Essays on Cultural Intelligence

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Essays on Cultural Intelligence

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This dissertation is dedicated to my late father, Martin Lankut: I love you and you are truly missed.

Erik Lankut

Executive summary

Cultural intelligence (CQ) is the individual ability to succeed in a cross-cultural environment. Originally from the cross-cultural psychology literature, CQ has managed to have a strong influence in the field of international business and management. Past empirical research show that CQ reliably predicts outcomes such as global leadership, negotiation performance, expatriation intention, and job performance. In this dissertation, I review, explore and investigate the mechanisms and associations of CQ in the field of international business and management, with focus on leadership emergence.

This dissertation consists of three essays/papers on cultural intelligence. The first essay/paper is a systematic review using bibliometric methods that explored the CQ literature in international business, including the two concepts cross-cultural competencies (CC) and global mindset (GM). The paper complements past reviews by broadening the focus and offers an objective and reproducible approach to assessing the current state of the literature, provides improved understanding of the intellectual structure of research on the three constructs, and their effects on different outcomes through presenting its findings and recommending guidelines for future research.

The second essay/paper investigates whether EQ and CQ are direct predictors of leadership emergence in global virtual teams (GVT). The paper created a leadership emergence model based on socioanalytic theory to theorize the mechanisms which EQ and CQ motivate the individual to emerge as a leader. Using partial least squares structural equation modeling (PLS-SEM), the results indicated some determinants do matter for leadership emergence in GVT, with the explanatory power of the model being low. Control variables of surface-level skills and factors, such as English proficiency, demonstrated more relevance.

The third essay/paper conducts more investigation into the role of EQ and CQ on leadership emergence by considering EQ and CQ as must-have and not should-have factors. The paper employs necessity logic as a possible explanation for why CQ and

EQ do not significantly matter to leadership emergence. Using necessary condition analysis (NCA), the results found EQ or CQ to not qualify as necessary condition for leadership emergence, but English proficiency qualified. The contradiction suggests a call for further investigation of the different "paths to leadership" that occur in settings of emergent leadership.

Keywords: Cultural Intelligence (CQ); bibliometric methods; leadership emergence, emotional intelligence (EQ); global virtual teams (GVT), partial least squares structural equation modeling (PLS-SEM); necessary condition analysis (NCA)

List of Studies

This dissertation consists of the following essays/papers.

1. Yari, N., Lankut, E., Alon, I., & Richter, N. F. (2020). Cultural intelligence, global mindset, and cross-cultural competencies: A systematic review using bibliometric methods. *European Journal of International Management*, 14(2), 210-250. https://doi.org/10.1504/EJIM.2020.105567

2. Lankut, E., Marjaana, G., Richter, N. F., Alon, I., Taras, V., & Munim, Z. H. (Unpublished). Who will lead the team? Predicting leadership emergence in global virtual teams.

3. Lankut, E. (Unpublished). Necessary Conditions To Emerge As A Leader In Global Virtual Teams

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Overview of Dissertation:
Essays on Cultural Intelligence

1. Introduction

Cultural intelligence (CQ) is the individual ability to succeed in a cross-cultural environment and comprises several dimensions, including cognitive, metacognitive, motivational, and behavioral CQ (Ang & Van Dyne, 2008). It stems originally from cross-cultural psychology literature but has managed to have a strong influence in the field of international business and management (e.g., Johnson, Lenartowicz, & Apud, 2006). Past empirical research has found that CQ reliably predicts outcomes such as global leadership (e.g., Sutton, Zander, & Stamm, 2013), negotiation performance (e.g., Imai & Gelfand, 2010), expatriation intention (e.g., Richter, Schlaegel, van Bakel, & Engle, 2020), and job performance (e.g., Ang et al., 2007).

There are several definitions of CQ in international business and management (Andresen & Bergdolt, 2017; Yari, Lankut, Alon, & Richter, 2020), but throughout this dissertation, I follow the definition by Ang and Van Dyne (2008) and Earley and Ang (2003) and define CQ as the capability to succeed in complex cross-cultural environments through knowledge or cognition, motivation, and behaviors. This definition includes four dimensions: Cognitive CQ represents the general knowledge and knowledge structures about culture. Metacognitive CQ reflects the mental capability of individuals to acquire and understand cultural knowledge. Motivational CQ is an individual's capability to direct energy towards learning about and functioning in different intercultural situations. Finally, behavioral CQ describes an individual's capability to exhibit appropriate actions in culturally diverse encounters (Ang & Van Dyne, 2008; Earley & Ang, 2003).

Empirically, there are different approaches to use these type of intelligence constructs that range from using the individual dimensions to the aggregate construct or combinations of the two (see Rockstuhl & Van Dyne, 2018). This dissertation includes two empirical studies that have implemented both the individual dimensions (the four-factor model) as well as the overall constructs (the single-factor model) to test two different types of models: One model that uses the four-factor structures, and one model that uses single-factor constructs. Hence, the overall objective of this dissertation is to review, explore and investigate the mechanisms and associations of CQ currently in the field, and focus on one particular outcome: leadership emergence.

1.1 Research Objectives Of The Three Essays/Papers

This dissertation's common theme is to explore the role of cultural intelligence (CQ) in relation to leadership. A literature review study is also included as part of this dissertation's objective. Hence, the overall objective of this dissertation is divided into three separate essays/papers. Table i showcases the objective/research questions of each essay/paper in question.

Table i. Research objectives of all three essays/paper

Essay/paper title	Type/nature	Research questions/objectives
Paper 1: Cultural intelligence, global mindset, and cross-cultural competencies: A systematic review using bibliometric methods	Hybrid Literature Review	i. Which journals, publications, and specific researchers are the most influential in CQ, GM, and CC research? ii. What is the intellectual structure of the CQ, GM, and CC literatures, including key research streams and potentially bridging researchers in the field? iii. What is the temporal evolution of research streams in CQ, GM, and CC research and what are the emerging topics? iv. What are the promising routes for future research?
Paper 2: Who will lead the team? Predicting leadership emergence in global virtual teams	Empirical	Will higher EQ or CQ make individuals more likely to emerge as a leader in a global virtual team (GVT)?
Paper 3: Necessary conditions to emerge as a leader in global virtual teams	Empirical	Is EQ or CQ a necessary condition for the individual to emerge as a leader in a global virtual team (GVT)?

The remaining part of the introduction chapter is divided into the following sections: Section 2 provides an overview of the Cultural Intelligence (CQ)

literature and of which the three essays/papers in this dissertation contributes to such literature. Section 3 presents an overview of the applicable theories used and discussed in these essays. Section 4 briefly presents the methodology applied in each essay/paper. Section 5 and 6 will summarize each of the three essays/papers.

2. Overview of Cultural Intelligence Literature and Contributions of the Three Essays/Papers

Essay/paper 1 (Cultural intelligence, global mindset, and cross-cultural competencies: A systematic review using bibliometric methods) explored the cultural intelligence (CQ) literature in international business (and management). In addition, two concepts with a longer research history in international business and management are also included: these being cross-cultural competencies (CC) and global mindset (GM) (e.g., Andresen & Bergdolt, 2017; Elo, Benjowsky, & Nummela, 2015; Leung, Ang, & Tan, 2014; Bücker & Poutsma, 2010). These concepts are not identical to CQ but they are valuable to compare with the CQ research domain for two reasons: first, the paper argues that they have relevant overlap with the concept of CQ (see Appendix 1 in paper 1 for a brief overview of selected measurement approaches). Second, they are used for the same objective: to understand and explain diverse outcome variables in international business and management. However, it was discovered that reviews of empirical research only concentrate on one of the concepts – Either CQ, either GM, or either CC (see Javidan & Bowen, 2013; Levy, Beechler, Taylor, & Boyacigiller, 2007). Hence, There is potential in gaining further insight through combining the existing knowledge on shared and distinct facets of each construct. There is already research that goes in this direction, such as the study by Andresen and Bergdolt (2019) empirically combining CQ with GM, and Johnson et al. (2006) who suggest that CQ plays an important role in the development of CC. Essay/paper 1 complement past reviews by broadening the focus: the paper systematically review the literature using bibliometric methods and include concepts that are strongly related to CQ. Through bibliometric methods is it able to offer an objective and reproducible approach to assessing the current state of the literature (see Belter, 2015). Ultimately, the paper contributes to a better understanding of the

intellectual structure of research on the three constructs and their effects on different outcomes through presenting its findings and recommending guidelines for future research.

Followed by the literature review, the second essay/paper (Who will lead the team? Predicting leadership emergence in global virtual teams) conducts an empirical investigation on the individual factors that determine whether an individual will emerge as a leader in a global virtual team (GVT). This is a direct response to the call by Judge, Colbert, and Ilies (2004) to investigate other forms of intelligence with leadership. This essay/paper focuses in particular on analyzing whether EQ and CQ are relevant determinants of emergent leadership in GVTs. Literature on CQ did find it to have a positive association with leadership effectiveness in international workgroups (Groves & Feyerherm, 2011; Offermann & Phan, 2002; Yari et al., 2020), and with task performance (Ang et al., 2007); EQ is found to have a positive association with leadership effectiveness (Kerr, Garvin, Heaton, & Boyle, 2006), conflict-handling styles (Gunkel, Schlaegel, & Taras, 2016) and with follower satisfaction (Wong & Law, 2002). Hence, most research have supported what Alon and Higgins (2005) conceptualized previously, that a global leader should have a combination of analytical (general) intelligence, EQ and CQ to achieve successful leadership. Thus, the paper investigates whether the self-selection mechanism in GVTs, that are typical without a formal leadership structure, will result in informal leadership structures that are effective or create leaders that have the right skills.

The paper argues that it is an important contribution to investigate these more direct predictors of leadership emergence, to which EQ and CQ were investigated. Both forms of intelligences are in contrast to general intelligence considered abilities (Earley & Ang, 2003; Mayer, Salovey, & Caruso, 2008) have a direct influence on leadership emergence, to which is explained further in the theoretical section of the paper. Another contribution of the second essay/paper is through the review of past empirical research on the associations between EQ and/or CQ and leadership: It was observed that there are almost no studies that test the multiple intelligence proposition or test whether EQ and CQ lead to leadership emergence in the context of GVT. Thus, the paper employ tests to compare if higher EQ and CQ in the individual makes them more likely to lead in GVT. In addition, a leadership emergence model building on socioanalytic theory (Hogan & Blickle, 2018) was created. As explained in the paper, it theorizes how EQ and CQ motivate

the individual to have the team members get along, get ahead, and find meaning, and therewith emerge as a leader. The results indicated that only (single-factor) CQ mattered to leadership emergence in GVT, but the explanatory power of the model was low and an assessment of the predictive relevance of CQ showed that the practical relevance of CQ in predicting the emergence of leaders was not given. Contrary to the expectations, the control variables of surface-level skills and factors, such as English proficiency, demonstrated more relevance. This contradicts past empirical findings that have clearly indicated EQ was associated with leadership emergence (Cote, Lopes, Salovey, & Miners, 2010). This includes studies that also indicate CQ was associated with leadership emergence (Lisak & Erez, 2015).

The third and final essay/paper (Necessary conditions to emerge as a leader in global virtual teams) complement the second essay/paper by more investigation into the role of EQ and CQ on leadership emergence. The third paper consider if EQ and CQ are instead must-have and not should-have factors: that is, EQ and CQ are factors that are necessary and not only sufficient for leadership emergence. As further explained in the third essay/paper, a variable (e.g., CQ) can both be a determinant or driver of an outcome from a sufficiency logic, or a necessary or bottleneck condition for an outcome from a necessity logic, depending on the method used. Additionally, Richter, Martin, Hansen, Taras, and Alon (2021) have called for more empirical research testing whether CQ is a necessary condition for different mechanisms to specific outcomes. Thus, essay/paper 3 examine EQ, CQ and leadership emergence through necessary condition analysis (NCA, Dul, 2020). Thus, it explores whether a different logic may be an explanation for the finding that CQ and EQ do not significantly matter to leadership emergence. The results indicated that EQ or CQ does not qualify as necessary condition for leadership emergence, but only English proficiency was found to be practically relevant as a necessary condition for leadership role. This contradicting finding suggest that there is a need to further investigate the different "paths to leadership" that occur in settings of emergent leadership.

3. Applicable Theories and Concepts

In essay/paper 1, CQ, GM and CC are reviewed together, as there was a lack of consensus on the terms, similarities, distinct features, and associations they share. The paper gives an overview of the factors and clusters derived from the co-citation analysis, and lists their publications and core research themes (see Table 5 in paper 1). These factors or sub-clusters form intellectual streams were labelled as follows: 1A) 'The CQ construct and its implementation into the literature' (with 40 publications), 1B) 'Knowledge management cross-cited over constructs' (with 10 publications), 1C) 'CQ, leadership and social interaction' (with 7 publications), 2D) 'CQ and international exposure' (with 9 publications), and 3E) 'Research involving the GM construct' (with 11 publications). The analysis of the common and distinct research areas in the different streams led to the following observations: First, there is an overlap of research areas. Even if the constructs have emerged separately, their underlying similarities have spawned a surge of similar research themes, which in turn has led to the emergence of closely-related literature. Second, the CQ literature has more research on individual-level and group-level outcomes, while the GM literature has more research on organizational-level outcomes. Even if CQ is the dominant construct overall, GM is the preferred construct for organizational-level research. Third, there are sometimes similar publications (from similar teams of co-authors) that loaded under different factors and in different streams.

Essay/paper 2 review 44 empirical research papers that research into the associations between EQ and/or CQ and leadership (see Table 1 in paper 2). Among these 44 papers, 32 papers look at EQ with leadership, ten look at CQ with leadership, and two papers look at both EQ and CQ with leadership. Of the 32 papers that investigate EQ, 27 focus on leader behavior or performance, and five on taking a leadership role. The nine papers that investigate CQ, and the two papers that look at both EQ and CQ, focus on leader behavior or performance. Only one paper investigates CQ with leadership emergence. To understand the roles of EQ and CQ with leader behavior and taking a leadership role, especially in the context of GVTs, socioanalytic theory was used to conceptualize the theoretical mechanisms.

3.1 Socioanalytic Theory

Socioanalytic theory differentiates three motives and behaviors that are key in this process of leadership emergence: Getting along (communion), that is the behavior that achieves approval of others, strengthens cooperation, and serves to build and maintain relationships. Getting ahead (agency), that is the behavior that produces results and advance members within the group and the group within its competition. Last, finding meaning, that is the behavior that produces stable, predictable, and meaningful social interactions in everyday living (Hogan & Holland, 2003; Hogan & Blickle, 2018). Paper 2 and 3 use socioanalytic theory to hypothesize that individuals with high EQ and CQ may be more motivated and able to get along, get ahead or to find meaning in their teams and therewith emerge as leaders.

4. Methodology

This dissertation consists of three papers and used different methods, techniques, and data sources to fulfill each paper's objective. Paper 1 is a hybrid literature review of CQ, GM and CC in international business and management, made up of four methods: (i) bibliometric citation analysis, (ii) bibliometric co-citation analysis, (iii) computer-aided text analysis, and (iv) burst analysis. Paper 2 used partial least squares structural equation modeling (PLS-SEM), while paper 3 used necessary condition analysis (NCA).

4.1 Data sources

The first paper selected appropriate publications from the Web of Science (WoS) database by Clarivate Analytics, it is well recognized among authors performing bibliometric analyses (e.g., Fetscherin & Heinrich, 2015; Collinson & Rugman, 2010), has good coverage of publications, comparable to Scopus (e.g., Harzing & Alakangas, 2016), and it was designed to satisfy the users of citation analysis and is therefore compatible with most tools for citation analyses (e.g., Harzing & Alakangas, 2016).

Paper 2 and 3 use data from a large-scale virtual international collaboration project. Participants are put into virtual teams, of four to eight members that typically all come from a different country, to develop solutions to real-life business challenges. The project is a "simulation" of current business practices, and the task included market research, market entry plan development, and product design. The project had a duration of ca. nine weeks, and the participants come from more than 50 countries.

5. Summary of Studies and Conclusion

This dissertation consists of three studies that are related, sharing a similar structure. Paper 1 and paper 2 were presented at several conferences, internal and external workshops and received constructive feedback throughout the process. At present, paper 1 have been published in European Journal of International Management (ABS 1). Paper 2 is being prepared for a submission to the journal International Journal of Human Resource Management (ABS 3), while paper 3 will be prepared for a target journal. The abstracts of each paper is presented below.

5.1 Essay/Paper 1: Cultural Intelligence, Global Mindset, and Cross-cultural Competencies: A Systematic Review Using Bibliometric Methods

Abstract: We conducted a systematic review of 158 publications on cultural intelligence (CQ) and related concepts, global mindset (GM), and cross-cultural competence (CC) using bibliometric methods. We apply citation analysis to highlight the most influential (in terms of citations) journals, publications, and specific researchers in the field. We apply factor and cluster analyses to analyze co-citations to identify the current knowledge structure in the research field. With content coding on the resulting groups of co-citations, we identify five research streams showing the overlap between the CQ, GM, and CC constructs, and also revealing the separations in the research on the constructs. We perform burst analyses to identify trends and emerging topics or streams. Building on this, we outline future research opportunities.

5.2 Essay/Paper 2: Who Will Lead The Team? Predicting Leadership Emergence in Global Virtual Teams

Abstract: In this study, we examine the individual factors that predict whether or not individuals will emerge as leaders in the context of global virtual teams (GVT), which often lack a more formal leadership structure. We focused on emotional intelligence (EQ) and cultural intelligence (CQ) as two contemporary concepts that are of key relevance to leadership success. We review 44 empirical research papers on the associations between EQ and/or CQ and leadership. Building on socioanalytic theory, we hypothesized that individuals with higher levels of EQ and CQ have a higher probability of emerging as team leaders. We tested the hypotheses in a sample of 415 teams comprised of 1,102 individuals who participated in an virtual international collaboration project. Using structural equation modeling, the results revealed that individuals who had higher CQ more likely emerged as leaders. Our findings did not support the relevance of EQ. In addition, individual factors such as English proficiency, a higher age, and a lower power distance were also associated with leadership emergence.

5.3 Essay/Paper 3: Necessary Conditions To Emerge As A Leader In Global Virtual Teams

Abstract: In this study, I complement the findings from Lankut et al. (unpublished) by examining EQ, CQ and leadership emergence, in global virtual teams (GVT), through a necessary condition analysis (NCA). I test whether a difference in the two logics, sufficiency versus necessity, can explain the initial finding that CQ and EQ do not significantly matter to leadership emergence. The sufficiency logic regards independent variables as not necessary but sufficient to increase the outcome, while the necessity logic regards independent variables as constraints, bottlenecks, or critical factors at the right levels for the outcome to occur. Building on necessity logic, I hypothesized that EQ and CQ are a necessary condition for the individual to emerge as a leader. The hypotheses were tested on the same sample with NCA, and the results revealed that EQ and CQ as necessary conditions are not supported. Instead, individual factor such as English Proficiency was found as meaningful condition for leadership to emerge.

6. Overview of Three Essays/Papers in Dissertation

The updated status of all three essays/papers in this thesis is given below.

Paper 1	**Cultural intelligence, global mindset, and cross-cultural competencies: A systematic review using bibliometric methods**
Status	Published
Authors	Nooria Yari, Erik Lankut, Ilan Alon, and Nicole Franziska Richter
Journal	European Journal of International Management (ABS 1, Impact factor 2.145)

Yari, N., Lankut, E., Alon, I., & Richter, N. F. (2020). Cultural intelligence, global mindset, and cross-cultural competencies: A systematic review using bibliometric methods. *European Journal of International Management*, 14(2), 210-250. https://doi.org/10.1504/EJIM.2020.105567

Paper 2	**Who Will Lead The Team? Predicting Leadership Emergence in Global Virtual Teams**
Status	Prepared for submission
Authors	Erik Lankut, Marjaana Gunkel, Nicole Franziska Richter, Ilan Alon, Vasyl Taras, Ziaul Haque Munim
Target Journal	International Journal of Human Resource Management (ABS 3, Impact factor 3.04)

Paper 3	**Necessary Conditions To Emerge As A Leader In Global Virtual Teams**
Status	Working paper
Authors	Erik Lankut

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Essay/Paper 1:
Cultural Intelligence, Global Mindset, and Cross-cultural Competencies: A Systematic Review Using Bibliometric Methods

Cultural Intelligence, Global Mindset, and Cross-cultural Competencies: A Systematic Review Using Bibliometric Methods

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Abstract: We conducted a systematic review of 158 publications on cultural intelligence (CQ) and related concepts, global mindset (GM), and cross-cultural competence (CC) using bibliometric methods. We apply citation analysis to highlight the most influential (in terms of citations) journals, publications, and specific researchers in the field. We apply factor and cluster analyses to analyze co-citations to identify the current knowledge structure in the research field. With content coding on the resulting groups of co-citations, we identify five research streams showing the overlap between the CQ, GM, and CC constructs, and also revealing the separations in the research on the constructs. We perform burst analyses to identify trends and emerging topics or streams. Building on this, we outline future research opportunities.

Keywords: cultural intelligence; global mindset; cross-cultural competence; bibliometric methods; citation analysis; co-citation analysis; burst analysis; content analysis

1. Introduction

Cultural intelligence (CQ) is the ability to succeed in a cross-cultural environment and comprises several dimensions, including cognitive, metacognitive, motivational, and behavioral CQ (Ang & Van Dyne, 2008a). It stems from cross-cultural psychology yet has attracted strong interest in the field of international business and management (e.g., Johnson, Lenartowicz, & Apud, 2006). Empirical research shows that it reliably predicts outcomes such as global leadership (e.g., Sutton, Zander, & Stamm, 2013), negotiation performance (e.g., Imai & Gelfand, 2010), expatriation intention (e.g., Richter, Schlaegel, van Bakel, & Engle, 2019 (forthcoming), and job performance (e.g., Ang, Van Dyne, Koh, Ng, Templer, Tay et al., 2007). Furthermore, a number of journals have published special issues on CQ (e.g., Chiu, Lonner, Matsumoto, & Ward, 2013), and there are already several review articles on the concept (e.g., Ott & Michailova, 2018; Fang, Schei, & Selart, 2018).

Review studies address the definition of CQ in contrast to the more traditional international business terminology (e.g., Andresen & Bergdolt, 2017: Levy, Beechler, Taylor, & Boyacigiller, 2007; Johnson et al., 2006). Moreover, the authors have reviewed the literature with a focus on structuring (empirical) studies based on CQ (Fang et al., 2018; Ott & Michailova, 2018). Ott and Michailova (2018) present an overview of studies that refer to the concept as an antecedent, moderator, or mediator in relation to different outcomes, such as leadership, performance, and effectiveness. They also present an overview of antecedents to CQ, such as cultural exposure and cross-cultural training. Their review refers to 73 conceptual and empirical publications published from 2002 to 2015 in management, international business, education, and psychology journals that fulfill certain rankings (appearance on the ABS list, rank C or above in the ABDC ranking) (Ott & Michailova, 2018). Fang et al. (2018) review empirical research (142 publications) on CQ, building on a keyword search in the Web of Science (WoS) database (keyword: CQ in the topic or title, excluding, among others, articles in anthropology, biology, and medicine). Fang et al. (2018) also discuss different measurement scales and offer an overview of antecedents, including articles that focus on means to develop CQ, direct and indirect effects of CQ on various outcomes in quantitative studies, and qualitative research into CQ. Finally, they discuss studies that look at CQ at an aggregate level (Fang et al., 2018).

Moreover, there are the first meta-analyses done on the different work-related outcomes of CQ (Rockstuhl & Van Dyne, 2018; Schlaegel, Richter, & Taras, 2017). These reviews draw an excellent picture of the research completed and indicate that the topic of CQ in international business and management is no longer in a nascent phase, but in a growth phase, with an evolving scientific community (see von Krogh, Rossi-Lamastra, & Haefliger, 2012).

In addition to CQ, there are two concepts with a longer research history in international business and management: cross-cultural competencies (CC) and global mindset (GM) (e.g., Andresen & Bergdolt, 2017; Elo, Benjowsky, & Nummela, 2015; Leung, Ang, & Tan, 2014; Bücker & Poutsma, 2010a). While these concepts are not identical to CQ, they are valuable when looking at the CQ research domain for two reasons: first, they have relevant overlap with the concept of CQ (see Appendix 1 for a brief overview of selected measurement approaches). Second, they are used for the same purpose in international business and management, namely to understand and explain diverse outcome variables such as those mentioned above. However, reviews of empirical research only concentrate on one of the concepts – the above on CQ (and others on GM and CC, see Javidan & Bowen, 2013; Levy et al., 2007). This may be cumbersome due to the overlap involved and we see potential in gaining further insight through combining the existing knowledge on shared and distinct facets of each construct. The early research goes in this direction, such as the recent study by Andresen and Bergdolt (2019) empirically combining CQ with GM, and Johnson et al. (2006) who suggest that CQ plays an important role in the development of CC.

In this vein, we complement past reviews and broaden the focus: we systematically review the literature using bibliometric methods and include concepts that are strongly related to CQ, namely GM and CC. Relying on bibliometric methods, we offer an objective and reproducible approach to assessing the current state of the literature (see Belter, 2015). We seek to contribute to a better understanding of the intellectual structure of research on the three constructs and their effects on different outcomes. Since each concept is ultimately used to explain different outcomes in international business (at the individual, group or team, and organizational levels), there is a value in understanding: a) the intellectual structure of the literature around CQ, CC, and GM; b) the diffusion of the different concepts throughout the research literature, and; c) the structure of the scientific community. We believe that there is value in further integrating research into the three concepts

as each can be informed by the other, and knowledge spillovers in research may help to further resolve the existing conflicts in explaining the performance outcomes of international business and management phenomena. This should help in developing a potential joint future research agenda to advance theorizing in international business and management.

Ultimately, this will answer the following questions: *(1) Which journals, publications, and specific researchers are the most influential in CQ, GM, and CC research? (2) What is the intellectual structure of the CQ, GM, and CC literatures, including key research streams and potentially bridging researchers in the field? (3) What is the temporal evolution of research streams in CQ, GM, and CC research and what are the emerging topics? (4) What are the promising routes for future research?*

2. Concepts, Data, and Methods

2.1 Concepts studied: CQ, GM, and CC

There is a lack of consensus on the terms, similarities, distinct features, and associations of CQ, GM, and CC. We demonstrate this below with reference to conceptual papers that seek accepted definitions: Andresen and Bergdolt (2017) present a systematic review of the definitions of CQ and GM (that also incorporates studies in a similar vein, such as Levy et al., 2007, who define GM on individual, group, and organizational levels). Johnson et al. (2006), Spitzberg and Chagnon (2009), as well as Leung et al. (2014) all propose definitions and models of CC.

We define CQ as the ability to succeed in complex cross-cultural environments through knowledge or cognition, motivation, and behaviors. This definition is based on the review by Andresen and Bergdolt (2017), who compare seven definitions and conceptualizations of CQ. All the publications they reviewed identify a cognitive dimension, with six out of seven suggesting that resources to adapt behavior are an integral part of CQ, and four out of seven refer to the motivational component (Andresen & Bergdolt, 2017). We next refer to Ang and Van Dyne (2008a) and Earley and Ang (2003) and summarize as follows: Cognitive CQ represents the general knowledge and knowledge structures about culture. Metacognitive CQ reflects the mental capability of individuals to acquire

and understand cultural knowledge. Motivational CQ is an individual's capability to direct energy towards learning about and functioning in different intercultural situations. Finally, behavioral CQ describes an individual's capability to exhibit appropriate actions in culturally diverse encounters (Ang & Van Dyne, 2008a; Earley & Ang, 2003). Andresen and Bergdolt (2017) find that a certain degree of CQ is a necessary precondition for acquiring a GM that enables successful international business relationships. Johnson et al. (2006) state that CQ has a key role in the development of CC, and that CQ relates to CC, which in turn relates to failure or success in international business.

We define GM "as the capacity to function effectively within environments characterized by high cultural and business complexity" (Andresen & Bergdolt, 2017, p. 183). To function effectively in these environments, individuals need to have personal attributes of openness and cosmopolitanism (in addition to cognitive and motivational facets). Andresen and Bergdolt (2017) conclude that GM goes beyond CQ since it allows managers or employees to identify successful strategic actions needed in a global context. Similarly, Javidan, Bullough, and Dibble (2016) define GM as a set of individual self-efficacies that affect a global leader's ability to influence others in a complex, interdependent, ambiguous, and constantly changing global world. While both GM and CQ resemble each other, a GM more specifically addresses successfully coping with global management and leadership challenges in addition to *just* being culturally intelligent, at least when following what Andresen and Bergdolt (2017) summarize in their review.

Following the review of CC definitions in international business by Johnson et al. (2006), we define CC as "an individual's effectiveness in drawing upon a set of knowledge, skills, and personal attributes in order to work successfully with people from different national cultural backgrounds." (Johnson et al., 2006, p. 530). Most authors define CC as similar to CQ: the ability to effectively function in diverse cultural settings. Gertsen (1990) discusses three interdependent dimensions that make up CC: an affective dimension (personality traits and attitudes), a cognitive dimension (how individuals acquire and categorize cultural knowledge), and a communicative dimension (being an effective communicator). In contrast to CQ, CC involves personality traits and a focus on communication (although there is some overlap with the behavioral CQ dimension). Leung et al. (2014) present a general framework of CC that views GM and CQ as forms of CC, using CC as an umbrella term for the other two. In their model, capabilities related to CQ are

determined by traits and attitudes. Traits and attitudes are part of GM that additionally comprises capabilities (see also Appendix 1 for an overview of content domains of selected measurement instruments, adapted from Leung et al., 2014).

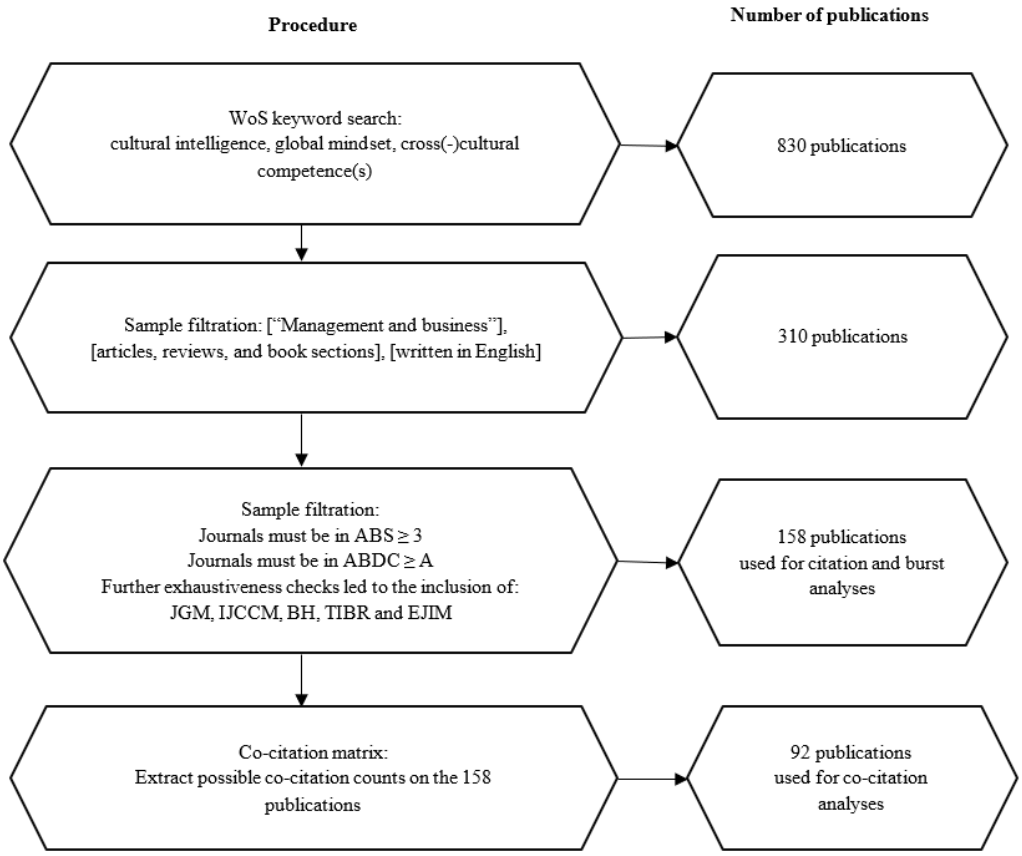
Pinpointing the distinct features of each concept and the potential associations between them is ambiguous. Although broadly accepted terminologies are desirable, including recognizing distinct and overlapping characteristics as well as the causal ordering of concepts (e.g., Spitzberg & Chagnon, 2009; Levy et al., 2007), we note that recent attempts to do so have not fully accomplished this goal. Still, we believe that the above overviews provide a good first indication.

