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**Article**

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# Predicting leadership emergence in global virtual teams

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## ABSTRACT

**Objective:** This study examines the individual factors that predict whether individuals will emerge as leaders in global virtual teams, which often lack a more formal leadership structure.

**Research Design & Methods:** We focus on emotional intelligence (EQ) and cultural intelligence (CQ) as two contemporary concepts that are of key relevance to leadership success. Building on socioanalytic theory, we hypothesize that individuals with higher levels of EQ and CQ have a higher probability of emerging as team leaders. We test the hypotheses on a sample of 415 teams comprised of 1 102 individuals who participated in a virtual international collaboration project. Using structural equation modeling, the results reveal that individuals with higher CQ were more likely to emerge as leaders.

**Findings:** 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.

**Implications & Recommendations:** The study identified the gap in the literature regarding EQ and CQ in the context of leadership emergence. The results demonstrate 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. We recommend that managers carefully consider which projects and tasks they will leave the leadership structure to emerge more informally.

**Contribution & Value Added:** The key contribution and value added of this study is the investigation of the role of CQ and EQ with leadership emergence in global virtual teams (GVT), through the creation of a leadership emergence model building on socio-analytic theory.

**Article type:** research article

**Keywords:** leadership emergence; emotional intelligence; cultural intelligence; global virtual teams; PLS-SEM

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## INTRODUCTION

In light of growing internationalization and continuous technological development, organizations have steadily increased the use of global virtual teams (GVTs) (Taras *et al.*, 2019). A recent survey revealed that up to 87% 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). For GVTs to be successful and operational, effective leaders are crucial (Lisak & Erez, 2015). Effective leaders have the ability to influence, motivate, and enable others to contribute toward the success of the organization and its members (House, Javidan, Hanges, & Dorfman, 2002). The right leadership brings positive

outcomes to the team and, ultimately, the organization. Leaders facilitate trust, instill the right structures and processes, and involve multiple resources and cultures in temporal, geographical, and complex cultural 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, influence leadership effectiveness (Rockstuhl, Seiler, Ang, Van Dyne, & Annen, 2011). Following Gardner (1992) and Sternberg (1999), 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 the 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; Richter, Martin, Hansen, Taras, & Alon, 2021; Yari, Lankut, Alon, & Richter, 2020); EQ is found to have a positive association with leadership effectiveness (Kerr, Garvin, Heaton, & Boyle, 2006). 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 be effective.

In many GVTs, leaders are not appointed or elected, but emerge. Hence, there often is no formal process that appoints individuals possessing effective leadership skills, such as CQ and EQ as leaders, and research indicates that in some groups, individuals emerge as leaders who may be less effective than others (e.g., Judge, Bono, Ilies, & Gerhardt, 2002; Lanaj & Hollenbeck, 2014). 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 as leaderlike by others (Hogan, Curphy, & Hogan, 1994). Acton, Foti, Lord, and Gladfelter (2019) define leadership emergence "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 often more informally distributed within teams, especially in contemporary global virtual settings (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).

The key contribution of this study is to investigate the role of CQ and EQ with leadership emergence in GVTs. Thereby, we respond to the call by Judge, Colbert, and Ilies (2004) to investigate other forms of intelligence to understand leadership emergence. In addition, we thereby 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. For this purpose, we create a leadership emergence model building on socioanalytic theory (Hogan & Blicke, 2018) and 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 on a sample of 415 teams comprised of 1 102 individuals who participated in a virtual international collaboration project using structural equation modeling.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

We build on socio-analytic theory to develop a model that associates EQ and CQ with leadership emergence. From this perspective, three motives and behaviors are key in the process of leadership emergence: Getting along (communion), that is the behavior that achieves the approval of others, strengthens cooperation, and serves to build and maintain relationships. Getting ahead (agency), that is the behavior that produces results and advances members within the group and the group within its competition.

