

Huong Trang Kim

Article

Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms

Cogent Business & Management

Provided in Cooperation with:

Taylor & Francis Group

Suggested Citation: Huong Trang Kim (2020) : Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 7, Iss. 1, pp. 1-22, <https://doi.org/10.1080/23311975.2020.1829272>

This Version is available at:

<https://hdl.handle.net/10419/244972>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms

Huong Trang Kim |

To cite this article: Huong Trang Kim | (2020) Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms, Cogent Business & Management, 7:1, 1829272, DOI: [10.1080/23311975.2020.1829272](https://doi.org/10.1080/23311975.2020.1829272)

To link to this article: <https://doi.org/10.1080/23311975.2020.1829272>



© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.



Published online: 13 Oct 2020.



Submit your article to this journal [↗](#)



Article views: 1476



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 4 View citing articles [↗](#)



Received: 01 April 2020
Accepted: 18 September 2020

*Corresponding author: Huong Trang Kim, Faculty of Banking and Finance, Foreign Trade University, Hanoi, Vietnam
E-mail: kimhuongtrang@ftu.edu.vn

Reviewing editor:
Pantea Foroudi, Middlesex University, UK

Additional information is available at the end of the article

MANAGEMENT | RESEARCH ARTICLE

Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms

Huong Trang Kim^{1*}

Abstract: The objective of our paper is to explore the impact of managers' emotional intelligence (EQ) and cognitive ability (IQ) on firm performance. In this regard, an experimental survey on managers from 623 textile and garments firms in Vietnam was conducted. We applied the International Positive Affectivity-Negative Affectivity Schedule-short form (I-PANAS-SF) to measure EQ, and Cognitive Reflection test (CRT) to measure IQ. We find that both emotional intelligence and cognitive ability matter with firm performance. One unit increase in a manager's EQ leads to a 18.3 percentage point increase in firm performance. Likewise, a firm whose manager has higher IQ performs better. IQ also enhances the effect of a manager's education on firm performance. An interesting finding of this study is that the effect of EQ on firm performance is more significant among male than female managers. From a managerial standpoint, the findings of our study suggest that to improve firm performance, it may be beneficial for organizations to recruit, facilitate and promote emotionally intelligent managers who have good cognitive ability and managerial skills.

Subjects: Cognition & Emotion; Economic Psychology; Business, Management and Accounting; Leadership; Entrepreneurship

ABOUT THE AUTHOR

Huong Trang Kim is a Senior Lecturer of International Finance at Foreign Trade University, Vietnam and she was awarded PhD degree at Middlesex University Business School, the United Kingdom. She won the first prize at "The scientific research contests for students 2004" of Vietnam, and won the first prize of "VIFOTEC prize 2004" of Vietnam. She has published her paper in the top-ranked journals such as *Journal of International Business Studies*, *Journal of Operations Management*. Her research interests include economic behaviors, economic psychology, financial performances and financial management of Multinational Enterprises (MNEs), risk management, financial derivatives use, and institutional theory.

PUBLIC INTEREST STATEMENT

An individual's emotional intelligence (EQ) and cognitive ability (IQ) are found to have a meaningful association with his/her behaviors and various life domains. However, in a dynamic business and management world, the link between firm performance and managers' EQ and IQ remains under-research area for both scholars and practitioners. Thus, this study is an attempt to explore that link by conducting an experimental survey on managers from 623 textile and garment firms in Vietnam. The findings reveal that both EQ and IQ matter for firm performance. A manager with higher IQ level is more likely to improve firm performance, while one unit increase in EQ level of a manager leads to 18.3 percentage point increase in performance of firm. At a practical level, the study provides has some substantial implications for firms regarding recruitment and HR management, as well as managers whose objectives is to improve firm performance.

Keywords: emotional intelligence; cognitive ability; firm performance; experimental survey; managers

JEL codes: G41; D22; D91

1. Introduction

Building upon the assumptions of perfectly rational decision makers, the traditional economic and financial theories have provided insights into corporate finance and performance. Yet, numerous important phenomena have raised challenges to these theories (Asness et al., 2020; Tai et al., 2018). For example, previous studies do not thoroughly scrutinize the role of human resources in the firm performance relationship (Irwin et al., 2018; Pereira et al., 2020); and traditional theories do not consider some aspects of a manager's personality traits and competencies as the main driver of firm performance. Other strands of literatures, however, have noted that cognitive ability (IQ) and emotional intelligence (EQ) are vital factors in explaining and understanding an individual's job performance and managerial practices (e.g., Ashkanasy & Daus, 2002; Behbahani, 2011; Ding & Yu, *in press*; Mysirlaki & Paraskeva, 2020; Udod et al., 2020). Along this line, a growing literature evidences that a person's cognitive ability (IQ), or intellectual qualities, have a meaningful relationship with his/her behaviors and performance (Demetriou et al., 2020; Tai et al., 2018), and is related to various life domains (Dohmen et al., 2018; Revelle et al., 2020; Treglown & Furnham, 2020). Compared with IQ, emotional intelligence (EQ) is relatively new yet has been attracting a great deal of attention. Salovey and Mayer (1990) and Mayer et al. (1999) refer EQ as the ability of an individual to understand and manage his/her own emotions and others' feelings, and then utilize this information to reason and solve problems, and guide actions. By this definition, we expect that managers with higher EQ would make better managerial decisions, leading to improved organizational performance (Alferaih, 2017; Ezzi et al., 2020; Sánchez et al., 2020).

Prior studies have examined the role of IQ (e.g., Gignac et al., 2020; Grinblatt et al., 2011; Noussair et al., 2016; Stasielowicz, 2020; Wai & Rindermann, 2015) and EQ (e.g., Ackert et al., 2020; Baczynska & Thornton, 2017; Furnham & Taylor, 2020; MacCann et al., 2020; Zhang et al., 2018)¹ in individuals' achievement. An under-researched question in the current literature is how a manager's IQ and EQ play a role at the organizational level? To explore this question, we focused on a sample of 623 textile and garment firms² in Vietnam in the year of 2018. Specially, we conducted an experimental survey based on the International Positive Affectivity–Negative Affectivity Schedule–short form (I-PANAS-SF) to measure sample managers' positive affectivity and negative affectivity, which is proxy for EQ. As for IQ we implement the Cognitive Reflection test (CRT).

We aim to make following contributions. *First*, our study examines the role of nontraditional factors such as managers' EQ and IQ in driving firm performance. *Second*, our research is one of the pioneering studies scrutinizing these factors in the context of an emerging economy like Vietnam. Doing so responds to important call for a better understanding of determinants of firm growth in developing countries. *Third*, focusing on individual's traits including EQ and IQ, we provide practical implications for firms in terms of organizational development strategies, human resources management and policies, and for managers whose aim to enhance firm performance.

We summarize the main findings as follows. There is suggestive evidence that a manager with higher cognitive ability can contribute more to effective performance of firm. One unit increase in a manager' EQ is associated with 18.3 percentage point increase in firm performance. We also note the interactive effects of IQ and EQ with a manager's demographic factors on firm performance. For example, EQ enhances the effect of manager's educational level on performance improvement. Likewise, a manager's IQ and experience interactively affect performance.

Interestingly, we uncover that the effect of EQ on firm performance depends on a manager's gender, which is more significant among male managers than their female counterparts.

The rest of the paper is structured as follows. In section 2, we review the related studies on the impact of cognitive ability and emotional intelligence on firm performance, as well as develop hypotheses. Section 3 details our experimental design and variables construction. In section 4, we present regression results and discuss our findings. Section 5 presents our conclusion.

2. Theoretical framework and hypothesis development

2.1. *Managers' emotional intelligence and firm performance*

Until the early 1990s, scholars and researchers paid very little attention to the concept of emotional intelligence (EQ). By coupling emotions and intelligence, Salovey and Mayer (1990) are among the first to define it as the "ability to monitor one's own and others' feelings and emotions, and discriminate among them and to use this information to guide one's thinking and actions" (p. 189). An emotionally intelligent person is assumed to have "the ability to recognize the meanings of emotions and their relationships, and to reason and solve problems based on them" (Mayer et al., 1999, p. 267). As such, the level of EQ is used as an indicator to examine human behavior and performance (MacCann et al., 2020; Sternberg, 1996), and a guideline for individual work involvement because it is related to problem solving, and decision-making (Naixiao & Zhuoqi, 2012; Treglown & Furnham, 2020; Udod et al., 2020).

Regarding theoretical models, although there are many EQ models, Mayer and Salovey (1997) contend that two foremost EQ models driving research are ability models and mixed models. Ability models conceptualize EQ in such a way as similar cognitive ability (IQ) and measure it by a test based on performance (Baczynska & Thornton, 2017). On the contrary, mixed models, which were introduced by Goleman (1998), embody both non-cognitive models (e.g., Bar-On, 1997, 2006), competency-based models (e.g. Goleman, 1995), and trait emotional intelligence (Petrides, 2009). Mixed models of EQ conceptualize EQ as a broad mix of constructs consisting of character traits and emotion-related abilities (see MacCann et al., 2020). These mixed models tend to use self-reports as their principal measurement of EQ (Baczynska & Thornton, 2017). As this study is concerned with considering EQ as a function of individuals' potency in presenting their emotions, we would focus on mixed model conceptualization of EQ.

