The development and validation of the Business Cultural Intelligence Quotient

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Abstract:

Purpose – The purpose of this paper is to present a new instrument for measuring cultural intelligence in the business context (BCIQ).
Design/methodology/approach – The paper describes the process of the conceptualization of the model and the development of the instrument, the sample, as well as the validation of the instrument. Directions on the use of the instrument and future research are discussed.
Findings – The instrument shows good psychometric properties and good predictive power and outperforms other publicly available CQ measures on a number of dimensions.
Originality/value – The unique features and advantages of the present instrument are as follows: first, a refined factor structure compared to existing CQ instruments; second, use of objective cultural knowledge measures; third, applicability in the business and workplace contexts, thus rendering the instrument suitable for assessing cultural intelligence among expatriates, employees, and global virtual team members; and fourth, improved reliability and validity as compared to other Cultural Intelligence Quotient measures.

Keyword: Cultural intelligence | Instrument validation | Measurement

Article:

The pervasive impact of globalization is no longer limited to global economic and political shifts. Interacting with people from different cultures is rapidly becoming a part of the job description for people in all kinds of professions. Only several decades ago, it was mainly the prerogative of politicians and businessmen to interact across cultures. Today, just about any office worker, educator, artist, soldier, and even blue-collar worker is encountering foreigners in his or her professional and personal lives. Much of these cross-cultural interactions occur in the virtual realm via various social networking and online collaboration platforms (Stanko and Gibson, 2009).

This shift requires effective global citizens to be able to deal with a diverse group of people and to interact in often unfamiliar and ambiguous environments. In order to be successful, the ability to navigate these social and cognitive challenges requires various competencies, skills, and behaviors. These are normally referred to as “cultural intelligence” or the Cultural Intelligence Quotient (CQ).

The CQ is defined by Thomas et al. (2008) as a system of interacting knowledge and skills, linked by cultural meta-cognition, which allows people to adapt to, select, and shape the

cultural aspects of their environment. This includes "[…] building adaptive skills and a repertoire of leadership behavior so that one is effective in different intercultural situations" (p. 126).

Simply put, the greater one's cultural intelligence, the more likely one is able to effectively manage culturally diverse settings (Ang et al., 2007). This can include both international situations, requiring cross-border leadership effectiveness (Alon and Higgins, 2005; Rockstuhl et al., 2011) as well as domestic situations. Even though "[…] some workers may never work outside their country of citizenship, many will interact with customers, clients, suppliers, and co-workers who are themselves outside their home country" (Crowne, 2008, p. 396).

Although the CQ is a relatively new construct in international business research, a number of studies have begun to document the impact of cultural intelligence on important work-related dimensions/outcomes. Given the wide range of processes and outcomes that have been shown to be affected by the CQ, the CQ has the potential of becoming in International Business/Management what the Emotional Intelligence (a.k.a., EQ) has become in HR/OB/I-O Psychology. This paper seeks to develop a new measure of business cross-cultural intelligence that will provide both academics and practitioners with a tool to measure, assess, and develop cross-cultural intelligence. In this context, we describe the process of developing the instrument for measuring cultural intelligence in the business context (BCIQ) and report on its psychometric properties, including its factor structure, reliability, and validity.

The role of cultural intelligence in international business

The importance of the CQ in international business and management has been well established. It has been shown to affect: work and academic performance and judgment; work- and academic-related attitudes; psychological adjustments; and sociological adjustments (see Gabrenya et al., 2011). Work and academic performance judgments include project grades, peer evaluations, academic performance, and managerial assessments (Ang et al., 2007).

Alon and Higgins (2005) indicate that the CQ is not only associated with expatriate success, but also with the development of global leadership. Global leaders must develop cognitive flexibility and possess competencies that are an aggregate of intellectual, social, emotional, cognitive, and skill-based functions, now commonly recognized as "cultural intelligence." Not only must such leaders be competent in the global aspects of business functions, such as finance, marketing, human resource management, and operations, but also they must be skilled in their interpersonal conduct of global business.

Measuring the CQ

One of the reasons the CQ has not taken management research by storm is the difficulty of conceptualizing and measuring the construct. Although many CQ measurement instruments have been suggested, most have not been designed to be used in business or in the workplace context, and almost all of them rely on self-assessments, thus limiting their validity. For example, Gabrenya et al. (2011), in a review of 32 measures of the CQ and cross-cultural competencies in a variety of disciplines, conclude that CQ research is still in its infancy and there is a clear need for better measures. They report that only the measure developed by Van Dyne et al. (2009) directly measures the CQ.

The existing CQ measures have been criticized for errors in the conceptualization of the construct (Thomas et al., 2008), their perceptual self-reporting nature, their limited scope (Gabrenya et al., 2011), their lack of theoretical and empirical rigor (Gabrenya et al., 2011), their limited predictive validity (Gabrenya et al., 2011), as well as their ambiguity in terms of concepts, failure to differentiate from existing constructs of intercultural effectiveness, and their inability to establish the CQ as a form of intelligence and to differentiate predictive validity from a training model (see Gabrenya et al., 2011).

Second, existing CQ measures are not always suitable for business-focussed research. Their items and dimensions are often too general and at times irrelevant in the business context, thus making them less useful for research on expatriates, business global virtual teams, and workplace processes and outcomes.