2.2 The database and collection of publications

To perform our analyses, we first selected the appropriate publications using the WoS database by Clarivate Analytics, for three reasons: first, it is well recognized and most authors performing bibliometric analyses use it (e.g., Fetscherin & Heinrich, 2015; Collinson & Rugman, 2010). Second, recent reviews comparing different databases demonstrate that it has good coverage of publications, comparable to Scopus – another popular database used for bibliometric purposes (e.g., Harzing & Alakangas, 2016). Third, it was designed to satisfy the users of citation analysis and is therefore compatible with most tools for citation analyses (e.g., Harzing & Alakangas, 2016).

In the second step (see Figure 1), we chose keywords: CQ, GM, and CC. This search also refers to different abbreviations of these terms, their plurals, and different ways of spelling, resulting in 830 publications. We filtered this collection for English publications in management and business. We also filtered for research published in journals that meet certain minimum rankings (for a similar procedure, see García-Lillo, Úbeda-García, & Marco-Lajara, 2017) which is advantageous with regards to ensuring a sufficient number of co-citations for the later analyses.

Figure 1 Procedure and Results of Sample Extraction



JGM = *Journal of Global Mobility,* IJCCM = *International Journal of Cross-Cultural Management,* BH = *Business Horizons*, and TIBR = *Thunderbird International Review,* EJIM = *European Journal of International Management*

Further checks of the resulting journal list showed that this list was not sufficiently exhaustive to permit a comprehensive review. Evaluating further outlets with the help of three experts in the field of CQ and along the number of articles published, we added more journals to the list (see Figure 1). This process was designed to achieve a collection of publications with the potential to make strong research contributions and generate citations, which is our primary unit of analysis. Publications that generated few or no citations are problematic in bibliometric analyses since they inflate the collection of publications retrieved without contributing to the analyses. For instance, they may bias the intended clustering of publications or may result in many small clusters of research with few publications or even only one. We also included two seminal books on CQ (Earley & Ang, 2003 and Ang & Van Dyne, 2008b) as external references to our sample (see Boyack &

Klavans, 2010) due to a high number of co-citations identified for the two sources. The filtering process led to the final retrieved collection of 158 publications.

For a final correction of the extracted citation data (e.g., checking for duplicates, spelling of author names), we used several software packages that prepared the collection for the different purposes: citation analysis, co-citation analysis, and burst analysis. For the citation and burst analyses, we used HistCite, the R-package Bibliometrix (Aria & Cuccurullo, 2017) with the default script included in the package, and Sci2 (science of science). For the co-citation analysis, we used Bibexcel (Persson, Danell, & Schneider, 2009) to check for spelling errors, incorrect author names, and duplicates (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011) and used the default functions provided. Finally, we manually checked the files to ensure there were no duplicates in the analyses.

2.3 Bibliometric citation analysis

We performed a bibliometric citation analysis using HistCite on our retrieved collection of 158 publications and their number of citations. Bibliometric citation analysis has become popular in many fields in the past few years (e.g., Chatterjee & Sahasranamam, 2018; Apriliyanti & Alon, 2017; White, Guldiken, Hemphill, He, & Khoobdeh, 2016; Fetscherin & Heinrich, 2015; Collinson & Rugman, 2010) as it estimates the influence of publications (or documents), authors, and journals via citation rates. In this context, citations are viewed as a measure of influence or impact. If a publication or an author is heavily cited, it or they will be considered important or popular (e.g., Zupic & Cater, 2015; Kim & McMillan, 2008).

We obtained bibliometric citation data in the forms of local citations (LCS) and global citations (GCS). LCS is the number of times a publication is cited by others in our collection of 158 publications. GCS is the number of times a publication is cited in WoS databases and within the retrieved collection (Apriliyanti & Alon, 2017). We also used HistCite to compute LCS and GCS for the two external seminal books. Using these scores, we identify the most influential publications, the most prolific authors, and the most influential journals.

2.4 Bibliometric co-citation analysis

We performed a co-citation analysis on publications to understand the intellectual structure of the research into CQ, GM, and CC (see Zupic & Cater, 2015). The analysis uses co-citation counts, i.e., the number of times two publications are cited together by others. This is regarded as a measure of similarity based on the assumption that the more often two publications are cited together, the more likely their content is related (Small, 1973). Thus, co-citation analysis is a useful tool to identify streams of thought or shared research interests (Zupic & Cater, 2015; Pasadeos, Phelps, & Kim, 1998). We used Bibexcel to extract the number of co-citations for the publications in our retrieved collection. Of the 158 publications, 92 showed co-citations and were extracted in the form of a co-citation square matrix (an overview of detailed steps when using Bibexcel is provided from the corresponding author upon request). The co-citation square matrix produced in Bibexcel includes the raw counts of co-citations and was loaded into SPSS. We transformed this matrix into a correlation matrix using Pearson's r, as this is an advantageous normalization for the upcoming cluster and factor analyses (see Di Stefano, Gambardella, & Verona, 2012; Reader & Watkins, 2006).

To find intellectual streams, we performed exploratory factor and cluster analyses, which allow for a comparison and reliability check of results (see Samiee & Chabowski, 2012). We first applied an exploratory factor analysis using principal component analyses (most common in bibliometric analyses, see Zupic & Cater, 2015). We referred to the eigenvalues and the scree plot for determining the number of factors. We used varimax rotation to ease the interpretation of results (e.g., Di Stefano et al., 2012; Reader & Watkins, 2006) which produced results similar to an oblimin rotation in our case (as preferred by Samiee & Chabowski, 2012). To interpret the assignment of publications to factors or intellectual streams, we used a threshold for factor loadings at ±0.50 (as did Samiee & Chabowski, 2012; Reader & Watkins, 2006). While the factor analysis led to nine factors (with a total explained variance of 94.80%), the analysis of loadings shows that no publication specifically loaded on factor 9, providing us with eight factors to be analyzed further. Second, we used cluster analyses on the correlation matrix of co-citations. We employed the most common protocol of first applying a hierarchical, connectivity-based clustering method, Ward, followed by a centroid-based cluster procedure, k-means (Mooi & Sarstedt, 2011). Ward's method helped us determine the appropriate number of clusters and the related agglomeration schedule (based on squared Euclidean distances) pointed to eight or nine clusters. In combination

with the factor analysis results, we decided on an eight-cluster solution. In the next step, we applied the k-means cluster procedure to specify the best assignment of publications to the eight clusters (see Mooi & Sarstedt, 2011). Table 1 gives an overview of the assignment of publications to clusters from both the factor and cluster analyses. The eight factors are numbered from 1 to 8 and the clusters are labelled from A to H to avoid confusion. We note that two publications were not loaded under a factor due to their factor loadings, but are clustered under F and H. The total number of publications assigned was 92.

Table 1 Overview of Assignment to Clusters from Factor and Cluster Analysis

	Cluster								*Total*
Factor	A	B	C	D	E	F	G	H	
1	**40**	**10**	**7**	2					*59*
2				**9**					*9*
3					**11**	1			*12*
4						2			*2*
5							3		*3*
6								1	*1*
7					2				*2*
8						2			*2*
-						1		1	*2*
Total	*40*	*10*	*7*	*11*	*13*	*6*	*3*	*2*	***92***

As Table 1 demonstrates, both analyses are strongly in line and confirm a basic structure of research clusters. For interpretative purposes, we concentrated on the clusters confirmed by both procedures that showed a meaningful size (10% of publications in a cluster). We decided to include cluster C, which has seven publications, due to its very clear assignment to one group in the cluster analysis. Thus, we concentrated on: 1A with 40 publications, 1B with 10 publications, 1C with seven publications, 2D with nine publications, and 3E with 11 publications. We are confident that these 77 (of the 92) publications provide a good overview of the research streams. For the 15 publications not unambiguously grouped into a coherent group, we pursued the following strategy: If they were neither among the top-cited publications nor received more than 20 co-citations, we excluded them from further analysis.

2.5 Code frame development and manual coding based on computer-aided text analysis

To understand the meaning of the intellectual streams emerging from the multivariate analyses, we transferred all publications along with their cluster assignment to NVivo (e.g., Leech & Onwuegbuzie, 2011; Bazeley, 2002). In NVivo, we performed an automatic count of keywords and used the word-tree function on the full publications (as a tool of computer-aided text analysis / CATA, see Gaur & Kumar, 2018). In combination with previous literature reviews (e.g., Fang et al., 2018; Ott & Michailova, 2018; Andresen & Bergdolt, 2017) and a careful reading of the publications, we developed a code frame for manual coding. Hence, we combined automated procedures with manual coding to achieve the highest level of objectivity while being able to structure content into meaningful categories.

We coded all publications along their core research areas into seven broad themes: (1) *Concept, stages, measurement* was assigned to all publications that either introduce one of the concepts of CQ, GM, or CC, or conceptually discuss or empirically validate the concepts and their measurements. (2) *Antecedents* was assigned to all publications that look at the antecedents of CQ, GM, or CC either empirically or conceptually; these antecedents comprise, for instance, personality, international exposure, language abilities. One antecedent received a separate code, namely learning. Publications that look into how training can influence CQ, GM, and CC and at the forms of training or learning and learning contexts received the code (3) *Learning* (see likewise, Fang et al., 2018). We coded *outcomes* into three levels: the first was (4) *Individual-level outcomes*, which was assigned to all publications on outcomes at the individual level of analysis. Subthemes center around different performance types (job, task, leadership, and expatriation) and also discuss expatriation intention, adjustment, and job satisfaction. The second code was (5) *Group-level outcomes*, as knowledge sharing in teams, team performance, collaboration, trust, acceptance in groups, and negotiations. The third code was (6) *Organizational-level outcomes*, for all publications that examine organizational outcomes from internationalization processes, firm performance effects, and outcomes at the level of business functions such as marketing (innovation, marketing mix adaptation), and human resources (organizational turnover, employee commitment, human resource success). Some of these HR

outcomes show an overlap between the organizational and individual level, hence we implemented a double coding under two categories yet proposed a lead or primary category. If a publication analyzes both antecedents and outcomes, we coded it primarily along the outcomes it looks at. Review studies (i.e., publications with the primary objective of conducting a structured or unstructured review of the literature and field) are not further coded along themes but receive the code (7) *Review*.

For the coding, we followed standard procedures in the field (e.g., Richter, Sinkovics, Ringle, & Schlägel, 2016), such as testing the code frame on a sub-collection of publications and engaging in open coding to enrich the code frame when necessary. Coding was done by two of the authors independently from each other. Thus, coding was done by coders with in-depth knowledge of the field. Conflicts were discussed and addressed (Leech & Onwuegbuzie, 2011). Intercoder reliability was calculated using Cohen's kappa (Cohen, 1960). The overall intercoder reliability between the two coders is 0.813, which is within the upper level of "perfect agreement" (McHugh, 2012).

2.6 Burst analysis

Across a period of years, research topics may weave in and out of popularity. One technique for measuring the appeal of a topic in research literature over time is Kleinberg's (2003) burst detection algorithm, which is well recognized on different fields using bibliometric methods (e.g., Zhu, Song, Zhu, & Johnson, 2019; Chen, Song & Heo, 2018; Song, Zhang, & Dong, 2016; Guo, Weingart, & Börner, 2011). We applied this algorithm to identify emerging topics and radical changes or sharp increases in interest in a specific topic – called the burst – over time (e.g., Zhu et al., 2019). Researchers may look at different kinds of time-stamped text to run the algorithm, including titles, abstracts, and keywords published with the manuscript in a certain year. Running the algorithm for a certain time period, researchers can identify words in titles, abstracts, and keywords that reflect sudden usage increases. The algorithm then outputs a list of these words together with the beginning and end of the burst, as well as the burst strength (also called weight), to indicate the change in usage frequency (e.g., Guo et al., 2011; Kleinberg, 2003).

Two authors reviewed these lists and selected words relevant to our study, resulting in 38 keywords. We compared the words from the algorithm with the keywords by means of the CATA performed for the co-citation clusters and our code frame. As a result, we identified a list of terms which we structured along our code frame to facilitate readability. For some of the keywords, coding them into different categories would have been possible. For instance, a burst for the word *performance* in 2013 is twice related to organizations yet related one time to expatriates in organizations (see Table 6). In this and other cases, we structured it along the dominant context, here the organizational one. To make this transparent, we integrated an overview of the context in which the respective keyword was used in the manuscript.

3. The Most Influential Publications, Authors, and Journals

3.1 The most influential publications

Table 2 shows the most cited publications based on the number of local citations, the LCS. It demonstrates a strong focus on CQ with 11 out of 14 publications focusing on CQ. Conceptualizations were found in particular: for instance, the most cited publication is the handbook by Earley and Ang (2003) (LCS: 84; GCS: 801). It is one of the earliest publications that focused on the development of the concept along with theoretical reviews and a discussion of measurements. The publication by Ang et al. (2007) (LCS: 74; GCS: 487) ranks second and focuses on the validation of the then newly developed cultural intelligence scale (CQS). Similarly, the study by Ang, Van Dyne, and Koh (2006) (LCS: 37; GCS: 229 and rank 5) discussed the discriminant validity of the four-factor model of CQ and laid the groundwork for all authors aiming to empirically use the CQ model. Earley and Peterson (2004) are third most cited (LCS: 44; GCS: 224) and focused on CQ and its implications on training and global work assignments. Likewise, Ng, Van Dyne, and Ang (2009) (LCS: 40; GCS: 179 and rank 4) present CQ as a moderator in the relationship between experiential learning and global leadership self-efficacy. GM and CC come into the ranking in the form of review articles, i.e., the review by Johnson et al. (2006) on CC (LCS: 31; GCS: 261) and the review by Levy et al. (2007) on GM (LCS: 25; GCS: 268).

Table 2 Ranking of Top Publications along LCS (and GCS)

LCS Rank	*GCS Rank*	*Publication*	*Title*	*Source*	*LCS*	*GCS*
1	1	Earley & Ang, 2003	Cultural intelligence: individual interactions across cultures	*Stanford University Press*	84	801
2	3	Ang et al., 2007	Cultural intelligence: Its measurement and effects on cultural judgement and decision-making, cultural adaptation and task performance	*Management and Organization Review*	74	487
3	8	Earley & Peterson, 2004	The elusive cultural chameleon: cultural intelligence as a new approach to intercultural training for the global manager	*Academy of Management Learning & Education*	44	224
4	10	Ng et al., 2009	From experience to experiential learning: cultural intelligence as a learning capability for global leader development	*Academy of Management Learning & Education*	40	179
5	7	Ang et al., 2006	Personality correlates of the four-factor model of cultural intelligence	*Group & Organization Management*	37	229
6	12	Templer, Tay, & Chandrasekar, 2006	Motivational cultural intelligence, realistic job preview, realistic living conditions preview, and cross-cultural adjustment	*Group & Organization Management*	32	158
7	5	Johnson et al., 2006	Cross-cultural competence in international business: towards a definition and a model	*Journal of International Business Studies*	31	261
8	4	Levy et al., 2007	What we talk about when we talk about 'global mindset': Managerial cognition in multinational corporations	*Journal of International Business Studies*	25	268
8	11	Earley & Mosakowski, 2004	Cultural intelligence	*Harvard Business Review*	25	178
9	13	Thomas, 2006	Domain and development of cultural intelligence – the importance of mindfulness	*Group & Organization Management*	24	155
9	14	Imai & Gelfand, 2010	The culturally intelligent negotiator: The impact of cultural intelligence (CQ) on negotiation sequences and outcomes	*Organizational Behavior and Human Decision Processes*	24	119
10	9	Gupta & Govindarajan, 2002	Cultivating a global mindset	*Academy of Management Executive*	22	219
11	2	Ang & Van Dyne, 2008b	Handbook of Cultural Intelligence: Theory, Measurement, and Applications	*ME Sharpe*	21	609
12	6	Shaffer et al., 2006	You can take it with you: Individual differences and expatriate effectiveness	*Journal of Applied Psychology*	17	244

Table 2 also shows an overview of the top 14 most cited publications, based on the number of global citations, the GCS. The publications in the two lists are identical, however the ranking changes when looking at the GCS. The most

obvious difference is the one found for the publication by Ang and Van Dyne (2008a), which is the second most globally cited publication (though ranked eleventh along the LCS). The two review publications by Levy et al. (2007) and Johnson et al. (2006) are also higher ranked along the GCS.

3.2 The most prolific authors

There was a total of 375 authors with articles in the 158 publications: 19 publications have a single author, and 362 authors belong to one or more co-authored publications. Table 3 presents the most prolific authors in CQ, GM, and CC research from 1999 to 2018. We present all authors with their affiliation, country, number of publications, and a weighted score for their co-authorships. Country of origin was measured along the corresponding authors of each publication (which is one way to measure country of origin). As per White et al. (2016), we calculated a weighted score based on the authorship for the total number of publications: single authors receive a score of 1, authors with only one co-author receive 1/2, authors with two co-authors receive a score of 1/3, etc. We present the top 15 authors in terms of the weighted score in Table 3.

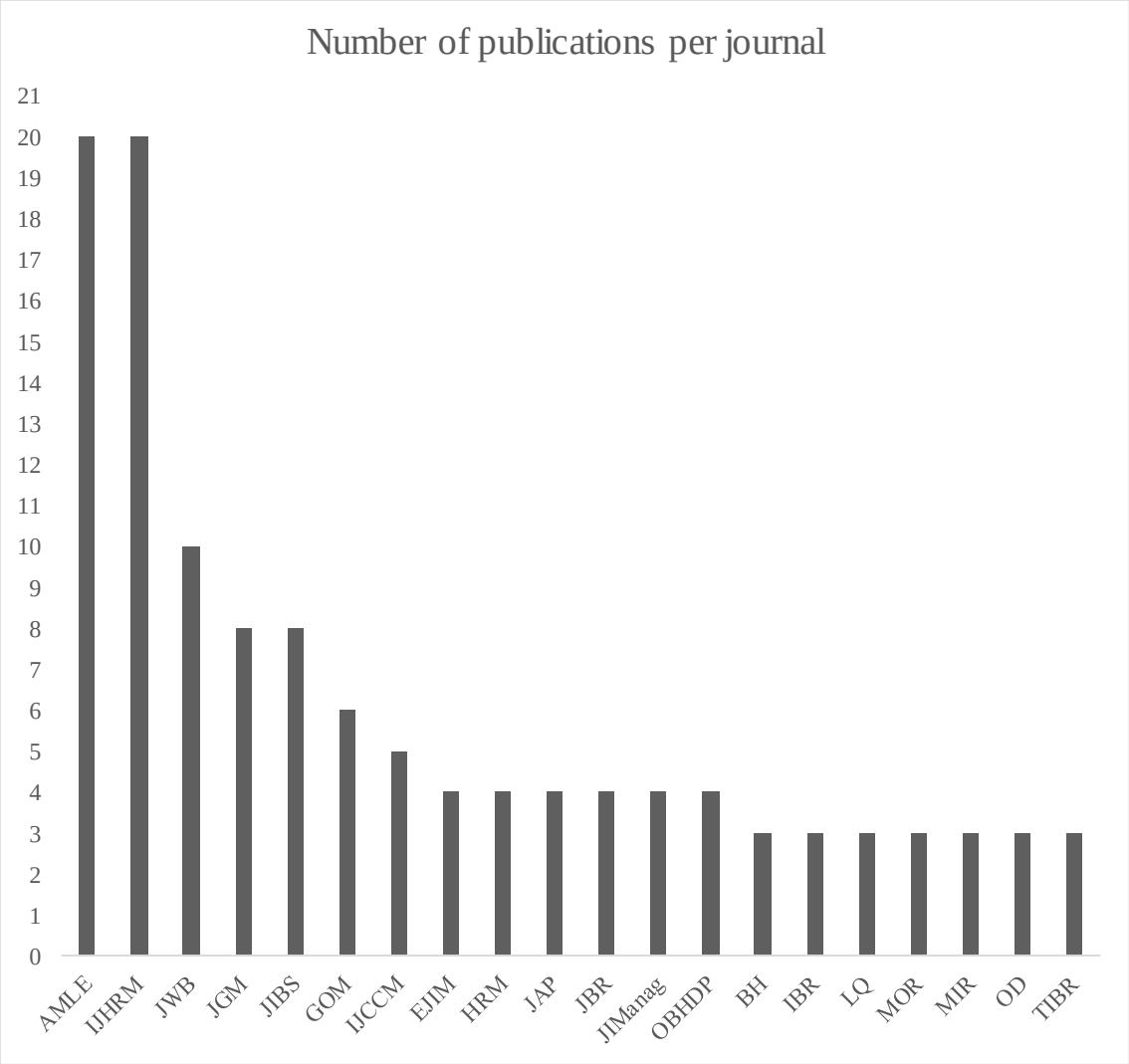
Table 3 The Most Prolific Authors between 1999 and 2018

Author Name	*Author affiliation*	*Country*	*No. of publications*	*Weighted Score*
Soon Ang	Nanyang Technological University	Singapore	8	2.84
Christopher P. Earley	University of Technology Sydney	Australia	5	2.83
Alfred Presbitero	Deakin University	Australia	3	2.50
Joost J.L.E. Bücker	Radboud University	Netherlands	6	2.42
Linn Van Dyne	Michigan State University	USA	4	2.01
Snejina Michailova	University of Auckland	New Zealand	4	1.75
Dana L. Ott	University of Otago	New Zealand	3	1.50
Kok Yee Ng	Nanyang Technological University	Singapore	4	1.18
Tomasz Lenartowicz	Florida Atlantic University	USA	3	1.17
Susan Freemann	University of South Australia	Australia	3	1.03
Melanie P. Lorenz	Florida Atlantic University	USA	3	1.03
Jase R. Ramsey	Saint Louis University	USA	3	1.03
Jose Augusto Felicio	Technical University of Lisbon	Portugal	3	1.00
Olivier Furrer	University of Fribourg	Switzerland	3	0.92
Günter K. Stahl	Vienna University	Austria	3	0.91

3.3 The most influential journals

The publications come from 47 different sources, published between 1999 and 2018, with a strong uptick of publications in recent years (especially from 2013). Figure 2 depicts the distribution of publications across journals, and Figure 3 depicts the development of publications over time. Table 4 gives an overview of the number of publications per journal, the LCS, and the GCS, as well as the LCS and GCS per year.

Figure 2 Number of Publications per Journal



AMLE = *Academy of Management Learning & Education*; IJHRM = *International Journal of Human Resource Management;* JWB = *Journal of World Business*; JGM = *Journal of Global Mobility;* JIBS = *Journal of International Business*; GOM = *Group & Organization Management*; IJCCM = *International Journal of Cross Cultural Management*; EJIM = *European Journal of International Management*; HRM = *Human Resource Management*; JAP = *Journal of Applied Psychology*; JBR = *Journal of Business Research;* JIManag = *Journal of International Management;* OBHDP = *Organizational Behavior and Human Decision Processes*; BH = *Business Horizons*; IBR = *International Business Review*; LQ = *Leadership Quarterly*; MOR = *Management & Organization Review;* MIR = *Management International Review*; OD = *Organizational Dynamics*; TIBR = *Thunderbird International Review*

Figure 3 Development of Publications over Time

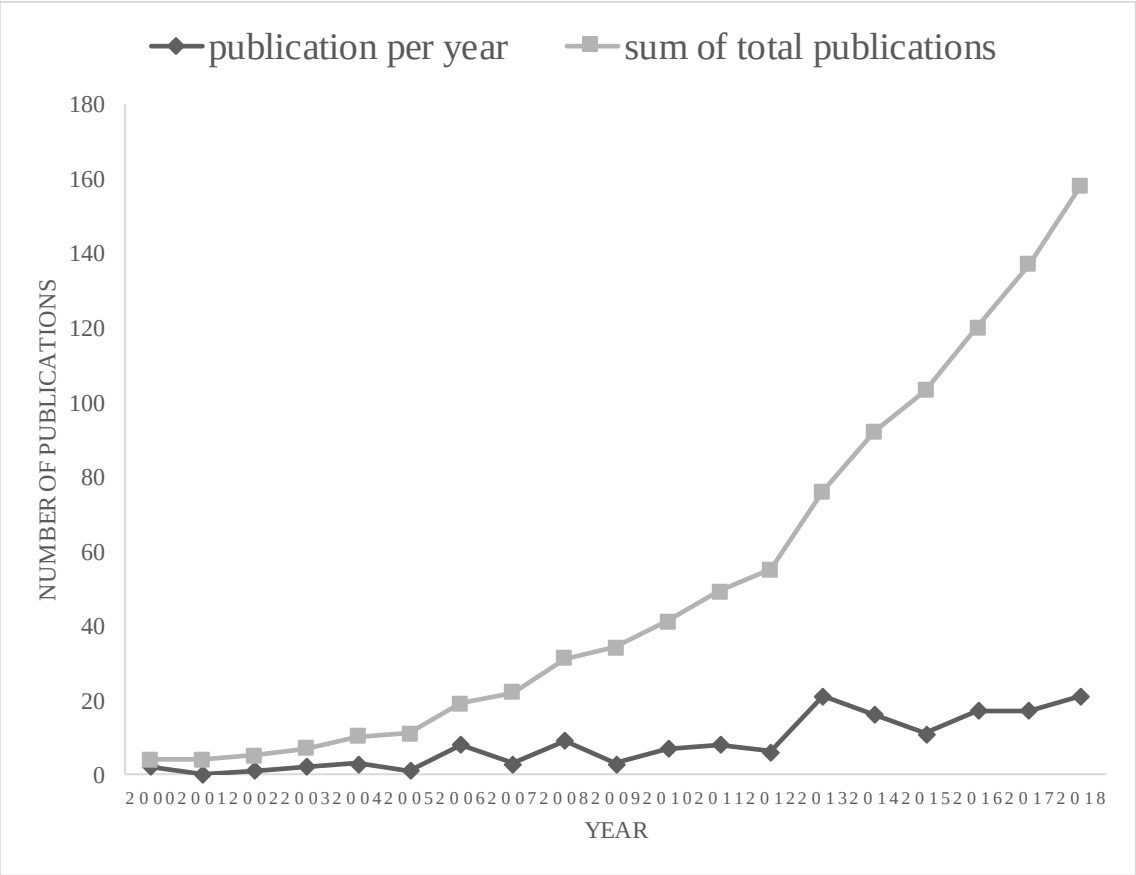


Table 4 The number of publications per Journal between 1999 and 2018

Journal	*Subject*[*]	*No. of publications*	*LCS*	*Rank*[†]	*LCS yearly*	*Rank*[†]	*GCS*	*Rank*[†]	*GCS yearly*	*Rank*[†]
Academy of Management Learning & Education	General & Strategy	20	163	*1*	21.60	*1*	972	*1*	131.35	*1*
International Journal of Human Resource Management	HRM / IB	20	45	*7*	7.62	*4*	446	*8*	79.34	*2*
Journal of World Business	IB	10	49	*6*	5.89	*6*	472	*7*	63.31	*4*
Journal of Global Mobility-The Home of Expatriate Management Research	HRM	8	3	*19*	1.17	*19*	19	*29*	8.33	*23*
Journal of International Business Studies	IB	8	75	*5*	8.24	*3*	806	*2*	75.88	*3*
Group & Organization Management	Organization / HRM	6	130	*2*	11.22	*2*	720	*4*	59.90	*6*
International Journal of Cross-Cultural Management	Organization / HRM	5	5	*18*	1.25	*18*	17	*31*	5.33	*28*
European Journal of International Management	IB	4	0	*22*	0.00	*27*	10	*35*	1.75	*40*
Human Resource Management	Organization / HRM	4	13	*14*	1.91	*11*	139	*13*	17.97	*11*
Journal of Applied Psychology	Psychology	4	35	*9*	4.31	*9*	371	*9*	40.18	*8*
Journal of Business Research	Marketing	4	2	*20*	0.50	*22*	28	*26*	10.42	*20*
Journal of International Management	IB	4	2	*20*	0.33	*25*	54	*19*	9.25	*22*
Organizational Behavior and Human Decision Processes	Organization / HRM	4	40	*8*	4.95	*8*	203	*11*	26.20	*10*
Averages (total database)		**3.16**	**17.5**		**2.01**		**151.26**		**17.25**	

[*]According to Anne-Wil Harzing's journal quality list (www.harzing.com); [†]relative rank among each of the 47 journals in the sample.

We refer to the number of publications as a proxy of the output by each journal on CQ, GM, and CC. The three highest-output journals are: *Academy of Management Learning & Education* (N = 20), *International Journal of Human Resource Management* (N = 20), and *Journal of World Business* (N = 10). We

concentrate on the GCS per year to determine whether the high-output journals are also influential in the field. In terms of GCS per year, the ranking differs slightly: *Academy of Management Learning & Education* (GCS yearly: 131.35) and *International Journal of Human Resource Management* (GCS yearly: 79.34) remained at the top of the list. Third highest along the GCS per year is *Journal of International Business Studies* (GCS yearly: 75.88 GCS), though slightly before *Journal of World Business* (GCS yearly: 63.31 GCS).