In terms of empirical studies, a growing body of literature suggests that rather than being merely an additional factor to scrutinize, emotional intelligence plays a central role in the effective performance of managers in the workplace (e.g., Bouzguenda, 2018; Ezzi et al., 2016, 2020; Sánchez et al., 2020; Udod et al., 2020; Wilderom et al., 2015) because not only managers' knowledge and skills but their emotions and personality traits also affect performance (Carmeli, 2003). Many recent studies support the positive relationship between managers' EQ and performance of firms (e.g., Ezzi et al., 2020; Maqbool et al., 2017; Soussi & Jarboui, 2018; Tai et al., 2018). They sustain the underlying thesis that emotional intelligence is more likely to have positive effect on various managerial issues such as strategic choices (Bouzguenda, 2018; Soussi & Jarboui, 2018), leadership and team management (Lone & Lone, 2018; Maqbool et al., 2017; Miao et al., 2018; Treglown & Furnham, 2020; Udod et al., 2020), financial structure (Tai et al., 2018), and planning and decision-making skills (Furnham & Taylor, 2020), which in turn will improve firm performance.

Along this line, Ezzi et al. (2016) claim that a manager with high EQ possesses the aptitude to enhance the effectiveness of his job performance and to be conscious of the financial situation of the company. That manager is likely to have key traits such as discipline, inventiveness, motivation, and openness which may help him to motivate idea generation, decision and strategy making (Bouzguenda, 2018; Mysirlaki & Paraskeva, 2020; Soussi & Jarboui, 2018). As such, these traits enhance a manager to increase his/her evaluation skills (Bouzguenda (2018), and effective

leadership (Mysirlaki & Paraskeva, 2020; Sánchez et al., 2020), which leads to cost reduction and performance improvement.

Furthermore, due to the aptitude to recognize pros and cons of emotions and the capability of influencing others' emotions (George, 2000), an emotionally intelligent manager may have advantage in motivating performance of his employees (Lone & Lone, 2018; Miao et al., 2018; Treglown & Furnham, 2020), and building up the manager–employees exchange relationship (Dasborough & Ashkanasy, 2003; Udod et al., 2020). An emotionally intelligent manager also has ability to improve the relationship with his partners such as creditors, customers ... (Ezzi et al., 2016). As such, Ezzi et al. (2016) argue that emotional intelligence allows managers to minimize agency costs, transaction costs and exploit the productive capacity of their firms. An emotionally intelligent manager who is encouraging, and engaged in face-to-face communication (Udod et al., 2020), and who offer task support, provide emotional support and solve management problems (Sánchez et al., 2020) can achieve expected outcomes for firm

Based on mixed model conceptualizations of EQ (Bar-On, 1997, 2006) and taking the above evidence and arguments together, we hypothesize as follows:

Hypothesis 1a: The managers' emotional intelligence positively affects performance of firms

Given the fact that emotional intelligence refers to “the extent to which a person is attuned to his or her own feelings and to the feelings of others and is able to integrate emotions and reason such that emotions are used to facilitate cognitive processes, and emotions are cognitively managed.” (Yukl, 1998, p. 65), Damasio (1994) considers it a positive effect of emotions, which may guide actions to making benefits for firms. In particular, some studies find that positive emotions play a role in more positive behaviors and outcomes (Carmeli, 2003), and might contribute to improve decision-making (Bechara et al., 1997). Therefore, even though positive emotions of managers are not the primary concern in this paper, we still scrutinize whether managers' positive affectivity has impact on firm performance.

Based on the above logic, we hypothesize as follows:

Hypothesis 1b: The managers' positive affectivity positively affects performance of firms

2.2. Managers' cognitive ability and firm performance

Many studies in recent years have debated how an individual's intellectual qualities, or cognitive ability, influence his/her behaviors and performance (Tai et al., 2018). Even though an IQ score is typically used to assess a person's intelligence, what cognitive ability exactly means and what facets of cognitive ability are measured are still controversial issues in the current literature (Ackert et al., 2020; Gould, 1994) due to some limitations of studies on individual differences in IQ including issues of cost, sample size and scale (Revelle et al., 2020).

Revelle et al. (2020) point out that early research on intelligence contributed to advance in measurement of ability and theories of intelligence. Accordingly, Spearman (1904) was among the first to establish the tradition of measuring general intelligence. Since the work of Spearman (1904), theories of intelligence have been noticed that all cognitive measures form a positive manifold (e.g., Bouchard, 2014; Carroll, 1993; Johnson & Bouchard, 2005). Along with theories of intelligence, there are different types of measurement of cognitive ability, from the first IQ test developed by Alfred Binet in the early 20th century (Wade & Tavis, 2017), and the most widely used test worldwide – Wechsler Adult Intelligence Scale (WAIS) (e.g. Tai et al., 2018; Webb et al., 2014; Wechsler, 1997) to recent developed tests such as Raven's Progressive Matrices (Andersson

et al., 2016; Agnoli et al., 2014), working memory assessment – Global Adaptive Memory Evaluation (G.A.M.E) (Martin et al., 2020), and Cognitive Reflection test (CRT) (e.g., Ackert et al., 2020; Noussair et al., 2016). In this study, we would use CRT to measure IQ of our sample managers.

In terms of empirical studies, to our knowledge so far, there is no study investigating the link between managers' cognitive ability and performance of firms. However, our study is related to a large strand of literature on psychology and intelligence scrutinizing the usefulness of cognitive ability in predicting personal achievement such as academic performance (Demetriou et al., 2020) or job performance (see Stasielowicz (2020) for meta-analyses). Wai and Rindermann (2015) use historical data regarding education and cognitive ability of Fortune 500 CEOs to examine the path to become CEO and their performance, and they find that 41% of those CEOs attended at elite schools and were placed in the top 1% of cognitive ability. As for financial investment, Grinblatt et al. (2011) find that investors with high cognitive ability invest more in stock markets, and effect of IQ on participation is much greater than income's effect.

Moreover, Dohmen et al. (2018) points out that empirical studies by and large indicate that cognitive ability is related to changes in risk-taking behavior. Particularly, Lusardi and Mitchell (2014) evidence that cognitive ability improves the quality of decision-making under risk, which in turn leads to better financial planning and higher wealth accumulation. In the same vein, Corngnet et al. (2015), Noussair et al. (2016) find that the higher cognitive ability that traders in assets markets and futures market have, the greater earnings they earn.

Along this line, we can draw hypothesis as below:

Hypothesis 2: Cognitive ability of managers is positively related to firm performance

3. Research methodology

3.1. Survey development and participants

The study was conducted for a sample of 623 managers of textile and garment firms in three largest manufacturing hubs of Vietnam, namely Thai Binh, Hai Duong and Binh Duong provinces in 2018. Sample firms are randomly selected from the archives of the General Statistics Office of Vietnam (GSO). To ensure the creditability of the data, many officials from the General Statistics Office of Vietnam were hired to do our experimental survey. GSO officials sent invitations to managers, if the managers agreed to participate in our survey, they would deliver our questionnaire directly to managers. Our experimental survey consisted of two parts, in which part 1 was questions on managers' demographic profiles and part 2 was questionnaire on emotional intelligence and cognitive ability. There were 10 questions from the I-PANAS-SF in section A of part 2 to measure emotional intelligence. In the section B of part 2, cognitive ability was measured by three questions from the Cognitive Reflection test (CRT). The participation of managers in this study was totally voluntary, and there was no monetary incentive to complete our experimental survey. It is worth noting that the overall response rate is 100%,³ so there is no self-selection bias involved in this data set. Detailed experimental survey is in the Appendix 1

Participants were managers, mostly CEO and CFO. The age of sample group ranged from 26 to 76. The average age of participants was 49.5 years old ($SD = 10.025$). In the sample, there were 34.75% female managers ($M_{age} = 45.998$, $SD_{age} = 11.107$) and 65.25% male managers ($M_{age} = 50.218$, $SD_{age} = 9.692$). Participants had various academic degrees, in which about 57% of sample managers held bachelor degrees, managers had master degrees account for 4.28%, while only 0.52% of participants had doctoral degrees. Detailed participants' demographic profiles are reported in Table 2.

