Psychometric evaluation of Dynamic Managerial Capability scale in the context of early internationalizing firms from an emerging economy

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Abstract

Purpose: The research aims to perform a psychometric evaluation of dynamic managerial capability (DMC) scale in the context of early internationalizing firms from an emerging economy. Drawing on DMC theory, this study validates the measurement scales to operationalize DMC of entrepreneurs as managerial human capital, managerial social capital, and managerial cognition.

Design/methodology: Sample firms were drawn from the apparel industry in Bangladesh, an emerging economy. Data was collected from entrepreneurs in two waves through a questionnaire-based survey. One hundred and eighty-five firms responded during the first wave and 223 firms responded during the second wave. The first wave of data was used to conduct exploratory factor analysis (EFA) to uncover the underlying dimensions of DMC and the data from the second wave was used to test the validity of the DMC scale through confirmatory factor analysis (CFA).

Findings: EFA suggested a 3-dimension scale which was supported by CFA. The findings of the study demonstrate that DMC is a valid and reliable scale to capture the individual-level capability of entrepreneurs.

Originality/value: DMC is rooted in three underlying attributes as managerial human capital, managerial social capital, and managerial cognition. It is advisable to the practitioner and researcher to operationalize DMC as a second-order construct in future studies.

Keywords: dynamic managerial capability; managerial human capital; managerial social capital; managerial cognition; psychometric evaluation.

Introduction

Dynamic managerial capability (DMC) refers to the capabilities of the top-level manager to create, extend and reconfigure resources and competencies of a firm (Adner & Helfat, 2003). There are ongoing debates on the correlation between DMC and dynamic capability (DC). Scholars define DMC as individual-level capability, whereas DC is related to the firm-level capability (Helfat & Martin, 2015). DMC contributes to the capabilities of top-level managers to transform organizational DC to effective resources of the firm (Barreto, 2010). In this research, the term manager and entrepreneur are used interchangeably. It is because the early internationalizing firms in emerging economies are operated by the founder who typically plays the role of the CEO (Cerrato & Piva, 2015). Three underlying attributes are conceptualized to theorize DMC and the attributes are managerial human capital (MHC), managerial social capital (MSC), and managerial cognition (MC) (Helfat & Martin, 2015). These three attributes assist a top manager to sense, seize and transform opportunities to respond to strategic changes (Andersson & Evers, 2015; Teece, 2007). Majority of researches on DMC have been at the conceptual level. This research paucity indicates the need for psychometric evaluation of the attributes of DMC.

DMC is a sophisticated, unidimensional capability and challenging to measure directly. The context plays a significant role in understanding DMC. None of the attributes of DMC is an innate and inherent quality of top managers. These attributes require continuous attention and practices to respond to strategic changes. Gradually, top managers develop this capability to create economic value for the organization (Harris & Helfat, 2013). Country's economic condition, government's participation, legal policies influence the development process of the attributes of DMC (Oxtorp, 2014). For example, managers from developed economies tend to

have a higher level of academic qualification and better training than managers from emerging economies (Tabares, Alvarez, & Urbano, 2015). Managers in developed economies have a higher level of network engagement and global mindset to ensure success in the international market (Nummela et al., 2014). All three attributes of DMC are interlinked and complement each other to develop managerial skill, ability, and competencies to handle challenges in a volatile business environment (Helfat & Martin, 2014).

MHC refers to "capabilities derived from skill, knowledge, and experiences possessed by the manager of a firm" (Adner & Helfat, 2003:1016). The conceptualization of human capital is based on the explanation of Becker (1964). Author has claimed that MHC is derived from the educational background, training activities, prior managerial and entrepreneurial experiences. MSC refers to the network relationships of top-level managers. Adler and Kwon (2002) posit that "social networking is analogous to other resources such as physical and human capital that can create value" (p. 1018). It is not necessary that the social network has to be manifested from outside the firm; it can also emerge from inside the firm through formal and informal relationships. Adner and Helfat (2003) have argued that the external networks (directorships) can help the manager to obtain vital information and create a network for future directorships, which in turn can improve the performance of the firm. MC concentrates on the capacity of the manager to process the information, by which the sensory input is reduced, stored, transformed, recovered, elaborated and used (Neisser, 1967). Walsh (1995) and Elstein and Schwarz (2002) posit that the MC is a mental process of decision-making and problem-solving capacity of the manager through learning, understanding, reasoning and thinking. Adner and Helfat (2003) have defined MC as "the beliefs and mental model of managers that serve as the basis for taking a decision" (p. 1017). The conceptualization of MC in this paper focuses on the behaviors of