4. Current and Emerging Intellectual Streams

4.1 Co-citation clusters and their main research themes

Table 5 gives an overview of the factors and clusters derived from the co-citation analysis, and lists their publications and core research themes. These factors or sub-clusters form intellectual streams that we labelled as follows: *1A) 'The CQ construct and its implementation into the literature' (with 40 publications), 1B) 'Knowledge management cross-cited over constructs' (with 10 publications), 1C) 'CQ, leadership and social interaction' (with 7 publications), 2D) 'CQ and international exposure' (with 9 publications), and 3E) 'Research involving the GM construct' (with 11 publications).*

Table 5 Overview of Clusters

Clusters	Core research	Core concept	Theme (author) Sequencing from older to newer
The CQ construct and its implementation into the literature (1A: 40)	Concept, stages, measurement (13)	CQ (12) CC (1)	A handbook of CQ introducing its definition, conceptualizations, dimensions, measurements, training as well as demonstrating the usage of the construct to understand intercultural encounters in organizations (Earley & Ang, 2003; see org-level outcome and learning) * The CQ concept, its measurement, profiling and training options in a manuscript targeted towards business people and managers (Earley & Mosakowski, 2004) A commentary outlining CQ as an alternative concept for future cross-cultural research (Earley, 2006) Conceptualizingon a culturally intelligent model of team collaboration intended to enhance creative and realistic decision-making (Janssens & Brett, 2006; see group-level outcome) * A definition of CQ that explicitly introduces mindfulness as a key component (Thomas, 2006) In a vein to enhance the theoretical precision of the CQ concept, the authors cross-validate the CQ scale and introduce a model that links CQ to intercultural effectiveness outcomes (Ang et al., 2007; see individual-level outcome) * A framework of firm-level intercultural capability (CQ) in the context of offshore outsourcing (Ang & Inkpen, 2008; see org-level outcomes) * Conceptualization of CQ (Ang & Van Dyne, 2008a) Conceptualization on a process model that delineates CQ as a moderator when it comes to translating work experiences to leadership learning outcomes (Ng et al., 2009; see learning) * Conceptual foundations of CQ at the organizational level, building on dynamic capabilities (Moon, 2010b) Quantitative test of the operationalization and conceptualization of the CQ scale (Bücker et al., 2015) Introduction of the CQ short-form measure (Thomas, Liao, Aycan, Cerdin, Pekerti, Ravlin et al., 2015) Conceptual paper on the extension of situational judgement tests from an intercultural competence perspective (Rockstuhl, Ang, Ng, Lievens, & Van Dyne, 2015) *See also: Moon, 2010a; Magnusson et al., 2013; Earley & Peterson, 2004; Ang et al., 2006*
	Antecedent (5)	CQ (5)	Examine the relationship between personality and CQ (Ang et al., 2006; see conceptualization) * Examine the relationship between cultural exposure and individual CQ (Crowne, 2008) Examine the relationship between EQ and CQ (Moon, 2010a; see conceptualization) * Examine factors and processes that contribute to CQ development in the context of experiential CQ education (Rosenblatt, Worthley, & MacNab, 2013; see learning) * Examine the relationship between short-term cross-cultural study tours and CQ (Wood & St Peters, 2014)
	Learning (7)	CQ (5) CQ, GM (2)	The CQ concept and its implications for training global managers for global work assignments (Earley & Peterson, 2004; see conceptualization) * Experiential learning (in developing countries) and CQ/GM (Pless, Maak, & Stahl, 2011) Experiential learning approach to train CQ (MacNab, Brislin, & Worthley, 2012; see individual-level outcome) * Experiential learning in global virtual teams (GVT) and CQ (Erez, Lisak, Harush, Glikson, Nouri, & Shokef, 2013) Cross-cultural management courses and CQ (Eisenberg, Lee, Bruck, Brenner, Claes, Mironski et al., 2013). Experiential learning (style) and CQ (Li et al., 2013) Cultural learning in different cultural contexts with a focus on GM and CQ (Mosakowski, Calic, & Earley, 2013) *See also: Rosenblatt et al., 2013;Ng et al., 2009;Mor, Morris, & Joh, 2013; Earley & Ang, 2003*
	Individual-level outcome (7)	CQ (6) CC (1)	Examine the relationship between motivational CQ and cultural adjustment (Templer et al., 2006) Examine the relationship between personality and competencies (such as cultural flexibility, ethnocentrism) on expatriate effectiveness (Shaffer et al., 2006) Examine the relationship between CQ (and expatriate experiences) and cultural adjustment, effectiveness and performance (Lee & Sukoco, 2010) Examine the moderating role of CQ in the relationship between expatriate supporting practices, cultural adjustment and performance (Wu & Ang, 2011)

The CQ construct and its implementation into the literature (1A: 40)			Examine the relationship between motivational CQ and interactions (cultural sales) between people of different origins (Chen, Liu, & Portnoy, 2012; see org-level outcomes) * Examine the relationship between CQ and expatriate adjustment (Malek & Budhwar, 2013) Examine the relationship between CQ and communication effectiveness and job satisfaction (Bücker et al., 2014) *See also: Ang et al., 2007;MacNab et al., 2012*
	Group-level Outcome (4)	CQ (4)	Examine the relationship between CQ and negotiation sequences and outcomes (Imai & Gelfand, 2010) Examine the relationship between leader CQ and team performance outcomes (Groves & Feyerherm, 2011) Examine the relationship between cultural metacognition, trust and creative collaboration (Chua, Morris, & Mor, 2012) Examine the relationship between metacognitive CQ, cultural perspective taking and intercultural collaboration, with a focus on deriving recommendations for training (Mor et al., 2013; see learning) * *See also: Janssens & Brett, 2006*
	Org-level outcome (2)	CQ (2)	Examine the moderating role of CQ in the relationship between leadership and innovation in organizations / units (Elenkov & Manev, 2009) Examine the moderating role of export manager's CQ in the relationship between marketing mix adaptation and export performance (Magnusson et al., 2013; see conceptualization) * ***See also:** *Ang & Inkpen, 2008;Chen et al., 2012; Earley & Ang, 2003*
	Review (2)	CC (1) CQ, GM (1)	A definition and model of CC in IB (that is linked to CQ) (Johnson et al., 2006) A review of theoretical and empirical developments in the inter-cultural competence literature (comprising CC, CQ and GM) (Leung et al., 2014)
Knowledge management cross-cited over constructs (1B: 10)	Concept, stages, measurement (3)	CQ (1) CC, GM (1) CC (1)	A conceptual framework to distinguish between stable and dynamic CC (Leiba-O'Sullivan, 1999) Conceptualization on the stages of cultural adaptation (Sanchez, Spector, & Cooper, 2000) An examination of a four-stage model of developing cultural sensitivity or CQ (Shapiro, Ozanne, & Saatcioglu, 2008) *See also: Begley & Boyd, 2003;Bücker & Poutsma, 2010a; Lenartowicz, Johnson, & Konopaske, 2014*
	Learning (2)	CQ, CC (1) CQ (1)	A conceptual learning framework for cross-cultural training programs in MNCs (with a focus on cultural knowledge transfer) (Lenartowicz et al., 2014; see conceptualization) * Cross-cultural management education and CQ (and student satisfaction and commitment) (Ramsey & Lorenz, 2016; see individual-level outcome) *
	Individual-level Outcome		*See also: Ramsey & Lorenz, 2016;Taylor et al., 2008*
	Group-level Outcome (1)	CQ (1)	Examine the relationship between CQ and team knowledge sharing (Chen & Lin, 2013) *See also: Zander, Mockaitis, & Butler, 2012*
	Org-level outcome (2)	GM (2)	Elaborate on the need to embed a corporate GM in company-wide policies (Begley & Boyd, 2003; see conceptualization) * Examine the relationship between top management orientations and employee commitment in MNC (Taylor et al., 2008; see individual-level outcome) *
	Review (2)	CQ (1) CQ, CC, GM (1)	A review of measurement instruments of global management competencies (CC, GM and CQ) (Bücker & Poutsma, 2010a; see conceptualization) * A review of the leadership literature of global teams (involving GM and CQ of leaders) (Zander et al., 2012; see group-level outcome) *
CQ, leadership and social interaction (1C: 7)	Antecedents (1)	CQ (1)	Relationship between international exposure, languages, orientations, sex, age, and education with BCIQ (Alon, Boulanger, Elston, Galanaki, de Ibarreta, Meyers et al., 2018)
	Learning (1)	CQ (1)	Experiential cross-cultural training and CQ (Alexandra, 2018) *See also: Xu & Chen, 2017*
	Individual-level outcome (3)	CQ (2) CC (1)	Examine the mediating role of CC in the relationship between personality and cultural adjustment (Wu & Bodigerel-Koehler, 2013) Examine the relationship between CQ and transformational leadership (Ramsey, Rutti, Lorenz, Barakat, & Sant'anna, 2017) Examine the relationship between metacognitive and motivational CQ with cultural learning and job creativity of expatriates (Xu & Chen, 2017; see learning) *
	Group-level Outcome (2)	CQ (2)	Examine the moderating role of motivational CQ in the relationship between psychic distance and team performance (Magnusson, Schuster, & Taras, 2014) Examine the interaction effect between cognitive and metacognitive CQ on an individual's creativity in multicultural teams (Chua & Ng, 2017)

CQ and international exposure (2D: 9)	Concept, stages, measurement (1)	CQ (1)	Assessment of the cross-cultural equivalence of the four-dimensional 20-item CQ scale and the two-dimensional 12-item CQ short scale (Bücker et al., 2016) *See also: Schreuders-van den Bergh & Du Plessis, 2016; Varela & Gatlin-Watts, 2014*
	Antecedents (4)	CQ (4)	Examine the relationship between cultural beliefs and CQ in international sojourns (Chao, Takeuchi, & Farh, 2017) Examine the relationship between international sojourns and CQ (Varela & Gatlin-Watts, 2014; see conceptualization) * Examine the relationship between cross-cultural trigger events and CQ with a discussion of the implications for training (Reichard, Serrano, Condren, Wilder, Dollwet, & Wang, 2015; see learning) * Examine the relationship between individual motives and CQ in study abroad programs and the mediating role of cultural boundary spanning (Holtbrügge & Engelhard, 2016) *See also: Remhof, Gunkel, & Schlagel, 2013*
	Learning		*See also: Reichard et al., 2015; Schreuders-van den Bergh & Du Plessis, 2016*
	Individual-level outcome (3)	CQ (3)	Examine the relationship between international exposure and CQ, as well as between CQ and the intention to work abroad (Remhof et al., 2013; see antecedents) * Examine the role of motivational CQ in experiential learning and cultural adjustment of expatriates (Schreuders-van den Bergh & Du Plessis, 2016; see learning) * Examine the relationship of CQ and adaptation of expatriates (Presbitero, 2017)
	Review (1)	CQ (1)	A review of the research on antecedents, outcomes and moderators of CQ (Ott & Michailova, 2018)
Research involving the GM construct (3E: 11)	Concept, stages, measurement (3)	CQ, CC, GM (1) GM (2)	A framework for and systematic assessment of measurement instruments of global management competencies (CC, GM and CQ) (Bücker & Poutsma, 2010b) Examine the relationship between individual and corporate GM and internationalization (Felicio, Meidute, & Kyvik, 2016; see org-level outcome) * Conceptual paper on the need of a manager's GM to integrate global forces and a global network (Kedia & Mukherji, 1999; see org-level outcome) * *See also: Lahiri et al., 2008; Gupta & Govindarajan, 2002*
	Antecedents (1)	GM (1)	Examine antecedents of GM (among them education, languages, international experiences) (Story, Barbuto, Luthans, & Bovaird, 2014)
	Learning (2)	GM (1) CQ (1)	A framework to reduce the stigmatization and stereotyping of inpatriates in the home country organizations with a focus on GM (Harvey, Novicevic, Buckley, & Fung, 2005) Examine the relationship between experiential learning in GVT and different performance outcomes (Taras, Bryla, Caprar, Ordenana, Rottig, Bode et al., 2013)
	Org-level outcome (3)	GM (3)	Conceptual framework on GM and its development in a firm context (Gupta & Govindarajan, 2002; see conceptualization) * Conceptualize on the moderating role of GM in the globalization and organizational development relationship (Lahiri et al., 2008; see conceptualization) * Examine the relationship between GM and the performance of offshore service providers (Raman et al., 2013) *See also: Felicio et al., 2016; Kedia & Mukherji, 1999*
	Review (2)	GM (2)	A review of the literature on GM (Levy et al., 2007) A review of the literature on GM with a focus on its identification and development (Javidan & Bowen, 2013)

Note: We have double-coded publications that equally fit under two or more codes. We added the details of these publications under the primary code that we assigned and marked them with a "*" to indicate that they received a secondary coding which is then listed under "see also". The publications have only been counted once under their primary code.

The overwhelming majority of publications that form intellectual stream 1A relate to CQ as the core concept and there are 13 out of the 40 publications in this stream that relate to the concept itself, stage models, or measurement aspects of CQ. These publications are at the heart of the CQ conceptualization and its implementation into the literature or field. It was less obvious to label the intellectual streams 1B and 1C. Therefore, we made use of word trees and word frequency counts using NVivo for these groups of publications which provided a focus on 'leadership' and 'social groups/relationships/experiences/interactions/dominance' for intellectual

stream 1C. The intellectual stream 1B showed a focus on knowledge management (i.e., knowledge creation and knowledge transfer). This latter stream is also interesting, as it demonstrates a mixture of concepts involved: there seems to be a knowledge transfer or at least cross-consideration visible in the co-citations in the sense that studies often include more than one concept (cf. Ramsey & Lorenz, 2016). Stream 2D again focuses on CQ as the core concept and concentrates on examining its associations with international exposure. The 11 publications in stream 3E differentiate from the others by almost fully focusing on GM.

Analyzing the common and distinct research areas in the different streams using our coding scheme and the more quantitative analyses, we outlined the following observations. First, there is an overlap of research areas. Even if the constructs have emerged separately, their underlying similarities have spawned a surge of similar research themes, which in turn has led to the emergence of closely-related literature. However, this literature often remains separated along the constructs. For instance, studies on individual-level outcomes examine the effects of CQ (Lee & Sukoco, 2010) and CC (Shaffer, Harrison, Gregersen, Black, & Ferzandi, 2006) on expatriate effectiveness separately. However, there is no study that has compared the effects of the two constructs on expatriate effectiveness.

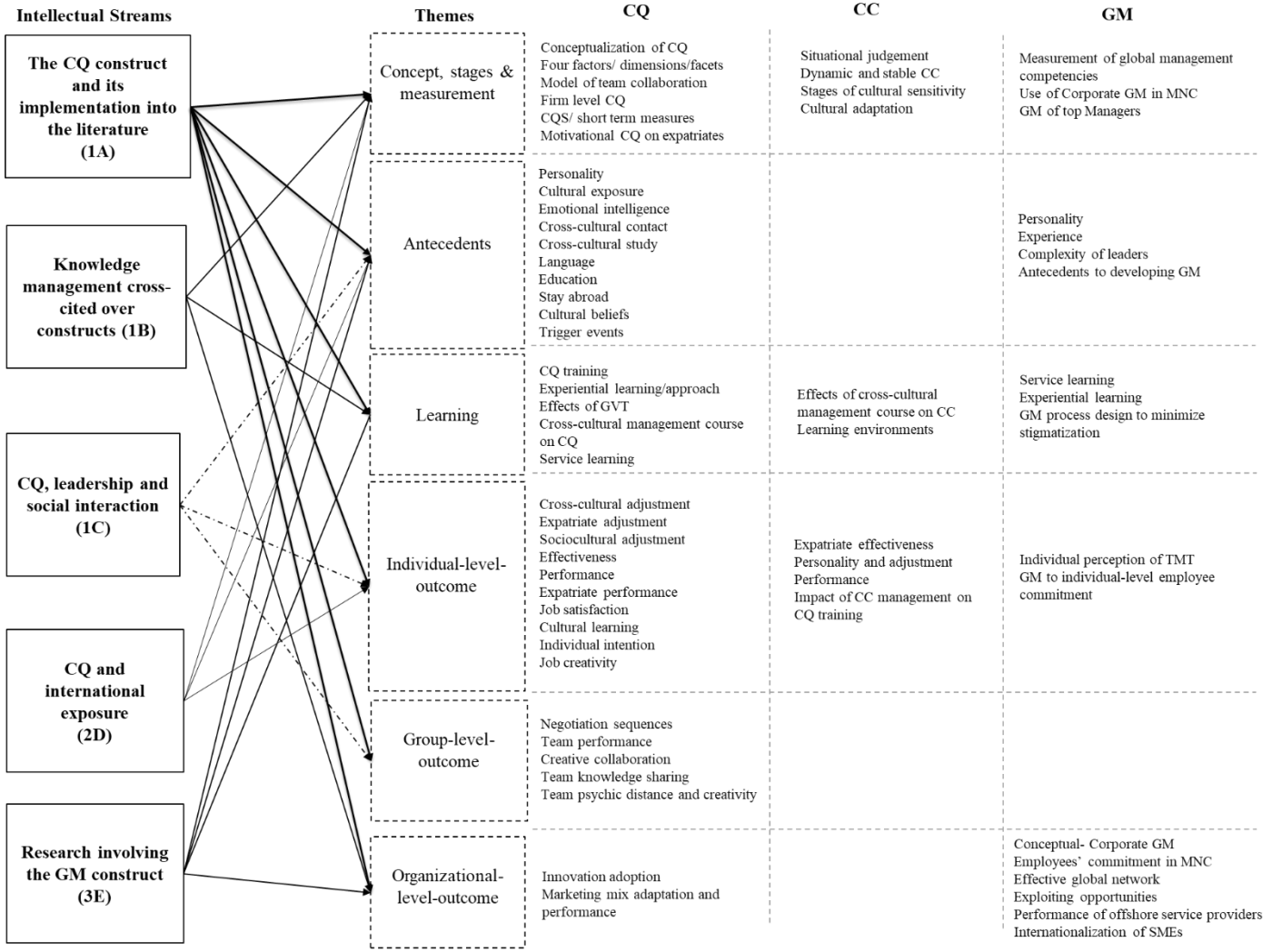
Second, the CQ literature has more research on individual-level and group-level outcomes, while the GM literature has more research on organizational-level outcomes. Even if CQ is the dominant construct overall, GM is the preferred construct for organizational-level research. As Andresen and Bergdolt (2017) conclude, there is still uncertainty over the constituents of organizational GM (c.f. Lahiri, Perez-Nordtvedt, & Renn, 2008; Raman, Chadee, Roxas, & Michailova, 2013; Felicio, Caldeirinha, & Ribeiro-Navarrete, 2015) and organizational CQ (c.f. Elenkov & Manev, 2009; Magnusson, Westjohn, Semenov, Randrianasolo, & Zdravkovic, 2013; Moon, 2010b) due to limited research. There is a substantial need for more research on organizational-level CQ and its association with individual-level CQ in the organization. In this context, GM has consistently been related to managerial cognition (Levy et al., 2007), CQ with individuals, such as employees, expats or managers (c.f. Bücker, Furrer, Poutsma, & Buyens, 2014), and CC has been tested in both the management literature (e.g., Leiba-O'Sullivan, 1999) and international business literature (e.g., Johnson et al., 2006). However, the majority of CQ publications in the sample are published in management

journals, while the publications on GM and CC are more often published in both management- and international business-focused journals.

Third, there are sometimes similar publications (from similar teams of co-authors) that loaded under different factors and in different streams (e.g., Bücker & Poutsma, 2010a, Bücker, Furrer, & Lin, 2015, and Bücker, Furrer, & Weem, 2016 loaded under factors 1A, 2D, and 3E). These publications loaded under different factors because they were not co-cited with related publications. Hence, researchers were not aware of their interrelatedness (maybe also triggered by former co-cites remaining in the same stream). As Samiee and Chabowski (2012) note, this could lead to research streams that remain aware of only a few publications within a certain subfield. Alternatively, some publications showed elevated loadings with several factors, yet remained in the factor with the highest loading (e.g., Taylor, Levy, Boyacigiller, & Beechler, 2008 showed a loading with Factor 1 of 0.669, and of 0.571 with Factor 3; full factor loadings are available upon request from the authors). These publications could point to relevant cross-co-cites, as the publications are recognized both in the CQ and GM literature.

We believe that researchers can benefit from the knowledge along the different constructs and from a combination of this knowledge. Figure 4, therefore, sheds light on this existing knowledge and potential areas for knowledge creation across the three concepts. As Shafique (2013) states, science can progress due to the dynamics of convergence among knowledge domains, which results from the fusion and recombination of related knowledge across the boundaries of different knowledge domains. These knowledge spillovers, and the fusion of research streams, may be a dynamic process that continuously feeds the growth of the field.

Figure 4 Visual representation of intellectual streams



4.2 Emerging intellectual streams resulting from the burst analysis

Table 6 gives an overview of keywords (we took the freedom to complete word stems to full keywords) that emerged from the burst analysis sorted along our coding categories. The weights represent the relevance of a keyword (or burst term) over its active period. Thus, a higher weight may result from a long active period of a keyword, its higher frequency, or both. For instance, the word stem for *language* had the highest weight (3.06), appearing frequently in the titles and original keywords of the publications analyzed (from 2015 onwards).

Table 6 Overview of Keyword Stems from Burst Analysis

	Weight	Length	Start	End	Context to the keyword
Concept and measurement					
global mindset	1.57	4	1999	2002	developing a mindset for global competitiveness; cultivating a GM
global mindset	2.01	4	2005	2008	leading cultural research in the future - paradigms and tastes; what we talk about when we talk about GM; GM and high-performance work practices
global mindset	1.76	2	2015	2016	individual and corporate GM in internationalization (2x); effect of GM in client-vendor relationship quality; nurturing GM and leadership
corporate global mindset	1.58	1	2016	2016	GM, cultural context, and the internationalization of SMEs (2x)
competence	2.48	2	2012	2013	cross-cultural competencies; can business schools make students culturally competent; developing cross-cultural competencies; intercultural competence; an exploratory study of competences required to create customer experience; dynamic cross-cultural competencies (2x); cross-cultural competence of expatriate managers
CQS	1.35	2	2015	2016	measuring CQ; robustness and measurement equivalence of CQS
quotient	1.52	1	2018		business cultural intelligence quotient (BCIQ) (2x)
cultural intelligence	1.91	3	2016		CQ in study abroad programs; impact of cross-cultural management education on CQ; effect of leader CQ on managing national diversity; measuring organizational CQ; CQ and export performance; CQ and trust building among expatriates; CQS; role of CQ in expatriation; role of CQ in turnover intentions; effect of host country language exposure on the development of CQ; CQ and individual and team creativity; CQ and job performance; CQ and leadership; systematic literature review on GM and CQ; CQ and virtual teamwork; CQ and task performance; CQ and consumer ethics; CQ and expatriate adaptation; CQ and transformational leadership; CQ and job creativity; CQ and creativity in teams;

					enhancing CQ; CQ and benefits from diversity in international alliances; BCIQ (2x); CQ and voice behavior among migrant workers; global team performance and CQ; a review on CQ; CQ in global project teams; CQ and maladaptation; CQ and conflict management; international experience and CQ development; CQ's role in expatriates' opportunity recognition and innovativeness; CQ meta-analysis; CQ and job satisfaction; CQ and cross-cultural event volunteering
Antecedents and correlates					
personality	1.59	1	2006	2006	consumer ethnocentrism and personality traits; Big 5 and expatriate effectiveness
capability	2.19	3	2008	2010	intercultural capability, learning capability, dynamic capability
skill	2.11	1	2014	2014	skill cross-cultural competence mechanisms; assessing cross-cultural skills; leadership skills
emotion(al)	1.50	2	2010	2011	emotional intelligence as correlate to the four-factor model of CQ; empathic emotion and leadership performance
psychological capital	1.60	1	2014	2014	psychological capital in international HRM (antecedents of GM); a measure of cross-cultural psychological capital
language	3.06	4	2015		language-based diversity and faultiness in organizations; leading across language barriers; contributing to public goods in native and foreign language settings; language, CQ and turnover intentions; impact of host country language exposure on CQ; language proficiency, adaptability and job performance; it is not all about language ability (CQ's role for task performance)
Learning and training					
develop	1.28	6	1999	2004	developing a mindset for global competitiveness; a developmental expatriate model; expatriate development; development of political skill and capital
learn	1.44	3	2009	2011	from experience to experiential learning in global leader development; cultural learning processes in MNCs; developing global leaders through international service-learning programs
experiential	1.58	2	2012	2013	experiential CQ development; experiential CQ education; develop CQ - moderating role of experiential learning style
student	1.31	1	2013	2013	can business schools make students culturally competent; developing management students' CQ
education	2.10	1	2013	2013	developing cross-cultural competencies in management education; experiential CQ education; effectiveness of Global Virtual Collaboration as a Teaching Tool in Management Education
cross-cultural training	1.27	1	2014	2014	application of learning theories to improve cross-cultural training programs in MNCs; short-term cross-cultural study tours
Individual- and group-level outcomes					

expatriate	2.60	2	1999	2000	a developmental expatriate model; expatriate training and development
expatriate	1.41	3	2006	2008	CQ in IB, a definition and model related to expatriates; management of New Zealand expatriates in China
expatriate	1.38	3	2008	2010	expatriation (what leads to CQ); expatriate stories about cross-cultural encounters
performance	1.65	2	2010	2011	effects of CQ on expat performance; leader CQ; testing moderating effects of CQ on team performance; expatriate performance; leadership performance
leader	1.30	1	2011	2011	leadership performance; developing responsible global leaders; leader CQ and leader and team performance
collaboration	1.39	2	2012	2013	collaborating across cultures (CQ and trust in creative collaboration); global virtual collaboration
work	1.77	2	2013	2014	CQ and intention to work abroad (2x); CQ among host country managers working for foreign multinationals
communication effectiveness	1.37	2	2014	2015	impact of CQ on communication effectiveness; assessing effects of cultural simulation game on communication effectiveness
creativity	1.41	2	2017		CQ and individual and team creativity; unlocking expatriates' job creativity; CQ's effect on creativity in teams
knowledge	2.10	3	2016		effects of knowledge management in client-vendor relationships - mediating role of GM; knowledge hiding in teams; knowledge sharing in teamwork (2x); effect of cultural knowledge on creativity in teams
Organizational-level outcomes and aspects					
firm	1.72	1	2008	2008	role of mindset in a firm's decline in a new competitive landscape; framework of firm-level intercultural capability
organizational	1.93	5	2008	2012	what leads to CQ in multinational organizations (among expatriates); impact of organizational culture on employee commitment; cross-cultural organizational analysis; organizational CQ (a dynamic capability perspective); CQ among expatriates for organizational development; CQ, organizational diversity climate and cultural sales
performance	1.31	1	2013	2013	performance of offshore IT service providers; export performance; expatriate performance
talent management	1.52	1	2018		managing talent in emerging economy MNC; framework for understanding global talent management systems; talent management
Divers					
socio	1.52	1	2013	2013	effects of CQ on team knowledge sharing from a socio-cognitive perspective; a socio-analytic perspective on CC among expatriate managers
hospitality	1.23	3	2011	2013	hospitality management (2x)
motivation	2.39	3	2016		individual motivations in study abroad programs; exploring the role of motivational CQ in expatriation; motivational CQ and turnover intention; motivational CQ in task performance; intrinsic motivation for

				successful expatriation; expatriates' job creativity and motivational CQ
review	1.34	2	2017	systematic literature review on the definitions of GM and CQ; CQ review; review on leader individual differences, situational parameters, and leadership outcomes

We find that the concept of GM had several bursts in different periods starting in 1999, the most recent in 2016 with the addition of being related to corporations, i.e., corporate GM. CC had a burst from 2012-2013 related to various topics. CQ has a recent and ongoing burst. Among the antecedents and correlates of CQ, GM, and CC, language shows an ongoing burst from 2015. Publications look at leadership across language barriers (Tenzer & Pudelko, 2015), the role of language proficiency for adaptability and job performance (Jyoti & Kour, 2017), and the relevance of language in comparison to CQ (Presbitero, 2017). Language diversity, barriers, and proficiency are arguably important for predicting cultural-related outcomes because language is embedded across the levels of the individual, the organization, and the context (country).

Learning, training, and the focus on the development of CQ, GM, and CC peaked between 2009 and 2014. Among the individual-level and group-level outcomes, outcomes show different trends: expatriation had several bursts, starting with a focus on development and training in 1999 to 2000, and performance studies on expatriates had a burst until 2011, a year when leadership research had a peak. More related to group-level outcomes, a burst was identified for group collaboration (2012-2013). Two keywords that also more clearly relate to group-level outcomes are "creativity", with an ongoing burst from 2017, and "knowledge", with an ongoing burst from 2016. Studies refer to CQ and team creativity, knowledge sharing in teams (Bogilovic, Cerne, & Skerlavaj, 2017) or to a combination of the two, namely the effect of cultural knowledge on creativity in teams looking at the role of metacognition (Chua & Ng, 2017). These ongoing bursts show the need to organize, conduct or design working teams to address cultural challenges.

Keywords identified in the burst analysis that relate to the organizational level are mainly more generic terms, such as firm or organizational. Here, performance is in focus, especially in 2013. Another keyword with an ongoing and recent burst in 2018 is *talent management*. Studies relate to managing talent in emerging economy multinational firms (Tarique & Schuler, 2018) or more generally to talent

management (Cerdin, Sharma, & Liao, 2018). Capturing the best talent can drive organizational performance to impressive heights. Hence, strategies for talent management are desirable.

The burst analysis indicates few areas that entered an ongoing burst and qualify as pointing to emerging areas of interest: language, creativity, and knowledge sharing, as well as talent management. For example, future research can compare language-induced emotions and leadership strategies across different contexts (Tenzer & Pudelko, 2015). While metacognition was tested for individual creativity in multicultural teams, the other dimensions of CQ remain to be tested to expand the theoretical depth of cultural knowledge arguments (Chua & Ng, 2017). The underlying creativity processes, together with the dimensions of CQ at the individual level, are worth investigating (Xu & Chen, 2017).

5. Emerging Intellectual Streams and Future Research Directions

5.1 Trace thought through time and space: use bibliometrics

The dominant academic affiliations of the most prolific authors are scattered geographically: of the 15 prolific authors, five are affiliated with Oceania (33%), four with North America (27%), four with Europe (27%), and two with Asia (13%). To an extent, the findings confirm that becoming a prolific author does not demand affiliation with a specific region – though it is interesting to note that there is a somewhat stronger share of Asia-Pacific-driven publications as compared to other fields. As we also know that researchers are embedded in a certain culture, it could be interesting for future researchers to investigate the potential effects of regional academic affiliations on the research conducted or on an author's output (though we have to note that academic affiliations may change during a research career, which is hard to assess in bibliometrics).

There is a difference when we compare the most prolific authors to the most influential publications (by LCS) in the field: none of the publications by Presbitero, Bücker, Michailova, Ott, Freeman, Lorenz, Ramsey, Felicio, Furrer, and Stahl received enough LCS to be on the list. All of the most influential publications appeared before 2011, with more than half published before 2007, while the majority of the prolific authors who had not received enough LCS had their first publication after 2010. Thus, many of these publications have been

around between five to ten years longer than those publications by the most prolific authors, which at least partially explains their LCS. A publication's impact may become more relevant and stronger over time, for instance, leadership became more popular as a research topic and therefore the most cited (Ng et al., 2009). Hence, we recommend that future researchers regularly explore the same field to observe these influences.

Journal influence can be measured via the citations attained for each published article, serving as a benchmark for comparison across journals, their editors, and publishing companies, yet also to track scholarly impact of researchers at universities (Podsakoff, MacKenzie, Bachrach, & Podsakoff, 2005). The citation analysis reveals that the most influential journals reside in human resource management, international business, strategy, marketing, psychology, and organization management. Based on the citation data, the top journals with strong article output have similar impacts in terms of citations per year. There are numerous citations of international business journals which implies that international business-related variables are dominant in the discussion of CQ, GM, and CC. The many citations of journals of marketing, strategy, and organization management also highlight the relevance of the concepts to their scholarly debates (e.g., marketing mix adaptations and organizational outcomes). It would be interesting to investigate whether the increase in citations of international business journals for the micro-oriented cultural concepts (e.g., CQ, GM, and CC) affects the citations of those journals for the macro-oriented cultural concepts (e.g., national cultures, cultural distance, values & practices). Future researchers could, therefore, compare the streams of macro-oriented cultural research with micro-oriented cultural research across international business journals.