3.2. Model specification

To test the above hypotheses, we carried out cross-sectional regressions of firm performance by estimating managers' emotionality and cognitive ability for firm i in the year 2018, which is shown in our baseline model in Equation (1) as below:

$$FP_i = \alpha_i + \beta_{EQ} EQ_i + \lambda_{IQ} IQ_i + \theta_{PA} PA_i + \mu_X X_i + \varepsilon_i \quad (1)$$

Where:

FP_i : Firm performance of firm i , which is measured by sales revenue per employee

EQ_i : Emotional intelligence of manager of firm i

IQ_i : Cognitive ability of manager of firm i

PA_i : Positive affectivity of manager of firm i

X_i : A vector of control variables of firm i , including managers' demographic variables and firm-level variables

ε_i : Error terms

We then implemented an estimation of the equation (1) to investigate moderating effects of managers' gender, age and educational levels.

3.3. Measures

3.3.1. Cognitive ability measurement

There are many intelligence tests for researchers to measure different aspects of cognitive ability (Urbina, 2001) such as Raven's matrices (Burks et al., 2009), Raven's Progressive Matrices (Agnoli et al., 2012; Andersson et al., 2016), and one of the most widely used instruments worldwide is Wechsler Adult Intelligence Scale (WAIS). The obvious shortcoming of these tests is prolonged time for administration, leading to difficulties in conducting many surveys and experimental research. For example, WAIS consists of 11 modules, 6 verbal and 5 non-verbal sections. Being aware of that drawback, some researchers apply a subset of the WAIS (e.g., Dohmen et al., 2010; Tai et al., 2018) or the Cognitive Reflection (CRT) to measure cognitive ability (e.g., Ackert et al., 2020; Corgnet et al., 2015; Frederick, 2005; Noussair et al., 2016).

Following previous studies, in this paper we applied CRT to measure cognitive ability due to its practical implications in the way of short test and easy assessment of scores obtained. Further, Frederick (2005) also points out that the CRT is not only linked to substantial intelligence tests but also to the behaviors that these tests are related to. The CRT consists of three simple questions, which require participants to think and reflect cognitively. Appendix 1 presents the CRT. The total scores of these three questions reflect the cognitive ability of a participant, in which 0 means that he answered all questions incorrectly, and 3 means that he answered correctly all questions. A higher score refers to higher cognitive ability.

3.3.2. Emotional intelligence measurement

As shown in the previous section, there are various approaches to measure emotional intelligence (EQ) (e.g. Boyatzis & Goleman, 1999; Charupat et al., 2013; Mayer et al., 1999; Zeidner et al., 2004). In this study, EQ was measured by the approach of Charupat et al. (2013). According to that approach, one of the "Big Five" personal trait groupings is called Emotional stability. People who have high emotional stability are likely to display calm, gracefulness under stress and exhibit

positive affectivity (PA); while those who have low emotional stability are prone to be anxious, nervous, and exhibit negative affectivity (NA) (Charupat et al., 2013).

In this line of thought, we designed an experimental survey including 10 questions on the basis of I-PANAS-

SF, which was put forward and tested for validity by Thompson (2007). All 10 questions were asked on a 5-point Likert Scale, ranging from 1 (never) to 5 (always), in which 5 questions correlate with negative emotions, and 5 others correspond to positive emotions. Our proxy for emotional intelligence is average scores on the five negative affectivity (NA) questions. It is because stress and negative emotions have negative impact on performance (Bouzuenda (2018), thus EQ is related to more effective handling (Zeidner et al., 2004), and an emotionally intelligent person may resist adverse effect of negative emotions (Fallon et al., 2014). In order to interpret regression results more easily, we use 5 minus NA average scores, thus a higher value refers to higher EQ in the following regressions. Additionally, the average score on the five questions, which corresponds to positive emotions, is our proxy for positive affectivity (PA). A higher value indicates higher likelihood of experiencing positive emotions.

3.3.3. *Dependent variable*

While in the current literature there are various methods to measure firm performance such as profitability (ROA, ROE), investment capacity, turnover, in this study we used a key indicator of firm- the sales revenue per employees- as a proxy for firm performance. We used the natural logarithm of net sales revenue per employees in fiscal year of 2018 as the dependent variable, which is the income received by a firm from its sales of goods minus costs, then divided by total number employees of that firm. The data were obtained from the General Statistics Office of Vietnam. One other important reason for our choice of dependent variable is that most firms often set target of sales on a yearly basis, implying that it is likely to depend on managers' behaviors and traits such as cognitive ability and emotional intelligence.

3.3.4. *Control variables*

Firstly, a manager's EQ and IQ may change as a result of demographic characteristics (Mayer et al., 2004). In particular, Prufeta (2017), Ackert et al. (2020), among others, show that age and gender together with EQ and IQ have effect on performance. Da Silva et al. (2019) document that gender of leaders is the most relevant condition leading to success of projects in information system. On the other hand, Agnoli et al. (2014), and Sergio and Marcano (2013) indicate that education associated with EQ and IQ has a relationship with firm performance. Following the previous studies, in this paper, we controlled for some demographic variables, namely managers' age, gender and educational levels.

Secondly, many prior studies (e.g. Bouzuenda, 2018; Ezzi et al., 2016; Wilderom et al., 2015) evidence that firm size has effect on firm performance. Firm size, in fact, is measured by several methods such as the log of total assets, total workforce, or total size. In this study, we used the natural logarithm of total employees as a proxy for firm size.

Table 1 provides definitions of all variables.

4. Results analysis and discussion

4.1. *Descriptive statistics*

Table 2 details descriptive statistics of all variables. In addition to cognitive ability and emotional intelligence, managers' demographic profile variables including gender, age and educational levels are of interest. As can be gleaned from Table 2, the cognitive ability (IQ)'s mean value of 1.584 is noted, which is somewhat similar to the mean of 1.60 found in Ackert et al. (2020). This finding ($M = 1.584$, $SD = 0.691$) verbally interprets that managers under consideration are characterized by an average IQ level. As for emotional intelligence (EQ), the average score ($M = 2.519$, $SD = 0.716$) is slightly below the 2.73 level found in Ackert et al. (2020), but fairly close to the mean of 2.42 found

Table 1. Definitions of variables

	Variables	Measurement	Sources
Dependent variables			
Sales revenue/employees		Natural log of net sales revenue per employees	General Statistics Office of Vietnam
Independent variables			
	Cognitive ability	Score from 0 to 3 based on Cognitive Reflection test (CRT), where 0 means a participant answered all three questions wrongly, and 3 means he answered correctly all questions. A higher score refers to higher cognitive ability	Authors' construction
	Emotional intelligence	A 5-point Likert scale based on the International Positive Affectivity—Negative Affectivity Schedule—Short form (I-PANAS-SF) questions to measure Negative Affectivity. Proxy for emotional intelligence is 5 minus scores of those questions. A higher average value implies higher emotional intelligence.	Authors' construction
	Positive Affectivity	A 5-point Likert scale based on the International Positive Affectivity—Negative Affectivity Schedule—Short form (I-PANAS-SF) questions to measure Positive Affectivity. A higher average value indicates higher likelihood of experiencing positive emotions	Authors' construction
Control variables			
	Age	Age of participants (in years)	Authors' construction
	Gender	Dummy variable coded 1 if a participant is male and 0 otherwise	Authors' construction
	Education	Educational levels, ranging from 1 (lowest level) to 9 (highest level), while it is coded 6 if a manager has a bachelor degree	General Statistics Office of Vietnam
	Firm size	Natural log of total number of employees	General Statistics Office of Vietnam

Note: Table 1 provides definitions of dependent variables, independent variables and control variables. The independent variables are constructed from responses of participants collected from the survey and experiment, including cognitive ability, emotional intelligence, negative emotions and demographic profile variables.

Table 2. Descriptive statistics

Variables	Observation	Mean	Std. Dev.	Min	Max
Sales revenue per employees	623	2.641	2.853	3.663	17.665
Cognitive ability	623	1.584	0.691	0	3
Positive affectivity	623	3.490	0.639	0	4
Emotional intelligence	623	2.519	0.716	1	5
Age	623	49.596	10.025	26	76
Gender	623	0.652	0.354	0	1
Education	623	5.509	1.977	1	9
Firm size	623	2.713	1.708	0	9.233

Note: Table 2 displays summary statistics of firm-specific variables, and participants' characteristics including cognitive ability, emotional intelligence, negative emotions and demographic profile. See Table 1 for variables definitions.

in Charupat et al. (2013). The result suggests that managers under consideration, on average, have quite high EQ level. The mean score ($M = 3.49$, $SD = 0.639$) of positive affectivity is quite close to the mean of 3.36 and 3.60 levels found in Ackert et al. (2020), and Maqbool et al. (2017), respectively. In our sample, male managers account for 65.25%, and 34.75% are female managers. The age of the sample managers, on average, is 49.5 years old. The mean score of educational levels ($M = 5.509$, $SD = 1.977$) shows that most of the sample managers have bachelor degrees.