entrepreneurs. The knowledge structure of international entrepreneur is driven by a set of beliefs which are distinctively different from traditional entrepreneurs. The inventory of knowledge structure delivers international commitment and vision and influence these entrepreneurs to behave pro-actively while internationalizing (Nummela et al. (2004). When domestic entrepreneurs tend to mature first in the local markets, international entrepreneurs focus on accelerated internationalization to create footprints in the international market (Weerawardena et al. 2007).

Augier and Teece (2009), Martin (2011), and Kor and Mesko (2013) have highlighted the importance of DMC of entrepreneurs in achieving superior firm performance as each attribute of DMC has a pronounced effect. The defining feature of psychometric assessment is its empirical foundation and this assessment is critical to understand the psychological states/abilities (Atkinson, 2001). According to Granpeesheh et al. (2014), psychometric assessment of scales is evaluated in terms of construct validity and reliability. The assessment helps to assure the researcher that the information contained in the scale is reliable and valid. The reliability and the validity of the DMC scale also shed light on international entrepreneurship literature by providing measurement scales for future empirical research (Andersson & Evers, 2015). A unidimensional scale is proposed in this study, which complements the theorization by Helfat and Martin (2014). Authors argue that the operationalization of DMC should be conducted as a uni-dimensional scale on the immediate outcome to identify the overall effects on firm performance. The psychometric properties evaluation of DMC scale has not been addressed by researchers. This study has attempted to fulfil this research gap. In doing so, academic research on DMC will benefit by having a valid scale to operationalize DMC and capture the preeminent effects on strategic actions of the firm. Since the attributes of DMC have a strong theoretical

foundation, we perform a psychometric evaluation of the DMC scale as a unidimensional construct in the context of early internationalizing firms from an emerging economy. In doing so, this research contributes to the study by Adner and Helfat (2003) and early internationalization literature related to the context of emerging economies (Knight & Liesch, 2016).

Theoretical Background

The theory of DMC is an extension of the resource-based view (RBV) and dynamic capability theory (DC). RBV highlights the importance of valuable, rare, inimitable, and non-substitutable (VRIN) resources and competency of the firms to achieve competitive advances (Barney, 1991). However, the propositions of RBV are generic because they have failed to answer the mechanism to develop VIRN. DC has fulfilled that research gap by proposing the mechanism of creating the resource base to deliver a competitive advantage (Teece, Pisano & Shuen, 1997). Empirical studies profoundly recognize DC to explain the performance of the firms. However, theoretical disputes arise when it comes to distinguishing individual-level capability and firm-level capability.

While DC constitutes VRIN base of competitive advantage in the international market, DMC advances the configuration and deployment process to achieve strategic goals (Makadok, 2001). The capabilities and the competencies to achieve strategic goals reside within the top managers and entrepreneurs (Adner & Helfat, 2003). For example, the export performance of a firm is influenced by individual resources such as effective decision-making capability of entrepreneurs (MHC) (Kyvik et al., 2013; Oura, Zilber, & Lopez, 2016); networking capability of entrepreneurs (MSC) (Adler & Kwon, 2002); and making the decision to export (MC) (Antonelli, Crespi, & Scellato, 2013; Harris & Li, 2008). Therefore, it is imperative to consider

the effect of DMC as the individual-level capabilities of an entrepreneur while analyzing the success or failure of early internationalizing firms.

Adner and Helfat (2003) originally defined DMC as "the capabilities with which managers build, integrate, and reconfigure organizational resources and competencies" (p. 1012). Later, substantial development has been done to complement the original definition. Helfat et al. (2007) note DMC as the "capacity of the managers to create, extend, or modify the resource base of the organization" (p. 3). Later, O'Reilly and Tushman (2008) argued that DMC is the ability of managers to " ensure learning, integration, and when required, reconfiguration and transformation-all aimed at sensing and seizing opportunities as market evolves" (p. 189). Harris and Helfat (2013) expand DMC and highlight the ability of the manager to respond to external challenges, along with the ability to reconfigure internal resource and competencies. It is also mentioned in the earlier literature that DMC enables the manager to continuously sense, seize, and transform opportunities in an extremely volatile market (Mostafiz, Sambasivan, & Goh, 2019b). However, none of the studies has provided unidirectional effects of DMC on strategic changes (Helfat & Martin, 2015).