5.2 You can only manage what you measure: Be mindful on measurement instruments!

Fang et al. (2018) suggest that future researchers should pay attention to CQ measurement reliability and validity, as using the right measurement instrument is key to successful research designs (as in any field, e.g., Richter, Schmidt, Ladwig, & Wulhorst, 2017). More than two dozen instruments have been developed for the quantitative assessment of CQ (Earley & Mosakowski, 2004; Ang et al., 2006;

Thomas, Elron, Stahl, Ekelund, Ravlin, Cerdin et al., 2008; Van Dyne, Ang, Ng, Rockstuhl, Tan, & Koh, 2012; Alon, Boulanger, Meyers, & Taras, 2016). However, in our view, there is less need for more new instruments, but a greater need for a structured review of instruments to outline the statistical properties and suitability of instruments for different research purposes. In addition, and likewise called for in Matsumoto and Hwang (2013), research is needed that examines the best fit factor structure underlying CQ tests (see Rockstuhl & Van Dyne, 2018), i.e., that further elaborates on how to operationalize the overall CQ construct and individual dimensions. Third, we need further research that demonstrates incremental predictive validity of both the overall construct over other constructs and of subdimensions of the construct for different areas (e.g., Richter et al., 2019 (forthcoming); see also Matsumoto & Hwang, 2013). Fourth, researchers need to further test the statistical properties, such as measurement equivalence, discriminant validity of subdimensions of CQ, and of CQ in contrast to subdimensions of GM or CC (e.g., Bücker et al., 2016; Schlägel & Sarstedt, 2016).

5.3 Be like Victor Frankenstein: Experiment and scrutinize using solid designs!

A typical limitation outlined in quantitative empirical designs is the dataset's cross-sectional nature. Quantitative researchers often call for longitudinal designs to test causality as we do. Yet another way to improve causality is experiments (e.g., Skelly, Dettori, & Brodt, 2012). Good experiments have high internal validity and can directly analyze whether the dependent variables are caused by the treatment or antecedents. Replications can then produce cumulative knowledge with high external validity, i.e., that can be generalized to other populations (Bernard, 2017). An example in the field is an experiment on cultural awareness by Gannon and Poon (1997) that finds that the delivery method of training has no significant difference for the positive effects. Picking up from here, future researchers could, for instance, experiment with interventions during the delivery of training and then observe their effects on CQ, GM, or CC development. This may involve the participants' behavior (Monkey-see-monkey-do versus material-based training), participant motivation (monetary, personal benefits versus non-monetary, social benefits) or participant cognition (meditation versus reflection, or foreign logical counting versus foreign verbal learning).

We support a stronger use of experimental designs, for instance, in the forms of simulation games (Bücker & Korzilius, 2015), randomly assigned groups, intervention groups or stimuli groups, quasi-experiments (Bogilovic et al., 2017) and field experiments. This can help to simulate effects that aid understanding the underlying processes in the association between antecedents and outcomes of CG, GM, and CC in various themes (e.g., learning, communication, teamwork). Experiments can thereby make a strong contribution to theorizing in the field (Weick, 1995). Experimental methods have limitations such as highly controlled (artificial) situations, or a focus on ensuring strong internal validity at the cost of external validity (Punch, 2014; Skelly et al., 2012). Hence, these designs are not the only possible route yet are a promising complement to the research landscape.

5.4 CQ in group processes and outcomes: The roles of knowledge and CQ's moderating impact

We observe a strong and emerging research stream that discusses group-level outcomes of CQ and related team or group processes. This stream's publications discuss the knowledge component, knowledge sharing in collaborations, knowledge generation in groups, and creativity (Bogilovic et al., 2017; Eisenberg & Mattarelli, 2017; Chua & Ng, 2017; Dollwet & Reichard, 2014; Chen & Lin, 2013; Li, Mobley, & Kelly, 2013; Thomas, 2006). With a growing knowledge-based economy where knowledge and information acquisition are increasingly important for performance (Earley & Mosakowski, 2004), this focus seems reasonable from a management perspective.

Hence, we see potential in continuing with this intellectual stream. We call for a deeper look into the processes that lead to knowledge creation and acquisition (including a focus on cognitive CQ) (see also Ott & Michailova, 2018). This may involve a better understanding of the role of 'multicultural' brokers that can recognize the benefits of shared knowledge (Eisenberg & Mattarelli, 2017). This may likewise involve a better understanding of how CQ can foster these knowledge processes and help in moderating unfavorable situations or behaviors, such as knowledge hiding (which may cause great harm in R&D, creative tasks, and security tasks).

We likewise encourage researchers to integrate the research into group-level CQ outcomes, with the broader research field looking at team processes and outcomes. From an international business perspective, this field strongly relies on analyzing cultural diversity's impacts on various team outcomes such as creativity, conflicts, communication effectiveness, and social integration. From past studies, we know about cultural diversity's impacts on some of these outcomes, such as a higher creativity, more conflicts and less social integration (e.g., Stahl, Maznevski, Voigt, & Jonsen, 2010). Researchers should explore the direct and potential moderating impact of CQ on these group-level outcomes and on the associations between cultural diversity and group-level outcomes. We strongly believe that the field could profit from more integration of the cultural diversity and CQ perspectives in group-related research.

5.5 Collective CQ, GM, or CC: Future research from a macro perspective

A key question is how CQ, GM, or CC function at the macro level. A few authors have already begun to discuss whether these conceptualizations should be context-specific or general, similar to previous debates about universal or specific national cultures (Fang et al., 2018; Hofstede, 1980). Researchers can analyze the interplays between CQ, GM, and CC scores, traditional approaches to national culture (such as Hofstede and Schwartz), and informal and formal institutional environments.

Researchers should explore whether some countries could improve in the development of CQ, shaping unique culturally intelligent societies. More conceptual work is required to define such societies: Should a high-CQ society be explained by the number of high-CQ individuals in the society? Are there specific CQ dimensions that are more present in one particular society? Are there specific policies or laws that differentiate societies that are more culturally intelligent than others? Future research should address aggregate-level CQ scores on the national level. The within-nation and across-nation distribution of CQ scores also deserves illustration and explanation, as specific subgroups (e.g., genders, occupational groups, cultural archetypes) (see also Javidan et al., 2016; Richter, Hauff, Schlägel, Gudergan, Ringle, & Gunkel, 2016) may show significant variations that could explain differences. Researchers should explore the underlying processes of how individual CQ, GM, and CC can translate to the national level.

The within-nation distribution also translates into aggregated CQ scores on other levels, such as the organizational or firm and group levels. These scores can then be used to improve empirical studies, which must determine whether it is the individual CQ or an aggregated score for the group or a dyad that explains business outcomes. Researchers can explore whether and how CQ on different levels moderates the relationships between nationality and diversity effects (Rosenauer, Homan, Horstmeier, & Voelpel, 2016).

6. Limitations

Before concluding, we briefly outline the limitations of our study: first, it is limited to the use of one database, Web of Science. While the use of WoS provides a solid basis for citation analysis, the use of a combination of databases such as Scopus would have provided a more comprehensive set. Additionally, keywords like "cultural intelligence" exist across multiple fields and we limited this study to business and management literature. Due to the emerging nature of the field, our filtration of manuscripts to be included (i.e., journals and book chapters) is also less strictly oriented on journal ranking lists as implemented in other research papers (such as Ott & Michailova, 2018). It involved a partially subjective – though expert-based – selection of outlets. Moreover, we only applied certain types of citation and co-citation analyses and neglected other likewise potentially fruitful options, such as bibliographic coupling. Furthermore, we must acknowledge that based on bibliometric citation analysis, it is impossible to fully understand the reasons why a certain publication was cited. Related to this, the quantitative numbers generated through our factor and cluster analyses were in parts difficult to interpret in terms of underlying content structures. In spite of using automated tools implemented in NVivo, the coding involves some level of subjectivity (e.g., with regard to assignment to a primary coding category). Finally, the conduct of burst analyses depends on specific parameters to be set and results may differ, though not considerably, if the researchers modify these settings.

7. Conclusion

We conducted a systematic review using bibliometric methods of 158 publications on CQ, GM, and CC. We thereby offer an objective approach to assessing the current state of the literature and emerging streams. We list the most influential journals, publications, and specific researchers in the field. We identify five different research streams that show that different researchers tackle the same management and business challenges using different constructs. Hence, we call for a stronger acknowledgement of findings generated separately for the three constructs in the literature. Finally, we outline a potential shared future research agenda on CQ, GM, and CC for advancing the theories in international business and management.

Appendix 1 Content domains of selected CQ, GM and CC measurement instruments

Measurement instrument	**Intercultural traits**	**Intercultural attitudes and worldviews**	**Intercultural capabilities**
Cultural Intelligence Scale, CQS			x
Global Mindset Inventory, GMI	x	x	x
Global Competencies Inventory, GCI	x	x	x

Source: Adapted from Leung et al., 2014; Cultural Intelligence Scale, CQS: Ang et al., 2007; Global Mindset Inventory, GMI: Javidan, Hough, & Bullough, 2010; Global Competencies Inventory, GCI: Bird, Mendenhall, Stevens, & Oddou, 2010

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Essay/Paper 2:
Who Will Lead The Team? Predicting Leadership Emergence in Global Virtual Teams

Who Will Lead The Team? Predicting Leadership Emergence in Global Virtual Teams

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Abstract: In this study, we examine the individual factors that predict whether or not individuals will emerge as leaders in the context of global virtual teams (GVT), which often lack a more formal leadership structure. We focused on emotional intelligence (EQ) and cultural intelligence (CQ) as two contemporary concepts that are of key relevance to leadership success. We review 44 empirical research papers on the associations between EQ and/or CQ and leadership. Building on socioanalytic theory, we hypothesized that individuals with higher levels of EQ and CQ have a higher probability of emerging as team leaders. We tested the hypotheses in a sample of 415 teams comprised of 1,102 individuals who participated in an virtual international collaboration project. Using structural equation modeling, the results revealed that individuals who had higher CQ more likely emerged as leaders. Our findings did not support the relevance of EQ. In addition, individual factors such as English proficiency, a higher age, and a lower power distance were also associated with leadership emergence.

Keywords: *Leadership emergence, emotional intelligence, cultural intelligence, global virtual teams, partial least squares structural equation modeling (PLS-SEM)*

1. Introduction

In light of growing internationalization and continuous technological development, organizations have steadily increased the use of global virtual teams (GVT) (Taras et al., 2019). A recent survey revealed that up to 87 percent of white-collar workers in OECD countries at least occasionally work in GVTs (CultureWizard, 2018). As the COVID-19 pandemic imposed restrictions on international travel and many companies shifted to telework, the reliance on GVTs is likely to increase further (Donthu & Gustafsson, 2020).

Jarvenpaa and Leidner (1999) defined GVTs as workgroups that are "temporary, culturally diverse, geographically dispersed, and electronically communicating" (p. 792). GVTs offer several benefits, including lower costs for operating virtually and not face-to-face, the potential for increased creativity and improved problem solving due to a stronger diversity of team members, and the possibility of having a continuous workflow across different time-zones (Taras et al., 2019). Yet, virtual collaboration also brings some challenges due to the lack of face-to-face collaboration when it comes to cultural differences, social integration, and geographical dispersion (Avolio, Kahai, & Dodge, 2000). For GVTs to be successful and operational, effective leaders are crucial (Lisak & Erez, 2015). "Global leadership" can be considered as the individual ability to influence, motivate, and enable others to contribute toward effectiveness and success to the organization and its members (House, Javidan, Hanges, & Dorfman, 2002, p. 5). The right leadership brings positive outcomes to the team and, ultimately, the organization. Leaders facilitate trust, instill the right structures and processes, involve multiple resources and cultures in temporal, geographical, and cultural complex situations (Park, Jeong, Jang, Yoon, & Lim, 2018, p. 96).

Previous research has identified what influences successful leadership behavior in teams that are diverse and international: among others, the leader's individual motivation is important (Barbuto, 2005), and the leader's intellectual capability, that is different forms of intelligence, influences leadership effectiveness (Rockstuhl, Seiler, Ang, Van Dyne, & Annen, 2011). Following Gardner (1992) and Sternberg (1999b), researchers have argued that instead of considering intelligence in a single form (like "IQ"), one should also consider the social intelligences: these are separate intelligences for emotions and culture, each

respectively termed "emotional intelligence" (EQ) and "cultural intelligence" (CQ).

EQ is the ability to assess emotional aspects of the individual, including empathy towards oneself and others (Wong & Law, 2002). Individuals who have higher EQ will understand the emotions of their team-members better, which is beneficial to the team outcomes. CQ is the capability to effectively address culturally diverse settings (Ang et al., 2007; Earley & Ang, 2003), through cognition, metacognition, motivation, and behavior. CQ is found to have a positive association with leadership effectiveness in international workgroups (Groves & Feyerherm, 2011; Offermann & Phan, 2002; Yari, Lankut, Alon, & Richter, 2020), and with task performance (Ang et al., 2007); EQ is found to have a positive association with leadership effectiveness (Kerr, Garvin, Heaton, & Boyle, 2006), conflict-handling styles (Gunkel, Schlaegel, & Taras, 2016) and with follower satisfaction (Wong & Law, 2002). Hence, research supported what Alon and Higgins (2005) conceptualized, namely that a global leader should have a combination of analytical (general) intelligence, EQ and CQ to achieve successful leadership.

In many GVTs, leaders are not appointed or elected, but emerge. Hence, there often is no formal process that appoints the individuals possessing good leadership skills, such as CQ and EQ as leaders. In groups that lack a pre-defined hierarchical or governance structure, leadership emerges because individuals become influential in the perception of followers or are perceived leaderlike by others (Hogan, Curphy, & Hogan, 1994). Acton, Foti, Lord, and Gladfelter (2019) define leadership emergence as "*as the multilevel interactional process driven by deep-level cognitive and perceptual processes of group members that form a collective patterning of leader and follower interactions over time*" (p. 146). Past research showed a tendency to consider formal team leadership structures, despite the fact that leadership is also more informally distributed within teams (Morgeson, DeRue, & Karam, 2010). Hence, there is a need to further understand informal leadership emergence, especially in GVTs (with their more complex cross-cultural and technology-supported settings) as compared to face-to-face settings (Avolio, Sosik, Kahai, & Baker, 2014).

To address this gap in the research, the key research objective of this study is to identify the individual factors that determine whether an individual will emerge as a leader in a GVT. We respond to the call by Judge, Colbert, and Ilies (2004) and investigate other forms of intelligence with leadership: We will place a special

emphasis on analyzing whether EQ and CQ are relevant determinants of emergent leadership in GVTs. That is, we will investigate whether the self-selection mechanism in GVT without a formal leadership structure will result in informal leadership structures that are effective or create leaders that have the right skills. We believe that it is a fruitful avenue to investigate these more direct predictors of leadership emergence. We investigate emotional intelligence (EQ) and cultural intelligence (CQ). Both forms of intelligence are in contrast to general intelligence considered abilities (Earley & Ang, 2003; Mayer, Salovey, & Caruso, 2008), that - as we argue below - have a direct influence on leadership emergence.

Individuals that have higher levels of both EQ and CQ are more likely to be motivated to lead. We reviewed past empirical research on the associations between EQ and/or CQ and leadership, and observe there are almost no studies that test the multiple intelligence proposition or test whether EQ and CQ lead to leadership emergence in the context of GVT. Hence, we test if higher EQ and CQ in the individual makes them more likely to lead in GVT. For this purpose, we create a leadership emergence model building on socioanalytic theory (Hogan & Blickle, 2018). More specifically, we theorize how EQ and CQ motivate the individual to have the team members get along, get ahead, and find meaning, and therewith emerge as a leader. We test our hypotheses in a sample of 415 teams comprised of 1,102 participants who participated in a virtual international collaboration project.

We begin with reviewing past empirical research on the associations of EQ and CQ with (formal and informal) leadership. Then, we outline the theoretical underpinnings of traits and abilities and use socioanalytic theory to form our own leader emergence model that focuses on the role of EQ and CQ. Next, we test and report the results, which lead to interesting findings regarding the association of EQ and CQ with leadership emergence. We conclude with a discussion of the implications of our findings, limitations and provide suggestions for future research.

2. Review of past empirical studies

We use the Web of Science (WoS) database by Clarivate analytics to search papers that investigated either EQ and/or CQ, and leadership. We follow the procedure in Yari et al. (2020) to refine the results of our search (i.e., we select only articles in business, management, and psychology). We find 44 empirical research papers that research into the associations between EQ and/or CQ and leadership (see Table 1 for an overview). Among these 44 papers, 32 papers look at EQ with leadership, ten look at CQ with leadership, and two papers look at both EQ and CQ with leadership. Of the 32 papers that investigate EQ, 27 focus on leader behavior or performance, and five on taking a leadership role. The nine papers that investigate CQ, and the two papers that look at both EQ and CQ, focus on leader behavior or performance. Only one paper investigates CQ with leadership emergence.

Table 1. Literature review

Author	Construct	Theory	Sample	Controls	Key associations (hypothesized/tested)	Key results
Sosik and Megerian (1999)	Individual EQ dimensions	Emotional Intelligence Theory (Mayer & Salovey, 1995); Transformational Leadership (Bass, 1985a; Burns, 1978)	63 Managers; 192 subordinates; 63 superiors of focal managers, USA	-	EQ → transformational leadership → performance (moderated by self-awareness)	EQ-leadership-performance association varies with different levels of self-awareness
Wong and Law (2002)	Individual EQ dimensions	Emotional Intelligence Theory (Mayer & Salovey, 1997)	Measurement sample: 120 MBA/ undergraduate students, Hong Kong Cross-validation samples: 218 students, Hong Kong; 149 supervisor-subordinate dyads, Hong Kong; 146 middle-level administrators, Hong Kong	Job characteristics, education, job tenure	EQ → job performance / satisfaction / organizational commitment / turnover intention (moderated by extent of emotional labor) EQ leaders → follower performance / satisfaction / behavior	EQ is positively associated with job satisfaction and behavior but not with performance
Wolff et al. (2002)	Individual EQ dimension (Empathy)	Emergent Leadership (Kozlowski, Gully, Salas, & Cannon-Bowers, 1996)	382 MBA students, USA	-	Empathy EQ →leader behavior → emergent leadership	Empathy is associated with emergent leadership: empathy serves as a foundation for cognition and behavior that support leadership emergence

Charbonneau and Nicol (2002)	Overall EQ	Transformational Leadership (Megerian & Sosik, 1996)	191 adolescents, USA	-	EQ → leadership role	For one of the EQ scales used Weisinger, 1998: Those with high EQ are more often peer-nominated as having leadership abilities; no significant correlation found for the Schutte et al., 1998 scale.
Mandell and Pherwani (2003)	Overall EQ	Transformational Leadership (Bass & Avolio, 1994)	32 managers, USA	Gender	EQ → leadership behavior	Positive association of EQ and leadership behavior
Barbuto and Burbach (2006)	Overall and individual EQ dimensions	Transformational Leadership (Bass, 1985a)	388 leader-member dyads, USA	-	EQ → leadership behavior	All EQ dimensions are associated with leadership behavior (associations are stronger for self-than for rater-reports)
Elenkov and Manev (2009)	Overall and individual CQ dimensions	Visionary-Transformational Leadership (Kouzes & Posner, 1995)	153 senior expatriates; 695 subordinates; mixed nationalities, EU countries	Country macro environment, industry, organizational age, organizational size, tenure	Leadership behavior → innovation (moderated by CQ)	Overall CQ and the individual CQ dimensions are relevant moderators of the leadership and innovation association
Cote et al. (2010)	Overall and individual EQ dimensions	Emotional Intelligence Theory (Mayer & Salovey, 1997; Salovey & Mayer, 1990)	303 undergraduate students, USA	Big five personality, gender, cognitive intelligence, self-monitoring	EQ → leadership emergence	Overall EQ is positively associated with leadership emergence; individual EQ dimensions are likewise associated with leadership emergence (most consistently: the ability to understand emotions)
Clarke (2010)	Overall and individual EQ dimensions	Transformational Leadership (Bass & Avolio, 2000)	67 project managers, UK	Personality, general mental ability, project management qualification	EQ → leadership behavior	Only the dimension emotions to facilitate thinking is associated with leadership behavior
Huang, Chan, Lam, and Nan (2010)	Individual EQ dimensions	Leader-Member Exchange (Densereau, Graen, & Haga, 1975)	493 leader-member dyads, China	Gender, education, age, organizational tenure, length of supervisor-subordinate relationship	EQ → work performance LMX → burnout (moderated by EQ) LMX → work performance (moderated by EQ)	SE is negatively and UOE is positively associated with work performance; SE positively moderates the LMX and burnout association; SE negatively and UOE positively moderates the LMX and work performance association
Tang, Yin, and Nelson (2010)	Overall EQ	Transformational Leadership (Kouzes & Posner, 1995)	50 academic leaders, Taiwan and USA		EQ → leadership practices	EQ is positively associated with leadership practices in both cultures
Sears and Holmvall (2010)	Overall EQ	Leader-Member Exchange (Densereau et al., 1975)	37 senior-public service executives-subordinate dyads	Conscientiousness, core self-evaluations, gender, age, education levels	EQ similarity → LMX	Supervisor-subordinate EQ similarity is positively associated with LMX
Groves and Feyerherm (2011)	Overall CQ (and overall EQ)	Cultural Intelligence Theory (Ang & Van Dyne, 2008; Ang et al., 2007; Earley & Ang, 2003)	99 work unit leaders; 321 direct reports; mixed nationalities, USA	Gender, Tenure, general leadership competencies	CQ → leader performance CQ → team performance	Leader CQ is positively associated with leader and team performance (the relationship is stronger in teams with higher diversity) (no significant associations found for EQ)
Rockstuhl et al. (2011)	Individual CQ dimensions and individual EQ dimensions	Cultural Intelligence Theory (Ang & Van Dyne, 2008; Ang et al., 2007; Earley & Ang, 2003)	126 military leaders, Switzerland	General mental ability, Big-Five personality, previous leadership experience, international experience, age	General intelligence → leadership effectiveness; EQ relevant in domestic context; CQ in cross-border contexts	EQ is associated with leadership effectiveness; CQ is associated with cross-border leadership effectiveness

Hur, van den Berg, and Wilderom (2011)	Overall and individual EQ dimensions	Transformational Leadership (Bar-On, 2000; Goleman, 1998)	859 non-managerial employees across 55 teams, South-Korea	Age, education, team size	EQ → transformational leadership → leader effectiveness / team effectiveness / service climate	Both overall EQ and its dimensions are positively associated with transformational leadership; EQ has an indirect effect on leader effectiveness and on service climate through transformational leadership
Jordan and Troth (2011)	Individual EQ dimensions	Leader-Member Exchange (Densereau et al., 1975)	578 employees, Australia	Age, gender, negative affect	EQ → turnover intention / job satisfaction EQ → quality of LMX quality of LMX → turnover intention / job satisfaction EQ → turnover intention / job satisfaction (mediated by quality of LMX)	Individual EQ dimensions associated positively with Job satisfaction and negatively with turnover intentions, except for the other awareness dimension of EQ. Individual EQ dimensions associated positively to the quality of LMX, except for the other awareness dimension of EQ. Quality of LMX associated with turnover intension and job satisfaction. Only Individual EQ dimensions own awareness and other awareness associated with turnover intention and job satisfaction when mediated by quality of LMX
Hong et al. (2011)	Individual EQ dimensions	Motivation To Lead (MTL) (Chan & Drasgow, 2001)	Study 1: 309 undergraduate students, Canada Study 2: 121 master students across 44 teams, USA	Gender, age, work experience, English as second language, cognitive ability, personality measures, academic achievement, conventional leadership predictors, group size, group gender, past leadership experience, year of study	Affective-identity / Non-calculative / Social-Normative MTL → leader emergence EQ → leadership emergence (mediated by MTL)	Study 1: Affective-identity MTL associated with leader emergence. Individual EQ dimensions associated to MTL differently; UOE positive to Affective-identity MTL, OEA negative to non-calculative MTL. UOE associated indirectly with leader emergence through affective-identity MTL Study 2: Social-normative MTL levels to those of entire sample associated with leader emergence, while levels relative to other team members did not. Individual EQ dimensions associated differently; UOE associated with affective-identity and social-normative MTL, and OEA with non-calculative MTL UOE associated indirectly with leadership emergence through social-normative MTL
Bratton, Dodd, and Brown (2011)	Individual EQ dimensions	Transformational Leadership (Bass & Avolio, 1990)	146 managers; 1,314 subordinates, USA	Gender, manager job tenure	EQ → transformational leadership (tested in different subgroups: leaders who assess their leader abilities accurately good, poor, and who over – or underestimate their abilities)	Individual EQ dimensions and leader behavior association varied across different levels of self-awareness: EQ was not associated to leaders who assess their leader abilities accurately good, poor, and overestimate their abilities. Intrapersonal skills associated with leadership behaviors for managers who underestimate their abilities.
Kafetsios, Nezlek, and Vassiou (2011)	Individual EQ dimensions	Emotional Intelligence Theory (Mayer & Salovey, 1997)	33 school directors; 179 teachers, Greece	gender	EQ → leaders' / subordinates' job satisfaction / positive affect / negative affect / burnout Leaders' EQ → subordinate positive emotions / job satisfaction Subordinate EQ → subordinates' outcomes (moderated by leaders' EQ)	Leaders SEA associated with job satisfaction, ROE with positive affect, Appraisal of others' negative with burnout and negative affect. Subordinates' UOE and AOE associated with job satisfaction and positive affect, ROE with positive and negative affect, and SEA with burnout. Leaders' EQ and subordinates' outcomes association varied with leaders' EQ: leaders' UOE associated with positive emotions / job satisfaction, SEA and ROE associated negatively with emotions / job satisfaction. Leaders' SEA most consistent moderator to the subordinates' EQ and outcomes association

Smollan and Parry (2011)	Overall EQ	Emotional Intelligence Theory (Mayer & Salovey, 1997)	24 participants from organizations undergoing change, New Zealand (qualitative)	Work experience	Leader EQ → leaders' emotional understanding and regulation → followers' responses to organizational change	Higher leader EQ levels associated with better emotional responses to followers' responses to change. Leaders who failed to regulate their emotions associated with negative followers' response to change. Followers' response to change was higher when leaders' EQ was associated with leaders' emotional understanding and regulation.
Cavazotte et al. (2012)	Overall EQ	Transformational Leadership (Avolio, 1999; Bass & Avolio, 1994)	134 midlevel managers, Brazil	Gender, managerial experience, team size	EQ / IQ / Big Five → leadership behavior → performance	Leadership behavior is associated to performance, but EQ has no association with performance when mediated by transformational leadership
Kim and Van Dyne (2012)	Overall CQ	Cultural Intelligence Theory (Earley & Ang, 2003); Contact Theory (Allport, 1954)	181 employees; 781 observers; mixed nationalities, USA	Gender, education, work experience	Prior intercultural contact → CQ (moderated by minority status) Prior intercultural contact → CQ → international leadership potential (mediated by CQ) Prior intercultural contact → CQ→ international leadership potential (moderation + mediation)	Prior intercultural contact associated with CQ; those with majority status associated positively, but not those with minority status CQ associated with international leadership potential. Prior-intercultural-contact leadership-potential association fully mediated by CQ. Moderation mediation association supported
Lam and O'Higgins (2012)	Overall EQ	Transformational Leadership (Bass, 1997; Burns, 1978)	323 managers and subordinates, China	Gender, age, education level, work experience	EQ → leadership behavior → employees' performance / job satisfaction / organizational commitment / job stress	EQ associated with only job satisfaction when mediated by transformational leadership style. No association found between EQ nor leadership behavior with employees' job stress
Chang, Sy, Choi (2012)	Overall and individual EQ dimensions	Emotional Intelligence Theory (Mayer & Salovey, 1997)	347 individuals across 91 teams; mixed ethnicity, USA	-	EQ → team performance / intrateam trust	Members' EQ associated with team performance. Emotion appraisal and social skills associated positively; mood regulation nor emotion utilization was not. Leaders' EQ associated with team performance and intrateam trust. All dimensions associated positively. Interaction between Leaders' and members EQ on team performance have a compensatory association: members' EQ associated with team performance only when leaders' EQ was low. Leaders' EQ associated the most when members' EQ was low.
Lee, Veasna, and Wu (2013)	Overall CQ	Transformational Leadership (Bass, 1985a; George & Jones, 2012)	156 expatriate managers from 39 Taiwan MNCs, China	-	Transformational leadership → performance (moderated by CQ)	CQ moderates the transformational leadership and performance association
Follesdal and Hagtvet (2013)	Overall and individual EQ dimensions	Transformational Leadership (Bass, 1997; Bass & Riggio, 2006)	104 executives, Norway	Leader age, five factor model of personality, general mental ability	EQ → transformational leadership	Neither overall EQ nor individual EQ dimensions are associated with transformational leadership

Siegling et al. (2014)	Individual-EQ dimensions	Emotional Intelligence Theory (Petrides, Pita, & Kokkinaki, 2007)	96 employees, EU	Cognitive ability, Tenure, Age, Gender	Trait EQ → leadership role	Emotional self-efficacy (trait EQ) is positively associated with leadership and differentiates between leaders and non-leaders
Lisak and Erez (2015)	Overall CQ	Person-team fit approach (Kristof-Brown, Barrick, & Kay Stevens, 2005); Cultural Intelligence Theory (Earley & Ang, 2003; Ang et al., 2007)	317 MBA and graduate students from ten universities in eight countries (USA [3], England, Hong-Kong, Germany, Israel, Italy, Spain and Switzerland)	Age, Gender, GVT work experience,	CQ / Global Identity / Openness to cultural diversity → leadership emergence High levels of CQ / Global Identity / Openness to cultural diversity (H-H-H) > mixed patterns and low levels of global characteristics (L-L-L)	CQ positively associated with leadership emergence Individual with high levels of global characteristics (H-H-H) were more likely to emerge as a leader
Rosenauer, Homan, Horstmeier, and Voelpel (2016)	Overall CQ	Cultural Intelligence Theory (Ang & Van Dyne, 2008; Earley & Ang, 2003)	410 participants and supervisors across 63 teams; mixed nationalities, Germany	Hierarchical position, position tenure (experience), interaction frequency, ethnicity, division, team size, educational background, nationality, age, gender	(Interdependence) Nationality diversity → perceptive diversity climate / team performance (moderated by leader CQ)	Leader-CQ-diversity climate association varied with levels of interdependence; Low levels of interdependence found no association irrespective of CQ levels, whereas high levels of interdependence associated only when leaders' CQ was high Leader-CQ-performance association varied with levels of interdependence; Low levels of interdependence found no association irrespective of CQ levels, whereas high levels of interdependence associated only when leaders' CQ was high
Li, Gupta, Loon, and Casimir (2016)	Overall and individual EQ dimensions	Combinative Leadership Styles (Casimir, 2001)	204 full-time managers/supervisors, Australia	Age, Gender (balanced sample), work experience, educational levels	Before style preference → EQ (positive) Delayed style preference → EQ (negative)	Leaders who preferred the before style had higher levels of overall and individual dimensions of EQ Leaders who preferred the delayed style had lower levels of overall and individual dimensions of EQ. OEA was significantly lower than the before style group. Difference in leaders' EQ levels between After and Either style not significant.
Khalili (2017)	Overall EQ	Transformational Leadership (Podsakoff, MacKenzie, Moorman, & Fetter, 1990)	2,021 employees from 50 organizations, Iran	-	Transformational leadership → Organizational citizenship behavior (moderated by EQ)	EQ and leadership behavior associated with organizational citizenship behavior positively. Higher levels of Employee-EQ association with OCB moderated positively; Transformational leaders have positive impact on OCB.
Jiang, Le, and Gollan (2018)	Overall CQ	Leader-Member Exchange (Hooper & Martin, 2008)	261 migrant workers; mixed nationalities, Australia	Age, gender, education, race, identity status, length of residency, type of employment, work status, tenure, frequency of cross-cultural interactions in workplace, organizational size	CQ →Voice behavior CQ → LMX LMX → Voice behavior CQ →Voice behavior (mediated by LMX)	CQ associated positively with voice behavior CQ associated positively with LMX LMX associated positively with voice behavior CQ-voice-behavior association was positively mediated by LMX