4.2. Correlation analysis

Pearson correlation matrix among explanatory variables and dependent variables is performed and presented in Table 3, which provides us an initial perception of what we may find in the next step of implementing regression estimations. It is notable that the correlation between two key independent variables – cognitive ability (IQ) and emotional intelligence (EQ) – is not statistically significant at any level ($r = -0.004$, $p > 0.1$), providing support for the notion that they are different constructs. Different from Charupat et al. (2013) and Ackert et al. (2020), we observe a strong positive correlation between emotional intelligence (EQ) and positive affectivity ($r = 0.135$, $p < 0.01$).

Turning to the correlation between key explanatory variables and dependent variables, some clear tendencies are shown. Emotional intelligence and cognitive ability show a positively strong correlation with firm sale revenue per employees ($r = 0.082$, $p < 0.05$; $r = 0.093$, $p < 0.05$, respectively), while positive affectivity is correlated positively with sale revenue per employees ($r = 0.108$, $p < 0.01$). The results partly support Hypotheses 1a, 1b and 2. Further, we find a positive relationship between sale revenue per employees and gender ($r = 0.068$, $p < 0.05$). Additionally, we observe that high emotional intelligence (EQ) level is positively correlated with being male ($r = 0.044$, $p < 0.01$), it also has a positive correlation with education levels. In contrast, we cannot find any correlation between cognitive ability (IQ) with gender, age or educational levels. In the same vein, no correlation between positive affectivity and demographic profile variables is found.

4.3. The link between managers' emotional intelligence (EQ) and cognitive ability (IQ) and firm performance

Table 4 presents the results of a cross-sectional estimation for the impact of managers' emotional intelligence and cognitive ability. Beginning with cognitive ability, as in Hypothesis 2, it is asserted that a higher IQ level of managers is likely to lead to higher firm performance. Supporting that hypothesis, we find that cognitive ability is positively and significantly related to firm performance at 5% significance level ($\beta = 0.102$, $p < 0.05$). The result suggests that an intelligent manager is

Table 3. Correlation matrix

	1	2	3	4	5	6	7	8
1. Sales revenue/ employees	1							
2. Cognitive ability	0.093**	1						
3. Emotional intelligence	0.082**	-0.004	1					
4. Positive affectivity	0.108***	-0.072***	0.135***	1				
5. Age	-0.004	-0.008	0.0081	-0.003	1			
6. Gender	0.068*	-0.007	0.044***	0.0076	0.155***	1		
7. Education	0.037**	0.015	0.0010	0.0232	0.178***	-0.001	1	
8. Firm size	0.0170	0.076***	-0.063***	0.045***	-0.019	-0.028*	-0.001	1

Note: Table 3 shows the correlation matrix among variables. Asterisks *, **, and *** present significance at 10%, 5% and 1% levels, respectively

Table 4. Cross-sectional regressions for impacts of cognitive ability and emotional intelligence on firm performance

	Model 1	Model 2	Model 3
Cognitive ability	0.135*	0.104**	0.102**
	(1.84)	(2.35)	(2.30)
Emotional intelligence	0.172*		0.183*
	(1.79)		(1.75)
Positive affectivity		0.173**	0.063
		(2.44)	(1.23)
Age	-0.059	-0.031	-0.016
	(-0.11)	(-0.93)	(-0.56)
Gender	0.244*	0.144	0.142
	(1.65)	(1.45)	(1.42)
Education	0.054**	0.01	0.019
	(1.98)	(0.55)	(0.12)
Firm size	0.704***	0.472***	0.468***
	(2.93)	(4.49)	(2.87)
Intercept	2.533***	1.969***	1.309***
	(6.25)	(7.33)	(4.83)
Observations	623	623	623
Adjusted R-squared	0.259	0.132	0.259

Note: Table 4 reports the effects of managers' cognitive ability and emotional intelligence on firm performance, measured by natural log of net sales revenue per employees. t-values are in parentheses. Asterisks *, **, and *** present significance at 10%, 5% and 1% levels, respectively. All variables definitions are provided in the Table 1.

aware of his business, solves problems and chooses the most appropriate actions based on his IQ level to obtain better outcomes for firm.

Regarding emotional intelligence and positive affectivity, we investigate them separately in the models 1 and 2; both of these variables are included and examined in model 3. As reflected in Hypothesis 1a and Hypothesis 1b, coefficients of emotional intelligence and positive affectivity are expected to be positive, implying that a higher EQ level is likely to be related to better firm performance, and good moods of managers are likely to increase firm performance. Based on the results in Table 4, we observe a strong positive relationship between a manager's emotional intelligence and firm performance in all models ($\beta = 0.172$, $p < 0.1$; $\beta = 0.183$, $p < 0.01$), which supports Hypothesis 1a. The coefficient of 0.183 shows that one unit increase in emotional intelligence of a manger has a 18.3% impact on firm performance, which is in line with findings of Maqbool et al. (2017). The coefficient of positive affectivity is positive and statistically significant at 5% level ($\beta = 0.173$, $p < 0.01$) only when we examine it separately with emotional intelligence in the model 1. The results are in line with findings of Bouzguenda (2018) and suggest that an emotionally intelligent manager has ability to be self-conscious and mindful of his business, and life environment. As such, he is dedicated to employees and organizational concerns (Muller & Turner, 2010), good at creating comfortable working conditions and trust with stakeholders (Ezzi et al., 2016). Thus, he solves problems and makes proper decisions based on his competencies and preference system, which helps to improve productivity, sales and firm performance ultimately. On the other hand, the results also support Bouzguenda (2018) that the use of emotions in making decisions is influenced by the mood of managers: they face new challenges and resolve problems easily when they are in good mood.

Regarding the control variables, we find a significantly positive relationship between gender and firm performance ($\beta = 0.244$, $p < 0.1$) in the model 1, firm size is positively and significantly associated to firm performance at 1% level in all models ($\beta = 0.704$, $p < 0.01$; $\beta = 0.472$, $p < 0.01$; $\beta = 0.468$, $p < 0.01$).

The main results of Table 4 and proposed hypotheses are depicted in Figure 1. The main results support all the hypotheses of the study, revealing a significantly positive linkage between EQ and IQ levels of managers and firm performance.

4.4. The effects of managers' emotional intelligence and cognitive ability on firm performance under the influence of demographic profiles

In Table 5, we report regression results for the link between managers' EQ, IQ and firm performance. In the panel A, panel B and panel C of Table 5, we investigate emotional intelligence and negative emotions separately in models 1; and the dependent variable is regressed on EQ, IQ, positive affectivity, the interaction terms of these variables with gender, age and educational levels in the models 2, respectively.

4.4.1. Moderating effect of gender

For decades, supply-side theories⁴ (e.g. Browne, 2006; Okamoto & England, 1999) have claimed that gender has some essential and reliable psychological differences, which might lead to workers' different personality and ability profiles (Wright et al., 2015). In particular, previous studies, reviews and meta-analyses on gender differences have shown that the magnitude of differences based on individual studies ranges from small (e.g. Cabello & Fernández-Berrocá, 2015; Lumley et al., 2005) to moderate (e.g. Cabello et al., 2016; Fischer et al., 2018). Although there is an abundance of research on gender differences in emotions and ability, previous research is not very consistent (Cabello et al., 2016). Therefore, in this section we aim to examine how gender differences in managers' emotional intelligence and cognitive ability explain different firm performance.

In the panel A, controlling for demographic variables, cognitive ability presents a positive and significant relation with firm performance in all models ($\beta = 0.6281$, $p < 0.01$; $\beta = 0.2267$, $p < 0.1$, respectively), which is consistent with our previous findings. However, while gender alone has a significantly impact on firm performance in both models 1 and 2 ($\beta = 0.519$, $p < 0.05$; $\beta = 0.1414$, $p < 0.1$, respectively), the estimated coefficient on the interaction term between this variable and

Figure 1. Main results and proposed hypotheses of the study.

Note: Figure 1 depicts the main results and proposed hypotheses of the study. H1a, H1b and H2 stand for Hypothesis 1a, Hypothesis 1b and Hypothesis 2, respectively. Symbols in parentheses are expected signs.