We attempt to fill this gap by offering a Business Cultural Intelligence Quotient (BCIQ) model of the CQ. This instrument is specifically designed to be used in the business context and it provides a viable alternative to other more general or non-business context-oriented CQ measures. The model, as presented in this paper, is innovative in terms of employing a broad conceptualization of the construct from a psychological perspective, but a narrower applicability to the needs of businesses and for the development of global leaders. The BCIQ is anchored in the cultural intelligence literature, with a focus on international business.

The BCIQ focusses on the growing business needs of multinational corporations for culturally intelligent managers in the global workforce. Our goal is to develop a measure that is capable of predicting long-term success in other cultures based on the level of the CQ combined with known predictors that do not require analysis, such as the number of languages spoken and the degree of cultural distance. The BCIQ addresses the limitations cited in the literature regarding CQ theory vs the way in which the CQ is actually measured (Berry and Ward, 2006). It exceeds the Emotional Intelligence (EQ) or personality predictors of openness to include culture-specific questions and behaviors that reflect cultural breadth. The results are also transferable to specific types of cultural training (Littrell et al., 2006; Javidan et al., 2007; Ang et al., 2007; Earley and Peterson, 2004), including the development of the EQ, cross-cultural adaptability, and self-efficacy (MacNab and Worthley, 2012), all of which are CQ factors.

The BCIQ takes into account the cognitive features and measurable independent variables that are associated with cross-cultural success. The final BCIQ score is a composite score that includes affective and behavioral components as well as knowledge. The predictive validity of the CQ measure also includes psychological well-being, the acquisition of culture-appropriate skills, and the capacity to make culturally accurate attributions.

The remainder of the paper is organized as following. First, the authors provide a detailed review of prior CQ research. They then offer a description of the process/ method to develop the BCIQ. Thereafter, they report on the results of assessments of analyses of the psychometric properties. They conclude with a discussion of the applications, implications, limitations, and directions for future research.

The development of the BCIQ construct

Origins of the CQ

The CQ literature has progressively developed over the years to identify multiple overlapping dimensions that include cross-cultural adaptation, emotional intelligence, and cognitive

processes that contribute to successful interactions in culturally diverse situations, a construct now known as "cultural intelligence." The origins of the research and CQ development began in the cross-cultural and intercultural training literature when investigators began to examine the behavioral and communication competencies required for cross-cultural adaptation (Berry and Ward, 2006).

Ruben and Kealey (1979) were among the first researchers to assess communication and behavioral competencies as predictors of cross-cultural adaptability. Other early researchers, including Abe and Wiseman (1983) and Gudykunst (1995), explored other dimensions of intercultural effectiveness and adaptive intercultural communication skills.

Not surprisingly, much of the research on CQ has emerged in the human resources area (e.g. Wood and St. Peters, 2014; Yao, 2014), and in particular in the area of crosscultural management (e.g. Ramsey et al., 2011). However, the CQ has been equally important in other fields, including but not limited to cross-cultural psychology (e.g. Hofstede and McCrae, 2004), pedagogy and counseling (e.g. Wrenn, 1962; Van der Zee and Brinkmann, 2004), political science and defense (e.g. Gabrenya et al., 2011), communications studies (e.g. Montagliani and Giacalone, 1998), study abroad (Wood and St. Peters, 2014; Durrant and Dorius, 2007), and applied psychology (Bennett, 1977), among others.

An exhaustive list of CQ applications across all disciplines is beyond the scope of this paper. Instead, we focus on the growing requirements of businesses and internationally minded managers. As the workplace is becoming increasingly global, the need to do business and to deal with people across cultures has grown. This growth has been accompanied by a need to understand, predict, and develop the CQ (Christiansen and Sezerel, 2013).

The attempt here is to develop a business CQ model, a model that is specific to and applicable to the business context. Accordingly, we seek to develop an instrument to measure the business CQ, or the "business cultural intelligence quotient" (BCIQ). This instrument specifically addresses the limitations of existing CQ measures.

Alon and Higgins (2005) have developed a conceptual model that suggests that cultural and EQ factors are both present in global leadership. In a discussion of the role of CQ in global leadership development, they note that although the EQ is the ability to identify, assess, and manage one's emotions for effective interpersonal problem solving and interpersonal relationships, "CQ enables leaders to translate the varying EQ behaviors of different cultures, and then to choose a more appropriate EQ action for a specific culture than the leader might otherwise have chosen" (Alon and Higgins, 2005, p. 505).

Even though there was initial criticism of this model because of a lack of consensus regarding the terminology and the validity of the construct, the theories were validated in subsequent research and they now form the basis for a substantial body of literature regarding intercultural relations, acculturation, and adaptation (Berry and Ward, 2006). This body of literature identifies constructs conducive to cross-cultural effectiveness, such as extraversion, positive self-esteem, and the ability to create good impressions, whether or not the impetus comes from conscious role-playing or genuine expressive warmth. Coping skills and stress tolerance, including freedom from psychological stresses, are also highlighted. The literature implies that developing an individual's capacity for empathy, emotional resilience, affective emotional expression, communications, and interpersonal skills will improve intercultural functioning.

Correlates of cultural intelligence

Various constructs have been developed in psychology and organizational behavior that include some cultural intelligence correlates, such as emotional intelligence, a global mindset, cross-cultural adaptability, and personality.

Thomas et al. (2008) suggest that CQ is different from the related constructs of a global mindset, social intelligence, and emotional intelligence. A global mindset refers to those competencies necessary for successful international business managers, including psychological capital, social capital, and intellectual capital (Thunderbird Najafi Global Mindset Institute, 2015). Social intelligence focusses on understanding oneself and others in a social context (Kihlstrom and Cantor, 2000). Emotional intelligence (CQ) is the ability to perceive others' emotions and to be able to respond to them appropriately (Goleman, 1995).