Majority of the studies on DMC are at the conceptual level, which has increased the need for empirical investigation (Helfat & Martin, 2015). The attributes of DMC complement each other and similar antecedents may contribute simultaneously to these attributes (Beck & Wiersema, 2013). For instance, Helfat and Martin (2015) argue that "managerial cognition affects the development of human capital by influencing the search for, and absorption of, information during education, training, and work experience, as well as how managers interpret and utilize this information" (p. 1287). In addition, Ployhart and Moliterno (2011) develop the model of unit-level human capital and argue that human capital "is created from the emergence

of individual' knowledge, skills, abilities, and other characteristics by explicating an emergence enabling process that amplifies and transform individual cognition into valuable human capital resources" (p. 128). Besides, the managerial cognition also drives the manager to strengthen their social networking through related and positive behavioural practices; however, not limited to, but social capital also complements the development of managerial human capital. For instance, Leitch, McMullan, and Harrison (2013) provide evidence that skill development (component to human capital) is benefited from the manager's social ties with the participants in the program. It could be vice-versa as managers seek to create a new network to tap the skills and expertise of other executives and embrace knowledge spillovers. This knowledge may influence managerial knowledge structure, belief system and mental model to respond to the external challenges, opportunities, and strategic actions.

Various types of strategic actions get complimented by DMC. For instance, Sirmon and Hitt (2009) provide evidence that DMC enhances investment and resource deployment capability of firms. According to Eggers (2012), the importance of DMC is in improving the quality of the new product. Ringov (2013) shows the effects of DMC in developing better fund performance in the dynamic market. In terms of firm-level capability, Tushman, Smith, Wood, Westerman, and O'Reilly (2010) argue that DMC improves innovation capability of the firm. In a similar vein, Martin (2011) argues that DMC increases the capability to launch a new product, reconfigure business unit resources, establish new business and elevate financial performance. Current research also highlights the importance of DMC in the international business context. For instance, Mostafiz, Sambasivan, and Goh (2019a); Mostafiz et al. (2019b) show the effect of DMC, after dropping managerial capital, in achieving superior performance in foreign market knowledge accumulation and international opportunity identification of the firm. DMC should be

operationalized as a second-order variable in a unidimensional model. As of now, existing research shows paucity in operationalizing DMC as a second-order construct. This study attempts to contribute to the existing literature by providing knowledge on the psychometric evaluation of DMC attributes in early internationalizing from emerging economy context.

Measurement of attributes of DMC

Davidsson and Honig (2003) and De Carolis et al. (2009) have proposed four items to measure MHC. These items include previous academic qualification, previous entrepreneurial experience, previous managerial experience, and previous training experience. Previous studies have shown the importance of MHC in management research. Heterogeneity in MHC creates more value in firm performance (Campbell et al., 2012). Different kinds of skills from MHC facilitate multiple operational and strategic level decision-making skills, such as asset bootstrapping (Dimov, 2010).

MSC (Managerial Social Capital) in management research is operationalized based on managerial tie, trust, and solidarity. Peng and Luo (2000) and Li et al. (2008) have proposed reflective dimensional factors such as political ties and business ties. McAllister (1995), Mayer et al. (1995), and Johnson et al. (1996) have proposed managerial trust between the members of the networks. Atuahene-Gima and Murray (2007) have proposed managerial solidarity to capture the worth of the network and the participation of the member in the network.

The concept of MC (Managerial Cognition) is contextual. Kor and Mesko (2013) have conceptualized MC based on the firm's dominant logic. MC is the managerial mindset and belief system to respond to strategic changes. International entrepreneurs need a global mindset to operate business internationally and achieve superior success. Nummela et al. (2004) have proposed three dimensions of a strong global mindset. These dimensions are entrepreneurial pro-

activeness, commitment to internationalization, and international entrepreneurial vision. The effects of global mindset to achieve international performance in international business are well researched.