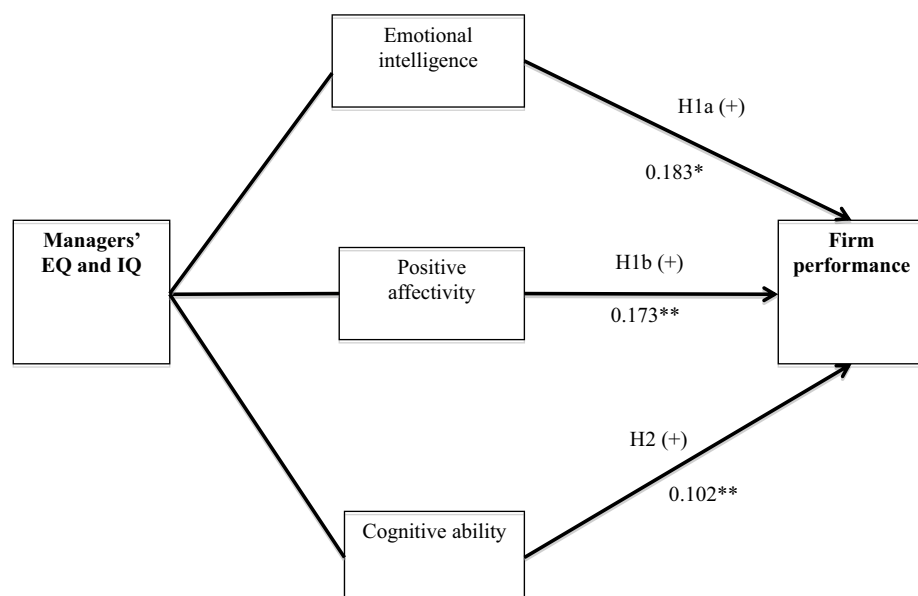


Table 5. Regressions with interaction terms

	Model 1		Model 2	
Panel A: Interaction terms between cognitive ability, emotional intelligence and gender				
Cognitive ability	0.6281***		0.2267*	
	(2.03)		(1.66)	
Cognitive ability* gender	0.3165		0.1450	
	(0.33)		(1.12)	
Emotional intelligence	0.0746		0.0466**	
	(0.72)		(2.32)	
Emotional intelligence*gender	0.2424**		0.0236***	
	(2.49)		(3.25)	
Positive affectivity			0.0634	
			(0.41)	
Positive affectivity* gender			0.033**	
			(1.99)	
Gender	0.519**		0.1414*	
	(2.11)		(1.85)	
Other control variables	Yes		Yes	
Intercept	4.5341***		2.007***	
	(5.11)		(2.59)	
Observations	623		623	
Adjusted R-squared	0.1328		0.1612	
Panel B: Interaction terms between cognitive ability, emotional intelligence and age				
Cognitive ability	0.4838		0.4906	
	(0.21)		(1.26)	
Cognitive ability* age	-0.0126*		-0.0127*	
	(-1.66)		(1.68)	
Emotional intelligence	0.7550**		0.7477*	
	(1.97)		(1.91)	
Emotional intelligence*age	-0.0156**		-0.0153	
	(2.05)		(-2.01)	
Positive affectivity			0.0740	
			(0.18)	
Positive affectivity *age			0.0025	
			(0.31)	
Age	-0.0588**		-0.0494	
	(-2.26)		(-1.22)	
Other control variables	Yes		Yes	
Intercept	3.8891***		1.1838***	
	(2.48)		(3.36)	

(Continued)

Table 5. (Continued)

	Model 1		Model 2	
Observations	623		623	
Adjusted R-squared	0.1873		0.2528	
Panel C: Interaction terms between cognitive ability, emotional intelligence and educational levels				
Cognitive ability	0.2419*		0.2396*	
	(1.72)		(1.69)	
Cognitive ability* education	0.0501**		0.0497**	
	(2.17)		(2.14)	
Emotional intelligence	0.1645**		0.7045***	
	(2.32)		(2.94)	
Emotional intellig ence*education	0.0164*		0.3069*	
	(1.81)		(1.90)	
Positive affectivity			0.0573	
			(0.41)	
Positive affectivity *education			0.0832	
			(0.35)	
Education	0.1238*		0.0929	
	(1.93)		(0.83)	
Other control variables	Yes		Yes	
Intercept	2.5195***		3.825***	
	(3.42)		(5.80)	
Observations	623		623	
Adjusted R-squared	0.2335		0.2601	

Note: Table 5 displays the impacts of managers' cognitive ability and emotional intelligence on firm performance with interaction terms. Dependent variable is measured by natural log of net sales revenue per employees. t-values are in parentheses. Asterisks *, **, and *** present significance at 10%, 5% and 1% levels, respectively. All variables definitions are provided in the Table 1.

cognitive ability is not statistically different from zero at any level. The results imply that a high IQ level of a manager improves firm performance regardless of manager's gender.

In terms of emotional intelligence, it has a positive and significant association with firm performance in model 2 ($\beta = 0.0466$, $p < 0.05$), which is in line with the findings in Table 4. Additionally, the estimated coefficient on the interaction term between EQ and gender is positive and statistically significant at 1% significance level in model 2 ($\beta = 0.0236$, $p < 0.01$). All these results suggest that one unit increase in emotional intelligence of a male manager has higher impact on firm performance than a female manager. In model 2, as the interaction term between positive affectivity and gender is concerned, the firm performance is significantly and positively predicted by that interaction term ($\beta = 0.033$, $p < 0.05$), showing that a male manager with higher positive affectivity improves firm performance at higher degrees. Our findings support the view that men are better than women at handling negative emotions and being optimistic (Austin et al., 2010; Berrocal & Extremera, 2008; Fischer et al., 2018; Parker et al., 2011), better at stress tolerance and impulse control (Bianchi et al., 2020; Candela Agulló et al., 2002), and managing and repairing one's stress (Lopez-Zafra & Gartzia, 2014).⁵

4.4.2. Moderating effect of age

Many previous studies have shown that individuals' emotional functions and cognitive ability vary to age (e.g. Cabello et al., 2016; Frederick, 2005; Grühn et al., 2010; O'Brien et al., 2013). Building on these insights, in panel B of Table 5, we investigate how age difference in managers' EQ and IQ can explain different firm performance.

Panel B shows that the estimated coefficient on age is negative and statistically different from zero at 5% significance level in model 1 ($\beta = 0.0588$), and the estimated coefficient on the interaction term between this variable and cognitive ability is negatively and significantly related to firm performance in both models 1 and 2 ($\beta = -0.0126$, $p < 0.1$; $\beta = -0.0127$, $p < 0.1$, respectively). These results indicate that IQ plays a more significant role in performance among younger managers.

Regarding emotional intelligence, in the model 1 we observe a positive and significant relationship between emotional intelligence and firm performance ($\beta = -0.0126$, $p < 0.05$). The interaction term between this variable and age also presents a negative association with firm performance ($\beta = -0.0156$, $p < 0.05$). These results altogether suggest that younger managers who are emotionally intelligent have higher impact on firm performance than their older counterparts. In terms of positive affectivity, no statistically significant interaction between those variables and age is found in model 2.

4.4.3. Moderating effect of educational levels

Prior studies document that education together with cognitive ability and emotional intelligence have impact on performance (e.g. Agnoli et al., 2014; Sergio & Marciano, 2013). Panel C of Table 5 displays regression results for the effect of managers' EQ and IQ on firm performance under influence of educational levels. As far as the interaction between emotional intelligence and educational levels is concerned, the estimation shows some statistically significant association. We find a strong positive association of a manager's emotional intelligence and firm performance in both models ($\beta = 0.1645$, $p < 0.05$; $\beta = 0.7045$, $p < 0.01$, respectively). In the model 1, firm performance is also positively predicted by educational levels ($\beta = 0.1238$, $p < 0.1$).

The estimated coefficient of interaction terms between emotional intelligence and educational levels is positively and significantly related to firm performance at 10% level in both models ($\beta = 0.0164$, $p < 0.1$; $\beta = 0.3069$, $p < 0.1$, respectively). These results indicate that an emotionally intelligent manager with a higher educational level will have stronger effect on firm performance. In terms of cognitive ability, in models 1 and 2, we find that IQ level plays a significant role in improving firm performance ($\beta = 0.2419$, $p < 0.1$; $\beta = 0.2396$, $p < 0.1$, respectively), its interaction term with educational levels is also statistically different from zero at 5% significance level ($\beta = 0.0501$, $p < 0.05$; $\beta = 0.0497$, $p < 0.05$, respectively). These results suggest that managers who are intelligent and have higher educational levels will influence firm performance more significantly than their counterparts. In contrast, we cannot find any significant relationship between positive affectivity, its interaction term with educational levels and firm performance.

5. Conclusion

Our study aims to explore an under-researched question in the current literature about the role of managers' emotional intelligence and cognitive ability at the organizational level. By investigating the effects of managers' EQ and IQ for a sample of 623 textile and garment enterprises in Vietnam, this work sheds a light on insights into firm performance. As such, this research has some important practical implications for firms regarding recruitment and HR management, as well as managers whose objectives is to improve firm performance.

First, as hypothesized, both emotional intelligence and cognitive ability of managers uniquely influence firm performance. We find that a manager with higher IQ level is more likely to improve firm performance, while one unit increase in EQ level of a manager leads to 18.3 percentage point

increase in performance of firm. Firm performance is partly attributed by a manager's mood as we observe that a manager with good mood is more prone to improve firm performance. These results suggest that a manager with high IQ level and/or EQ level is likely to resolve problems more effectively and make more appropriate decisions and actions, which enables him/her to improve firm performance. A manager also overcomes obstacles and handle problems easily when he is in a good mood. Consequently, from a managerial standpoint, in order to create added firm value and performance, it may be beneficial for organizations to recruit, facilitate and promote emotionally intelligent managers who have good cognitive ability and managerial skills.