Emotional intelligence

Both the Salovey and Mayer (1990) paradigm, which is the EQ ability model, and the Bar-On paradigm , which is a competencies and skills model, confirm the importance of perceiving, interpreting, and acting upon one's emotions in order to solve problems. However, emotional display may be culture specific and when applied to cross-cultural settings, social skills learned in one country may not translate into another national setting (Thomas et al., 2008). The unique CQ contribution is that it attempts to explain the motivation to master new social cues.

Emmerling and Boyatzis (2012), in an examination of emotional and social intelligence across cultures, find that the two are both a practical and coherent, and reliable and valid approach to assessing and developing managers across cultures. The EQ correlates with the four-factor CQ model of Ang et al. (2007). Moon (2010) discovers that the CQ can explain, over and beyond the EQ, self-competence, self-awareness, and relationship management among Korean students. The CQ complements social, emotional, and analytical intelligence in the construction of effective global leaders (Alon and Higgins, 2005).

Cross-cultural adaptability

Tang (2001) establishes a relationship between the EQ and cross-cultural adaptation by using the Cross-Cultural Adaptability Inventory (CCAI) to measure cross-cultural adaptability. Cross-cultural adaptability and EQ are critical to expatriate performance, cross-cultural negotiations, cross-cultural leadership training, medical and allied health education, international work groups, and virtual global teams. Cross-cultural adaptability is a major component of both the EQ and CQ, and comprises a great deal of the variance in CQ. The BCIQ was designed to measure that cognitive component that influences an individual to observe, reflect, and act in concert with the cultural demands of a business setting.

The CCAI, developed by Kelley and Meyers (1986, 1995, 2001, 2015), was one of the first instruments in the field to define and operationalize the dimensions of crosscultural adaptability. They identify four factors that are significant to cross-cultural adaptation and effectiveness: emotional resilience, flexibility and openness, perceptual acuity, and personal autonomy. The CCAI, recognized as one of the most widely used measures of cross-cultural competence, was used by Ang et al. (2007) in their validation studies. In total, 11 of the 16 correlations between the four CQ factors and the four CCAI factors establish a convergent validity with the construct of cross-cultural adaptation.

There are a number of links between the constructs of cross-cultural adaptability and the EQ. Researchers in both fields agree that social and emotional skills are highly important variables in determining in a person's ability to successfully solve problems (Mayer et al., 1990; Salovey and Mayer, 1990). Mayer and Salovey (1997) describe an EQ ability model that focusses on a person's skills to recognize emotional information and to use that information to carry out abstract reasoning tasks. This involves the "abilities to perceive, appraise and express emotion; to access and generate feelings when they facilitate thought; to understand emotion and emotional knowledge; and to regulate emotions to promote emotional and intellectual growth" (Mayer and Salovey, 1997, p. 10). They thus developed the Mayer Salovey and Caruso Emotional Intelligence Test. The Bar-On model of emotional-social intelligence describes the EQ as an array of interrelated emotional and social competencies, skills, and facilitators that have an impact intelligent behavior (Bar-On, 1997). Bar-On developed the Bar-On Emotional Quotient Inventory (Bar-On EQi).

Personality

Ang et al. (2006, 2007) show that in many ways CQ is distinct from the "Big Five" personality traits, but there are also significant correlations. For instance, conscientiousness correlates with metacognitive CQ, and agreeability and emotional stability are related to behavioral CQ, extraversion is related to motivational and behavioral CQ, and openness is related to experience related to all four CQ factors.

Bi-culturalism and international experiences

Lastly, CQ has been shown to correlate with bicultural upbringing and multiple cultural identities, as well as to general prior cross-cultural experiences (see Thomas et al., 2010; Brannen and Thomas, 2010). Unlike the correlates listed above, these correlates are likely to be antecedents rather than consequences of cultural intelligence. Contributing to the nature vs nurture debate on the origins of cultural intelligence (see Ang and Van Dyne, 2008), the relationship between CQ and multicultural upbringing and experiences suggests that, at least partially, cultural intelligence is a learnt rather than innate trait.

The dimensionality of CQ

It has been long recognized that CQ is multi-faceted. To date, the model proposed by Ang and Van Dyne (2008) appears to be among the most popular in the literature. It includes four dimensions, namely:

Metacognitive CQ focusses on higher order thinking and involves mental processes used to understand cultural knowledge. It has been shown to predict situational cultural judgments, decision making, and performance of tasks (Ang et al., 2006, 2007).

Cognitive CQ focusses on knowledge of norms, practices, and conventions in different cultures acquired from education and personal experiences (Ang and Van Dyne, 2008), and knowledge of basic frameworks for cultural values, such as those offered by Hofstede and McCrae (2004).

Motivational CQ is the capability to direct attention and energy toward learning about and functioning in situations that are characterized by cultural differences (Ang and Van Dyne, 2008).

Behavioral CQ is the capability to exhibit appropriate verbal and non-verbal actions when interacting with people from different cultures (Ang and Van Dyne, 2008), including using culturally appropriate words, tones, and gestures (Gudykunst and Ting-Toomey, 1988).

Other CQ models are based on somewhat different dimensionalities of the construct, although some parallels may be drawn. Ang's subsequent model, for example, also includes the four dimensions, but with some slight variations. The Center for Leadership and Cultural Intelligence (CLCI) model includes: CQ strategy, CQ knowledge, CQ drive, and CQ action, which roughly correspond to the dimensions in Ang and Van Dyne's (2008) instrument described above. Of note, the CLCI instrument is proprietary. Users must receive certification to administer the measure and to interpret the results.