Methods

A cross-sectional survey was conducted to collect data for analysis. A sample of 600 firms operating in the apparel industry of Bangladesh was selected using the random sampling method. The first wave of data was collected from 185 firms and data from 168 firms was used for exploratory factor analysis (EFA). The second wave of data was collected from 223 firms and data from 205 firms was used for confirmatory factor analysis (CFA). The respondents in this study were entrepreneurs of international firms. These firms were registered in Bangladesh garment manufacturers and exporters association (BGMEA) and Bangladesh knitwear manufacturers and exporters association (BKMEA). Listed firms in BGMEA and BKMEA were internationalized from inception and generated total revenue from the international market (Faroque and Morrish, 2016). The data was collected between April 2017 and September 2017.

Assessment of face validity

Face validity of DMC was assessed in two stages. In stage one, ten entrepreneurs were asked to comment on the appropriateness, relevance, difficulties, and ambiguity of the items. Since these measurement items were adopted from the previous study, the level of ambiguities and difficulties were low. In stage two, ten entrepreneurs were given the scale, and they were directed to determine the importance of the items using a 5-point Likert scale (1= not important and 5= completely important). Item impact score (importance * frequency ratio) was calculated based on the responses. An item impact score of more than 1.5 was considered suitable and usable (Hajizadeh and Asghari, 2011; Maasoumi et al., 2013).

Assessment of content validity

Content validity was assessed in two stages. In stage one, a qualitative assessment was done. Ten experts (four entrepreneurs and six doctorate students in international business) assessed and commented on the wording, item allocation and the scaling of the DMC's attributes. The process of qualitative content validity was conducted based on the guidelines by Colton and Covert (2007), and the scales were revised based on the experts' comments and feedback.

In stage two, a quantitative assessment was performed. Accordingly, the content validity ratio (CVR) and the content validity index (CVI) were computed to assess the content validity of the items. CVR highlights the essentiality of the items. Accordingly, ten experts who participated in the face validity assessment were invited to evaluate the essentiality of DMC's items on a three-point Likert scale. The scale included: not essential – 1, useful but not essential – 2, and essential - 3. Based on the guidelines by Lawshe (1975), CVR was computed as follows: CVR = $(n_e – (N/2))/(N/2)$ where N represents the total number of experts and n_e represents the number of experts who scored 'essential' for the intended items of DMCs. Lawshe (1975) suggested that a minimum acceptable score of CVR was 0.62 when the number of experts was 10.

CVI indicates the degree of relevancy, simplicity and the clarity of the items in the scale. This study asked the ten experts to rate relevancy, simplicity, and clarity of the DMC's items on a four-point Likert scale (1 = not relevant; 4 = highly relevant). This study calculated CVI for individual items based on the guidelines by Polit and Beck (2006). CVI value of the items higher than or equal to 0.78 was considered adequate and appropriate (Polit and Beck, 2006). Table 1 represents the results of CVR and CVI.

Assessment of construct validity

Internal consistency of the constructs was assessed through Cronbach's alpha and construct reliability (CR). An alpha value and CR score of more than 0.7 are considered adequate (Hair et al., 2010). EFA was performed by following maximum likelihood estimation to assess the construct validity of DMC scales by using SPSS version 24. It is recommended that the minimum threshold sample size for EFA analysis should be higher or equal to 5-10 times the number of items (Hair et al., 2010). Responses obtained during the first wave were used for EFA. During the period of data collection for EFA analysis, we administered 300 questionnaires. We received responses from 185 entrepreneurs. After handling the missing values, 168 responses were used to perform EFA analysis. Varimax rotation procedure was used in the EFA analysis. We used the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of Sphericity to assess the appropriateness of the study sample. Eigenvalues and scree plot were used to determine the number of components. This study limited the threshold of factor loading to 0.50 (Hair et al., 2010).

The second wave of data was used to perform CFA analysis. Three hundred questionnaires were distributed to firms different from the first wave and 223 firms responded. After handling the missing value, 205 valid cases were used for CFA analysis, which was performed using IBM AMOS version 24 (Arbuckle, 2013). This two-step process of performing EFA and CFA was suggested by Kline (2000). Multiple model fit indices were used to measure the adequacy of the measurement model, such as X^2 goodness of fit indices, normed X^2 (CMIN/df < 3), root-mean-square error of approximation (RMSEA < 0.08), standardized root-mean-square residual (SRMR < 0.1), comparative fit index (CFI > 0.90), goodness-of-fit index (GFI > 0.90), incremental fit index (IFI > 0.90), and Tucker-Lewis index (TLI > 0.9) (Hooper et al., 2008;

Schreiber et al., 2006). Convergent validity and discriminant validity assessments were conducted by using construct reliability and Fornell and Larcker (1981) criterion, respectively (Ho, 2013).