Zhang, Cao, and Wang (2018)	Overall EQ	Transformational (Wang, Chou, & Jiang, 2005); Active-Transactional (Bass & Avolio, 1997); Passive-Transactional (Podsakoff, Bommer, Podsakoff, & MacKenzie, 2006); Laissez-Faire Leadership (Bass & Avolio, 1997)	365 project-leader scholars, China	Age, gender, education level, working experience	EQ → transformational / active-transactional / passive-transactional / laissez-faire leadership → collaboration satisfaction (mediated by all four leadership styles)	EQ is associated with all four leadership behaviors. Transformational and active-transformational associated positively with collaboration satisfaction; Passive-transactional and Laisses-faire did not associate with collaboration satisfaction. Transformational and active-transformational leadership fully mediated the EQ-collaboration-satisfaction association positively. Passive-transactional and laisses-faire found no mediation to the association.
Hou, Li, and Yuan (2018)	Overall EQ	Conservation Of Resources (Hobfoll, 2011)	215 employees and supervisors, China	Tenure, age, gender	Disruptive leadership → psychological capital (mediator) → employee innovative behavior (moderated by EQ)	The disruptive-leadership and employee innovative-behavior association is moderated by EQ; disruptive leadership association with psychological capital weakened with higher levels of EQ. Indirect association of psychological capital between disruptive leadership and employee innovative behavior was negative when EQ was medium or high, but not when EQ was low.
Chen and Chen (2018)	Overall EQ	Attitude Theory (Bagozzi, 1992)	807 nurses, Taiwan	Age, tenure	Stressors/support → burnout (moderated by Leadership effectiveness and EQ) Burnout → job satisfaction / org. commitment → turnover intention	Stressors/support association with burnout varied between EQ and leadership as separate moderators; EQ associated with more burnouts, while leadership effectiveness associated with less burnout
Edelman and van Knippenberg (2018)	Overall EQ	Emotional Intelligence Theory (Antonakis, 2004; Antonakis et al., 2009; Salovey & Mayer, 1990)	84 leaders, Netherlands	Cognitive ability, big five personality, age, gender	EQ → appropriate response to emotion / appropriate affective display → leadership effectiveness	EQ is associated with leadership effectiveness; EQ is associated to more responses to follower emotions; EQ is not association with appropriate affective display
Gelaidan, Al-Swidi, and Mabkhot (2018)	Overall EQ	Transformational Leadership (Avolio, Bass, & Jung, 1999; Bass, 1985b)	260 academic staff, Malaysia	-	Leadership behavior/ EQ → organizations' readiness to change (moderated by organizational commitment)	Leadership behavior associated positively with readiness to change EQ associated positively with readiness to change Organizational commitment moderated the leadership-readiness-to-change association negatively, and EQ-readiness-to-change association positively
Presbitero and Teng-Calleja (2019)	Overall (team-) CQ Thomas et al., 2015	Social Learning (Bandura, 1977, 1986); Multiple Intelligence Theory (Sternberg, 1999a; Sternberg & Detterman, 1986)	234 employees as members of a global team; mixed nationalities, Australia	Gender, age, nationality and work experience	Perceived ethical leadership → individual ethical behavior (moderated by perceived leaders' CQ)	The perceived ethical leadership and individual ethical behavior association is moderated by leaders' CQ
Shariq, Mukhtar, and Anwar (2019)	Overall EQ	Knowledge-Oriented Leadership (Skyrme, 2000)	223 pharma employees, Pakistan	-	Knowledge-oriented leadership → knowledge sharing (moderated by EQ)	The knowledge-oriented leadership behavior and knowledge sharing association is not moderated by EQ
Lee (2019)	Overall EQ	Servant Leadership (Barbuto, Gottfredson, & Searle, 2014)	445 athletic directors, USA	-	EQ → development goal (mediated by servant leadership)	EQ is associated with servant leadership; servant leadership is associated with development goal EQ and development goal association varied positively with higher leadership behavior

Afsar, Shahjehan, Shah, and Wajid (2019)	Overall CQ	Transformational Leadership (Bass & Avolio, 1993)	316 hotel employees; non-national, Thailand	Age, gender, education, nationality, length of residence, tenure, organizational size	CQ → voice behavior (mediated by transformational leadership)	CQ is associated with transformational leadership; leadership is associated with voice behavior; CQ voice behavior association positively mediated by leadership behavior.
Mysirlaki and Paraskeva (2020)	Overall EQ	Transformational Leadership (Bass & Riggio, 2006)	500 massive multiplayer online game players	gender	EQ → transformational leadership (mediator) → team performance / viability / satisfaction	Leader EQ is associated with team performance, viability and satisfaction varied with different leadership behavior. EQ positively associated with transformational leadership. Transformational leadership positively associated with team outcomes EQ-team-effectiveness association positively mediated by transformational leadership Different associations across genders: female associated higher with EQ, satisfaction, and viability
Presbitero (2020)	Overall CQ	Social Identity And Self-Categorization Theory (Tajfel & Turner, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987); Multiple Intelligence Theory (Sternberg, 1999a; Sternberg & Detterman, 1986); Leader-Member Exchange (Gerstner & Day, 1997; Liden, Sparrowe, & Wayne, 1997)	105 GVT member-leader-pairings; mixed nationalities, Philippines	Age, gender, work experience	Perceived cultural dissimilarity → individual task performance (moderated by members' CQ, further moderated if leaders' CQ is higher than members' CQ)	The perceived cultural dissimilarity and task performance association is moderated by CQ. The moderating influence of members' CQ is stronger when leaders' CQ is higher.
Le, Jiang, and Radford (In Press)	Metacognitive CQ	Conservation of Resources (Hobfoll, 1989, 2002)	462 migrant workers; mixed nationalities, Australia	Age, gender, length of settlement	LMX → subjective well-being (moderated by metacognitive CQ)	The LMX and well-being association is moderated by metacognitive CQ; lower levels of metacognitive CQ increase the leadership and well-being association

The papers that investigate the associations of EQ and/or CQ and leader behavior and performance have unambiguous results: Almost all the empirical papers find positive associations with overall and individual EQ dimensions, and overall and individual CQ dimensions (see Table 1); only very few studies find no associations (e.g., Cavazotte, Moreno, and Hickmann (2012); Follesdal and Hagtvet (2013)). Previous meta-analyses also confirm the positive associations of EQ with leadership effectiveness (Miao, Humphrey, & Qian, 2018a), authentic leadership (Miao, Humphrey, & Qian, 2018b), and CQ with leadership performance (Rockstuhl & Van Dyne, 2018).

The five empirical papers that investigated the association between EQ and taking a leadership role indicate a positive association: Wolff et al. (2002) propose that

the individual EQ dimension "empathy" is a key component for an emergent leader's ability to recognize and understand the team's challenges, in addition to the cognitive problem-solving skills. They find that empathy is positively associated with emergent leadership in self-managed MBA teams. To demonstrate the usefulness of EQ in college students and adults, Charbonneau and Nicol (2002) test the validity of two instruments measuring EQ in adolescents and examined the association between EQ and transformational leadership. They assume that the leaders need to show empathy towards their members for effective communication, the delegation of tasks, and accommodating for individual needs, the effective traits of transformational leadership. They find that adolescents with a high EQ are more often peer-nominated as being able to lead. Cote et al. (2010) examine the association of EQ with leadership emergence in small groups and test the association in the context of informal leadership. They use a sample of undergraduate students assigned to small groups, and find that both the overall EQ and individual EQ dimensions (especially the ability to understand emotions) are (positively) associated with emergent leadership. Hong, Catano, and Liao (2011) investigate the underlying motivational mechanisms of leadership emergence that are considered as a closer predictor of performance than trait-like predictors. They find that the use of emotions (UOE) is consistently associated with motivation-to-lead across the two samples used and is indirectly associated with emergent leadership. Finally, Siegling, Nielsen, and Petrides (2014) examine if trait EQ can distinguish leaders from non-leaders, and investigate if trait EQ is also an important predictor of leadership as is ability EQ. They find that self-efficacy (from trait EQ) is positively associated with taking a leader role or differentiates between leaders and non-leaders. Out of the 5 papers, 1 refer to personality trait research for predicting trait-EQ (Siegling et al., 2014), one refer to the role differentiation theory (Cote et al., 2010), one refer to transformational leadership theory (Charbonneau & Nicol, 2002), 1 refer to social cognitive theory (Wolff et al., 2002), and one refer to intention-behavior theory (Hong et al., 2011). This indicates that there seems to be no dominant theoretical approach on how to connect an intelligence construct's association with leadership role: authors use intelligence as a key component for emergent leadership or as a trait for a leadership role.

Our literature review indicates a stronger presence of EQ as compared to CQ papers, both when it comes to leadership outcomes, but especially when it comes to taking a leadership role. We believe that there are good reasons to assume that

CQ is as relevant for emergent leadership as EQ in a cross-cultural context and that the dominance of EQ is more a result of 'first-mover' and domestic-context effects: when the multiple intelligence theory was tested (see Gardner, 1992), EQ was the first to be conceptualized and empirically investigated - before CQ was (Sternberg, 1999b) (i.e., EQ research grew first). Second, earlier research on leadership considered the interaction between leader and member to occur in a domestic setting, with EQ or the ability to guide one's thinking and actions being the key aspect in this interaction (Salovey & Mayer, 1990). Today, with increased globalization, communication technologies, and GVTs, the leader-member exchange does in many circumstances involve culture (Alon & Higgins, 2005; Earley & Ang, 2003; Rockstuhl et al., 2011). Hence, we need to understand the roles of EQ and CQ with leader behavior and taking a leadership role, especially in the context of GVTs.

3. Theory and hypotheses

3.1 The relationship between traits, abilities, and leader emergence

Traits are a key predictor of leadership emergence. Studies demonstrate that certain traits (e.g., personality traits such as emotional stability, openness to experience, self-confidence) predict leadership emergence (Judge, Piccolo, & Kosalka, 2009). Intelligences are regarded as the most important traits in social and applied psychology (Sternberg & Ruzgis, 1994; Schmidt & Hunter, 2000). Lord, de Vader, and Alliger (1986), for instance, found a significant positive relationship between intelligence and leadership emergence. Leaders who are intelligent are perceived as leaderlike because they have the ability to address important challenges, integrate information in decision-making, and develop solutions. However, the predictive validity of traits (be it personality traits or intelligence) on leadership emergence remains rather low. In this context, Judge et al. (2009) discussed paradoxical implications of traits for leadership emergence. For instance, they found that intelligent leaders can be cast as outsiders to the workgroup, overcomplicate the solutions for simple problems, or be less effective in timely-important decisions. That is, they outlined the positive and negative effects of traits

on leadership emergence. Judge et al. (2009) developed a leadership emergence model that introduces a relevant set of mediators between traits and leadership emergence, building on socioanalytic theory. More specifically, they posited that traits result in leader emergence because of the motives and abilities they elicit. Hence, the model assumes that traits influence abilities and motives, and these in turn influence leadership emergence.

Socioanalytic theory differentiates three motives and behaviors that are key in this process of leadership emergence: Getting along (communion), that is the behavior that achieves approval of others, strengthens cooperation, and serves to build and maintain relationships. Getting ahead (agency), that is the behavior that produces results and advance members within the group and the group within its competition. Last, finding meaning, that is the behavior that produces stable, predictable, and meaningful social interactions in everyday living (Hogan & Holland, 2003; Hogan & Blickle, 2018). By using socioanalytic theory, we hypothesize that individuals with high EQ and CQ may be more motivated and able to get along, get ahead or to find meaning in their teams and therewith emerge as leaders.

3.2. Emotional Intelligence (EQ)

There are several definitions of EQ that complicated its use in the context of leadership emergence in international business, management and psychology (Mayer et al., 2008; Antonakis, Ashkanasy, & Dasborough, 2009; Walter, Cole, & Humphrey, 2011). Salovey and Mayer (1990) defined EQ as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (p. 189). In contrast to this ability-based definition, scholars later conceptualized EQ as a possible trait and created new "mixed models of EQ" that mixed personality traits with socioemotional abilities without appropriate justifications as to why certain traits are included or not (Mayer, Salovey, & Caruso, 2000; Mayer et al., 2008).

Walter et al. (2011), who critically reviewed EQ's role in the context of leadership, observed three streams of EQ research that each follow a different definition of EQ and corresponding measurement approach: the first stream uses the EQ definition by Mayer and Salovey (1997) and measures EQ as the individual's performance in solving emotional problems (e.g., Mayer, Salovey, & Caruso, 2004). The second stream uses the same EQ definition but instead uses self-assessments or peer-evaluations of emotionally intelligent behaviors (e.g., Wong

& Law, 2002). The third stream uses mixed models of EQ and self-assessment or peer-evaluation of EQ behavior (e.g., Bar-On, 2000). All approaches to measuring EQ have their strengths and weaknesses (Walter et al., 2011): ability-based performance measurements are less vulnerable to fake or socially desirable responses, but criticized for using abstract questions instead of measuring actual emotional behavior. Self-assessment/peer-evaluations have a key advantage in feasibility (i.e., they can be easily distributed and are readily adjustable) but are criticized as they may rather measure the individuals' beliefs of their emotional abilities and not their true emotional abilities. Finally, mixed models of EQ often demonstrate good predictive validity, yet as they include possibly everything except for cognitive ability, they involve strong ambiguity and aggravate the development of new theoretical insights (Walter et al., 2011).

We follow the definition of EQ as an ability (Salovey & Mayer, 1990; Mayer & Salovey, 1997), and measure EQ using self-assessments/peer-evaluations (Wong & Law, 2002). EQ involves four dimensions: Regulation of emotion (ROE) that regards the ability to regulate emotions; self-emotional appraisal (SEA) that concerns the ability to understand deep emotions and express these freely; others' emotional appraisal (OEA) that relates to the ability to observe and understand emotions of other people; and, use of emotion (UOE) that is the ability to use emotions on meaningful activities and performance (Wong & Law, 2002).

Overall, reviews indicate that the majority of studies support the idea that emotionally intelligent individuals are more likely to emerge as leaders (Walter et al., 2011). Intuitively, EQ is relevant to leadership, as "leadership is an emotion-laden process, both from a leader and follower perspective" (George, 2000, p. 1046). Accordingly, we believe that EQ is a relevant predictor for emergent leadership behavior in GVTs. Additionally, we follow the idea that individuals are more likely to emerge as leaders in smaller groups, and that emotional intelligent individuals may exhibit more leadership emergent behavior through the following three mechanisms of EQ (Cote, Lopes, Salovey, & Miners, 2010): 1) EQ increases the emotional perception of others' emotions, and those with higher EQ can get a better knowledge of the group members' attitudes, goals and interests, in turn fulfilling the group members' needs (Wolff, Pescosolido, & Druskat, 2002); 2) EQ increases the ability to understand emotional risks and emotional thinking, and those with higher EQ can process information better before deciding on the best task that increase group performance, and suggest useful ideas for the group ; 3) EQ increases the ability to understand and reflect on previous emotional

management strategies that have worked out or not, and those with higher EQ can use the most effective strategies to manage emotions (Matthews et al., 2006), and in result emerge as a leader (Cote et al., 2010).

Using socioanalytic theory, we associate EQ with leader emergence (Hogan & Blickle, 2018) and hypothesize that individuals with higher EQ are more likely to emerge as leaders in GVT: First, individuals with higher EQ better understand others' emotions and have a better knowledge of the group members' attitudes, goals, and interests and needs enabling better relationships between team members. Moreover, they can better manage emotions within groups, which improves cooperation and facilitates establishing social relationships. Hence, individuals with a higher EQ should get along better with their group members and therewith should have a higher probability of emerging as a leader. Second, individuals with higher EQ can process information better before deciding on tasks, create ideas and make suggestions in the team, and demonstrate result-oriented behavior. They make use of their emotions and direct them towards group activities and tasks, and use creative behavior to motivate the team to get ahead (Salovey & Mayer, 1990; Cote et al., 2010). They consider an emotional strategy that fits the needs of the group members to achieve higher performance. Hence, individuals with a higher EQ are better at getting the team ahead and therewith show a higher probability of emerging as a leader. Third, individuals with higher EQ would find meaning by creating emotional strategies to improve and create social interactions that foster emotional regulation growth in the team (Wong & Law, 2002). They find meaning through positive thinking, expressing emotions to themselves and group members that create stable within-group relationships (Salovey & Mayer, 1990). They find meaning in emerging as a leader when they identify a problem and offer a solution (Salovey & Mayer, 1990). Hence, individuals with a higher EQ are better in finding meaning within the team and herewith show a higher probability of emerging as a leader.

In summary, we expect that individuals with higher EQ are more probable to emerge as a leader:

Hypothesis 1: The higher the EQ of a team member, the higher is the probability that the individual will emerge as a leader in the team.

3.3 Cultural Intelligence (CQ)

While there are several definitions of CQ in international business and management (Andresen & Bergdolt, 2017; Yari et al., 2020), we follow Ang and Van Dyne (2008) and Earley and Ang (2003) and define CQ as the capability to succeed in complex cross-cultural environments through knowledge or cognition, motivation, and behaviors. CQ involves four dimensions: Metacognitive CQ concerns the mental capability to acquire and understand cultural knowledge. Cognitive CQ regards the general knowledge and knowledge structures about culture. Motivational CQ describes the capability to focus energy towards learning about and functioning in different intercultural situations. Lastly, behavioral CQ represents the capability to perform appropriate actions in different cultural encounters (Ang & Van Dyne, 2008; Earley & Ang, 2003). Previous research examined the relationship of CQ with leadership (Ang et al., 2007; Groves & Feyerherm, 2011; Rockstuhl et al., 2011; Rockstuhl & Van Dyne, 2018) and demonstrated positive implications. There are also a number of studies that find that CQ is associated with outcomes such as job performance (Ang et al., 2007), negotiation (Imai & Gelfand, 2010), and expatriate adjustment (Malek & Budhwar, 2013).

The cross-cultural context of GVT poses cross-cultural challenges to teamwork. Groups that are composed of members with different cultural backgrounds are faced with different perceptions of the rules of interaction or meaning that is attributed to situations and behaviors. Hence, to be perceived as leaders, individuals need to be able to navigate this cross-cultural context (Marinova, Moon, & Kamdar, 2013). Lisak and Erez (2015) – who are among the few authors that tested their hypothesis in virtual teams- found that scores in global characteristics that included CQ was higher for emergent leaders than non-leaders in multicultural teams.

Using socioanalytic theory to associate CQ with leader emergence (Hogan & Blickle, 2018), we hypothesize that individuals with higher CQ are more likely to emerge as leaders in GVT, because they demonstrate the relevant capabilities to get along, get ahead and find meaning: Individuals with higher cognitive and metacognitive CQ have a better knowledge of cultural norms and values that helps them to map cross-cultural situations. They are sensitive to potential differences of group members (cognitive CQ) and reflective of cultural behaviors during the group work (metacognitive CQ) (Lisak & Erez, 2015). They know when and how

to apply cross-cultural knowledge (metacognitive CQ) (Ang et al., 2007), which enables them to better get along with their team members. Moreover, individuals with higher cognitive CQ have a better understanding of differences in role expectations and culturally-bounded habits and thinking (Van Dyne et al., 2012). In addition, their metacognitive CQ allows them to plan ahead and check whether chosen strategies contribute to getting the team ahead (Van Dyne et al., 2012). Overall cognitive and metacognitive CQ therewith contribute to getting ahead motives in the team. Finally, because culture defines the rules which provide social interactions with meaning (Hogan & Bond, 2009), cognitive and metacognitive CQ are relevant to understand how to provide the relevant meaning in culturally diverse GVT; they contribute to "insider understanding" (Van Dyne et al., 2012, p. 302), help in producing cultural interactions that become meaningful, and are less affected by stereotypes (Triandis, 2006). Hence, they contribute to finding meaning motives in the team.

Individuals with higher motivational CQ have an increased drive to enjoy cross-cultural interactions and maintain relationships across cultures, and they drive to learn and function in different cultural situations (Ang et al., 2007). Individuals with higher motivational CQ drive to enable stronger cooperation, maintenance of the relationship, and to solve conflicts in the groups (Lisak & Erez, 2015), which enables the group to get along and reach a higher communion. Individuals high in motivational CQ have high confidence or self-efficacy belief in mastering the challenges attributed to GVTs and accomplishing a certain level of performance in culturally diverse situations; Due to their higher self-efficacy, they strive for higher goals and are better able to manage the stressors in cross-cultural environments (Van Dyne et al., 2012). Finally, motivational CQ is relevant to understand how to provide the relevant meaning in culturally diverse GVTs; it includes the intrinsic interest and satisfaction obtained from cultural interactions and excitement of working with culturally different people, and a novel interest to work and engage in culturally diverse teams (Van Dyne et al., 2012).

Individuals with higher behavioral CQ create more adaptations to the verbal and nonverbal behaviors to meet the expectation of others, improving communion and enabling others to perceive an individual as a leader. Individuals also need behavioral CQ to decrease misunderstandings and increase team members' task performance to get ahead (Ang et al., 2007). Higher behavioral CQ also increases the effective intercultural interactions through verbal, non-verbal, and speech-acts behaviors that produce results for both members and team (Van Dyne et al., 2012).

Finally, behavioral CQ is relevant to understand how to provide the relevant meaning in culturally diverse GVT; it enables greater flexibility for effective communication, greater respect for cultural differences, and a greater understanding of communication cues and social interactions. Hence, behavioral CQ contributes to greater respect for the culturally-different others (Van Dyne et al., 2012).

In summary, we expect that individuals with higher CQ are more probable to emerge as a leader:

Hypothesis 2: The higher the CQ among an individual team member, the higher is the probability that the individual will emerge as a leader in the team.

4. Methodology

4.1 Sample and data collection

To test our hypotheses, we use data from a large-scale virtual international collaboration project. Participants are put into virtual teams, of four to eight members that typically all come from a different country, to develop solutions to real-life business challenges. The project is a "simulation" of current business practices, and the task included market research, market entry plan development, and product design. The project had a duration of ca. nine weeks, and our participants come from more than 50 countries. The initial sample included 4,851 participants who worked in 979 GVTs but was reduced to a sample of 1,102 participants across 415 teams due to missing data.

To identify what predicts who will emerge as a team leader in GVT, this paper will use partial least squares structural equation modeling (PLS-SEM). PLS-SEM has become a standard multivariate analysis technique to investigate causal-predictive relationships and is used to create path models with latent variables and to estimate their relationships (Hair, Risher, Sarstedt, & Ringle, 2019). PLS-SEM benefits predictive and exploratory purposes because the extraction of latent variable scores in conjunction with the explanation of a large percentage of the variance in the indicator variables are useful for accurately predicting individuals' scores on the latent variables. Thus, PLS-SEM has become a useful method for predictive modeling (Richter, Sinkovics, Ringle, & Schlaegel, 2016). We use the SmartPLS

3 software to run the PLS-SEM models (Ringle, Wende, & Becker, 2015). We then highlight the measurement model assessment and the structural model assessment.

4.2 Measures

Leadership role. The leadership role was assessed through participants' peer evaluation of a member's role in the team ("This person's role on the team?"). A score of 4 would indicate that the whole team would anonymously see the member as a formal leader, 3 would indicate informal leader, 2 would indicate a follower, and 1 would indicate no participating behavior. An average from all the peer evaluation of each team member was calculated at the end of the project.

Emotional intelligence. We measured emotional intelligence using the instrument by Wong and Law (2002), to operationalize four dimensions by 4 items each (total of 16 items): self-emotional appraisal (e.g., "I have a good sense of why I have certain feelings most of the time."), others' emotional appraisal (e.g., "I am sensitive to the feelings and emotions of others."), use of emotion (e.g., "I am always willing to take a moderate risk to get ahead.") and regulation of emotion (e.g., "I can always calm down quickly when I am very angry."). The items were measured on a scale from 1, "strongly disagree" to 5, "strongly agree".

Cultural intelligence. We measured cultural intelligence using the cultural intelligence scale (CQS) by Ang et al. (2007). We measured the four dimensions with their original items (except for one that was missing in the survey). Meta-cognitive CQ was assessed using three items (e.g., "I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me."), with one item not included in the survey ("I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds"). Cognitive CQ was assessed using six items (e.g., "I know the arts and crafts of other cultures." and "I know the rules for expressing nonverbal behaviors in other cultures."). Motivational CQ was assessed using five items (e.g., "I enjoy interacting with people from different cultures."). Behavioral CQ was assessed using five items (e.g., "I alter my facial expressions when a cross-cultural interaction requires it."). The items contributing to the cultural intelligence dimensions were measured on a scale from 1, "strongly disagree" to 5, "strongly agree".

Controls. We controlled for cultural values, international experience, English proficiency skills, age, gender, and team size. We measured cultural values using the cultural values scale developed by Yoo, Donthu, and Lenartowicz (2011), to measure the four key dimensions of the Hofstede framework (20 items): Masculinity was assessed using four items (e.g., "It is more important for men to have a professional career than it is for women"). Collectivism vs. Individualism was assessed using six items (e.g., "Individuals should sacrifice self-interest for the group"). Power distance was assessed using five items (e.g., "People in higher positions should avoid social interaction with people in lower positions".). Uncertainty avoidance was assessed using five items (e.g., "Instructions for operations are important"). All the items were measured on a scale from 1, "strongly disagree", to 5, "strongly agree". International experience was reported as the total time spent abroad for studying or for tourism (from "0-4 weeks" to "4 or more years"). English proficiency was operationalized as self-evaluations of participants' proficiency in listening, reading, speaking, and writing English (from 0, "very poor", to 10, "excellent"). Age was measured and categorized in age groups (from 1, "17-20", to 9, "60+"). Gender was measured and coded as 1 for males and 0 for females. Team size was the total number of members assigned to one team. Team size was controlled for because it is more probable for a member to become a leader in a small team than a big team.

5. Results

5.1 Descriptive statistics

The means, standard deviations (S.D.), and inter-correlations appear in table 2. The correlations among the intelligences (EQ and CQ) ranged between $r = 0.27$ and 0.62, $p < .01$. Behavioral CQ and Metacognitive CQ positively and significantly correlated with leadership emergence. Age ($r = .10$, $p < .01$) and language skills ($r = .16$, $p < .01$) positively correlated with leadership emergence; team size negatively correlated with leadership emergence ($r = -.18$, $p < .01$).

Table 2. Correlations among model variables.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.Age	2.20	1.12	-																
2.CQ Cogn	3.26	0.98	-.06	-															
3.CQ Behav	3.68	0.94	.04	.43**	-														
4.CQ Motiv	4.15	0.84	-.01	.39**	.46**	-													
5.CQ M.cogn	4.09	0.83	.02	.33**	.47**	.62**	-												
6.EQ OEA	4.08	0.74	-.01	.16*	.23**	.18**	.14**	-											
7.EQ SEA	4.13	0.76	.09*	.10*	.22**	.29**	.27**	.28**	-										
8.EQ UOE	4.23	0.73	.07*	.20**	.27**	.30**	.32**	.28**	.46**	-									
9.EQ ROE	3.98	0.85	.10*	.20**	.20**	.23**	.20**	.27**	.43**	.42**	-								
10.Gender	0.49	0.5	.03	.02	-.04	-.02	.01	-.06	.06	-.02	.11*	-							
11.Int. exp.	5.05	2.33	.14*	.08	.01	.04	.06	-.01	.08*	.11*	.11*	.10*	-						
12.Eng. prf.	9.33	0.77	.09*	-.01	.11**	.14*	.14**	.15*	.18**	.17**	.08	.08*	.07	-					
13.Collect.	3.54	1.02	.00	.11*	.12*	.22*	.16*	.03	.05	.03	-.04	-.04	.06	.16**	-				
14.Masc.	2.13	1.12	.04	-.03	-.04	-.10*	-.11*	-.03	-.09	-.08	-.01	.20**	.101*	-.06	.02	-			
15.PD	1.83	1.16	-.01	.02	-.08*	-.20*	-.14*	-.03	-.08	-.10	.00	.17**	.09	-.21**	-.11*	.44**	-		
16.UA	4.05	0.88	.08	.09	.22**	.24*	.24**	.08	.19**	.19*	.06	-.17**	.10*	.04	.06	-.05	-.11	-	
17.Team size	5.90	0.76	.09*	.06	-.02	.05	.00	-.08*	.02	.04	.07	.05	.16**	-.06	-.18**	-.00	.04	.03	-
18.Leader Role	2.19	1.01	.10**	.04	.12**	.06	.13**	.03	.05	.03	-.04	-.04	.06	.16**	.07	.02	-.11	.10	-.18**

N = 1,102. Age: 1 = 17-20, 2 = 21-24, 3 = 25-28, 4 = 29 - 32, 5 = 33 - 36, 6 = 37-40, 7 = 41 - 44, 8 = 45-48, 9 = 60+; Gender: 1 = Male, 2 = Female

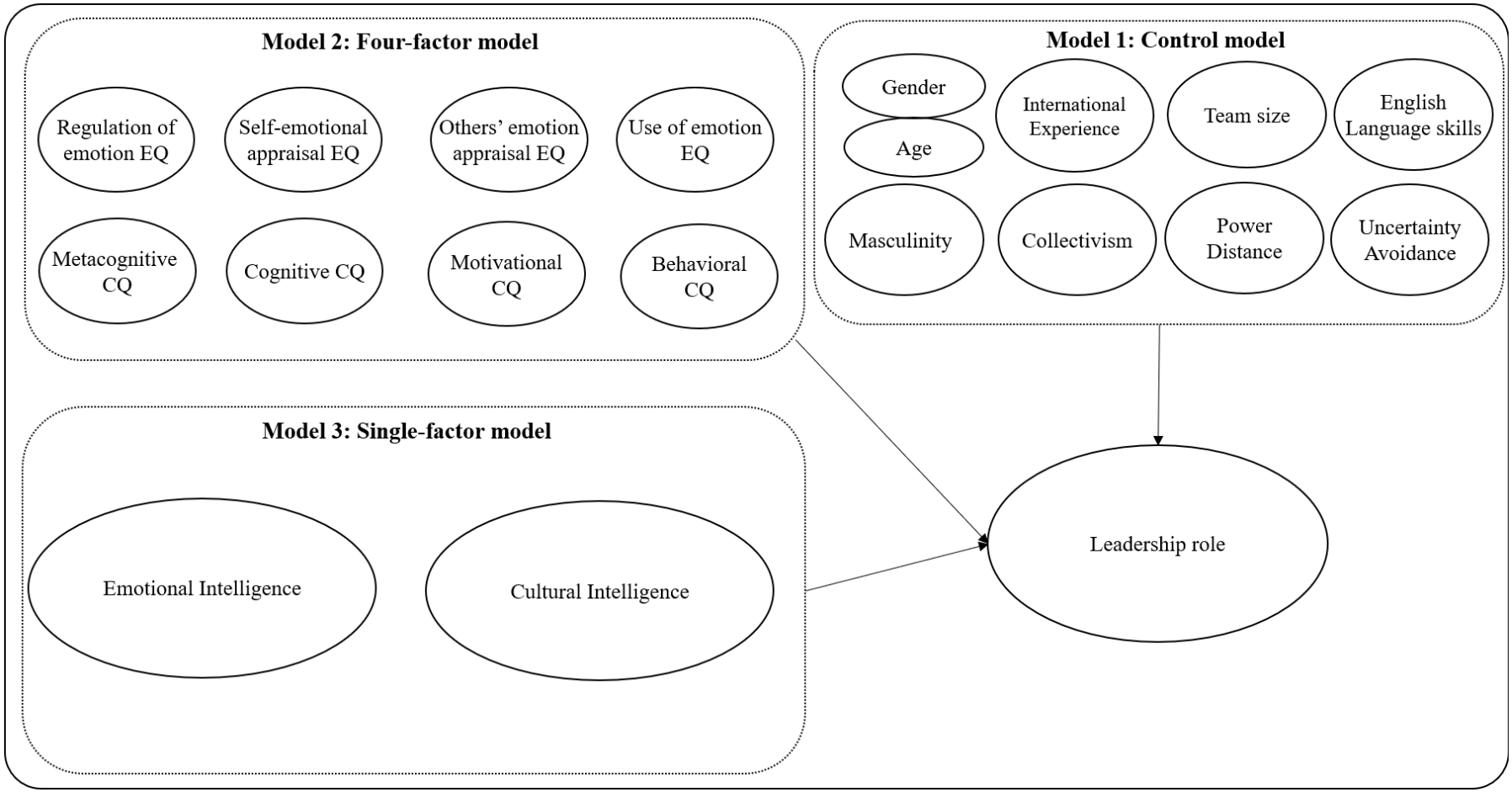
* p<0.05.