The models by Matsumoto et al. (2001) and Van der Zee and Van Oudenhoven (2000) are somewhat different from those by Ang and Van Dyne (2008), but they still contain factors that roughly correspond to the motivational, cognitive, and behavioral components. Specifically, Matsumoto's Intercultural Adjustment Potential Scale is based on a four-factor model comprised of emotional regulation, flexibility, openness, and critical thinking. Van der Zee and Van Oudenhoven's Multicultural Personality Questionnaire (2000) assesses cultural empathy, open-mindedness, emotional stability, flexibility, and social initiative.

Likewise, the Kozai Group has developed two CQ models for academic use. Their Global Competencies Inventory and Intercultural Effectiveness Scale are based on three dimensions that also include motivational and cognitive components:

(1) continuous learning focusses on cultural self-awareness and continuous exploration and the learning of cultures;
(2) interpersonal engagement focusses on a global mindset and interest in cross-cultural interactions; and
(3) hardiness, which is a positive cultural view and emotional intelligence.

Thunderbird's Global Mindset Inventory (Thunderbird Najafi Global Mindset Institute, 2015) is another proprietary model/instrument. Unlike the other models that were developed and validated using student convenience samples, development of this instrument relied on the use of actual business expatriates. It has three dimensions that are notably different from those described above:

(1) intellectual capital focusses on global business savvy, cognitive complexity, and cosmopolitan outlook;
(2) psychological capital deals with a passion for diversity, a quest for adventure, and self-assurance; and
(3) social capital includes intercultural empathy, interpersonal impact, and diplomacy.

Of note, the Global Mindset Inventory is proprietary. Users must receive certification to administer and interpret the assessments, including the 360 version, through a certification workshop.

CQ items

In order to obtain data, the existing CQ instruments rely on self-assessments and self-reported scores. Unfortunately, observing CQ directly is not always possible; this is especially the case for its motivational and metacognitive components. The behavioral component can be observed directly in principle, but it would require an experimental design, which would make the assessment prohibitively expensive. Therefore, rather than measuring CQ through direct observations or by test questions that have correct and wrong answers, the existing CQ measures ask respondents to assess their own CQ. This applies even to the knowledge component where instead of testing the respondents' cultural knowledge, the instrument tests the respondents' perception of their cultural knowledge. Using IQ tests as an example, the CQ tests do not, for example, ask for the answer of two + two, but rather ask the respondents to indicate on a Likert scale how well they know the answer to the question. As expected, their actual knowledge and their perception about their knowledge are not always identical.

The only exception so far is the instrument by Thomas et al. (2008, 2012). Their assessment involves a series of scenarios and video cases that are shown to the test takers on a computer screen. Each situation is followed by a series of questions that have correct and wrong answers. So rather than measuring perceptions, the instrument measures actual knowledge and reactions. Even though the scenarios are hypothetical and the respondents remain external observers, this is still a major step forward from a self-assessment approach to directly measure the CQ. Unfortunately, this approach makes administration of the test and analysis of the responses time-consuming and it requires special training. As a result, the test is inefficient and expensive to administer.

Contributions of the BCIQ

The BCIQ seeks to address these limitations. First, the BCIQ model relies on a more sophisticated factor structure that more fully captures all CQ aspects.

Second, the BCIQ has been designed to measure CQ in a business context. All items are applicable in workplace and international management settings, making the instrument uniquely suitable for business research applications.

Third, the BCIQ uses a combination of quasi-direct observations and objective direct measurements. Moreover, the instrument contains items that allow for direct observation of the cultural knowledge component of the CQ. Here, the instrument relies on a series of questions with right and wrong answers so that the items measure one's actual cultural knowledge, not one's perception or self-assessment of one's knowledge. The remainder of the items inquire about the frequency of certain behaviors and attitudes and ideas, rather than self-assessments of skills and attitudes. That is, the items do not ask the respondents to assess how well they know or do something, but rather the items report how frequently and in what manner the respondents do something. By forcing the respondents to report occurrences rather than to evaluate quality, the BCIQ makes the items more proximal to actual behaviors and skills. By combining the direct measurement items with self-reported observations, in the BCIQ the items are closer to the actual behaviors and skills. By combining the direct measurement items with the self-reported observations, the instrument and its administration are both inexpensive and efficient to directly measure the respondents' actual IQ rather than only their attitudes and perceptions related to the construct.

Development of the BCIQ

The first phase of our research focussed on the initial development of the instrument. This included a thorough review of the literature on cross-cultural adaptability, emotional intelligence, and, especially, cultural intelligence to determine the common IQ themes, dimensions, and concepts. Four scholars (one from clinical psychology, one from organizational behavior, one from international business, and one from psychometrics) participated in this collective research phase. A targeted pool of constructs was developed which included cross-cultural awareness, openness and tolerance for ambiguity and uncertainty, interpersonal relationship management, cognitive preparation and learning behavior, and global knowledge.

After generating the initial items to populate the targeted constructs, the authors built an online instrument with 154 questions, including 26 true/false questions on global knowledge and 18 demographic and business experience questions. The purpose of this first phase was to collect and analyze a sample of responses from professionals and to establish an efficient scale of 50-60 questions, with approximately ten questions on each targeted factor. We wanted a test sufficiently short to avoid fatigue and/or time constraints, yet sufficiently robust to achieve internal consistency.