Results

The overall response rate was 65%, including the first and second waves. Table 1 highlights the characteristics of the data. More than 50% of the firms had more than 1000 employees, and more than 98% of the firms were operating in more than four international markets. About 20.6% of the firms were young and less than five years old.

(Table 1 goes here)

Table 2 highlights the results of CVR and individual CVI score for 24 items of DMC. Ten experts evaluated and assessed the DMC's scale in terms of simplicity, relevancy, clarity and essentiality. The impact score of each of the 24 items is more significant than 1.5. Both CVR and individual CVI scores of DMC scale are higher than 0.62 and 0.78, respectively. Therefore, no item was excluded from the DMC scale.

(Table 2 goes here)

EFA and CFA analyses

The KMO score of the EFA analysis was 0.931. This result indicates the adequacy level of data and sample size in the EFA analysis. The Bartlett's Test of Sphericity test results (X^2 = 4445.911, *df* = 276, *p*-value = 0.000) indicate the appropriateness of the model. These two tests help the study to establish the suitability of the data for EFA. Table 3 highlights the results of the EFA analysis. The total variance explained by the three factors was 75.24%. The factor loading of the items was higher than 0.50, and therefore we did not delete any item from the scale.

(Table 3 goes here)

Figure 1 represents the measurement model for the CFA analysis. The measurement model provides an adequate goodness-of-fit index. The model fit indices are: Chi-square = 491.088, CMIN/*df* = 1.996, CFI = 0.907, IFI = 0.908, GFI = 0.843, SRMR = 0.0534, RMSEA (90% C.I.) = 0.070. (0.061-0.079). Standardized estimates of all items from CFA analysis are higher than 0.50. Table 4 represents the results of construct validity.

(Figure 1 goes here)

(Table 4 goes here)

The AVE (average variance extracted) of factor 1, factor2, and factor 3 are 0.514, 0.482, and 0.508, respectively. This result confirms the convergent validity. The square root of AVE of each factor is higher than the correlation of that factor with other factors, and this confirms that there is no sign of discriminant validity (Fornell and Larcker, 1981). The CR score and alpha reliability score of each factor are higher than 0.70; therefore, internal consistency is established (Hair et al., 2010). The results of CFA analysis indicate good reliability and validity of DMC's scale.

Discussion

The current study aimed to perform a psychometric assessment of DMC scale in the context of early internationalizing firms from an emerging economy. The scale was tested for face validity, content validity and construct validity. Based on the EFA analysis, three attributes emerged in line with the recommendation by Adner and Helfat (2003), Helfat and Martin (2014) and Andersson and Evers (2015). None of the previous studies conceptualized DMC with any other attributes (Helfat and Martin, 2014).

The first attribute (factor) identified by EFA analysis was MHC (managerial human capital). Human capital in DMC captures education, experience, knowledge, skills (Wright et al., 2014). Context plays a significant role in MHC, which leads to the development of tacit knowledge and explicit knowledge (Kim & Lee, 2010; Bailey and Helfat, 2003; Castanias and Helfat, 1991). Both tacit and explicit knowledge are relevant to sensing and seizing new opportunities. In an emerging economy, entrepreneurs do not create opportunity; however, they are more prone to identify new opportunities (Faroque and Morrish, 2016; Mostafiz, Sambasivan, & Goh, 2019). MHC helps entrepreneurs to sense multiple types of opportunities which are shaped by entrepreneurs absorptive capability (Cohen and Levinthal, 1990). Concerning seizing and reconfiguring new opportunities, entrepreneurs from emerging economies are opportunistic. The investment decision and market commitments differ based on the entrepreneurs' learning and expertise (Helfat and Martin, 2014).