Lastly, these findings mean, that the behavior that produces stable, predictable, and meaningful social interactions in everyday living (Hogan & Blicke, 2018; Hogan & Holland, 2003).

By using socioanalytic theory, we hypothesize the following that individuals with high EQ and CQ may be more motivated and able to get along, get ahead or find meaning in their teams and therewith emerge as leaders.

### **Emotional Intelligence (EQ)**

We follow Salovey and Mayer (1990), who 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). 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).

A majority of studies indicate that emotionally intelligent individuals are more likely to emerge as leaders (see, for instance, the review in Walter, Cole, & Humphrey, 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).

Using socioanalytic theory, we associate EQ with leader emergence (Hogan & Blicke, 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 toward group activities and tasks, and use creative behavior to motivate the team to get ahead (Salovey & Mayer, 1990; Cote, Lopes, Salovey, & Miners, 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 at 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 likely to emerge as a leader:

- H1:** The higher the EQ of a team member, the higher the probability that the individual will emerge as a leader in the team.

### **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. 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).

CQ involves four dimensions: Metacognitive CQ concerns the mental capability to acquire and understand cultural knowledge. Cognitive CQ regards general knowledge and knowledge structures about culture. Motivational CQ describes the capability to focus energy on learning about and functioning in different intercultural situations. Lastly, behavioral CQ represents the capability to be flexible in the repertoire of verbal and non-verbal behavior 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).

Using socioanalytic theory to associate CQ with leader emergence (Hogan & Blicke, 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 among 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 get along better 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 solving 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 the 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 likely to emerge as a leader:

- H2:** The higher the CQ among an individual team member, the higher the probability that the individual will emerge as a leader in the team.

## RESEARCH METHODOLOGY

### Sample

To test our hypotheses, we use data from a large-scale virtual international collaboration project. Throughout the project, participants needed to develop solutions to real-life business challenges, including, for instance, market entry plan development and product design. The project had a duration of nine weeks, during which participants were put into virtual teams of four to eight members from different countries. Our final sample comprised 1 102 participants from more than 50 countries across 415 teams for whom we had complete data.

### Measures

The *leadership emergence* 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 an informal leader, 2 would indicate a follower, and 1 would indicate no participating behavior. An average from all the peer evaluations of each team member was calculated at the end of the project.

We measured *emotional intelligence* and its dimensions using the instrument by Wong and Law (2002); that is, we used a seven-point agreement scale on in total of 16 items (i.e., four items to operationalize each dimension of EQ; SEA, OEA, UOE and ROE).