Phase 1 collected responses from a sample of 464 individuals gathered in several countries to advance the design of an instrument that was as robust to cultural variation as possible. A subset of 280 completed the survey in its entirety. These 280 individuals consisted primarily of MBA students and professionals in various countries, including the USA (203), China (37), Denmark (27), and France (13). The test questions were administered online.

Based on an initial analysis, 76 questions were removed from the initial pool of 154 questions as they were identified to have a poor fit with the emerging factor structure or to lack discriminatory power. A principal component analysis (PCA) was then performed on the remaining 78 items and 280 complete sets of responses. Four factors were revealed by the PCA, one of which was sufficiently broad to be a candidate for a potential split into two sub-dimensions.

The instrument that emerged from Phase 1 comprised 40 self-reported and 20 true/ false knowledge questions hypothesizing four to five factors. The self-reported section, containing a series of questions that measure frequency of behavior, ideas, and actions that represent different CQ levels, was answered on a five-point Likert Scale. The objective measure section contained a series of true/false factual questions. Faking this part of the test was impossible: one either knew the answer to the question (high CQ) or did not know the answer to the question (low CQ). This objective measure is to be compared against a reference point of 50 percent correctly answered questions, assuming random answers. The survey began with a small section on demographics, exposure to different cultures, and business experience in a foreign country.

A complete list of the items that were included in Phase 2 is provided in the Appendix.

Validation

Approach

Our second phase involved a series of steps and two different data sets. From a data set of participants in the X-Culture project (n ¼ 1,282), we conducted a confirmatory factor analysis (CFA), assessed the predictive capability of the model on the individual performance of the

participants in the program, and compared the BCIQ model with an existing model (Ang et al., 2007). A description of the X-Culture project used to collect the data during this phase along with information on the business experience present in our sample and the similarity of the program to the virtual work environment of many corporate firms of today is described below.

We also cross-validated the model with a set of respondents from the X-Culture project that was not used in the first step (n = 709).

Sample used for the development of the BCIQ-38

The X-Culture project is an eight-week structured program in which participants studying international business throughout the world are assigned to virtual teams of five to seven people, with each team member from a different country. The teams are instructed to develop a full business plan, with the goals, constraints, and commitments laid out at the beginning of the program, for an international venture. Each team works on a different plan, some of which at the request of real customers and enterprises that support the program. The X-Culture environment closely emulates the one in which the corporate global virtual teams operate. They both have a well-defined measurable mandate, and have to conduct business long-distance, face internal cultural differences, operate in different time zones, and to be multilingual (with English as the business language). The team members do not know each other, yet their individual performance is partially measured by the output of a team that they do not know and nor select. Peer evaluations of the performance of each team member are recorded (direct measures on contribution, absenteeism, communication skills, participation, etc.) and the quality of the entire team's output is evaluated and scored by a committee of experts.

We used the participants who took part in X-Culture in spring of 2013 (n ¼ 1,282). That sample included 508 master's level participants and 774 undergraduate participants. Overall, they came from 81 different countries of birth and 31 countries of residence. The percentage of participants who had business experience that included working abroad for at least two weeks during their last international assignment was 11 percent. A much larger percentage – not recorded, but estimated to be at least 40 percent – of participants had direct business experience. Two instruments were used to measure the cultural intelligence of the participants: the BCIQ and Ang et al. (2007) in that sample. Respondents who did not get the Ang's questionnaire but responded to the BCIQ questionnaire were used to cross-validate the results of the model (n = 709).

Problems with using student samples in business research are widely known. This convenience-sampling approach has been justifiably criticized because the findings obtained using student samples may not generalize to the real-world workplace environment. The lack of generalizability is a result of the different student demographics and differences in the work design.

The students are typically younger than their corporate counterparts. Generally, this presents no threat to validity of the findings, but sometimes age, work experience, or marital status may be believed to moderate the relationship of interest and if that is the case, the younger age of student samples may be of a concern. In other words, if the focus of the study is on general attitudes, personality, or reactions that are likely to be universal across different representatives of the general public, the younger age of the student-sample study participants should not present a problem. However, if the constructs in question are believed to morph as one matures and gains work experience, use of student samples may indeed present a problem.

The work design differences are a usually a much bigger concern. A typical student-based study is usually limited to a simple in-class experiment. The student team members lack the interdependence commonly observed in organizations. The completion of the task is usually quick, often taking only minutes and rarely longer than a class session. The cost of failure and compensation are not a factor at all, which changes the motivation and incentive structure. And if culture is part of the model, cultural diversity in student samples is often "artificial" in the sense that it is either induced through priming (cf. Oyserman et al., 2002), or even if the students come from different countries, they tend to be acculturated and adjusted to the host culture. This would be particularly of a concern if performance is a key variable of the model, or is used to validate the predictive validity of an instrument with respect to its effect on team dynamics and performance.

A careful inspection of the subject of the present study – namely cultural intelligence – and the context in which the instrument is validated suggest that our sample characteristics present no major threats to validity of our findings. First, the demographics of the present project participants was not meaningfully different from the demographics of their corporate counterparts. About half of the participants were MBA and EMBA students, and the rest were business students in their last or second last year of studies. The vast majority of the participants had at least some work experience, and many were employed at the time of the project. Many participants reported they had their own businesses or held managerial positions. Most project participants aged 21-28, with an average of about 25 years, and about 16 percent of the participants in their 30s and 40s. These are the people who either already are or will be organizational employees in a year or so and will comprise the core of business organizations.