The second factor identified in EFA analysis was MSC (managerial social capital), which captures social networking, quality and value of that networking to the entrepreneurs. The sources of the network include formal, informal, internal, and external relationships of entrepreneurs. MSC highlights the importance of brokerage positions, new links of individuals in different industries and communities and these help managers and entrepreneurs to obtain diversified information (Burt, 1992). External social ties of entrepreneurs provide them access to resources and new opportunities (Pfeffer and Salancik, 1978). These resources include sources of financing, skilled employees, investment opportunities, and unique sources of raw materials. Trust and solidarity also facilitate power and advantageous positions in the network, which in turn enable entrepreneurs to have control over resources. The concept of controlling the resource supports the seizing of opportunities. It is also possible that MSC delivers internal power and

increases influences in the organization (Coleman, 1988). According to Blyler and Coff (2003), “firms would be unable to acquire, recombine, and release resources” (p. 680) without entrepreneurs’ and top managers’ social capital. Therefore, MSC helps entrepreneurs to sense, seize and reconfigure new opportunities.

The third factor identified by EFA analysis was MC (Managerial Cognition). MC captures the mindset and belief system of an entrepreneur. Kor and Mesko (2013) have conceptualized MC of managers from a managerial dominant logic perspective. Andersson and Evers (2015) have proposed a global mindset as MC of international entrepreneurs in an early internationalization research setting. The global mindset has been proposed by Nummela et al. (2004) to capture entrepreneurial pro-active behaviours of internationalization, international commitment, and global vision. MC is a set of mental models and beliefs (Eggers and Kaplan, 2013; Walsh, 1995), emotions (Hodgkinson and Healey, 2011), and mental process (Helfat and Peteraf, 2015).

MHC and MSC facilitate a large amount of information and sources that entrepreneurs confront, but MC helps them to employ "knowledge structures to represent their information worlds” (Walsh, 1995, p.280). The knowledge structures such as commitment decision, proactive behaviour, and vision make entrepreneurs optimistic and influence their biases and heuristics which in turn facilitate them to anticipate market changes and the outcomes of strategic decisions (Garbuio et al., 2011). Context plays a significant role when entrepreneurs want to transfer knowledge structure between industries. The presence of higher cognitive capability in managers enable them to create an association between different knowledge structures in multiple different contexts (Gavetti, 2012). This ability of managers facilitates them to sense excellent market opportunities. The development of this ability is gradual and increases in the long run (Gary et

al., 2012). MC in DMC includes reasoning and problem solving (international commitment), attention (international vision), and emotion and perception (proactive behaviour). Based on the preceding arguments, we submit that MHC, MSC, and MC are reliable and valid attributes of DMC in the context of early internationalizing firms in emerging economies.

Besides direct effects, the three attributes have interaction effects between each other (Adner and Helfat, 2003). For example, prior experiences of entrepreneurs complement all three attributes (Beck and Wiersema, 2013). Educational qualification and prior experience affect MC in terms of developing knowledge structure; the cognition level of entrepreneurs facilitate them to gain relevant experience to improve their human capital (Helfat and Martin, 2014). This concept supports the emerging enabling process of entrepreneurs to explain the emergence of an individual's knowledge abilities, skills, and other interpersonal characteristics (Ployhart and Moliterno, 2011). This process amplifies and develops entrepreneurial cognition into crucial human capital resources. Similarly, information and knowledge delivered from social capital improve MHC (Castanias and Helfat, 2001). In addition, MC as entrepreneurs' proactive behaviour helps them to seek for new network and ties, which are also affected by perception and attention of entrepreneurs.

Drawing on DMC theory, this study contributes to the development of the measurement scale of DMC by conducting the psychometric evaluation. This study contributes to the body of knowledge on DMC (Adner & Helfat, 2003) from the context of the early internationalized firm in an emerging economy. The applicability of the finding of this study is not limited to emerging economy; this measurement scale will complement a vast array of future research on any economy. Managers are optimistic, which lead them to explore new opportunities. DMC is a critical and fundamental antecedent for managers to explore new opportunities and bring

economic value continuously. All three components of DMC are equally crucial for the manager. Therefore, the concurrent development of all three attributes is necessary to achieve success in various strategic actions. The market is extremely volatile where failure is natural and success is rare.

Conclusions, limitations and directions for future research

This research aims to perform a psychometric evaluation of dynamic managerial capability (DMC) scale in the context of early internationalizing firms from an emerging economy. The psychometric evaluation was performed through EFA and CFA based on the data obtained from two waves of respondents. The findings of the study demonstrate that DMC is a valid and reliable scale to capture the individual-level capability of entrepreneurs.