Second, when we scrutinize the interactive effects of managers' IQ and EQ levels with demographic profiles, this study documents that a manager with high IQ level is more likely to increase firm performance, regardless of manager's gender, but one unit increase in emotional intelligence of a male manager has higher effect on firm performance than a female manager. We also find that a younger manager with higher EQ or IQ level is more likely to enhance firm performance. Investigating the influence of educational levels, the evidence indicates that an emotionally intelligent manager with a higher educational level has a stronger impact on firm performance. In this regard, it would be relevant to capitalize on the organizational existing resources in such a way that emotional intelligence and cognitive ability become a central point in organizational development strategies, and become main factors of managers' job performance.

An interesting finding of this study is that the effect of EQ on firm performance is more significant among male than female managers. However, it is clear that in this study male managers account for higher proportion than female one, and our results are limited to some specific scales of EQ and IQ. Thus, we cannot yet conjecture on social implications of our findings. Future research with more balanced male-female participation and looking at other measures will be necessary to further investigate the effect of gender differences in managers' EQ and IQ on firm performance.

One further direction is to investigate the relationship between firm performance and three mixed model conceptualization of EQ, namely emotional competence, social and emotional competence, and trait EQ. In such that way, scrutinizing that link as well as conducting a longitudinal research could be interesting. Additionally, although this study provides important insights into the link between managers' IQ and firm performance by applying CRT to measure cognitive ability, there are some limitations such as subgroup differences due to race or ethnicity. Thus, it is suggested that future research is needed on these aspects or the use of an alternative to cognitive ability testing such as working memory assessments. Finally, one limitation of this study is that it does not provide any theoretical contribution, thus future research should aim to develop a model related to personality traits including EQ and IQ in order to hold significance for both theory and practitioners.

Funding

This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 502.99-2018.04

Author details

Huong Trang Kim¹
E-mail: kimhuongtrang@ftu.edu.vn
ORCID ID: <http://orcid.org/0000-0002-6158-9985>
¹ Faculty of Banking and Finance, Foreign Trade University, Hanoi, Vietnam.

Disclosure statement

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical statement

All procedures performed in studies involving human participants were in accordance with the code of conduct of research with human materials in our institution and in Vietnam.

Informed consent

All participants gave written informed consent.

Citation information

Cite this article as: Linking managers' emotional intelligence, cognitive ability and firm performance: Insights from Vietnamese firms, Huong Trang Kim, *Cogent Business & Management* (2020), 7: 1829272.

Notes

1. Most of these existing studies use simulations and are based on samples of college students, thus they do not examine the real managerial context in organizations.
2. Textile and garment are the main exporting products of Vietnam with the turnover of more than \$39 billion in 2019, and approximately \$16,18 billion in 7 months of 2020 (Annual Statistics Book, 2019). In Vietnam, there are about 7,000 textile and garment firms, in which most of them are SMEs processing garment products; and very few of them are textile firms. FDI companies account for approximately 18.5% and the

majority are big companies. Almost all garment and textile firms are located at industrial zones in the vicinity of big cities. The Vietnam textile and garment industry is labor-intensive with about 1.2 million labors, of which 80% are female. However, the skills of Vietnamese workers are low, equipments are backward, and the trained workers just account for small percentage. The major exporting markets for Vietnam's textile and garment products are the U.S. and European countries. In recent years, Japan has been one of the main exporting markets; meanwhile the U.S. is always the largest importer with the turn-over accounting for over 50% of total exports.

3. The survey is conducted by the General Statistics Office of Vietnam, so it is legally compulsory for participants to response to the survey
4. Theories concentrate on workers' skills, values, interests and choices (Wright et al., 2015)
5. Recall that as mentioned in the section "emotional intelligence measurement," EQ is related to effective handling of negative emotions such as stress, anxiety, or nervousness.

References

- Ackert, L. F., Deaves, R., Miele, J., & Nguyen, Q. (2020). Are time preference and risk preference associated with cognitive intelligence and emotional intelligence? *Journal of Behavioral Finance*, 1–21. <https://doi.org/10.1080/15427560.2019.1663850>
- Agnoli, S., Mancini, G., Pozzoli, T., Baldaro, B., Russo, P. M., & Surcinelli, P. (2014). The interaction between emotional intelligence and cognitive ability in predicting scholastic performance in school-aged children. *Personality and Individual Differences*, 53(5), 660–665. <https://doi.org/10.1016/j.paid.2012.05.020>
- Alferaih, A. (2017). Conceptual model for measuring Saudi banking managers' job performance based on their emotional intelligence (EI). *International Journal of Organizational Analysis*, 25(1), 123–145. <https://doi.org/10.1108/IJOA-10-2014-0807>
- Andersson, O., Holm, H. J., Tyrán, J.-R., & Wengstrom, E. (2016). Risk aversion relates to cognitive ability: Preferences or Noise? *Journal of the European Economic Association*, 14(5), 1129–1154. <https://doi.org/10.1111/jeea.12179>
- Ashkanasy, N., & Daus, C. S. (2002). Emotion in the workplace: The new challenge for managers. *Academy of Management Executive*, 16(1), 76–86. <https://doi.org/10.5465/ame.2002.6640191>
- Asness, C., Frazzini, A., Gormsen, N. J., & Pedersen, L. H. (2020). Betting against correlation: Testing theories of the low-risk effect. *Journal of Financial Economics*, 135(3), 629–652. <https://doi.org/10.1016/j.jfineco.2019.07.003>
- Austin, E. J., Saklofske, D. H., & Mastoras, S. M. (2010). Emotional intelligence, coping and exam-related stress in Canadian undergraduate students. *Australian Journal of Psychology*, 62(1), 42–50. <https://doi.org/10.1080/00049530903312899>
- Baczynska, A., & Thornton, G. C., III. (2017). Relationship of analytical, practical, and emotional intelligence with behavioral dimensions of performance of top managers. *International Journal of Selection and Assessment*, 25(2), 171–182. <https://doi.org/10.1111/ijsa.12170>
- Bar-On, R. (1997). *The emotional intelligence inventory (EQ-i): Technical manual*. Multi-Health Systems.
- Bar-On, R. (2006). The Bar-On model of Emotional-Social Intelligence (ESI). *Psicothema*, 18, 13–25. <https://www.redalyc.org/pdf/727/72709503.pdf>
- Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science*, 275(5304), 1293–1295. <https://doi.org/10.1126/science.275.5304.1293>
- Behbahani, A. A. (2011). A comparative study of the relation between emotional intelligence and employee's performance. *Procedia – Social and Behavioral Sciences*, 30, 386–389. <https://doi.org/10.1016/j.sbspro.2011.10.076>
- Berrocá, P., & Extremera, N. (2008). A review of trait meta-mood research. In A. M. Columbus (Ed.), *Advances in Psychology Research* (Vol. 55, pp. 17–45). Nova Science Publishers.
- Bianchi, R., Patthey, N., Mirkovic, D., Lemaitre, B., & Schlegel, K. (2020). Machiavellian males with high emotional intelligence exhibit fewer depressive symptoms. *Personality and Individual Differences*, 158(1), 109867. <https://doi.org/10.1016/j.paid.2020.109867>
- Bouchard, T. J. (2014). Genes, evolution and intelligence. *Behavior Genetics*, 44(6), 549–577. <https://doi.org/10.1007/s10519-014-9646-x>
- Bouzuenda, K. (2018). Emotional intelligence and financial decision making: Are we talking about a paradigmatic shift or a change in practices. *Research in International Business and Finance*, 44, 273–284. <https://doi.org/10.1016/j.ribaf.2017.07.096>
- Boyatzis, R. E., & Goleman, D. (1999). *Emotional competence inventory*. HayGroup.
- Browne, K. R. (2006). Evolved sex differences and occupational segregation. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 27(2), 143–162. <https://doi.org/10.1002/job.349>
- Burks, S. V., Carpenter, J. P., Goette, L., & Rustichini, A. (2009). Cognitive skills affect economic preferences, strategic behavior and job attachment. *PNAS*, 106(19), 7745–7750. <https://doi.org/10.1073/pnas.0812360106>
- Cabello, R., & Fernández-Berrocá, P. (2015). Implicit theories and ability emotional intelligence. *Frontiers in Psychology*, 6, 700. <https://doi.org/10.3389/fpsyg.2015.00700>
- Cabello, R., Sorrel, M. A., Fernández-Pinto, I., Extremera, N., & Fernández-Berrocá, P. (2016). Age and gender differences in ability emotional intelligence in adults: A cross-sectional study. *Developmental Psychology*, 52(9), 1486. <https://doi.org/10.1037/dev0000191>
- Candela Agulló, C., Barberá Heredia, E., Ramos López, A., & Sarrió Catalá, M. (2002). Inteligencia emocional y la variable género. *Revista electrónica de emoción y motivación REME*, 5(10), 167–182. https://www.robertexto.com/archivo11/intemocional_genero.htm
- Carmeli, A. (2003). The relationship between emotional intelligence and work attitudes, behavior and outcome: An examination among senior managers. *Journal of Managerial Psychology*, 18(8), 788–813. <https://doi.org/10.1108/02683940310511881>
- Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. Cambridge University Press.
- Charupat, N., Deaves, R., Derouin, T., Klotzle, M., & Miu, P. (2013). Emotional balance and probability weighting. *Theory and Decision*, 75(1), 17–41. <https://doi.org/10.1007/s11238-012-9348-x>
- Corgnet, B., Herman-Gonzalez, R., Kujal, P., & Porter, D. (2015). The effect of earned versus house money on price bubble formation in experimental asset markets. *Review of Finance*, 19(4), 1455–1488. <https://doi.org/10.1093/rof/rfu031>
- Da Silva, F. P., Jerónimo, H. M., & Vieira, P. R. (2019). Leadership competencies revisited: A causal