There is no reason to believe that their response patter to a cultural intelligence test, like BCIQ, will change in any way in a few years, or is currently different from a response pattern of organizational employees. It is certainly possible their cultural intelligence scores will improve, but it is unlikely that the inter-correlations among their responses to the survey items, which is the key issue in instrument development, will change in any way.

As far as the instrument validation, particularly concerning the predictive power of cultural intelligence, as measured by BCIQ, with respect to behavior and performance in cross-cultural settings, our sample was every bit as good, or possibly even better, than what could be obtained from corporate organizations.

First, the cross-cultural international settings were very real. The study participants worked in international virtual teams, each composed of about seven people with 5.2 different countries represented on each team (sometimes two team members were from the same country while the rest of the team member each came from a different country). The geographic and time-zone dispersion, cultural and language differences were real. Totally, 183 international teams took part in the study. Finding a large number of international work teams like this is simply impossible in the workplace. At most, an organization would have a few dozen international teams, and usually fewer than a dozen, whose performance could be observed to validate a cultural intelligence instrument with respect to behavior and performance in cross-cultural settings.

Second, the study task and environment were designed to resemble the corporate world as closely as possible. The team member interacted daily during eight to nine weeks, which is a typical project length in the corporate world.

Once the students enrolled in the course that participated in the project, they were required to take part in the project. The team assignment was random and students had no choice

over the countries represented on their teams. This is similar to how it works in the corporate world: accepting a job offer is voluntary, but once in a job, one has little choice as to what projects to work on and with whom.

The project involved development of a solution to real-life business challenges presented by real-life companies. The task involved market research, market entry plan development, and product design. The project was supervised by instructors with rich business consulting experience and managed as a regular business consulting project.

Just like in the corporate world, the teams were given significant autonomy in terms of the extent and type of communication methods. However, all participants were introduced to and were encouraged to use free collaboration tools, such as e-mail, voice and video conferencing tools (e.g. Skype), document and collaboration platforms (e.g. Google Docs and Dropbox), and social media (e.g. Facebook and Google+), similar to what is commonly used in a corporate environment.

The stakes were very high and the project was effectively a temporary employment for the client organization. First, the project accounted for 20-50 percent of the course grade. A failure on the project usually meant a failure in the course, with all resulting negative effects on future career prospects. The members of the best teams were invited project participants symposiums held once a year. Most attended received travel stipends. Additionally, organizations offered post-market commission, as well as prospects of internships and job offers. So from every angle, the project settings and work design were not different from those in organizations and the threat that the findings of the present study would not generalize to the corporate employee population is extremely small.

Most important, the advantages of the large international sample from the X-Culture project probably greatly outweighed the possible disadvantages due to marginally younger sample demographics. For example, the sample was comprised of participants from 31 countries by the current country of residence and 81 countries by the country of origin. One of the big concerns with instruments designed for international audiences is the instrument's generalizability across cultures. Using a large international X-Culture sample allowed us to confirm that the BCIQ psychometric properties meet the standards across various national subsamples.

Development of the model

The data set used in the development of BCIQ-38 consisted of 1,282 respondents to 40 self-report questions, 20 knowledge questions and 18 demographics and business experiential questions. First, an exploratory study of the factor structure presented in the data were conducted to confirm the number of factors. As anticipated in the first phase, four factors emerged from the exploratory factor analysis. Then a CFA was executed on the self-report questions, extracting both internal reliability and validity measures and leading to an optimization process for the number of items within each dimension.

The norms used for the overall fit of the model were adapted from Brown (2006). For an excellent model, these criteria consist of: normed χ 2 (χ 2 /degrees of freedom) less than 5; Tucker-Lewis Index (TLI) W0.90; comparative fit index (CFI) W0.90; and root mean squared error of approximation (RMSEA) o 0.10. A substantial improvement in the fit metrics of the instrument was obtained by reducing the initial set of 40 self-reported Likert scale questions to a subset of 18 indicators loading onto three constructs: Factor 1, was called motivation; Factor 2

was called listening and communicative adaptation; and Factor 3 was called cognitive preparation and learning behavior. Table I provides the loadings for the 18 self-reported indicators that remained in the final model. This revised instrument, used hereafter, meets the criteria for a good model, as defined above. It has the following goodness-of-fit characteristics: normed χ 2 = 5.50; TLI = 0.93; CFI = 0.94; RMSEA= 0.06.

Construct	Indicator	Loading
Motivation	Factor 1: 2	0.65
	Factor 1: 4	0.71
	Factor 1: 6	0.77
	Factor 1: 7	0.68
	Factor 1: 10	0.73
	Factor 1: 11	0.63
	Factor 1: 12	0.69
	Factor 1: 15	0.64
	Factor 1: 16	0.69
	Factor 1: 17	0.74
	Factor 1: 20	0.71
Listening and communicative adaptation	Factor 2: 5	0.74
	Factor 2: 6	0.72
	Factor 2: 7	0.7
	Factor 2: 8	0.76
Cognitive preparation and learning behavior	Factor 3: 1	0.62
	Factor 3: 5	0.67
	Factor 3: 9	0.82

Table I. Factor loadings for the BCIQ

The model development phase led to a reduction of the initial set of 40 self-report items to a subset of 18 items. The Appendix shows the items that were retained in the final version of the instrument. Each construct's validity and reliability was assessed to determine how well the items actually represent the latent theoretical constructs that they were intended to measure. Four measures for each one of the three constructs were obtained from the CFA. All construct loadings (Table I) were deemed satisfactory (between 0.62 and 0.82). Table II shows each construct's average extracted variance, discriminant validity (the extent to which a construct is truly distinct from the other constructs), and reliability (a measure of the internal consistency of the indicators).