** p<0.01.

5.2 Measurement models

The first step is to examine the measurement models using criteria that differ between formative and reflective constructs (Hair et al., 2019). Our model comprises constructs that are measured as single items (age, gender, team size, leadership role), constructs with reflective measurement models (EQ, CQ, and cultural values), and a construct with a formative measurement model (international experience). We measured international experience with two indicators that each capture a specific aspect of the construct and together form the composite variable *international experience*, which fits the idea of a formative measurement model (Fornell & Bookstein, 1982). For both CQ and EQ, there are different approaches to empirically use the construct that range from using the individual dimensions to the aggregate construct or combinations of the two (see Rockstuhl & Van Dyne, 2018). We implement both the individual dimensions (the four-factor model) as well as the overall constructs (the single-factor model) and test two different types of models accordingly: Model 2 uses the four-factor structures of EQ and CQ, and Model 3 uses single-factor constructs of EQ and CQ.

Figure 1. Conceptual model



For the reflective measurement models, indicator loadings above 0.708 are recommended, as they indicate that a construct explains more than 50 percent of the indicator's variance (Hair et al., 2019). Of those that do not meet the minimum, loadings between 0.5 and 0.7 should be retained as long as composite reliability (CR) and average variance extracted (AVE) meet their required thresholds (Ogbeibu, Emelifeonwu, Senadjki, Gaskin, & Kaivo-oja, 2020). Discriminant validity is evaluated along with the heterotrait-monotrait (HTMT) criterion (Hair Jr., Hult, Ringle, & Sarstedt, 2016). Table 3 shows that the reflective measurement models are internally consistent reliable, with AVE values (AVE > 0.50) confirming convergent validity. Nearly all of the measurement items loaded above the required thresholds, and those items failing the initial thresholds received further testing and were kept whenever their removal did not improve internal consistency reliability. This led to two items to be dropped from the cultural values masculinity measure, one item from others' emotional appraisal EQ, and two items from self-emotional appraisal EQ. Additionally, there are no issues of multicollinearity (Hair et al., 2019).

Table 3. Evaluation of reflective measurement models

Construct & indicators	Loadings (> 0.7)	Indicator reliability (>0.5)	AVE (>0.5)	Composite reliability (>0.7)	Cronbach's alpha (0.6-0.9)	HTMT conf. inter. include 1
EQ: Regulation of emotion (ROE)						
I can always calm down quickly when I am very angry.	0.923	0.852				
I am quite capable of controlling my emotions.	0.746	0.557	0.634	0.837	0.763	no
I am able to control my temper and handle difficulties rationally.	0.703	0.494				
I have good control of my own emotions.[a]	*0.292*	*0.085*				
EQ: Self-emotional appraisal (SEA)						
I have a good sense of why I have certain feelings most of the time.	0.862	0.743				
I am very comfortable not knowing what the outcome will be of an action I have taken.	0.783	0.613	0.678	0.529	0.808	no
I have a good understanding of my own emotions.[a]	*0.396*	*0.157*				
I really understand what I feel.[a]	*0.203*	*0.041*				
EQ: Other's emotion appraisal (OEA)						

I always know my friends- emotions from their behavior.	0.829	0.687				
I am a good observer of others-emotions.	0.744	0.554	0.629	0.836	0.717	no
I have a good understanding of the emotions of people around me.	0.805	0.648				
I am sensitive to the feelings and emotions of others.[a]	*0.046*	*0.002*				
EQ: Use of emotion (UOE)						
I always tell myself I am a competent person.	0.632	0.399				
I would always encourage myself to try my best.	0.829	0.687	0.629	0.836	0.717	no
I am a self-motivated person.	0.801	0.642				
I always set goals for myself and then try my best to achieve them.	0.796	0.634				

Note: [a] Indicators were dropped due to weak loadings

Table 3. Evaluation of reflective measurement models (continued)

Construct & indicators	Loadings (> 0.7)	Indicator reliability (>0.5)	AVE (>0.5)	Composite reliability (>0.7)	Cronbach's alpha (0.6-0.9)	HTMT conf. inter. Include 1
CQ: Metacognitive CQ						
I check the accuracy of my cultural knowledge as I interact with people from different cultures	0.791	0.626				
I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me	0.783	0.614	0.682	0.865	0.775	no
I am conscious of the cultural knowledge I apply to cross-cultural interactions	0.898	0.807				
I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds.[a]	-	-				
CQ: Cognitive CQ						
I know the arts and crafts of other cultures	0.826	0.681				
I know the cultural values and religious beliefs of other cultures	0.836	0.699				
I know the rules (eg, vocabulary, grammar) of other languages	0.543	0.295	0.573	0.887	0.877	no
I know the legal and economic systems of other cultures	0.653	0.426				
I know the marriage systems of other cultures	0.778	0.605				
I know the rules for expressing nonverbal behaviors in other cultures	0.853	0.728				
CQ: Motivational CQ						

I am sure I can deal with the stresses of adjusting to a culture that is new to me	0.814	0.663				
I enjoy interacting with people from different cultures.	0.816	0.666				
I enjoy living in cultures that are unfamiliar to me	0.525	0.276	0.565	0.863	0.866	no
I am confident that I can get accustomed (get used) to the shopping conditions in a different culture	0.677	0.458				
I am confident that I can socialize with locals in a culture that is unfamiliar to me	0.868	0.754				
CQ: Behavioral CQ						
I alter my facial expressions when a cross-cultural interaction requires it	0.825	0.681				
I change my nonverbal behavior when a cross-cultural situation requires it	0.844	0.712				
I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.	0.724	0.524	0.647	0.901	0.865	no
I use pause and silence differently to suit different cross-cultural situations.	0.767	0.589				
I vary the rate (speed) of my speaking when a cross-cultural situation requires it	0.853	0.728				

Note: [a] not included in this study

Table 3. Evaluation of reflective measurement models (continued)

Construct & indicators	Loadings (> 0.7)	Indicator reliability (>0.5)	AVE (>0.5)	Composite reliability (>0.7)	Cronbach's alpha (0.6-0.9)	HTMT conf. inter. include 1
Cultural values: Masculinity						
There are some jobs that a man can always do better than a woman	0.941	0.885				
Solving difficult problems usually requires an active, forcible approach, which is typical of men	0.673	0.453	0.669	0.797	0.553	no
It is more important for men to have a professional career than it is for women[a]	*0.165*	*0.027*				
Men usually solve problems with logical analysis[a]	*0.399*	*0.159*				
Cultural values: Collectivism						
Group success is more important than individual success	0.562	0.316				
Group welfare is more important than individual rewards	0.566	0.321	0.39	0.792	0.715	no
Individuals should sacrifice self-interest for the group	0.689	0.474				

Group loyalty should be encouraged even if individual goals suffer	0.664	0.441				
Individuals should stick with the group even through difficulties	0.619	0.383				
Individuals should only pursue their goals after considering the welfare of the group	0.635	0.403				
Cultural values: Power Distance						
People in higher positions should avoid social interaction with people in lower positions	0.796	0.634				
People in higher positions should make most decisions without consulting people in lower positions	0.573	0.329				
People in higher positions should not delegate important tasks to people in lower positions	0.575	0.331	0.504	0.832	0.78	no
People in lower positions should not disagree with decisions by people in higher positions	0.709	0.503				
People in higher positions should not ask the opinions of people in lower positions too frequently	0.849	0.722				
Cultural values: Uncertainty Avoidance						
Instructions for operations are important	0.866	0.751				
It is important to have instructions spelled out in detail so that I always know what I am expected to do	0.711	0.506				
It is important to closely follow instructions and procedures	0.649	0.422	0.507	0.834	0.778	no
Rules and regulations are important because they inform me of what is expected of me	0.757	0.573				
Standardized work procedures are helpful	0.533	0.284				

Note: [a] Indicators were dropped due to weak loadings

Table 3. Evaluation of reflective measurement models (continued)

Construct & indicators	Loadings (> 0.7)	Indicator reliability (>0.5)	AVE (>0.5)	Composite reliability (>0.7)	Cronbach's alpha (0.6-0.9)	HTMT conf. inter. include 1
English proficiency						
How would you describe your ability to understand spoken English?	0.909	0.826	0.828	0.951	0.931	no
How would you describe your ability to understand texts written in English?	0.912	0.831				
How would you describe your ability to speak English?	0.931	0.867				
How would you describe your ability to write in English?	0.887	0.787				

For the formative measurement model, international experience, we refer to the indicator weights and their significance (Hair et al., 2019). Table 4 shows that the weights are not significant for study abroad ($p = 0.079$) or tourism ($p = 0.106$), but the loadings are significant ($p = 0.016$, $p = 0.023$). Indicators with a nonsignificant weight should be eliminated if the loading is not also significant. A low but significant loading of 0.50 and below should be considered removed (Hair et al., 2019). Both loadings are above the minimum threshold for the formative measurement model and can therefore be included in the structural models.

Table 4. Evaluation of formative measurement models

Construct & indicators	Weights (loadings)	t-value (loadings)	p-value (loadings)	95% Conf. inter. weights	Weight Sig.[a]	Loadings Sig.[a]
International experience						
Study abroad, total time	0.663 (0.818)	1.412 (2.156)	0.079 (0.016)	[-0.420; 1.032]	no	yes
Tourism, total time abroad	0.596 (0.768)	1.247 (1.992)	0.106 (0.023)	[-0.541; 1.021]	no	yes

Note: [a] To assess significance, we refer to the 95% BCa-confidence intervals.

5.3 Assessing the structural model

To proceed with examining the model fit and evaluate the PLS-SEM results, we assess the structural model. The standard assessment criteria are the coefficient of determination (R^2), the blindfolding-based cross-validated redundancy measure (Q^2), and the statistical significance and relevance of the path coefficients (Hair et al., 2019). It is also recommended to assess the model's out-of-sample predictive power using the PLSpredict procedure (Shmueli, Ray, Estrada, & Chatla, 2016). We use the PLS algorithm for the estimation of models, then the bootstrapping procedure to test the statistical significance (see table 5 for structural model results): The control model (Model 1) explains 7.2 % of the variance in leadership role ($R^2 = 0.072$, $R^2_{adjusted} = 0.061$), the four-factor model (Model 2) explains 10.7 % ($R^2 = 0.107$, $R^2_{adjusted} = 0.080$); and the single-factor model (Model 3) explains 9.5 % ($R^2 = 0.095$, $R^2_{adjusted} = 0.078$). These R-squared sizes can be considered weak, but given the context and nature of this study, the level of explanatory power fits to levels achieved in other, comparable studies (e.g., see Rockstuhl & Van Dyne, 2018). Both Model 2 and Model 3 show more explanatory power above and beyond the control model ($\Delta R^2_{four\text{-}factor} = 0.035$, $\Delta R^2_{single\text{-}factor} = 0.023$).

To test the model's out-of-sample predictive power (Shmueli et al., 2016), we use the PLSpredict procedure (see Table 6). We compare the root mean squared error (RMSE) and the mean absolute error (MAE) to the linear model (LM) benchmark, and check if the analysis found higher prediction errors for all (no predictive power), the majority (low predictive power), the minority or the same number (medium predictive power) or none of the indicators (high predictive power) (Hair et al., 2019).

Table 5. Structural model results

Construct	Model 1				Model 2				Model 3			
	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]
Gender	-0.036 (0.161)	0.991	[-0.092; 0.029]	No	-0.059 (0.08)	1.406	[-0.118, 0.019]	No	-0.059 (0.075)	1.439	[-0.117; 0.017]	No
Age	0.065 (0.034)	1.82	[0.001; 0.118]	Yes	0.099 (0.007)	2.496	[0.032; 0.165]	Yes	0.097 (0.007)	2.477	[0.033; 0.163]	Yes
International experience	0.077 (0.062)	1.541	[-0.065; 0.131]	No	0.076 (0.048)	1.67	[-0.013; 0.146]	No	0.072 (0.055)	1.602	[-0.014; 0.140]	No
English proficiency	0.141 (0.000)	4.132	[0.081; 0.194]	Yes	0.112 (0.002)	2.954	[0.046; 0.170]	Yes	0.108 (0.002)	2.857	[0.041; 0.164]	Yes
Team Size	-0.125 (0.000)	3.509	[-0.186; -0.070]	Yes	-0.174 (0.000)	4.623	[-0.238; -0.114]	Yes	-0.182 (0.000)	4.849	[-0.236; -0.113]	Yes
Masculinity	0.080 (0.071)	1.471	[-0.033; 0.151]	No	0.068 (0.142)	1.072	[-0.035; 0.172]	No	0.074 (0.122)	1.167	[-0.036; 0.171]	No
Collectivism	0.058 (0.134)	1.109	[-0.143; 0,089]	No	0.074 (0.120)	1.177	[-0.067; 0.161]	No	0.057 (0.182)	0.909	[-0.080; 0.148]	No
Power Distance	-0.094 (0.016)	2.147	[-0.130; 0.136]	Yes	-0.106 (0.022)	2.02	[-0.188; -0.041]	Yes	-0.102 (0.017)	2.123	[-0.181; -0.046]	Yes
Uncertainty Avoidance	0.040 (0.324)	0.458	[-0.154; 0.121]	No	-0.026 (0.344)	0.401	[-0.154; 0.121]	No	-0.020 (0.321)	0.321	[-0.140; 0.081]	No
EQ ROE					-0.078 (0.121)	1.172	[-0.173; 0.055]	No				
EQ SEA					0.047 (0.170)	0.953	[-0.047; 0.116]	No				
EQ OEA					-0.004 (0.472)	0.071	[-0.102; 0.086]	No				
EQ UOE					-0.031 (0.292)	0.547	[-0.106; 0.078]	No				
CQ M.cogn					0.117 (0.017)	2.126	[0.014; 0.194]	Yes				
CQ Cogn					0.028 (0.361)	0.357	[-0.121; 0.119]	No				
CQ Motiv					-0.073 (0.201)	0.837	[-0.212; 0.081]	No				
CQ Behav					0.068 (0.079)	0.357	[-0.008; 0.150]	No				
EQ									0.002 (0.492)	0.021	[-0.173; 0.129]	No
CQ									0.103 (0.033)	1.838	[0.059; 0.191]	Yes
R^2	*0.072*				*0.107*				*0.095*			
R^2 *adjusted*	*0.061*				*0.08*				*0.078*			
Q^2					*0.043*				*0.042*			

N = 587

Note: Significance testing in the PLS-SEM models is performed with 5,000 bootstrap samples. [a] To assess significance, we refer to the 95% BCa-confidence intervals given above.

The results indicate that all three models show predictive relevance ($Q^2 > 0$). The PLS-SEM predictions' RMSE values are smaller than those of the LM benchmark for leadership role ($\Delta control_{RMSE} = -0.007$, $\Delta four\text{-}factor_{RMSE} = -0.040$, $\Delta single\text{-}factor_{RMSE} = -0.044$). The predictions' MAE values are smaller than those of the LM benchmark for leadership role ($\Delta four\text{-}factor_{MAE} = -0.029$, $\Delta single\text{-}factor_{MAE} = -0.034$), except for the control model ($\Delta control_{MAE} = 0.000$). This comparison shows that the three models have predictive power (Hair et al., 2019).

Table 6. PLSpredict leadership role prediction summary

Endogenous construct's indicators	PLS-SEM			LM		PLS-SEM - LM	
	RMSE	MAE	$Q^2_{predict}$	RMSE	MAE	RMSE	MAE
Leadership role (control)	0.989	0.847	0.037	0.996	0.847	-0.007	0
Leadership role (four-factor)	0.981	0.832	0.031	1.021	0.861	-0.040	-0.029
Leadership role (Overall)	0.979	0.829	0.036	1.023	0.863	-0.044	-0.034

In the control model (Model 1), we find age ($\beta = 0.065;\ p < 0.05$) and English proficiency ($\beta = 0.141;\ p < 0.05$) positively and significantly associated with leadership role. Team size ($\beta = -0.125;\ p < 0.05$) and power distance ($\beta = -0.065;\ p < 0.05$) were found to be negative and significantly associated with leadership role. Gender ($\beta = -0.036;\ p > 0.05$), international experience ($\beta = 0.077;\ p > 0.05$), masculinity ($\beta = 0.080;\ p > 0.05$), collectivism ($\beta = 0.058;\ p > 0.05$) and uncertainty avoidance ($\beta = 0.040;\ p > 0.05$) were not significantly associated with leadership role.

We posited that the four-factor EQ and the four-factor CQ would predict the emergence of leadership and tested this in our Model 2. The results show that regulation of emotion ($\beta = -0.078;\ p > 0.05$), self-emotion appraisal ($\beta = 0.047;\ p > 0.05$), others' emotion appraisal ($\beta = -0.004;\ p > 0.05$) and use of emotion ($\beta = -0.031;\ p > 0.05$) were not significantly associated with leadership role. Hence, Hypothesis 1 is not supported. Metacognitive CQ was positively associated with leadership role ($\beta = 0.117;\ p < 0.05$), but cognitive CQ ($\beta = 0.028;\ p > 0.05$), motivational CQ ($\beta = -0.073;\ p > 0.05$) and behavioral CQ ($\beta = 0.068;\ p > 0.05$) were not. Hence, Hypothesis 2 is only partially supported. Age ($\beta = 0.099;\ p < 0.05$), English proficiency ($\beta = 0.112;\ p < 0.05$), team size ($\beta = -0.174;\ p < 0.05$), and power distance ($\beta = -0.106;\ p < 0.05$) were also significantly associated with leadership role. Gender ($\beta = -0.059;\ p > 0.05$), international experience ($\beta = 0.076;\ p > 0.05$), masculinity ($\beta = 0.068;\ p > 0.05$), collectivism ($\beta = 0.074;\ p > 0.05$) and uncertainty avoidance ($\beta = -0.026;\ p > 0.05$) were still not significantly associated with leadership role.

In the single-factor model (Model 3), we tested whether the single-factor EQ and single-factor CQ would predict leadership emergence as posited. The results show that the single factor-EQ ($\beta = 0.002;\ p > 0.05$) was not significantly associated

with leadership role, which again does not provide support to our Hypothesis 1. The single-factor CQ ($\beta = 0.103;\ p < 0.05$) was positively associated with leadership role, lending support to our Hypothesis 2. Age ($\beta = 0.097;\ p < 0.05$), English proficiency ($\beta = 0.108;\ p < 0.05$), team size ($\beta = -0.182;\ p < 0.05$), and power distance ($\beta = -0.102;\ p < 0.05$) were also significantly associated with leadership role. Gender ($\beta = -0.059;\ p > 0.05$), international experience ($\beta = 0.072;\ p > 0.05$), masculinity ($\beta = 0.074;\ p > 0.05$), collectivism ($\beta = 0.057;\ p > 0.05$) and uncertainty avoidance ($\beta = -0.020;\ p > 0.05$) were still not significantly associated with leadership role.

We also assessed the relative impact of predictive relevance by the blindfolding procedure, also referred to as *the effect size* q^2 (Hair Jr. et al., 2016), defined as:

$$q^2 = \frac{Q^2_{included} - Q^2_{excluded}}{1 - Q^2_{included}}$$

q^2 values of 0.02, 0.15, and 0.35, respectively, indicate that an exogeneous construct has a small, medium, or large predictive relevance for an endogenous construct. Only English proficiency ($q^2 = 0.017$), age ($q^2 = 0.020$) and team-size ($q^2 = 0.034$) were found to have predictive relevance for leadership role.

6. Discussion

6.1 Summary of findings

The results of our study indicated that EQ did not significantly explain nor significantly predict the emergence of a leadership role – neither when analyzed using a four-factor nor a single-factor operationalization (lending no support to Hypothesis 1).

Then, our findings indicated that CQ matters to leadership emergence in GVT, with the single-factor model demonstrating a significant association with a leadership role (lending support to Hypothesis 2). Testing the four-factor model, the results demonstrated that only metacognitive CQ was associated with the emergence of leadership (lending partial support to Hypothesis 2).

Finally, we found that English proficiency and age were positively significantly associated, while team size and power distance were negatively significantly associated with leadership role across all three models. Additionally, English proficiency, age and team-size were found to have predictive relevance for leadership role.

6.2 Implications for theory and research

We contributed to the existing body of leadership literature by further understanding the association of EQ and CQ with leadership emergence. There were several studies on the association of EQ with leadership emergence, but almost none that focused on CQ. Past research indicates that EQ and CQ matter to the success of leaders, and there are good theoretical arguments that both forms of intelligence are also relevant to leadership emergence. Building on socioanalytic theory (Hogan & Blickle, 2018), we outlined that individuals may be perceived stronger in their motivation to get along, get ahead, or to find meaning in their teams when their EQ and CQ are higher; and this is theorized to contribute to the emergence of leadership.

A reason for the difference in the association between EQ and CQ with leadership emergence might be that members who work in GVT may first and foremost encounter cultural rather than emotional challenges. GVT function using virtual collaboration for a short duration of time, making team members have more cultural-laden processes instead of emotion-laden processes. In theory, individuals with higher EQ have increased emotional perception, emotional processing, and emotional reflection for handling team members' emotion-laden processes. While of relevance to the success of leaders, this seems to be less relevant when it comes to predicting leadership emergence in a GVT setting. Our results support similar findings where CQ mattered more than EQ in cross-border settings (i.e., EQ matters more for domestic-leadership, see Rockstuhl et al., 2011).

Our findings are in general consistent with what Lisak and Erez (2015) found: individuals that portray high global leadership characteristics (i.e., CQ) are perceived by their team members as more worthy to the global work context, hence appointed by their team members as the team leader. Still, the explanatory power of the model remains low, and an assessment of the predictive relevance of CQ showed that the practical relevance of CQ and metacognitive CQ in predicting the

emergence of leaders is not given. Hence, in the multicultural non-face-to-face setting, CQ and especially metacognitive CQ may enable individuals to reflect on their behavior, plan ahead, and find meaning through cultural interactions, but these abilities only to a marginal extent translate into leadership emergence. In contrast, skills and factors that we controlled for demonstrated more relevance: that is, better language skills and being older.

Our study suggests that language skills and demographic factors such as age are more important than EQ and CQ to the emergence of leadership. That is, surface-level characteristics seem to play a stronger role in the emergence of leadership in GVT. The appropriate language skills can address team conflict, aid performance-based tasks, and foster social interactions right away. Moreover, GVT members can perceive the potential leader's age as an indicator of experience and skills. While deeper-level factors, such as CQ and EQ, may matter to team-processes, they seem to not contribute as strong as surface-level factors to the emergence of leadership. These findings offer two first starting points for future research: First, researchers may test the underlying mechanisms outlined in socioanalytic theory in the context of leadership emergence, ideally by developing research designs that enable direct measurement of the facets of getting along, getting ahead, and finding meaning. Second, researchers may further explore the role of deep-level versus surface-level factors in the context of leadership emergence in GVT.

Finally, the low predictive relevance of EQ and CQ is somewhat surprising, and we call for future research that further analyses their role in leadership emergence. Authors argue that it may be fruitful to look at a combination of, or configurations of, traits and competencies (EQ and CQ), instead of considering these factors separately (Bergman & Magnusson, 1997). This may involve – among others – the exploration of individual EQ and CQ profiles. That is, specific patterns of EQ and CQ strengths among an individual that matter to becoming a leader. In addition, it may be that it is not about an ever higher EQ and ever higher CQ to emerge as a leader, but about a necessary minimum level that needs to be there as a must-have factor for leadership to emerge, which may call for a combination of sufficiency and necessity logic in developing research designs (e.g., Richter, Schubring, Hauff, Ringle, & Sarstedt, 2020).

6.2 Implications for managerial practice

Our study demonstrates that individuals with high CQ and high EQ that may have beneficial effects on the team and its outcomes do not automatically emerge as team leaders. That is, if the management lets the team decide who should lead, the leadership structure will most probably differ considerably from the structure that a manager would actively choose for the team to perform best.

A leader emerges because the individual becomes influential in the view of followers and is perceived as more leaderlike (Hogan et al., 1994), and in GVTs, this is most dominantly the case for individuals with strong language skills and higher age. To a lesser extent, this is induced by CQ and a low power distance attitude of individuals. Hence, leadership structures may emerge that lack relevant individual factors (i.e., EQ and CQ) that have a proven record of being positively associated with team outcomes such as satisfaction and performance, and instead have more of relevant surface-level characteristics (i.e., English proficiency and age).

We advise managers to carefully consider which projects and tasks they will leave the leadership structure to emerge more informally. For GVT that lack management or formal structures, managers must pay attention to the leadership structures that emerge. A leadership structure that lack the individual factors (i.e., EQ and CQ) relevant for the projects and tasks can be potentially non-optimal, potentially reduce performance-results, increase intra-team conflict, hinder team communication and induce a mixture of unmet expectations within the team (Jarvenpaa & Leidner, 1999). Even if there are individuals in the team that bring the relevant individual skills, including factors such as age, and language skills, certain cultural value patterns, such as high power distance, may prevent them from emerging as leaders. Hence, for projects of specific and strategic relevance, the management is advised to actively engage in the creation of leadership structures that follow findings from the rich field of leadership success.

6.3 Limitations and future directions

To the best of our knowledge, this is the first study to empirically compare EQ and CQ with leadership emergence in GVTs. This study is not without limitations that should be addressed and can serve as a reference for future directions. First, our study uses ability-based self-report/peer-evaluation measures and not ability-based judgment tests of EQ and CQ. Both instruments of EQ and CQ are validated and reliable, but self-report/peer-evaluation measures can be biased by the individuals' beliefs of their emotional and cultural abilities rather than their actual abilities. Ability-based judgment tests of EQ (see MSCEIT by Mayer et al., 2004) and CQ (see situational judgment tests by Rockstuhl, Ang, Ng, Lievens, & Van Dyne, 2015) would have a lower risk of fake or socially desirable responses.

Second, our leadership emergence model is based on individual predictions of the characteristics, though there may be arguments that it is less about individual characteristics separately but about joint effects or archetypes of individual factors (e.g., Richter, Hauff, et al., 2016; Schlaegel, Richter, & Taras, 2017). We acknowledge that this may be a limitation that was out of the scope of this study and encourage future research to test possible combinations, configurations, or patterns of these characteristics for which procedures such as qualitative comparative analyses or necessary condition analysis could be beneficial avenues (see Dul, 2016; Richter & Hauff, 2019).

Third, we used socioanalytic theory (Hogan & Blickle, 2018) to outline a leadership emergence model using EQ and CQ. Our leadership emergence model suggests individuals are more motivated to get along, get ahead, or find meaning in their teams when their EQ or CQ is higher. However, our study did not test the three motivators to lead directly. Future research should test and use the three motivators to lead (get along, get ahead, and find meaning) with EQ and CQ to further test our theoretical arguments.

Fourth, also personality traits were previously found to be predictors of leadership emergence (Judge et al., 2009) that we were unable to incorporate into our model (due to the unavailability of the relevant measures). Future research is encouraged that further compares the relevance of personality traits (e.g., emotional stability, openness to experience, or self-confidence) with the relevance of EQ and CQ in predicting leadership emergence.

Finally, participants in this study were business students (also including MBAs) who developed solutions to real-life business challenges. Other similar studies have also used students that may or may not complete the assignment as partial fulfillment for their course requirements (Lisak & Erez, 2015). The use of student samples has been discouraged by several editorial policies and by scholars in the literature, yet they become appropriate when used to study aspects of human nature and propensity that can explain specific phenomena in an international setting. Any sample of multicultural teams, including students, can undergo fundamental research that looks at underlying processes of human cognition and behavior (Bello, Leung, Radebaugh, Tung, & van Witteloostuijn, 2009). In this study, we use a homogenous sample (business students) to compare the predictive relevance of EQ and CQ above and beyond further predictors, such as cultural values, language skills, and international experience (that we control for). Nonetheless, future research is invited to validate our findings by examining EQ and CQ in fixed, long-term GVT in organizations.

7. Conclusion

We examined the individual factors that predict whether or not individuals will emerge as leaders in the context of global virtual teams (GVT) using EQ and cultural intelligence CQ as two contemporary concepts relevant to leadership success. We reviewed previous empirical research papers on the associations between EQ and/or CQ and leadership and observed limited investigations to that of leadership emergence. Building on socioanalytic theory, we hypothesized how individuals with higher levels of EQ and CQ have a higher probability of emerging as team leaders. We tested the hypotheses in a sample of individuals who participated in an virtual international collaboration project. Using structural equation modeling, the results revealed that individuals who had higher CQ more likely emerged as leaders. Our findings did not support the relevance of EQ. In addition, individual factors such as English proficiency, a higher age, and a lower power distance were also associated with leadership emergence.

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Essay/Paper 3:
Necessary Conditions To Emerge As A Leader In Global Virtual Teams

Necessary Conditions To Emerge As A Leader In Global Virtual Teams

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Abstract: In this study, I complement the findings from Lankut et al. (unpublished) by examining EQ, CQ and leadership emergence, in global virtual teams (GVT), through a necessary condition analysis (NCA). I test whether a difference in the two logics, sufficiency versus necessity, can explain the initial finding that CQ and EQ do not significantly matter to leadership emergence. The sufficiency logic regards independent variables as not necessary but sufficient to increase the outcome, while the necessity logic regards independent variables as constraints, bottlenecks, or critical factors at the right levels for the outcome to occur. Building on necessity logic, I hypothesized that EQ and CQ are a necessary condition for the individual to emerge as a leader. The hypotheses were tested on the same sample with NCA, and the results revealed that EQ and CQ as necessary conditions are not supported. Instead, individual factor such as English Proficiency was found as meaningful condition for leadership to emerge.