This study is not without limitations. First, in the CFA model, error terms were correlated leading to measurement errors. The emergence of such errors may be due to the (1) presence of similar words in multiple items and (2) negatively and positively worded statements which have not been understood by the respondents (Harrington, 2008). This study is not free from these types of errors. Second, the respondents have been only from one industry and from one country. The future research can (1) conduct the study among multiple industries and multiple countries, (2) empirically test the effects of the interaction between the three attributes, and (3) conduct longitudinal research to redefine, verify and evaluate the adequacy of the scale in a sophisticated research setting.

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List of tables

Table 1 Data characteristics of the sample (N = 373)

Characteristics	Number of Enterprises	Percentage (%)	Cumulative
No of employee			
<150	3	0.8	0.8
151 - 200	7	1.9	2.7
201 - 500	91	24.4	27.1
501 - 1000	81	21.7	48.8
1001 - 2000	91	24.4	73.2
> 2001	100	26.8	100
Number of export markets			
1 to 3	5	1.3	1.3
4 to 7	146	39.14	40.44
7 to 10	69	18.49	58.93
11 to 15	134	35.92	94.85
More than 15	19	5.1	100
Firm age			
1 to 5	77	20.64	20.64
6 to 10	87	23.32	43.96
11 to 15	88	23.59	67.55
16 to 20	75	20.10	87.65
More than 20	46	12.35	100

Table 2 CVR and individual CVI for the DMC scale items

Items (*N*=10)	CVI Simplicity (1-4)	CVI Relevancy (1-4)	CVI Clarity (1-4)	CVR Essential (1-3)
1. Prior Entrepreneurial Experiences: Number of years you had spent working for start-up firms.	0.76	0.81	0.89	0.92
2. Prior Managerial Experiences: Years spent managing others business as a manager prior to starting the current company.	0.82	0.70	0.79	0.87
3. Prior academic education: level of educational qualification achieved by your own prior to starting the current company.	0.78	0.79	0.84	0.88
4. Training experiences: Number of training activities obtained by your own: (such as legal, marketing, sales, strategy, etc.) which is related with your current company, prior to starting and during the position as CEO of your company.	0.86	0.87	1	0.92
5. Top manager at buyer firms.	0.88	0.79	0.78	0.97
6. Top manager at supplier firms.	0.78	1	1	0.99
7. Top manager at competitor firms	0.92	1	1	1
8. Political leader in various levels of the government.	0.76	1	0.96	0.79
9. Officials in industry bureaus.	1	0.97	0.93	0.99
10. Officials in regulatory and supporting organizations such as tax bureaus, state banks, commercial administration bureaus, and the like.	0.99	0.98	1	1
11. I assumed that he or she would always look out my interest.	1	1	0.94	1
12. I assumed that he or she would go out of his or her way to make sure I was not adversely affected.	0.87	0.89	0.79	0.94
13. I felt like he or she cared what happened to me.	0.88	1	1	0.97
14. I believed that this person approached his or her job with professionalism and dedication.	1	0.96	0.97	1
15. Members of my business network believe that the needs of the whole network should take priority over personal needs.	0.8	1	1	0.95
16. Members of your business network accept decisions taken within the network even when they have different opinions	0.79	0.84	0.91	0.99
17. Problem-solving by many members of a business network give better results that those by individuals.	1	1	1	0.91
18. It is important for our company to internationalize rapidly	0.87	0.89	0.99	0.89
19. Internationalization is the only way to achieve our growth objective.	0.77	0.91	0.98	0.99
20. We will, have to internationalize in order to succeed in the future.	0.79	1	0.81	1
21. The growth we are aiming at can be achieved mainly through internationalization.	0.73	0.79	0.74	1
22. The entrepreneur of the company is willing to take the company to the international markets.	0.83	0.92	1	0.93
23. The company's management uses a lot of time in planning international operations.	0.70	1	0.76	0.88
24. The company's management sees the whole world as a one big marketplace.	0.77	0.81	1	0.97