A nomological validity test and an evaluation of the extent to which the correlations between the constructs make sense are described below. Estimates of the correlations between the constructs in the measurement model are shown in Table III. At this stage, they were deemed to be reasonable by our experts on the team. Later on, when we conducted an SEM analysis including global knowledge and performance, the highest coefficient of correlation between motivation and listening and communicative adaptation (0.71) dropped to 0.61.

In addition to the 18 self-reported indicators that constitute the first part of the instrument, 20 true/false questions were asked to assess the respondents' global knowledge. The content of the questions was distributed as follows: four questions pertaining to American culture; five questions pertaining to Asia; five questions pertaining to the Middle East and Africa; four questions pertaining to Europe; one question pertaining to Oceania; and one question pertaining to the world in general. An item response theory (IRT) analysis was conducted to assess whether some of the questions should either be amended or dropped. IRT

recognizes that different test items may have different psychometric properties. For example, the difficulty level may vary across items and thus different items may function differently in different samples, such as discriminate between levels of skills very well at some levels of difficulty but not at others. So the IRT uses information about test item characteristics in addition to the actual question responses provided by respondents, which helps designing better survey instruments. After looking at the distribution of the questions across the world, the distribution of the level of complexity of the questions (as revealed via the responses), the discriminatory power of the questions (as revealed from the results of the IRT analysis), the distribution of the ability of the respondents to answer the questions (as revealed from the results of the IRT analysis), it was determined that none of the questions should be eliminated.

In conclusion, the various measures of overall goodness-of-fit and of the individual construct's average variance extracted (AVE), reliability, and discriminant validity, as well as the results from the IRT analysis, are quite good and confirm the validity of our final model. Hereafter, this model is referred to as the BCIQ-38 (consisting of 18 self-reported questions and 20 knowledge questions).

Construct	Average extracted variance	Reliability	Discriminant validity
Motivation	0.48	0.91	No, but very close
Listening and communication adaptation	0.54	0.82	Yes
Cognitive preparation and learning behavior	0.50	0.75	Yes

Table II. Average extracted variance, validity, and reliability for the BCIQ

Validation against the Ang *et al.* instrument

When constructing a new measurement scale it is important to draw a comparison against existing instruments. We chose Ang et al.'s (2007) scale with 20 indicators and four constructs because it is one of the most commonly used instruments to assess cultural intelligence. Our validation sample, with 1,282 respondents, included responses to both instruments: Ang et al. and the BCIQ-38.

Table IV reports the correlations we obtained from our sample between the various indices. As expected, the highest correlation between the BCIQ-38 four indices (including global knowledge) and Ang et al.'s (2006) four indices (0.52) is that between the two respective motivation indices. This correlation was also confirmed by a full-blown CFA that led to a correlation factor of 0.57 between the two motivation constructs.

In conclusion, the Ang *et al.* and the BCIQ-38 instruments share a similar motivation construct. As expected, these two constructs are correlated, but with a lack of a perfect correlation due to the different set of indicators used by each instrument. The other constructs from the two instruments do not appear to be related, reflecting the difference between the two tools. In particular, the BCIQ-38 items are designed to work in BCIQs, whereas that is not the focus of Ang *et al.*

Construct 1	Construct 2	Correlation estimate
Cognitive preparation and learning behavior	Listening and communication adaptation	0.41
Cognitive preparation and learning behavior	Motivation	0.59
Listening and communicative adaptation	Motivation	0.71

Table III. Correlations among the constructs

	Ang *et al.*				BCIQ			
	Cognitive	Motivational	Behavioral	Metacognitive	Global knowledge	Motivation	Learning and communicative adaptation	Cognitive preparation and learning behavior
Ang et al.								
Cognitive	1.00	0.48	0.48	0.48	0.10	0.30	0.25	0.30
Motivational	0.48	1.00	0.54	0.64	0.08	*0.52*	0.34	0.22
Behavioral	0.48	0.54	1.00	0.69	0.10	0.34	0.38	0.24
Metacognitive	0.48	0.64	0.69	1.00	0.09	0.41	0.40	0.21
BCIQ								
Global knowledge					1.00	0.10	0.06	0.09
Motivation					0.10	1.00	0.61	0.49
Listening and communicative adaptation					0.06	0.61	1.00	0.33
Cognitive preparation and learning behavior					0.09	0.49	0.33	1.00

Table IV. Comparison between Ang *et al.* and the BCIQ-38 cultural intelligence instruments

Validation against external criteria

The relationships between the external demographic variables and exposure to different cultures and the dimensions of the revised instrument were examined to further validate the instrument. Of the four dimensions supported by the instrument and the data, only the global and national knowledge dimension was significantly impacted by the level of the class (undergraduate or masters' students).

Cognitive preparation and learning behavior is significantly related to age. Females perform significantly better on three of the four dimensions (males perform better on cognitive preparation and learning behavior). The most significant result was the number of countries in which one had lived for more than six months, where all the dimensions except listening and adaptation were significantly impacted with a positive trend. A similar result is found in terms of the number of languages spoken.

Validation against the individual performance of the respondents

This section looks at how well-BCIQ predicts behavior and performance in crosscultural settings. We used two measures of performance to assess the predictive ability of the BCIQ-38 model. The first measure, overall performance, is an average of seven ratings given to each respondent by their team co-workers on effort, intellectual contribution, writing skills, contribution, English verbal communication, technical skills, and percent of work done. The second measure is a non-participation measure calculated as the sum of missed meetings during the length of project.