- configuration analysis of success in the requirements phase of information systems projects. *Journal of Business Research*, 101, 688–696. <https://doi.org/10.1016/j.jbusres.2019.01.025>
- Damasio, A. (1994). *Descartes' error: Emotion, reason and the human brain*. Putnam and Sons.
- Dasborough, M. T., & Ashkanasy, N. M. (2003). Emotional awareness and emotional intelligence in leadership teaching. *Journal of Education for Business*, 79(1), 18–22. <https://doi.org/10.1080/08832320309599082>
- Demetriou, A., Kazi, S., Makris, N., & Spanoudis, G. (2020). Cognitive ability, cognitive self-awareness, and school performance: From childhood to adolescence. *Intelligence*, 79, 101432. <https://doi.org/10.1016/j.intell.2020.101432>
- Ding, H., & Yu, E. (in press). Followers' strengths-based leadership and strengths use of followers: The roles of trait emotional intelligence and role overload. *Personality and Individual Differences* 110300. <https://doi.org/10.1016/j.paid.2020.110300>
- Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2010). Are risk aversion and impatience related to cognitive ability. *The American Economic Review*, 100(3), 1238–1260. <https://doi.org/10.1257/aer.100.3.1238>
- Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2018). On the relationship between cognitive ability and risk preference. *Journal of Economic Perspectives*, 32(2), 115–134. <https://doi.org/10.1257/jep.32.2.115>
- Ezzi, F., Azouzi, M. A., & Jarboui, A. (2016). Does CEO emotional intelligence affect the performance of the diversified companies. *Cogent Economics and Finance*, 4(1), 1–17. <https://doi.org/10.1080/23322039.2016.1230958>
- Ezzi, F., Jarboui, A., & Zouari-Hadjji, R. (2020). CSR categories and R&D investment: The moderating role of Managerial emotional intelligence. *Management & Marketing. Challenges for the Knowledge Society*, 15(1), 17–37. <https://doi.org/10.2478/mmcks-2020-0002>
- Fallon, C. K., Panganiban, A. R., Wohleber, R., Matthews, G., Kustubayeva, A. M., & Roberts, R. (2014). Emotional intelligence, cognitive ability and information search in tactical decision-making. *Personality and Individual Differences*, 65, 24–29. <https://doi.org/10.1016/j.paid.2014.01.029>
- Fischer, A. H., Kret, M. E., & Broekens, J. (2018). Gender differences in emotion perception and self-reported emotional intelligence: A test of the emotion sensitivity hypothesis. *PLoS One*, 13(1), e0190712. <https://doi.org/10.1371/journal.pone.0190712>
- Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19(4), 25–42. <https://doi.org/10.1257/089533005775196732>
- Furnham, A., & Taylor, N. (2020). The relationship between emotional intelligence and occupational personality scales in senior management. *Personality and Individual Differences*, 154, 109647. <https://doi.org/10.1016/j.paid.2019.109647>
- George, J. M. (2000). Emotions and leadership: The role of emotional intelligence. *Human Relations*, 53(8), 1027–1055. <https://doi.org/10.1177/0018726700538001>
- Gignac, G. E., Walker, B., Burtenshaw, T., & Fay, N. (2020). On the nonlinear association between intelligence and openness: Not much of an effect beyond an average IQ. *Personality and Individual Differences*, 166, 110169. <https://doi.org/10.1016/j.paid.2020.110169>
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. Bantam Books.
- Goleman, D. (1998). *Working with emotional intelligence*. Bantam.
- Gould, S. J. (1994, November 28). Curveball. *The New Yorker*.
- Grinblatt, M., Keloharju, M., & Linnainmaa, J. T. (2011). IQ and stock market participation. *The Journal of Finance*, 66(6), 2121–2164. <https://doi.org/10.1111/j.1540-6261.2011.01701.x>
- Grühn, D., Kotter-Grühn, D., & Röske, C. (2010). Discrete affects across the adult lifespan: Evidence for multidimensionality and multidirectionality of affective experiences in young, middle-aged and older adults. *Journal of Research in Personality*, 44(4), 492–500. <https://doi.org/10.1016/j.jrp.2010.06.003>
- Irwin, K. C., Landay, K. M., Aaron, J. R., McDowell, W. C., Marino, L. D., & Geho, P. R. (2018). Entrepreneurial orientation (EO) and human resources outsourcing (HRO): A “HERO” combination for SME performance. *Journal of Business Research*, 90, 134–140. <https://doi.org/10.1016/j.jbusres.2018.05.016>
- Johnson, W., & Bouchard, T. J., Jr. (2005). The structure of human intelligence: It is verbal, perceptual, and image rotation (VPR), not fluid and crystallized. *Intelligence*, 33(4), 393–416. <https://doi.org/10.1016/j.intell.2004.12.002>
- Lone, M. A., & Lone, A. H. (2018). Does emotional intelligence predict leadership effectiveness? An exploration in Non-Western context? *South Asian Journal of Human Resources Management*, 5(1), 28–39. <https://doi.org/10.1177/2322093718766806>
- Lopez-Zafra, E., & Gartzia, L. (2014). Perceptions of gender differences in self-report measures of emotional intelligence. *Sex Roles*, 70(11–12), 479–495. <https://doi.org/10.1007/s11199-014-0368-6>
- Lumley, M. A., Gustavson, B. J., Partridge, R. T., & Labouvie-Vief, G. (2005). Assessing alexithymia and related emotional ability constructs using multiple methods: Interrelationships among measures. *Emotion*, 5(3), 329. <https://doi.org/10.1037/1528-3542.5.3.329>
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5–44. <https://doi.org/10.1257/jel.52.1.5>
- MacCann, C., Jiang, Y., Brown, L. E., Double, K. S., Bucich, M., & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *Psychological Bulletin*, 146(2), 150. <https://doi.org/10.1037/bul0000219>
- Maqbool, R., Sudong, Y., Manzoor, N., & Rashid, Y. (2017). The impact of emotional intelligence project managers' competencies, and transformational leadership on project success: An empirical perspective. *Project Management Journal*, 48(3), 58–75. <https://doi.org/10.1177/875697281704800304>
- Martin, N., Capman, J., Boyce, A., Morgan, K., Gonzalez, M. F., & Adler, S. (2020). New frontiers in cognitive ability testing: Working memory. *Journal of Managerial Psychology*, 35(4), 193–208. <https://doi.org/10.1108/JMP-09-2018-0422>
- Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds.), *Emotional development and emotional intelligence: Implications for educators* (pp. 3–31). Basic Books.
- Mayer, J. D., Caruso, D., & Salovey, P. (1999). Emotional intelligence meets traditional standards for intelligence. *Intelligence*, 27(4), 267–298. [https://doi.org/10.1016/S0160-2896\(99\)00016-1](https://doi.org/10.1016/S0160-2896(99)00016-1)
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). TARGET ARTICLES: TARGET ARTICLES: “Emotional Intelligence: Theory, Findings, and Implications”. *Psychological inquiry*, 15(3), 197–215. https://doi.org/10.1207/s15327965pli1503_02