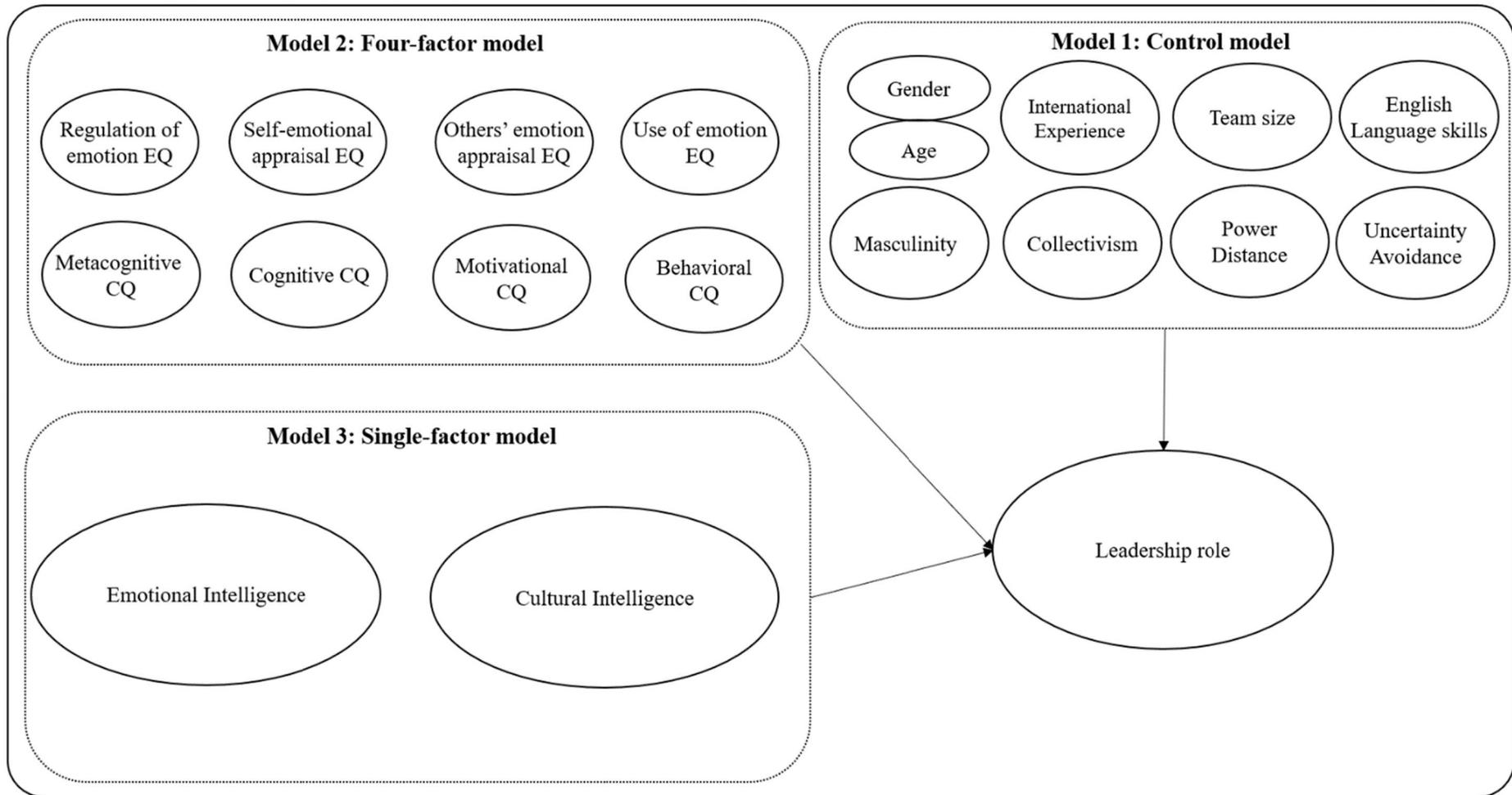
We measured *cultural intelligence* using the (CQS) scale by Ang *et al.* (2007). We measured meta-cognitive CQ with three items (as one item of the original scale was not included in the survey), cognitive CQ with six items, motivational CQ with five items, and behavioral CQ with five items using a five-point agreement scale.

We *controlled for* age, gender (coded 1 for males), team size (total number of members in the team) and cultural values, international experience as well as English language proficiency. We used the scale developed by Yoo, Donthu, and Lenartowicz (2011) to measure the four key dimensions of the Hofstede framework (20 items): Masculinity (four items), collectivism vs. individualism (six items), power distance (five items), and uncertainty avoidance (five items) on a five-point agreement scale. International experience was reported as the total time spent abroad 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").

### Analysis Technique and Approach

We use partial least squares structural equation modeling (PLS-SEM) which has become a standard analysis technique to investigate causal-predictive relationships in path models with latent variables (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 (Shmueli *et al.*, 2019). We use the SmartPLS 3 software to run the PLS-SEM models (Ringle, Wende, & Becker, 2015).

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; Schlaegel, Richter, & Taras, 2021). 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 above and beyond a control model (Model 1): 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**

Source: own elaboration.

## RESULTS AND DISCUSSION

### The Measurement Models

The means, standard deviations (S.D.), and correlations appear in Table 1.