Table V shows the results of a structural equation modeling (SEM) analysis run between the four BCIQ-38 constructs and performance. A performance construct was created during the SEM analysis from the two performance indices above, with acceptable loadings of 0.70 or above.

The results in Table V show that both global knowledge and motivation have a positive and significant impact on performance, with standard loadings of 0.13 and 0.19, respectively. The R2 value for performance is relatively small (0.044).

Cross-validation analysis on the X-Culture data set

To validate that the results obtained from the sample of 1,282 students from the X-Culture project of Spring 2013 can be generalized to other data sets, we extracted a new sample of respondents from the X-Culture project whose responses were not used in the validation study in the previous step (the respondents were in the X-Culture project in the Spring of 2013 but they did not take both the Ang et al. and the BCIQ surveys). The size of the subset was n = 709.

Table VI shows the results of the goodness-of-fit measures from the CFA analysis on each one of the two data sets as well as on the modeling data set. The BCIQ-38 performs well on both cross-validation data sets based on the results from the EFA and CFA analyses. The measures of the goodness-of-fit are comparable to those obtained on the modeling data set.

BCIQ-38 constructs	Performance correlate (loading)	SE	*t*-Value
Motivation	0.19	0.06	3.00
Listening and communication adaptation	0.01	0.06	0.02
Cognitive preparation and learning behavior	−0.10	0.05	−1.98
Global knowledge	0.13	0.03	3.87

SEM analysis: BCIQ-38 relationship to performance

The purpose of the validation process described in this section is to confirm the BCIQ-38 as our final model for assessing cross-cultural intelligence. This instrument performs well on the data set selected for the modeling effort, but also on the cross-validation data set. The BCIQ-38 correlates with another instrument used in the field, namely the Ang survey, and as expected that correlation is strong on a similar construct (motivation). But other constructs show no correlation among the two instruments, highlighting the differences between the two tools. Relative to the predictability of performance, we were able to explain a small yet significant percentage of the variability in a respondent's performance from two BCIQ-38 dimensions, motivation and global knowledge.

Discussion

The importance of CQ in the modern international workplace cannot be overestimated. Unfortunately, the available CQ measurement instruments are not always applicable in a business context. The present study seeks to fill this gap by offering the BCIQ, a cultural intelligence scale specifically designed to be used in business-related settings.

The BCIQ offers a number of advantages over competing instruments. First, it was specifically designed for business applications and can be used to study CQ in the contexts of

expatriation, work groups, global virtual teams, or other uniquely business settings. Second, the instrument relies on a newly refined model of CQ dimensionality. Third, the instrument shows excellent psychometric properties, including a clean factor structure, high internal reliability, and validity.

Limitations and directions for future research

Although the BCIQ has a number of advantages over other CQ instruments, it is not without limitations. First, the instrument was developed and validated using a convenience sample. The large size and diversity of the sample is a strong indicator that the psychometric properties and the predictive power of the instrument will hold true for other samples. Furthermore, the predictive power of the BCIQ was assessed by observing the respondents' behavior and performance in real-life cross-cultural situations. The respondents were working on a long-term project in teams involving people from throughout the world. The cultural differences and the challenges of cross-cultural collaboration faced by the students were real and not unlike those faced by their business counterparts. However, the generalizability of the results cannot be certain without further testing.

Although the BCIQ was developed and validated in a large international sample, the test was administered only in English. This presents several threats to validity of our study.

Data set	Bentler-Bonnet non-normed index (TLI)	Bentler comparative fit index (CFI)	Goodness-of-fit index (GFI)	Number of observations	Number of variables	RMSEA estimate
Threshold	> 0.95	> 0.95	> 0.95			< 0.05
Modeling data set	0.93	0.94	0.93	1,282	19	0.058
Cross-validation data set	0.92	0.93	0.93	572	19	0.055

Table VI. CFA for the BCIQ-38, different data sets

First, language barrier could impede understanding of the survey questions by the respondents with limited English skills, thereby introducing an error in their responses (cf. Harzing and Feely, 2008). Second, the language of the survey has been shown to systemically affect responses of bi-lingual respondents. For example, bi-linguals have been shown to answer the same question differently depending on the language of the survey so that their answers are more socially acceptable in the culture represented by the survey language (Marin et al., 1992). Third, the survey response styles have been shown to systemically vary across cultures. For example, people from some cultures tend to choose middle points, while people from other cultures tend to choose points close to the extremes of Likert-type scales (Harzing, 2006). A related body of research showed that the language of the survey may alter the response style of bi-lingual respondents.

A number of techniques to detect and correct for the response set have been proposed (e.g. Ellis and Kimmel, 1992; Smith and Fischer, 2008), but they are not without limitations. Lastly, even the cultural identity and language used by the interviewer can affect data collection (Zhang and Guttormsen, in press).

We would like to believe that the language barrier threat was minimal in our study, because all the respondents were fluent in English and had no problems understanding the items. Moreover, as English is becoming the lingua franca of business, our research design might have made the instrument even more similar to actual business settings, thereby improving the generalizability of the data collected using BCIQ to the target setting. However, if the instrument were to be administered in a different setting, additional tests would be required to establish its cross-language generalizability. Parts of the BCIQ rely on Likert-type scales, so the responses might have been contaminated by biases in the acquiescence and extreme response styles. Further research is needed to determine if the response set was a factor, and if so, to what extent it may have affected the BCIQ test results.

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