- Miao, C., Humphrey, R. H., & Qian, S. (2018). A cross-cultural meta-analysis of how leader emotional intelligence influences subordinate task performance and organizational citizenship behavior. *Journal of World Business*, 53(4), 463–474. <https://doi.org/10.1016/j.jwb.2018.01.003>
- Muller, R., & Turner, R. (2010). Leadership competency profile of successful project managers. *International Journal of Project Management*, 25(1), 21–32. <https://doi.org/10.1016/j.ijproman.2009.09.003>
- Mysirlaki, S., & Paraskeva, F. (2020). Emotional intelligence and transformational leadership in virtual teams: Lessons from MMOGs. *Leadership & Organization Development Journal*, 41(4), 551–566. <https://doi.org/10.1108/LODJ-01-2019-0035>
- Naixiao, Z., & Zhuoqi, D. (2012). Research on emotional intelligence management based on the intellectual capital business model; Case study in K Group enterprise in Shenzhen, Guangdong province, China. *International Journal of Asian Business and Information Management*, 3(2), 53–61. <https://doi.org/10.4018/jabim.2012040105>
- Noussair, C. N., Tucker, S., & Xu, Y. (2016). Futures markets, cognitive ability, and mispricing in experimental asset markets. *Journal of Economic Behavior & Organization*, 130, 166–179. <https://doi.org/10.1016/j.jebo.2016.07.010>
- O'Brien, E., Konrath, S. H., Grühn, D., & Hagen, A. L. (2013). Empathic concern and perspective taking: Linear and quadratic effects of age across the adult life span. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 68(2), 168–175. <https://doi.org/10.1093/geronb/gbs055>
- Okamoto, D., & England, P. (1999). Is there a supply side to occupational sex segregation? *Sociological Perspectives*, 42(4), 557–582. <https://doi.org/10.2307/1389574>
- Parker, J. D., Keefer, K. V., & Wood, L. M. (2011). Toward a brief multidimensional assessment of emotional intelligence: Psychometric properties of the emotional quotient inventory—Short form. *Psychological Assessment*, 23(3), 762. <https://doi.org/10.1037/a0023289>
- Pereira, V., Temouri, Y., & Patel, C. (2020). Exploring the role and importance of human capital in resilient high performing organisations: Evidence from business clusters. *Applied Psychology*, 69(3), 769–804. <https://doi.org/10.1111/apps.12204>
- Petrides, K. V. (2009). Psychometric properties of the trait emotional intelligence questionnaire (TEIQue). In C. Stough et al., (Eds.), *Assessing emotional intelligence* (pp. 85–101). Springer.
- Prufeta, P. (2017). Emotional intelligence of nurse managers: an exploratory study. *JONA: The Journal of Nursing Administration*, 471, 134–139. <https://doi.org/10.1097/NNA.0000000000000455>
- Revelle, W., Dworak, E. M., & Condon, D. (2020). Cognitive ability in everyday life: The utility of open-source measures. *Current Directions in Psychological Science*, 29(4), 0963721420922178. <https://doi.org/10.1177/0963721420922178>
- Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, 9(3), 185–211. <https://doi.org/10.2190/DUGG-P24E-52WK-6CDG>
- Sánchez, R. C., Pérez, C. G., & Aránega, A. Y. (2020). General intelligence and emotional intelligence in senior management in the distribution sector: An applied analysis with synthetic indicators. *Psychology & Marketing*, 37(1), 6–14. <https://doi.org/10.1002/mar.21275>
- Sergio, R. P., & Marciano, E. R. (2013). Emotional intelligence and demographic profile variables as predictors of job performance among bank managers in the middle east. *International Journal of Arts and Sciences*, 6(2), 377–388. <https://www.researchgate.net/publication/273382949>
- Soussi, Y., & Jarboui, A. (2018). Does CEO emotional bias affect performance? *Cogent Economics and Finance*, 6(1), 1453452. <https://doi.org/10.1080/23322039.2018.1453452>
- Spearman, C. (1904). General intelligence objectively determined and measured. In J. J. Jenkins & D. G. Paterson (Eds.), *Studies in individual differences: The search for intelligence* (p. 59–73). Appleton-Century-Crofts. <https://doi.org/10.1037/11491-006>
- Stasielowicz, L. (2020). How important is cognitive ability when adapting to changes? A meta-analysis of the performance adaptation literature. *Personality and Individual Differences*, 166(1), 110178. <https://doi.org/10.1016/j.paid.2020.110178>
- Sternberg, R. (1996). *Successful intelligence*. Simon and Schuster.
- Tai, C. C., Chen, S.-H., & Yang, L.-X. (2018). Cognitive ability and earnings performance: Evidence from double auction market experiments. *Journal of Economic Dynamics & Control*, 91, 409–440. <https://doi.org/10.1016/j.jedc.2017.12.008>
- Thompson, E. R. (2007). Positive and Negative Affect Schedule (PANAS): Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38, 227–242. doi:10.1177/0022022106297301
- Treglown, L., & Furnham, A. (2020). Birds of a feather work together: The role of emotional intelligence and cognitive ability in workplace interaction and advice networks. *Personality and Individual Differences*, 158, 109833. <https://doi.org/10.1016/j.paid.2020.109833>
- Udod, S. A., Hammond-Collins, K., & Jenkins, M. (2020). Dynamics of emotional intelligence and empowerment: The perspectives of middle managers. *SAGE Open*, 10(2), 2158244020919508. <https://doi.org/10.1177/2158244020919508>
- Urbina, S. (2001). Tests of intelligence. In R. J. Sternberg & S. B. Kaufman (Eds.), *Cambridge Handbook of intelligence*. Cambridge University Press.
- Wade, C., & Tavis, C. (2017). *Psychology* (12th ed.). Pearson.
- Wai, J., & Rindermann, H. (2015). The path and performance of a company leader: A historical examination of the education and cognitive ability of Fortune 500 CEOs. *Intelligence*, 53, 102–107. <https://doi.org/10.1016/j.intell.2015.10.001>
- Webb, C. A., DelDonno, S., & Killgore, W. D. S. (2014). The role of cognitive versus emotional intelligence in Iowa Gambling task performance: What's emotion got to do with it? *Intelligence*, 44, 112–119. <https://doi.org/10.1016/j.intell.2014.03.008>
- Wechsler, D. (1997). *Wechsler adult intelligence scale* (3rd ed.). the Psychological corporation.
- Wilderom, C. P. M., Hur, Y., Wiersma, U. J., Van-de-Berg, P. T., & Lee, J. (2015). From manager's emotional intelligence to objective store performance: Through store cohesiveness and sales-directed employee behavior. *Journal of Organizational Behavior*, 36(6), 825–844. <https://doi.org/10.1002/job.2006>
- Wright, D. B., Eaton, A. A., & Skagerberg, E. (2015). Occupational segregation and psychological gender differences: How empathizing and systemizing help explain the distribution of men and women into

- (some) occupations. *Journal of Research in Personality*, 54, 30–39. <https://doi.org/10.1016/j.jrp.2014.06.004>
- Yukl, G. (1998). *Leadership in organizations*. Prentice Hall.
- Zeidner, M., Matthews, G., & Roberts, R. D. (2004). Emotional intelligence in the workplace: A critical review. *Applied Psychology*, 53(3), 371–399. <https://doi.org/10.1111/j.1464-0597.2004.00176.x>
- Zhang, W., Wang, S., Zhu, Y., & Kim, K. (2018). The moderating effect of emotional intelligence on the performance of top management team. *International Journal of Business and Public Administration*, 15(1), 95–106. <http://www.iabpad.com/the-moderating-effect-of-emotional-intelligence-on-the-performance-of-top-management-team/>

Appendix 1. Experimental survey on emotional intelligence and cognitive ability

Part 1. General information

Full name: _____ Year of birth: _____

Gender: 1 Male ☐ 2 Female ☐

Educational levels (tick X on 1 box showing your highest educational level)

1 Untrained <input type="checkbox"/>	4 High school degree <input type="checkbox"/>	7 Master degree <input type="checkbox"/>
2 Short-term courses <input type="checkbox"/>	5 College degree <input type="checkbox"/>	8 Doctorial degree <input type="checkbox"/>
3 Secondary school degree <input type="checkbox"/>	6 Bachelor degree <input type="checkbox"/>	9 Other levels <input type="checkbox"/>

Part 2. Questions on emotional intelligence and cognitive ability

Sect.	No.	Question	Answer	Answer unit
A	1	Thinking about yourself and how you normally feel, to what extent do you generally feel UPSET?		1–5 scale 1 = NEVER 5 = ALWAYS
	2	Thinking about yourself and how you normally feel, to what extent do you generally feel HOSTILE?		As above
	3	Thinking about yourself and how you normally feel, to what extent do you generally feel ALERT?		As above
	4	Thinking about yourself and how you normally feel, to what extent do you generally feel ASHAMED?		As above
	5	Thinking about yourself and how you normally feel, to what extent do you generally feel INSPIRED?		As above

(Continued)

Sect.	No.	Question	Answer	Answer unit
	6	Thinking about yourself and how you normally feel, to what extent do you generally feel NERVOUS?		As above
	7	Thinking about yourself and how you normally feel, to what extent do you generally feel DETERMINED?		As above
	8	Thinking about yourself and how you normally feel, to what extent do you generally feel ATTENTIVE?		As above
	9	Thinking about yourself and how you normally feel, to what extent do you generally feel AFRAID?		As above
	10	Thinking about yourself and how you normally feel, to what extent do you generally feel ACTIVE?		As above
B	1	A bat and ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost?		Cents
	2	If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?		Minutes
	3	In a lake there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?		Days



© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



***Cogent Business & Management* (ISSN: 2331-1975) is published by Cogent OA, part of Taylor & Francis Group.**

Publishing with Cogent OA ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a Cogent OA journal at www.CogentOA.com