Keywords: *Leadership emergence, emotional intelligence, cultural intelligence, global virtual teams, necessary condition analysis (NCA)*

1. Introduction

Lankut et al. (unpublished) examined the individual factors that predict whether individuals will emerge as leaders in the context of global virtual teams (GVT), a team structure which often lack a more formal leadership structure. The focus on the analysis was on emotional intelligence (EQ) and cultural intelligence (CQ) with leadership emergence. EQ can be defined as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Salovey & Mayer, 1990, p. 189). EQ is argued to be relevant to leadership, as "leadership is an emotion-laden process, both from a leader and follower perspective" (George, 2000, p. 1046). It is also commonly supported that emotionally intelligent individuals are more likely to emerge as leaders (Walter, Cole, & Humphrey, 2011). EQ contains four dimensions: Regulation of emotion (ROE), the ability to regulate emotions; self-emotional appraisal (SEA), the ability to understand deep emotions and express these freely; others' emotional appraisal (OEA), the ability to observe and understand emotions of other people; and, use of emotion (UOE), the ability to use emotions on meaningful activities and performance (Wong & Law, 2002). Ang and Van Dyne (2008) and Earley and Ang (2003) define CQ as the capability to succeed in complex cross-cultural environments through knowledge or cognition, motivation, and behaviors. CQ includes four dimensions: Metacognitive CQ, the mental capability to acquire and understand cultural knowledge; cognitive CQ, the general knowledge and knowledge structures about culture; motivational CQ, the capability to focus energy towards learning about and functioning in different intercultural situations; and behavioral CQ, the capability to perform appropriate actions in different cultural encounters (Ang & Van Dyne, 2008; Earley & Ang, 2003). Because GVT work cross-culturally, GVT poses cross-cultural challenges to the teamwork. Groups are composed of members with different cultural backgrounds and are faced with different perceptions of the rules of interaction or meaning that is attributed to situations and behaviors. Individuals need to be able to navigate this cross-cultural context in order to be perceived leaderlike (Marinova, Moon, & Kamdar, 2013).

Built on socioanalytic theory, Lankut et al. (unpublished) hypothesized that individuals with higher levels of EQ and CQ should have a higher probability of emerging as team leaders. The hypotheses were then tested on a sample of 1,102 participants of a virtual international collaboration project using structural

equation modeling (PLS-SEM). The results were surprising, but disappointing as it did not support the majority of hypotheses: EQ did not significantly explain nor significantly predict the emergence of a leadership role – neither when analyzed using a four-factor (the individual dimensions) nor a single-factor (overall construct) operationalization. The results indicated that (single-factor) CQ mattered to leadership emergence in GVT. The four-factor model was also tested, and the results demonstrated that metacognitive CQ explains the emergence of leadership. However, the explanatory power of the model was low and an assessment of the predictive relevance of CQ showed that the practical relevance of CQ and metacognitive CQ in predicting the emergence of leaders was not given. Contrary to my expectations, skills and factors that the study controlled for demonstrated more relevance: that is, better English proficiency, and a higher age.

Past empirical findings clearly indicated that EQ was associated with leadership emergence (Cote, Lopes, Salovey, & Miners, 2010). Also, few studies on CQ indicated that CQ was associated with leadership emergence (Lisak & Erez, 2015). Moreover, there are good theoretical arguments that global leaders should have a combination of multiple intelligences (EQ and CQ) to achieve "successful leadership" (Alon & Higgins, 2005). Therefore, the objective of this study is to further investigate into the role of EQ and CQ on leadership emergence. One possible explanation for the conflicting results in Lankut et al. (unpublished) is that EQ and CQ are must-have and not should-have factors: that is, EQ and CQ are factors that are necessary and not only sufficient for leadership emergence. Lankut et al. (unpublished) applied partial least squares structural equation modeling (PLS-SEM) and followed a sufficiency logic, where the determinants are sufficient, but not necessary, for the outcome to occur. Typical associations from a sufficiency logic are interpreted as *an increase in A will lead to an increase in B.* In contrast, necessity logic considers the outcome to only exist if the determinant exists (Hauff, Guerci, Dul, & van Rhee, 2021). That is, *if A is not satisfied, B will not exist.* Commonly used data-analytic techniques (OLS, regressions, multilevel models, structural equations modeling) typically operate on the sufficiency logic, and hence they are not able to identify necessary conditions. Necessity logic can help IB researchers to gain better understanding of "causal" effects when investigating an outcome (Aguinis, Ramani, & Cascio, 2020). A variable (e.g., CQ) can both be a determinant or driver of an outcome from a sufficiency logic, or a necessary or bottleneck condition for an outcome from a necessity logic. To

identify if a variable constitutes a driver/should-have factor, methods such as regressions, correlations and structural equations modelling are used. To identify if a variable constitutes a necessary condition/must-have factors, methods such as necessary condition analysis (NCA) are used. Additionally, Richter, Martin, Hansen, Taras, and Alon (2021) have called for more empirical research testing whether CQ is a necessary condition for different mechanisms to specific outcomes (e.g., team success, see Richter et al., 2021). Thus, in this study, Lankut et al. (unpublished)'s findings are complemented by examining EQ, CQ and leadership emergence through NCA (Dul, 2020). Hence, I test whether a different logic may be an explanation for the finding that CQ and EQ do not significantly matter to leadership emergence. Therewith, I test the robustness of the empirical findings in Lankut et al. (unpublished).

I begin by outlining the key differences between sufficiency and necessity logic. I then outline and theorize EQ and CQ as necessary conditions for leadership emergence. Next, I describe in detail the necessary condition analysis procedure before I present and discuss the results. Then I conclude with this study's implications for research and practice and recommend directions for future research.

2. Theory

2.1 Sufficiency versus Necessity logic

In International Business (IB) research, many authors have referred to necessary conditions in theorizing different IB outcomes, while most of the classical research procedures underlie the sufficiency logic (Richter & Hauff, 2019). Also, in human resource management (HRM) research, research results are interpreted with two different logics: One being the *sufficiency logic* that to increase the outcome, independent variables are considered as not *necessary* but *sufficient.* For example, leadership emergence can be reduced if CQ is not present, thus allowing EQ to be effective and replace CQ (Hauff et al., 2021). The second logic is the *necessity logic*, where a "necessary cause allows an outcome to exist; without the necessary cause, the outcome will not exist" (Dul, 2016, p.11). In other words, the necessary variable is a constraint, bottleneck, or critical factor that must be used at the right levels in order for the outcome to occur; if the necessary condition is not in place,

the outcome cannot exist (Hauff et al., 2021). Table 1 illustrate the difference between sufficiency condition logic and necessity condition logic. Results from regression-based methods (e.g., regression, or structural equations modelling) are typically interpreted from a sufficiency logic, where any input adds up and compensates for each other in predicting an outcome, even with inputs being absent (or zero). For example, a typical multiple linear regression can be expressed as the additive model $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \ldots$, where causality is *additive,* and the input add up to cause the outcome. A practical example of sufficiency logic can be where a low score on CQ-behavioral dimension below the required levels can be compensated for by having a higher score on CQ-motivational dimension (Dul, 2016). In contrast, following necessity logic the outcome cannot simply exist if a single necessary condition is missing or below a certain level (Goertz & Starr, 2003). For example, necessary causality can be expressed as a multiplicative phenomenon, where $Y = X_1 \times X_2 \times X_3 \ldots$. A practical example of necessity logic can be that if the CQ-behavioral dimension score is below the required desired level, the outcome can fail regardless of the other CQ-dimension scores. A necessary cause is a constraint or a bottleneck that must be managed for the desired outcome to happen (Dul, 2016). One cannot use regression-based methods to test for necessary conditions. The two logics are fundamentally different, thus require two different empirical methods. Lankut et al. (unpublished) used PLS-SEM and hence followed a sufficiency logic, where the inputs EQ and CQ were sufficient but not necessary for leadership emergence to occur. Hence, this study will explore whether EQ or CQ are *necessary* for leadership emergence to occur in GVT, using necessary condition analysis (NCA, Dul, 2020).

Table 1. Sufficiency logic versus necessity logic

	Sufficiency logic	**Necessity logic**
Example hypothesis	The presence of variable X affects the outcome Y	The presence of variable X is a necessary condition for the outcome Y to occur; Y does not exist without X
Example finding	Results show higher levels of variable X increase the probability of the outcome Y to occur	Results find variable X as a meaningful necessary condition for outcome Y to occur
Example analysis technique	Multivariate regression, SEM	NCA

2.2 EQ and CQ as necessary conditions to leadership emergence

At first, I start by outlining the necessity logic for the determinants that I use, in particular *EQ* and *CQ*. Very few scholars in the CQ field argue that CQ makes up the necessary capabilities that an individual need to effectively perform where cultural diversity exists (Presbitero, 2019). Richter et al. (2021) proposed that motivational CQ of team members are a must-have for social integration. In contrast, I found no explicit statements on EQ as a necessary capability in the literature. I reviewed the key studies on EQ and CQ with leadership emergence in Lankut et al. (unpublished), and find several arguments where they follow the notion that both constructs are must-have (for an overview of statements, see table 2). Some formulations imply an approach to necessity logic where the level of necessity ranges from implicit to explicit: that is, some formulations are directly following a necessity logic in the theorization, clearly stated by the authors. Other formulations are indirectly following a necessity logic, where authors may "agree" with the logic. For example, both studies by Cote et al. (2010) and Lisak and Erez (2015) formulate EQ or CQ as a necessity for leadership emergence on a stronger level (e.g. "allow", "should", "enables", "essential"). I also found that some of the studies (e.g., Charbonneau & Nicol, 2002; Siegling, Nielsen, & Petrides, 2014; Wolff, Pescosolido, & Druskat, 2002) formulated EQ as a necessity for leadership emergence on a implicit level and more indirect. That is, these studies "agree" with previous proposals or arguments that is of necessity logic. It is unclear whether these formulations are unintended or indicate an implied necessity logic.

According to Dul, Hak, Goertz, and Voss (2010), these formulations imply necessity: if the necessary condition is not present, the outcome is not possible. However, a necessary condition that is present will not always guarantee the outcome to occur, "*but only that the outcome has become possible"* (Dul et al., 2010, p. 1172). Hence, the notion exists, that EQ and CQ are necessary conditions for leadership emergence to occur: EQ cannot be substituted by individual differences for leadership emergence (Cote et al., 2010); and CQ can differentiate emergent global leaders from other team members (Lisak & Erez, 2015). None of the studies on leadership emergence has actually tested the implied necessity, which is a typical phenomenon in many research areas (e.g., see Hauff et al., 2021) Thus, another contribution of this study is to perform a necessary condition analysis (NCA) using EQ and CQ as necessary conditions for leadership emergence.

Table 2. Review of necessary condition formulations

Author	Hypotheses	Necessary condition formulations*
Charbonneau and Nicol (2002)	EQ → leadership role	Follow that leaders **need** to show empathy towards their subordinates in order to be effective in two-way communication, in delegating responsibilities, and in attending to individual differences in needs (Megerian & Sosik, 1996) (p.1104)
Wolff et al. (2002)	Empathy EQ →leader behavior → emergent leadership	Propose what underlies an emergent leaders's ability to perceive and understand the team's task and member's needs is a **critical** component of emotional intelligence labeled empathy (Gardner, 1983; Goleman, 1995; Mayer, DiPaolo, & Salovey, 1990; Salovey & Mayer, 1990) (p.510)
Cote et al. (2010)	EQ → leadership emergence	"We propose that emotional intelligence explains variance in leadership emergence that **is not accounted for** by these individual differences." (p.498) "Equipped with the ability to perceive others' emotions and to understand the distinctions among them, emotionally intelligent individuals may gain considerable knowledge of other group members' attitudes, goals and interests. This knowledge **allow** them to influence the other group members by identifying, understanding, and addressing their unstated needs (George, 2000; Wolff et al., 2002)" (p.498) "By selecting and implementing the most effective strategies, emotionally intelligent individuals **should** achieve a pronounced influence on others' emotions, and emerge as leaders as a result." (p.498).
Hong, Catano, and Liao (2011)	EQ → leadership emergence (mediated by MTL)	*No clear necessary condition formulations*
Siegling et al. (2014)	Trait EQ → leadership role	"While these findings require replication on other samples and industries, they provide initial evidence to suggest that the range of personality traits linked to emotions is **fundamental** in occupational roles involving the supervision of, and responsibility for, others." (p.67)
Lisak and Erez (2015)	CQ / Global Identity / Openness to cultural diversity → leadership emergence	"Thus, the unique global context in which they work demands that multicultural leaders have unique characteristics that **enables** them to influence followers' perceptions and emerge as masters of the global environment (Zander, Mockaitis, & Butler, 2012)" (p.5) "CQ is therefore considered to be an **essential** learning capability that leaders use to translate their global experiences, characteristics, and behaviors into experiential learning, adjustment and effectiveness." (p. 6) "We propose that CQ **differentiates** emergent global leaders from other team members" (p.6)

*Based on necessary conditions hypotheses formulations by Dul et al. (2010).

Lankut et al. (unpublished) used socioanalytic theory to differentiate three motives and behaviors that are key in the leadership emergence process: Getting along (communion) is the behavior that seeks to achieve approval of others, improve cooperation, and build and maintain relationships. Getting ahead (agency) is the result-oriented behavior that advances members within the group and the group within its competition. Finding meaning is the behavior that seeks stable, predictable, and meaningful social interactions in everyday living (Hogan & Holland, 2003; Hogan & Blickle, 2018). Lankut et al. (unpublished) hypothesized that individuals with high EQ and CQ may be more motivated and able to get along, get ahead or to find meaning in their teams and therewith emerge as leaders *using a sufficiency logic* – EQ, CQ and other determinants were potentially able to add up together to predict leadership emergence. In this study, I argue that EQ and CQ may also be necessary conditions for leadership emergence, and this require new logic in the hypothesizing:

2.3 Emotional intelligence as a necessary condition

Following the implicit indications outlined above, that EQ is a predictor for leadership emergence, I outline that EQ is a necessary condition for leadership emergence. I believe that EQ is necessary for an individual to get along or find meaning to emerge as a leader. Without EQ an individual can hardly get along or find meaning. In global virtual teamwork, EQ is the individual members ability to check your own and others' feelings and emotions, understanding the differences in the emotions and follow up with an appropriate action (Salovey & Mayer, 1990). First, EQ will be a *necessary condition* for the individual to *get along*: the ability to regulate emotions (ROE), express emotions (SEA), understand other people's emotions (OEA), and use emotions correctly (UOE) (Wong & Law, 2002) will be a *necessary condition* for the individual to make the team get along. If a team member does not have the necessary ability to manage and address members' conflicting emotions and provide a solution, the group will not approve the individual as a leader. For good social relationships to exist, the individual needs abilities to regulate, express and use emotions correctly. If the abilities are not there, the individual is not able to get along and emerge as a leader. Second, EQ will be a *necessary condition* for the individual to *find meaning*: the ability to express emotions (SEA), understand other people's emotions (OEA), and use

emotions correctly (UOE) (Wong & Law, 2002) will be a *necessary condition* for the individual to make the team find meaning. If the individual does not have EQ and the ability to explain and see other members' emotion, it will be unable to create and foster positive social interactions within the team. If the abilities are not there, the individual is not able to find meaning and emerge as a leader.
In summary, I expect that EQ is a necessary condition for the individual to emerge as a leader:

Hypothesis 1: EQ is a necessary condition for the individual to emerge as a leader in the team.

2.4 Cultural intelligence as a necessary condition

Following the implicit indications outlined above, that CQ is a predictor for leadership emergence, I outline that CQ is a necessary condition for leadership emergence. I believe that CQ is necessary for an individual to get along, get ahead or find meaning to emerge as a leader. Without CQ an individual can hardly get along, get ahead or find meaning. In global virtual teamwork, CQ is the individual capability to succeed in complex cross-cultural environments through knowledge or cognition, motivation, and behaviors (Ang & Van Dyne, 2008; Earley & Ang, 2003). First, CQ is a *necessary condition* for the individual to *get along:* the capability to obtain and understand cultural knowledge (metacognitive CQ), have general cultural knowledge (cognitive CQ), the capability to direct attention towards learning about and functioning in different intercultural situations (motivational CQ), and use appropriate behavior (behavioral CQ) will be a necessary condition for the individual to get the team ahead. If a team member does not have the necessary ability to manage and address members' conflicting cultural differences and provide a solution, the group will not approve the individual as a leader. For good social relationships with culturally different others, the individual needs abilities to acquire, process and demonstrate cultural understanding. If the abilities are not there, the individual is not able to emerge as a leader. Second, CQ is a *necessary condition* for the individual to *get ahead:* the capability to obtain and understand cultural knowledge (metacognitive CQ), have general cultural knowledge (cognitive CQ), the capability to direct attention towards learning about and functioning in different intercultural situations(motivational CQ), and use appropriate behavior (behavioral CQ) will be a necessary condition for the individual to get the team ahead: these capabilities

will be necessary for the individual to adapt a result-oriented behavior that can best improve the members within the group (intracultural), and the group within its competition (intercultural). If the capabilities are not there, the individual is not able to get ahead and emerge as a leader. Third, CQ is a *necessary condition* for the individual to *find meaning*: the capability to obtain and understand cultural knowledge (metacognitive CQ), have general cultural knowledge (cognitive CQ), the capability to direct attention towards learning about and functioning in different intercultural situations(motivational CQ), and use appropriate behavior (behavioral CQ) will be a necessary condition for the individual to get the team ahead. If the individual does not have CQ and the ability to understand and see cultural interaction and expression, it will be unable to create and foster positive social interactions within the team. If the abilities are not there, the individual is not able to find meaning and emerge as a leader.

In summary, I expect that CQ is a necessary condition for the individual to emerge as a leader:

Hypothesis 2: CQ is a necessary condition for the individual to emerge as a leader in the team.

3. Methodology

3.1 Necessary condition analysis (NCA)

Necessary condition analysis (NCA; Dul, 2016) is a technique for researchers to develop and test necessary but not sufficient conditions (Dul, van der Laan, & Kuik, 2020). NCA is a fundamental different technique, because it identifies single necessary causes instead of focusing on average trends of multiple predictors (Hauff et al., 2021). A necessary condition enables the outcome to be present or constrain the outcome if absent. By assumption that outcome Y is bound by condition X, NCA will draw a ceiling line on top of the data in an XY scatter plot, and the line draws out the empty space in the upper-left corner (see appendix for scatter plot figures). The purpose of the ceiling line is to separate the empty zone from the full zone as accurately as possible. There are also two different ceiling techniques, ceiling envelopment and ceiling regression, but the specific envelopment technique with free disposal hull (CE-FDH) is recommended as it does not require many assumptions and is flexible in the application to necessary

conditions. (Dul, 2016). The size of the empty upper-left corner relative to the total space with observations (or cases) illustrate the extent of the constraint X poses on Y: the bigger the empty space, the more X constrains Y (Dul et al., 2020). More specifically, the necessary condition's effect size (*d*) is the size of the ceiling zone (the empty space) as a fraction of the total size of the area where observations are expected, given by the scope of the values of X and Y. NCA considers effect sizes above 0 as meaningful given the research context (Vis & Dul, 2018). Dul (2020) offer the following benchmarks to interpret effect sizes: small effect ($0 < d < 0.1$), medium effect ($0.1 < d < 0.3$), large effect ($0.3 < d < 0.5$) , and very large effect ($d \geq 0.5$). NCA can be used for significance tests for testing the randomness of the effect size. Specifically, NCA allow users to calculate a *p* value that aims to answer if "the observed effect size is the result of random chance" by answering with "with a probability less than *p*" (Dul et al., 2020). Besides the XY scatter plot, NCA also produces bottleneck tables that can be used for formulating the necessary condition *in degree* (Dul, 2016). That is, what are the specific levels of x that are necessary for levels of Y (for illustrative example, see Richter, Schubring, Hauff, Ringle, & Sarstedt, 2020, p. 2246).

I applied NCA using R and the package NCA (Dul, 2018). I obtained the NCA results (on the PLS-SEM latent variable scores) using the following settings (Richter et al., 2020): the default ceiling technique "ceiling envelopment-free disposal hull" (ce-fdh) ceiling line, and 10.000 permutations to generate significance levels (Dul, 2020).

3.2 Sample and data collection

I use the same sample from Lankut et al. (unpublished) of data from a large-scale virtual international collaboration project. Participants are put into virtual teams, of four to eight members that typically all come from a different country, to develop solutions to real-life business challenges. The project is a "simulation" of current business practices, and the task included market research, market entry plan development, and product design. The project had a duration of ca. nine weeks, and our participants come from more than 50 countries. The initial sample included 4,851 participants who worked in 979 GVTs but was reduced to a sample of 1,102 participants across 415 teams due to missing data.

3.3 Measures

As Lankut et al. (unpublished) confirmed, each measure that were tested for reliability and validity satisfied the relevant requirements. Additionally, the constructs scores from the PLS-SEM can also be also used for NCA (see Richter et al., 2020).

Leadership role. The leadership role was assessed through participants' peer evaluation of a member's role in the team ("This person's role on the team?"). A score of 4 would indicate that the whole team would anonymously see the member as a formal leader, 3 would indicate informal leader, 2 would indicate a follower, and 1 would indicate no participating behavior. An average from all the peer evaluation of each team member was calculated at the end of the project.

Emotional intelligence. Emotional intelligence was measured using the instrument by Wong and Law (2002), to operationalize four dimensions by 4 items each (total of 16 items): self-emotional appraisal (e.g., "I have a good sense of why I have certain feelings most of the time."), others' emotional appraisal (e.g., "I am sensitive to the feelings and emotions of others."), use of emotion (e.g., "I am always willing to take a moderate risk to get ahead.") and regulation of emotion (e.g., "I can always calm down quickly when I am very angry."). The items were measured on a scale from 1, "strongly disagree" to 5, "strongly agree".

Cultural intelligence. Cultural intelligence was measured using the cultural intelligence scale (CQS) by Ang et al. (2007). The scale measured the four dimensions with their original items (except for one that was missing in the survey). Meta-cognitive CQ was assessed using three items (e.g., "I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me."), with one item not included in the survey ("I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds"). Cognitive CQ was assessed using six items (e.g., "I know the arts and crafts of other cultures." and "I know the rules for expressing nonverbal behaviors in other cultures."). Motivational CQ was assessed using five items (e.g., "I enjoy interacting with people from different cultures."). Behavioral CQ was assessed using five items (e.g., "I alter my facial expressions when a cross-cultural interaction requires it."). The items contributing to the cultural intelligence dimensions were measured on a scale from 1, "strongly disagree" to 5, "strongly agree".

Controls. Cultural values, international experience, English proficiency skills, age, gender, and team size was controlled for. Cultural values was measured using the cultural values scale developed by Yoo, Donthu, and Lenartowicz (2011), to measure the four key dimensions of the Hofstede framework (20 items): Masculinity was assessed using four items (e.g., "It is more important for men to have a professional career than it is for women"). Collectivism vs. Individualism was assessed using six items (e.g., "Individuals should sacrifice self-interest for the group"). Power distance was assessed using five items (e.g., "People in higher positions should avoid social interaction with people in lower positions".). Uncertainty avoidance was assessed using five items (e.g., "Instructions for operations are important"). All the items were measured on a scale from 1, "strongly disagree", to 5, "strongly agree". As an additional robustness step in this study, the measures for cultural values were reversed to have the "polar" measures (e.g., individualism, feminism, individualism and uncertainty non-avoidance). International experience was reported as the total time spent abroad for studying or for tourism (from "0-4 weeks" to "4 or more years"). English proficiency was operationalized as self-evaluations of participants' proficiency in listening, reading, speaking, and writing English (from 0, "very poor", to 10, "excellent"). Age was measured and categorized in age groups (from 1, "17-20", to 9, "60+"). Gender was measured and coded as 1 for males and 0 for females. Team size was the total number of members assigned to one team. Team size was controlled for because it is more probable for a member to become a leader in a small team than a big team.

4. Results

4.1 Results from the PLS-SEM analysis

In Lankut et al. (unpublished), we tested if EQ and CQ would predict the emergence of leadership. We tested both the individual dimensions (called four-factor model) as well as the overall constructs (called single-factor model). We found that the individual dimension *metacognitive CQ* (but also overall construct *CQ*) was a relevant determinant, as well as *Age*, *English proficiency, team size*, and *power distance* to *leadership role* (see table 3 for an overview of the results). The other individual dimensions of the constructs (but also overall construct *EQ*),

as well as the controls and cultural values, were not relevant determinants for *leadership role*.

Table 3.

Structural model results (extracted from Lankut et al. (unpublished))

Construct	Model 1				Model 2				Model 3			
	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]	Path β (p-value)	t-value	95% Conf. interv	Sig.[a]
Gender	-0.036 (0.161)	0.991	[-0.092; 0.029]	No	-0.059 (0.08)	1.406	[-0.118, 0.019]	No	-0.059 (0.075)	1.439	[-0.117; 0.017]	No
Age	0.065 (0.034)	1.82	[0.001; 0.118]	Yes	0.099 (0.007)	2.496	[0.032; 0.165]	Yes	0.097 (0.007)	2.477	[0.033; 0.163]	Yes
International experience	0.077 (0.062)	1.541	[-0.065; 0.131]	No	0.076 (0.048)	1.67	[-0.013; 0.146]	No	0.072 (0.055)	1.602	[-0.014; 0.140]	No
English proficiency	0.141 (0.000)	4.132	[0.081; 0.194]	Yes	0.112 (0.002)	2.954	[0.046; 0.170]	Yes	0.108 (0.002)	2.857	[0.041; 0.164]	Yes
Team Size	-0.125 (0.000)	3.509	[-0.186; -0.070]	Yes	-0.174 (0.000)	4.623	[-0.238; -0.114]	Yes	-0.182 (0.000)	4.849	[-0.236; -0.113]	Yes
Masculinity	0.080 (0.071)	1.471	[-0.033; 0.151]	No	0.068 (0.142)	1.072	[-0.035; 0.172]	No	0.074 (0.122)	1.167	[-0.036; 0.171]	No
Collectivism	0.058 (0.134)	1.109	[-0.143; 0,089]	No	0.074 (0.120)	1.177	[-0.067; 0.161]	No	0.057 (0.182)	0.909	[-0.080; 0.148]	No
Power Distance	-0.094 (0.016)	2.147	[-0.130; 0.136]	Yes	-0.106 (0.022)	2.02	[-0.188; -0.041]	Yes	-0.102 (0.017)	2.123	[-0.181; -0.046]	Yes
Uncertainty Avoidance	0.040 (0.324)	0.458	[-0.154; 0.121]	No	-0.026 (0.344)	0.401	[-0.154; 0.121]	No	-0.020 (0.321)	0.321	[-0.140; 0.081]	No
EQ ROE					-0.078 (0.121)	1.172	[-0.173; 0.055]	No				
EQ SEA					0.047 (0.170)	0.953	[-0.047; 0.116]	No				
EQ OEA					-0.004 (0.472)	0.071	[-0.102; 0.086]	No				
EQ UOE					-0.031 (0.292)	0.547	[-0.106; 0.078]	No				
CQ M.cogn					0.117 (0.017)	2.126	[0.014; 0.194]	Yes				
CQ Cogn					0.028 (0.361)	0.357	[-0.121; 0.119]	No				
CQ Motiv					-0.073 (0.201)	0.837	[-0.212; 0.081]	No				
CQ Behav					0.068 (0.079)	0.357	[-0.008; 0.150]	No				
EQ									0.002 (0.492)	0.021	[-0.173; 0.129]	No
CQ									0.103 (0.033)	1.838	[0.059; 0.191]	Yes
R^2	*0.072*				*0.107*				*0.095*			
R^2 adjusted	*0.061*				*0.08*				*0.078*			
Q^2					*0.043*				*0.042*			

N = 587

Note: Significance testing in the PLS-SEM models is performed with 5,000 bootstrap samples. [a] To assess significance, we refer to the 95% BCa-confidence intervals given above.

4.2 Necessary condition analysis

To identify whether my necessary condition hypotheses can be confirmed or not, the results of the NCA need to indicate at least a small yet significant effect size. Additionally, they should indicate practical relevance by investigating the required levels of the necessary condition. For the first aspect, Dul (2020) offered the following benchmarks to interpret effect sizes: small effect ($0 < d < 0.1$), medium effect ($0.1 < d < 0.3$), large effect ($0.3 < d < 0.5$) , and very large effect ($d \geq 0.5$).

Table 4. NCA effect sizes

Construct	Leadership role CE-FDH	*p*-value
CQ Overall|	0.190	0.243
CQ Cognitive	0.065	0.134
CQ Metacognitive	0.215	0.103
CQ Motivational	0.217	0.052
CQ Behavioral	0.125	0.164
EQ Overall	0.102	0.235
EQ OEA	0.000	1.000
EQ SEA	0.085	0.657
EQ UOE	0.152	0.468
EQ ROE	0.071	0.672
Age	0.000	1.000
Gender	0.000	1.000
International experience (formative)	0.000	1.000
International experience - study	0.065	0.423
International experience - travel	0.052	0.079
English proficiency	0.185	0.040
Team Size	0.025	0.712
Collectivism	0.104	0.150
Masculinity	0.000	1.000
Power Distance	0.000	1.000
Uncertainty Avoidance	0.291	0.019
Individualism	0.000	1.000
Masculinity-Reversed	0.000	1.000
Power Distance-Reversed	0.087	0.172
Uncertainty Avoidance-Reversed	0.000	1.000

The NCA's results (see table 4 for estimated effect sizes and the *p*-values) indicate that *English proficiency* (d = 0.185; p = 0.040) and *uncertainty avoidance* (d = 0.291; p = 0.019) are meaningful as medium-sized necessary conditions (d = 0.185; p = 0.05) for *leadership role*. *Motivational CQ* qualifies as a medium necessary condition on the alpha level of 10% (d = 0.217; p = 0.052). *Overall CQ, Metacognitive CQ, behavioral CQ, Overall EQ, use-of-emotion EQ* and *collectivism* are meaningful (d > 0) but not significant (p > 0.05 v p > 0.10) necessary conditions. Hence, these determinants do not qualify as a necessary condition for leadership emergence, hypothesis 1 is unsupported and hypothesis 2 is partially unsupported.

To determine whether hypothesis 2 find partial support (on the alpha level of 10%), I created a bottleneck table that provide the minimum levels of each determinant to achieve a certain leadership role percentile. If there is no required minimum level of a determinant to achieve a certain leadership role percentile, this is marked with NN (NN = not necessary).