In the first step, we evaluated the measurement models along traditional guidelines (Hair *et al.*, 2019; Hair Jr., Hult, Ringle, & Sarstedt, 2016). In addition to single items (age, gender, team size, leadership role), we used reflective measurement models for EQ, CQ, and cultural values, and a formative measurement model for international experience (comprised of two indicators that each capture a specific aspect of the construct which fits the idea of a formative measurement model, e.g., Fornell & Bookstein, 1982).

For the reflective measurement models, nearly all of the measurement items loaded above the required threshold ( $> 0.708$ ), and those items failing the initial threshold 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. Our final measurement models demonstrate internal consistency reliability, convergent validity ( $AVE > 0.50$ ), and discriminant validity evaluated along the heterotrait-monotrait (HTMT) criterion (see appendix for results).

For the formative measurement model, international experience, the results show that the weights are not significant for study abroad ( $p = 0.079$ ) or tourism ( $p = 0.106$ ), but the loadings are significant ( $p = 0.016$ ,  $p = 0.023$ ) and above the minimum thresholds to keep items (see appendix for results). Finally, there are no issues of multicollinearity in our model.

### Hypothesis Testing

We assess the structural model using the standard assessment criteria in Hair *et al.* (2019) as provided in Table 2: The control model (Model 1) explains 7.2 % of the variance in a 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 ( $\Delta R^2_{four-factor} = 0.035$ ,  $\Delta R^2_{single-factor} = 0.023$ ). Finally, the results indicate that the models show predictive relevance ( $Q^2 > 0$ ) that we further assessed by means of the model's out-of-sample predictive power using the PLSpredict procedure (Shmueli, Ray, Estrada, & Chatla, 2016).

Table 3 provides the results of the PLSpredict procedure. We compare the root mean squared error (RMSE) and the mean absolute error (MAE) to the linear model (LM) benchmark and compare the prediction errors (Hair *et al.*, 2019). The PLS-SEM predictions' RMSE values are smaller than those of the LM benchmark for leadership roles ( $\Delta_{four-factor} RMSE = -0.040$ ,  $\Delta_{single-factor} RMSE = -0.044$ ). The predictions' MAE values are smaller than those of the LM benchmark for leadership roles ( $\Delta_{four-factor} MAE = -0.029$ ,  $\Delta_{single-factor} MAE = -0.034$ ). This comparison shows that the models have predictive power (Hair *et al.*, 2019).

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 not significantly associated with leadership role.

**Table 1. 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	-0.06	–															
3.CQ Behav	3.68	0.94	0.04	0.43**	–														
4.CQ Motiv	4.15	0.84	-0.01	0.39**	0.46**	–													
5.CQ M.cogn	4.09	0.83	0.02	0.33**	0.47**	0.62**	–												
6.EQ OEA	4.08	0.74	-0.01	0.16*	0.23**	0.18**	0.14**	–											
7.EQ SEA	4.13	0.76	0.09*	0.10*	0.22**	0.29**	0.27**	0.28**	–										
8.EQ UOE	4.23	0.73	0.07*	0.20**	0.27**	0.30**	0.32**	0.28**	0.46**	–									
9.EQ ROE	3.98	0.85	0.10*	0.20**	0.20**	0.23**	0.20**	0.27**	0.43**	0.42**	–								
10.Gender	0.49	0.5	0.03	0.02	-0.04	-0.02	0.01	-0.06	0.06	-0.02	0.11*	–							
11.Int. exp.	5.05	2.33	0.14*	0.08	0.01	0.04	0.06	-0.01	0.08*	0.11*	0.11*	0.10*	–						
12.Eng. prf.	9.33	0.77	0.09*	-0.01	0.11**	0.14*	0.14**	0.15*	0.18**	0.17**	0.08	0.08*	0.07	–					
13.Collect.	3.54	1.02	0.00	0.11*	0.12*	0.22*	0.16*	0.03	0.05	0.03	-0.04	-0.04	0.06	0.16**	–				
14.Masc.	2.13	1.12	0.04	-0.03	-0.04	-0.10*	-0.11*	-0.03	-0.09	-0.08	-0.01	0.20**	0.101*	-0.06	0.02	–			
15.PD	1.83	1.16	-0.01	0.02	-0.08*	-0.20*	-0.14*	-0.03	-0.08	-0.10	0.00	0.17**	0.09	-0.21**	-0.11*	0.44**	–		
16.UA	4.05	0.88	0.08	0.09	0.22**	0.24*	0.24**	0.08	0.19**	0.19*	0.06	-0.17**	0.10*	0.04	0.06	-0.05	-0.11	–	
17.Team size	5.90	0.76	0.09*	0.06	-0.02	0.05	0.00	-0.08*	0.02	0.04	0.07	0.05	0.16**	-0.06	-0.18**	-0.00	0.04	0.03	–
18.Leader Role	2.19	1.01	0.10**	0.04	0.12**	0.06	0.13**	0.03	0.05	0.03	-0.04	-0.04	0.06	0.16**	0.07	0.02	-0.11	0.10	-0.18**