Table 3 EFA factor loadings of items in the DMC with three factors

Item No	Factors of DMC scales	Mean (N = 168)	SD	Communalities (h2)	Factor loading		
					Factor 1	Factor 2	Factor 3
Factor 1:	**Managerial Human Capital** (% of variances = 40.412, eigenvalue = 12.738)						
1	Prior Entrepreneurial Experiences: Number of years you had spent working for start-up firms.	4.99	1.15	0.717	0.736		
2	Prior Managerial Experiences: Years spent managing others business as a manager prior to starting the current company.	5.16	1.074	0.9	0.882		
3	Prior academic education: level of educational qualification achieved by your own prior to starting the current company.	5.14	0.999	0.655	0.737		
4	Training experiences: Number of training activities obtained by your own: (such as legal, marketing, sales, strategy, etc.) which is related with your current company, prior to starting and during the position as CEO of your company.	5.24	1.112	0.851	0.857		
Factor 2:	**Managerial Social Capital** (% of variances = 21.556, eigenvalue = 4.061)						
5	Top manager at buyer firms.	5.47	0.972	0.804		0.863	
6	Top manager at supplier firms.	5.55	0.927	0.774		0.849	
7	Top manager at competitor firms.	5.57	0.939	0.808		0.862	
8	Political leader in various levels of the government.	5.6	0.949	0.715		0.793	
9	Officials in industry bureaus.	5.51	0.96	0.724		0.824	
10	Officials in regulatory and supporting organizations such as tax bureaus, state banks, commercial administration bureaus, and the like.	5.56	0.94	0.763		0.841	
11	I assumed that he or she would always look out my interest.	5.55	0.959	0.769		0.843	
12	I assumed that he or she would go out of his or her way to make sure I was not adversely affected.	5.69	0.947	0.77		0.846	
13	I felt like he or she cared what happened to me.	5.58	0.932	0.735		0.825	
14	I believed that this person approached his or her job with professionalism and dedication.	5.51	0.966	0.776		0.835	
15	Members of my business network believe that the needs of the whole network should take priority over personal needs.	5.54	0.915	0.797		0.854	
16	Members of your business network accept decisions taken within the network even when they have different opinions	5.58	0.957	0.748		0.838	
17	Problem-solving by many members of a business network give better results that those by individuals.	5.61	0.922	0.771		0.844	
Factor 3:	**Managerial Cognition** (% of variances = 13.272, eigenvalue = 1.980)						

18	It is important for our company to internationalize rapidly	5.61	0.929	0.62	0.738
19	Internationalization is the only way to achieve our growth objective.	5.71	0.898	0.741	0.823
20	We will, have to internationalize in order to succeed in the future.	5.72	0.997	0.739	0.835
21	The growth we are aiming at can be achieved mainly through internationalization.	5.74	0.943	0.691	0.791
22	The entrepreneur of the company is willing to take the company to the international markets.	5.67	0.97	0.732	0.836
23	The company's management uses a lot of time in planning international operations.	5.7	1.002	0.737	0.837
24	The company's management sees the whole world as a one big marketplace.	5.69	0.935	0.72	0.830

Table 4 Validity and reliability

	Cronbach alpha	Construct reliability	Factor 1	Factor 2	Factor 3
Factor 1	0.826	0.759	0.717		
Factor 2	0.922	0.920	0.611	0.694	
Factor 3	0.869	0.878	0.639	0.639	0.713

Note: The diagonal value is the squared root of AVE.

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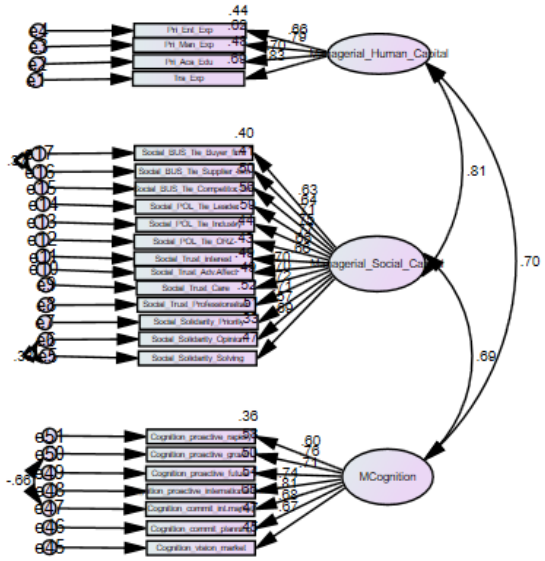

Figure 1 CFA measurement model of DMC scale. Note: X^2 = 491.088, CMIN/*df* = 1.996, CFI = 0.907, IFI = 0.908, GFI = 0.843, SRMR = 0.0534, RMSEA (90% C.I.) = 0.070. (0.061-0.079).