Table 5. Bottleneck table

	CQ overall	CQ Cog	CQ M.co	CQ Mot	CQ Beh	EQ overall	EQ OEA	EQ SEA	EQ UOE	EQ ROE
Bottleneck leadership role										
0.94	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
1.09	-1.47	0.12	0.39	NN	NN	NN	NN	NN	NN	NN
1.24	-1.47	0.12	0.39	NN	NN	NN	NN	NN	NN	NN
1.40	-1.47	0.12	0.39	NN	NN	NN	NN	NN	NN	NN
1.55	-0.55	0.12	0.39	-0.50	0.37	NN	NN	NN	NN	NN
1.70	-0.55	0.12	0.39	-0.50	0.37	NN	NN	NN	NN	NN
1.85	-0.55	0.12	0.39	-0.50	0.37	NN	NN	NN	NN	NN
2.00	-0.55	0.12	1.05	-0.50	0.37	0.48	NN	-0.45	0.41	NN
2.16	-0.55	0.12	1.05	-0.50	0.37	0.48	NN	-0.45	0.41	NN
2.31	-0.55	0.12	1.05	-0.50	0.37	0.48	NN	-0.45	0.41	NN
2.46	-0.55	0.12	1.05	-0.50	0.37	0.48	NN	-0.45	0.41	NN
2.61	-0.55	0.21	1.05	0.24	0.37	1.15	NN	-0.45	0.98	NN
2.77	-0.55	0.21	1.05	0.24	0.37	1.15	NN	-0.45	0.98	0.07
2.92	-0.55	0.21	1.05	0.24	0.37	1.15	NN	-0.45	0.98	0.07
3.07	-0.55	0.37	1.05	0.24	0.37	1.15	NN	-0.45	1.02	0.07
3.22	-0.55	0.37	1.05	0.24	0.37	1.15	NN	-0.45	1.02	0.07
3.38	1.10	0.37	2.03	1.47	2.30	1.15	NN	-0.45	1.02	0.07
3.53	1.10	0.37	2.03	1.47	2.30	1.15	NN	-0.45	1.02	0.07
3.68	1.10	0.37	2.18	1.47	2.30	1.15	NN	-0.45	1.02	0.07
3.83	1.10	0.37	2.18	1.47	2.30	1.15	NN	-0.45	1.02	0.07
3.99	1.10	0.37	2.18	1.47	2.30	1.15	NN	-0.45	1.02	0.07

Table 5. Bottleneck table (continued)

	Age	Gender	Int. Exp	Eng. prf.	Team Size	CLTV	MSC	P.D	U.A.	P.D.R	U.A.R	MSC.R	CLTV.R
Bottleneck leadership role													
0.94	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
1.09	NN	NN	NN	NN	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
1.24	NN	NN	NN	NN	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
1.40	NN	NN	NN	NN	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
1.55	NN	NN	NN	7.96	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
1.70	NN	NN	NN	7.96	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
1.85	NN	NN	NN	7.96	NN	-0.35	NN	NN	-1.20	NN	NN	NN	NN
2.00	NN	NN	NN	8.15	NN	-0.35	NN	NN	1.46	NN	NN	NN	NN
2.16	NN	NN	NN	8.15	NN	-0.35	NN	NN	1.46	NN	NN	NN	NN
2.31	NN	NN	NN	8.15	NN	-0.35	NN	NN	1.46	NN	NN	NN	NN
2.46	NN	NN	NN	8.15	NN	-0.35	NN	NN	1.46	NN	NN	NN	NN
2.61	NN	NN	NN	8.56	NN	0.69	NN	NN	1.46	NN	NN	NN	NN
2.77	NN	NN	NN	8.56	NN	0.69	NN	NN	1.46	NN	NN	NN	NN
2.92	NN	NN	NN	8.56	NN	0.69	NN	NN	1.46	NN	NN	NN	NN
3.07	NN	NN	NN	9.34	NN	0.69	NN	NN	1.68	NN	NN	NN	NN
3.22	NN	NN	NN	9.34	NN	0.69	NN	NN	1.68	NN	NN	NN	NN
3.38	NN	NN	NN	9.34	NN	0.69	NN	NN	1.68	NN	NN	NN	NN
3.53	NN	NN	NN	9.34	NN	0.69	NN	NN	1.68	-0.51	NN	NN	NN
3.68	NN	NN	NN	9.34	3.68	0.69	NN	NN	1.69	-0.42	NN	NN	NN
3.83	NN	NN	NN	9.34	3.68	0.69	NN	NN	1.69	-0.42	NN	NN	NN
3.99	NN	NN	NN	9.34	3.68	0.69	NN	NN	1.69	-0.42	NN	NN	NN

Note: R = reversed scale

To determine the practical relevance, I analyze the bottleneck table, which helps to identify the necessary or minimum required levels of *English proficiency, uncertainty avoidance* and *motivational CQ* for *leadership role*. To define the relevant levels that establish "leadership role", I use an approach of using the 75th percentile to find the 25% of the highest leaderlike perception "leaders" (e.g., Fiss, 2011). In my sample, the top 25% best "leaders" were all evaluated at least 3.5 on the (4-scale) leadership role scale. The cutoff fit the logic of the top scores of the original scale (i.e., the individual was perceived as a leader with a rating of 3.5 or above). Hence, I use the 75th percentile as my overall establishment point to define the top 25% perceived leader. Accordingly, for each of the relevant determinants, an individual has fair English proficiency if the individual scores on average at least 8 on the 10-point scale (i.e., does not disagree to understand their ability to understand English), avoiding uncertainty if the individual scores on average at least 3 on the 5-point scale (i.e., does not disagree to the uncertainty value), and motivational CQ if the individual scores on average at least 3 on the 5-point scale (i.e., does not disagree to the motivational CQ dimensions). Hence, I deem my hypotheses confirmed if, in addition to the significant effect sizes, the English proficiency scores are at least 8, uncertainty avoidance scores are at least 3 and the motivational scores are at least 3 at the 75th percentile on leadership role. Besides confirming or rejecting hypotheses, the bottleneck table also allows a more specific identification of relevant minimum levels that are necessary to achieve high or excellent levels of leadership role.

Table 5 indicates that the leaders that outperform 75% of the rated team members (3.53 or more on the actual scale) can be achieved only with an average English proficiency of 9.34 (on a 10-point scale), uncertainty avoidance of 1.68 (on a 5-point scale) and motivational CQ of 2.03 (on a 5-point scale). Hence, the individual's average English proficiency is a necessary condition for leadership role. Motivational CQ (and uncertainty avoidance) is not a necessary condition and thus lends no support for hypothesis 2. No additional levels of English proficiency were found to achieve even higher levels of leadership role beyond the 75th percentile.

5. Discussion

5.1 Summary of findings

The results of this study indicates that EQ or CQ does not qualify as necessary condition for leadership emergence (lending no support to Hypothesis 1 or 2). Only motivational CQ qualifies as a medium necessary condition on the alpha level of 10%, lending partial support for hypothesis 2 statistically. However, the bottleneck analysis found motivational CQ to be not practically relevant, thus lending no support for hypothesis 2.

The results also found that English proficiency and uncertainty avoidance are meaningful as medium-sized necessary conditions for leadership role. Based on the bottleneck analysis, only English proficiency was found to be practically relevant as a necessary condition for leadership role.

5.2 Implications for theory and research

The goal of this study was to further examine the results from Lankut et al. (unpublished) by following a different interpretation with the necessity logic. Sufficiency logic and necessity logic are fundamentally different and both require two different empirical methods (Dul, 2020). Hence, I outline a new logic in the hypothesizing of EQ and CQ as necessary conditions for leadership emergence, of which several scholars were also found to have similar arguments that both EQ and CQ are must-have (Cote et al., 2010; Lisak & Erez, 2015). The results from Lankut et al. (unpublished) found overall & metacognitive CQ, age, gender, English proficiency, team size, and power distance as relevant determinants to leadership role. Here, this study demonstrates that EQ and CQ were not necessary conditions for leadership emergence, that motivational CQ and uncertainty avoidance are statistical but not practical relevant, and that English proficiency is a necessary condition for leadership role.

These findings fit to three relevant scenarios of interpreting NCA relationships as outlined in Richter et al. (2020): The first scenario is where an exogenous construct (X) may be a relevant determinant and a necessary condition of an endogenous construct (Y). This can undermine the construct's practical relevance because a certain level of the construct will be necessary for the outcome, and the bottleneck

table can help to specify this level. Hence, a further increase in the construct (X) may trigger a further increase in the outcome (Y).

The second scenario is where an exogenous construct may be relevant determinant of an endogenous construct, but is not a necessary condition (Richter et al., 2020). An increase in the exogeneous construct (X) can lead to an increase in the outcome (Y), but no minimum level of the exogeneous construct is required to guarantee the occurrence of the outcome (Y).

The third scenario is where an exogenous construct (X) may not be an endogenous construct's (Y) relevant determinant but instead could be a necessary condition (Richter et al., 2020). From a managerial perspective, there will be no point to increase the exogenous construct's performance above the level necessary to achieve the target level in the endogenous construct. Instead, this level should be achieved to ensure the outcome can happen.

This study's findings cover all of these three scenarios: regarding the first scenario, English proficiency was found as a relevant determinant and a necessary condition for leadership role. This means that on average, an increase in English proficiency will increase leadership role. However, the bottleneck table show that a certain level of English proficiency of 7.96 on average is necessary for leadership role to manifest. Thus, a further increase in the individual's average English proficiency will increase the perceived leadership role. Overall, this finding demonstrates that English proficiency, or surface-level skills like language proficiency, play a more important role for perceived leadership. That is, strong language proficiency is a necessary condition for higher perceived leadership role in the context of GVT. This finding demonstrate that surface-level skills should be included in future studies when identifying the possible configurations between surface-level skills and individual factors (e.g., EQ or CQ) for predicting outcomes. However, it remains unclear on how these mechanisms, or the "paths to leadership", prefer surface-level skills (e.g., language proficiency) over individual factors to become necessary conditions for the outcome.

Contrary to previous assumptions, and according to the PLS-SEM results from Lankut et al. (unpublished), overall & metacognitive CQ, age, gender, team size, and power distance were found as relevant determinants but not as necessary conditions for leadership role (the second scenario). On average, an increase in overall CQ, motivational CQ, metacognitive CQ, age, gender, team size and power distance will increase leadership role, but no minimum level of these determinants are needed to ensure that leadership role will occur. These results suggest certain

skills, traits or competencies to be sufficient but not necessary for leadership role, which further contributes with evidence that these determinants are important to include. This study also brings new empirical evidence to the existing theoretical arguments in the field (in particular to CQ) of what determinants are both sufficient and/or necessary. The literature in the cross-cultural management field do consider CQ as the determinant to address challenges between culturally diverse individuals (Yari, Lankut, Alon, & Richter, 2020). However, if the necessary conditions are not met, the preferred level of outcomes in interest (here, leadership role) will not be present. Thus, the necessity perspective can further aid future empirical investigations on comparing previous findings with the discovered evidence (Richter et al., 2021).

As for the third scenario, uncertainty avoidance was not found as a relevant determinant but, statistically, as a necessary condition for leadership role. This result suggest uncertainty avoidance is a necessary but insufficient condition for emerging leadership. However, according to the bottleneck table, a certain level of uncertainty avoidance at -1.20 was necessary for leadership role to manifest. Because uncertainty avoidance was not found as a relevant determinant, any further increases will not increase leadership role any further. Thus, the third scenario has no practical relevance: individuals that emerge in GVT will not be perceived to have less or more leadership role by their team members regardless of how you avoid uncertainty. Despite this finding, this study demonstrate one potential scenario where specific determinants should be less prioritized as these determinants may be not useful. Thus it can be interpreted, that only when the necessary conditions and the bottlenecks are managed to the required level, will other skills, traits and competencies be able to increase leadership role (Richter et al., 2020).

5.3 Implications for managerial practice

The findings in this study demonstrates that English proficiency is a relevant determinant and a necessary condition for an individual to emerge as a leader in GVT. CQ, age, gender, team size and power distance were found as relevant determinants and sufficient, but not necessary, conditions to emerge as a leader. This study adds new perspectives to the managerial understanding of what are some conditions for the individual to emerge as a leader in GVT.

An individual is said to emerge as a leader because the individual becomes influential in the view of its followers, thus perceived as more leaderlike (Hogan, Curphy, & Hogan, 1994). Here, the results suggest individuals with high language proficiency in GVTs have the necessary conditions to emerge and be perceived as a leader. Higher CQ, higher age, or a low power distance attitude of individuals are sufficient but not necessary determinants for the individual to emerge as a leader. Thus, there are potential leadership structures that emerge and emphasize more on relevant surface-level characteristics (i.e., English proficiency), over relevant individual factors (i.e., CQ) that are previously considered to be as necessary for team outcomes such as performance or satisfaction.

Thus, I recommend managers to carefully consider the language proficiency diversity of their members for those teams that are left with leadership structures to emerge more informally. Managers must pay attention to the leadership structures that emerge, especially to GVT that lack the management or formal structures. A leadership structure that do not have enough levels of language proficiency relevant for the projects and tasks can be devastating for team performance, communication and increased conflicts among its members' (Jarvenpaa & Leidner, 1999). Hence, managers are advised to implement language training or programs that increase language proficiency among GVT members to lessen the burden of intra-team complications.

Managers should also consider the diversity of the individual factors among the GVT members, such as CQ, or certain cultural value patterns, despite these being only sufficient but not necessary conditions for them to emerge as leaders. That is, managers should carefully consider the use of resources to further increase or improve these factors, as increasing them will not increase the likelihood of individuals emerging as leaders. Hence, managers are advised to actively engage in the creation of leadership structures that follow findings from the rich field of leadership success for projects of specific and strategic relevance.

5.4 Limitations and future directions

To the best of my knowledge, this is one among the few studies to use necessity logic to empirically compare EQ and CQ with leadership emergence in GVTs. This study is not without limitations that should be addressed and can serve as a reference for future directions.

First, the necessary condition analysis is a recent toolset for testing if CQ or EQ is necessary for different managerial outcomes. There are promising avenues for more necessary condition analysis of the various relationships between EQ or CQ with outcomes such as performance, satisfaction and or conflict (Richter et al., 2021; Yari et al., 2020). Additionally, future research is encouraged to further use necessity logic to explore the mechanisms that are interpreted using sufficiency logic.

Second, in addition to being limited to the measures and predictors of leadership emergence in Lankut et al. (unpublished), the context of leadership interaction was not directly observed or measured. It is possible that the individual perceived leadership of GVT members is the result of interaction between the perceived leaders and the leadership situation (see contingency theory, Fiedler, 1978). The individual's reason to emerge as a leader can be situational based and not determined by necessary conditions. Future research should theorize about and analyze the various relationship-paths ("paths to leadership") individuals are emerging as a leader for the situations that calls for emergent leadership. In addition, future researchers can also explore the different relationships between EQ or CQ with the different types of leadership configurations (see Avolio, Walumbwa, & Weber, 2009).

Finally, this study uses data of business students (also including MBAs) who participated and developed solutions to real-life business challenges. Other similar studies have also used students that may or may not complete the assignment as partial fulfillment for their course requirements (Lisak & Erez, 2015). The use of student samples has been discouraged by several editorial policies and by scholars in the literature, yet they become appropriate when used to study aspects of human nature and propensity that can explain specific phenomena in an international setting. Any sample of multicultural teams, including students, can undergo fundamental research that looks at underlying processes of human cognition and behavior (Bello, Leung, Radebaugh, Tung, & van Witteloostuijn, 2009). This study uses a homogenous sample (business students) to compare the predictive relevance of EQ and CQ above and beyond further predictors, such as cultural values, language skills, and international experience (that was controlled for). Nonetheless, future research is invited to validate our findings by examining EQ and CQ in fixed, long-term GVT in organizations.

Conclusion

This study further examined EQ and CQ leadership emergence, in global virtual teams (GVT), through a necessary condition analysis (NCA). I tested if EQ and CQ are deemed as necessary conditions for leadership emergence to occur, as there are limited studies on leadership emergence that have tested the implied necessity. The hypotheses were tested on the same sample with NCA, and the results revealed that EQ and CQ as necessary conditions are not supported. Instead, individual factor such as English Proficiency was found as meaningful condition for leadership to emerge. This demonstrate how surface-level skills should be included in future research during possible configurations between surface-level skills and individual factors for predicting outcomes. It remains unclear on how these mechanisms, or the "paths to leadership", prefer surface-level skills over individual factors to become necessary conditions for the outcome.

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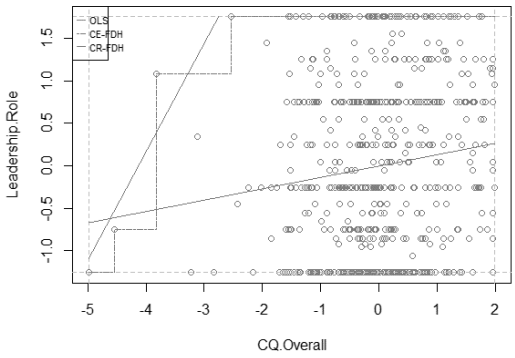
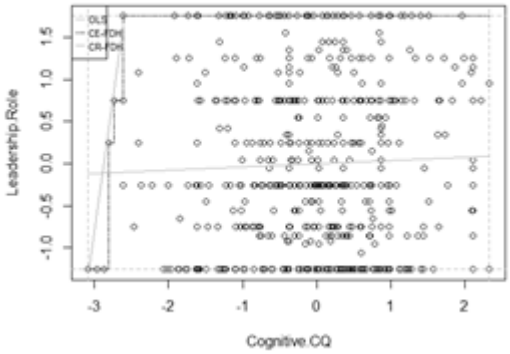
Appendix – Scatter plots

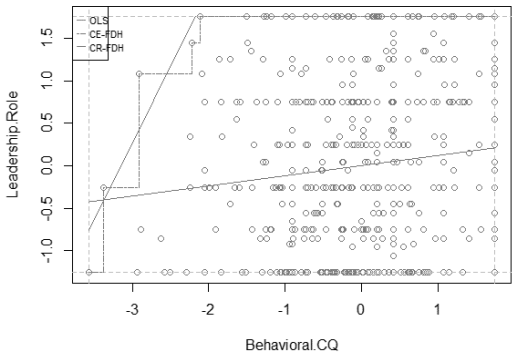
NCA Plot : CQ.Overall - Leadership.Role



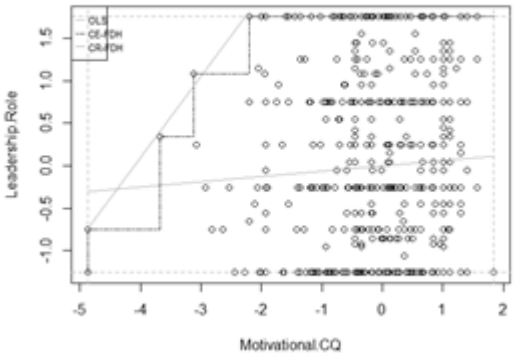
NCA Plot : Cognitive.CQ - Leadership.Role



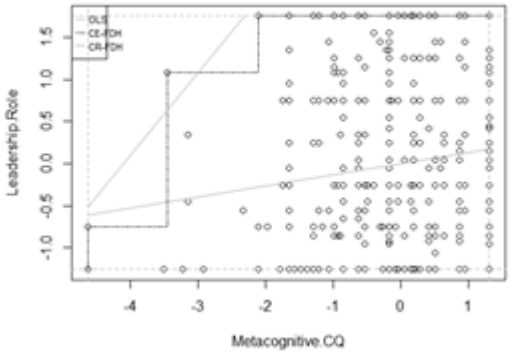
NCA Plot : Behavioral.CQ - Leadership.Role



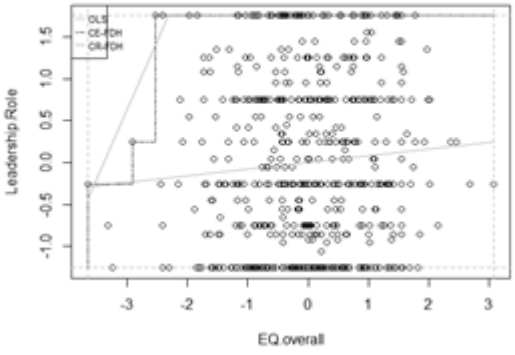
NCA Plot : Motivational.CQ - Leadership.Role

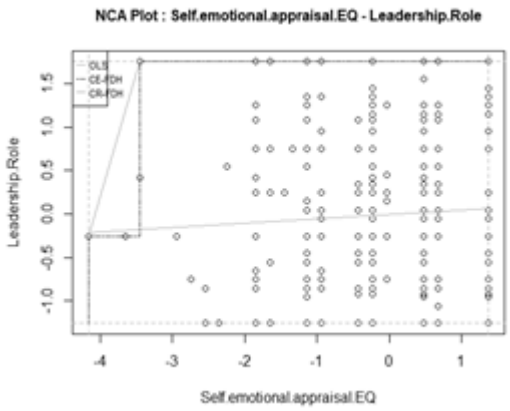


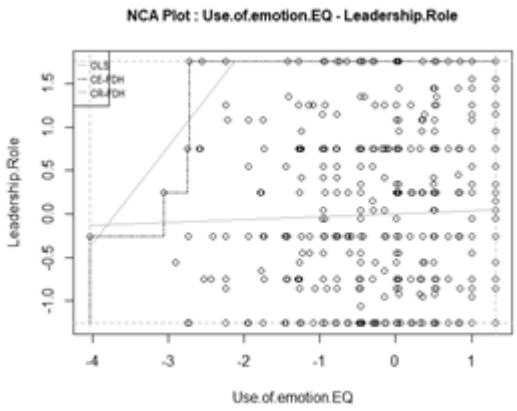
NCA Plot : Metacognitive.CQ - Leadership.Role

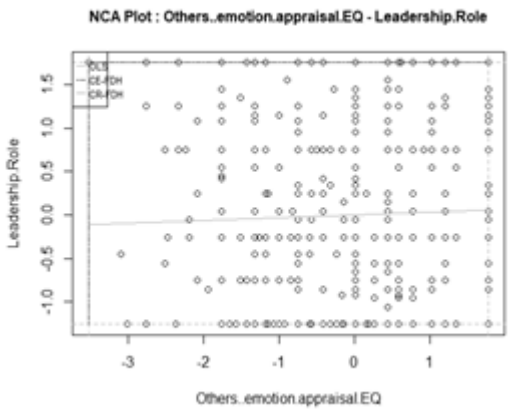


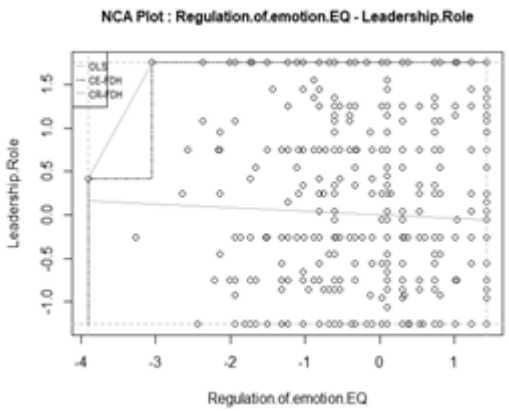
NCA Plot : EQ.overall - Leadership.Role

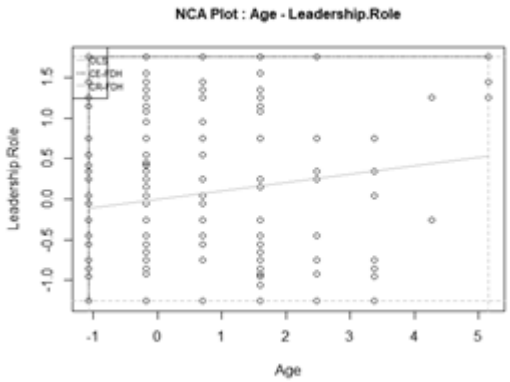


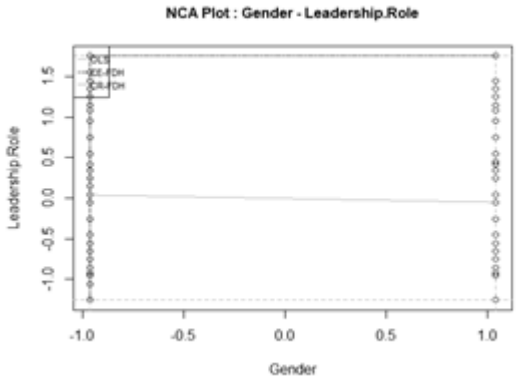

NCA Plot : Self.emotional.appraisal.EQ - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Self.emotional.appraisal.EQ


NCA Plot : Use.of.emotion.EQ - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Use.of.emotion.EQ


NCA Plot : Others..emotion.appraisal.EQ - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Others..emotion.appraisal.EQ


NCA Plot : Regulation.of.emotion.EQ - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Regulation.of.emotion.EQ


NCA Plot : Age - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Age

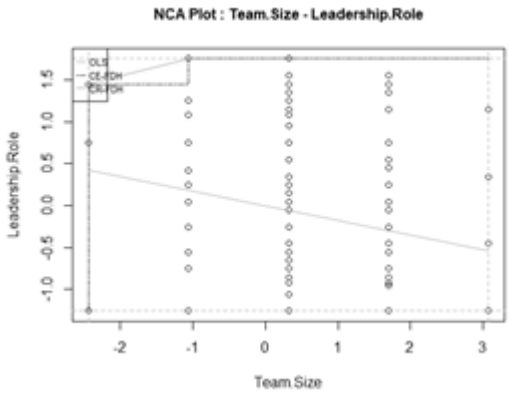

NCA Plot : Gender - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Gender

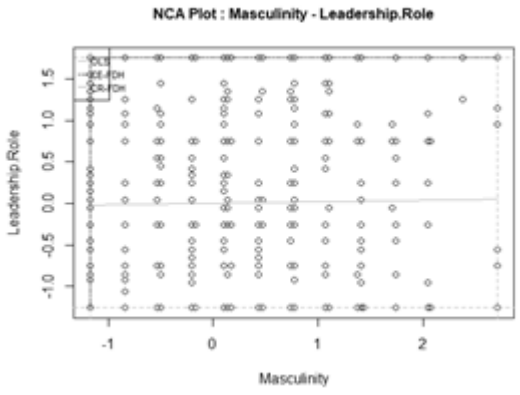

NCA Plot : English.proficiency - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
English.proficiency

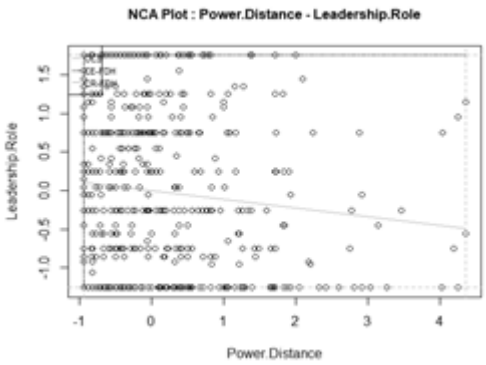

NCA Plot : International.experience - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
International.experience

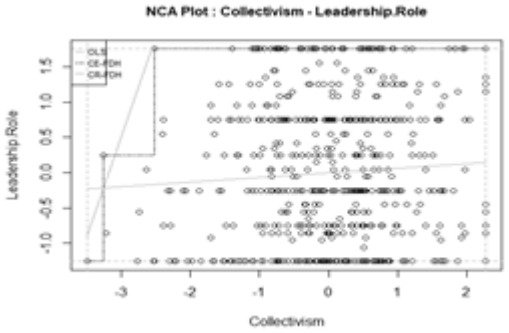

NCA Plot : International.experience..tourist - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
International.experience..tourist

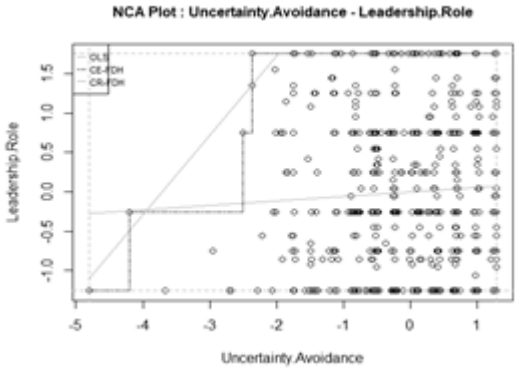

NCA Plot : International.experience..study - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
International.experience..study

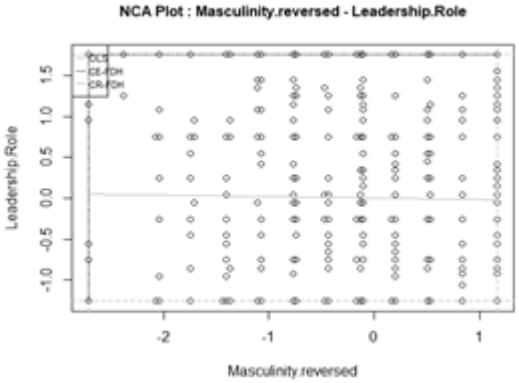

NCA Plot : Team.Size - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Team.Size

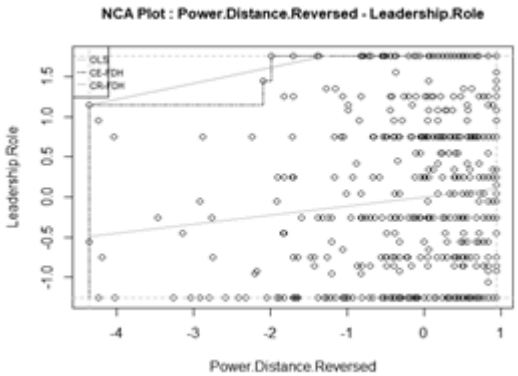

NCA Plot : Masculinity - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
Masculinity


NCA Plot : Power.Distance - Leadership.Role
Leadership.Role
Power.Distance

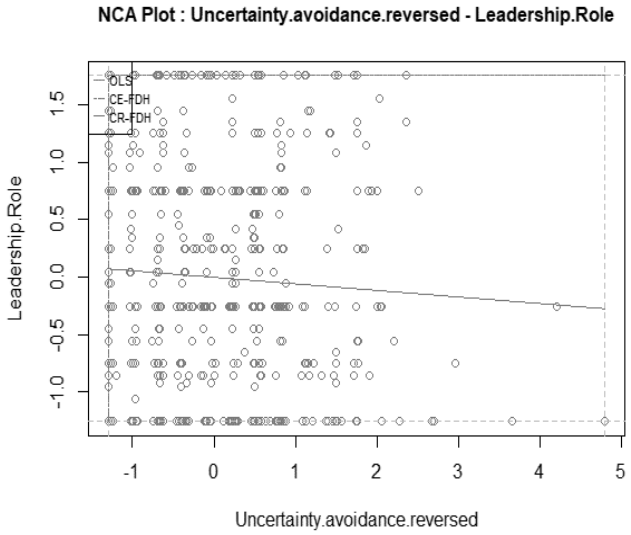

NCA Plot : Collectivism - Leadership.Role
Leadership.Role
Collectivism


NCA Plot : Uncertainty.Avoidance - Leadership.Role
Leadership.Role
Uncertainty.Avoidance


NCA Plot : Masculinity.reversed - Leadership.Role
Leadership.Role
Masculinity.reversed


NCA Plot : Power.Distance.Reversed - Leadership.Role
Leadership.Role
Power.Distance.Reversed


NCA Plot : Collectivism.reversed - Leadership.Role
Leadership.Role
Collectivism.reversed


NCA Plot : Uncertainty.avoidance.reversed - Leadership.Role
OLS
CE-FDH
CR-FDH
Leadership.Role
1.5
1.0
0.5
0.0
-0.5
-1.0
-1
0
1
2
3
4
5
Uncertainty.avoidance.reversed