qualitative manner, topic modelling or literature review methods would be highly appropriate for further research on the role of cultural differences in GVTs.

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