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.

Source: own calculation based on the sample (n = 1.102).

**Table 2. Structural model results**

Construct	Model 1				Model 2				Model 3			
	Path $\beta$ (p-value)	t-value	95% Conf. interv	Sig. <sup>a</sup>	Path $\beta$ (p-value)	t-value	95% Conf. interv	Sig. <sup>a</sup>	Path $\beta$ (p-value)	t-value	95% Conf. interv	Sig. <sup>a</sup>
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
<i>R</i> <sup>2</sup>		<i>0.072</i>				<i>0.107</i>				<i>0.095</i>		
<i>R</i> <sup>2</sup> <i>adjusted</i>		<i>0.061</i>				<i>0.08</i>				<i>0.078</i>		
<i>Q</i> <sup>2</sup>						<i>0.043</i>				<i>0.042</i>		

Note: *N* = 587. Significance testing in the PLS-SEM models is performed with 5,000 bootstrap samples. <sup>a</sup> To assess significance, we refer to the 95% BCa-confidence intervals given above.

Source: own calculation based on the sample (*n* = 587).

**Table 3. PLSpredict leadership role prediction summary**

Endogenous construct indicators	PLS-SEM	MAE	$Q^2_{predict}$	LM	MAE	PLS-SEM – LM	
	RMSE			RMSE		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

Source: own calculation based on PLSpredict procedure.

In the single-factor model (Model 3), we tested whether the single-factor EQ and single-factor CQ would predict leadership emergence. 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 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), and values above 0.02 are meaningful. 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.

## CONCLUSIONS

### Overview 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). 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 associated, while team size and power distance were negatively associated with leadership role across all models. Additionally, English proficiency, age, and team size were found to have predictive relevance for leadership role.

### Theoretical Implications

We contributed to the existing body of leadership literature by further understanding the association of EQ and CQ with leadership emergence. While there were several studies on the association of EQ with leadership emergence, there are almost no studies that research CQ in the context of leadership emergence (exceptions are Lisak & Erez, 2015). Past research indicated 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 & Blicke, 2018), we outlined that individuals may be perceived as stronger in their motivation to get along, get ahead, or 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 functions using virtual collaboration for a short duration of time, making team members have more cultural-laden processes instead of emotion-laden processes. In theory, individ-

uals 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 strongly 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 (see Richter, Schlaegel, Taras, Alon & Bird, 2023). 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).

### **Practical Implications for HRM**

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 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. A leadership structure that lacks individual factors such as EQ and CQ relevant can 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.

### Limitations and Future Research

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, Salovey, & Caruso, 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 *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, 2022).

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, Piccolo, & Kosalka, 2009) that we were unable to incorporate into our model (due to the unavailability of the relevant measures). Future research is encouraged to further compare 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.

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### Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The data that support the findings of this study are available on request from the corresponding author, ZHM. The data are not publicly available due to information that could compromise the privacy of research participants.

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