Dimensions of human capital and firm performance: Micro-firm context

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Abstract The objective of the paper is twofold: first, to examine the dimensions of human capital with respect to a measurement model; second, to test the direct and mediating relationships between human capital dimensions and firm performance. A mixed method research design was used. Results suggest a formative construct of demographic and psychographic factors. We found a positive effect of demographic and psychographic factors on firm performance, as also a positive effect of demographic factor on psychographic factor. Further, results indicate the mediation effect of psychographic factor on firm performance. Finally, this study discusses several theoretical and practical implications of the findings.

Introduction

Grounded on resource-based view (RBV) and dynamic capability view (DCV) of firm, human capital is clearly central to the assembly of resources and capabilities. This is because firm's competitiveness and performance depends on the human capital profiles (Chadwick, & Dabu, 2009; Hatch, and Dyer, 2004; Mayer, Somaya, & Williamson, 2012). In other words, firms with superior human capital are better positioned to create resources and capabilities (Barney, 1991). However, the underlying dimensions binding human capital to competitive performance have not been fully developed (Coff, & Kryscynski, 2011). From a resource and capability perspective, calls for micro-firm research on human capital and performance have also been coming forth (Kelliher, & Reinl, 2009; Abell, Felin, and Foss, 2008; Teece, 2007). Micro-firms are inherently different in their organisational characteristics. Specifically, human resource profiles within a micro-firm are exclusive and "micro-firms' behavioural responses to issues that impact upon them differ fundamentally from those of larger firms" (Kelliher, & Reinl, 2009: 522), and should hence be studied carefully (Coff, 1997). Considering the growing interest in human capital characteristics and micro-firm research, this study attempts to answer the following questions: what are dimensions of human capital with respect to a measurement model, and how are these dimensions linked with each other and how do they contribute to firm performance?

The human capital dimension has received limited research attention, especially for micro-firms. So far, to our knowledge, no study has attempted to develop and validate

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human capital dimensions with respect to a measurement model. However, scholars claim the importance of both theoretical and empirical considerations for designing and validating appropriate measurement models (Coltman, Devinney, & Midgley, 2008, for instance). Coltman et al. (2008) argue that empirical evaluations build important ground for content validity, especially to identify errors and wrongly conceived theories. Wrong specifications of measurement models have significant impact on research outcomes and may even mislead organisational policy setting (Khan, & Quaddus, 2015). Therefore, we pay careful attention to identifying and designing an appropriate measurement model for human capital dimensions of a micro-firm.

The direct effect of human capital on firm performance has been widely studied (Chandler, & Hanks, 1998; Duchesneau, and Gartner, 1990; Eesley, & Roberts, 2012). However, human capital can be perceived based on different dimensions and examined according to their influence on firm performance. While human capital dimensions are crucial factors influencing firm performance, there might also exist contingency relationships between human capital dimensions and firm performance, which have not been investigated as yet. However, it is crucial to analyse these contingency relationships because in real-life situations, factors do not function in a standalone mode, rather they are sequentially linked. Therefore, exploring the dynamics of such contingency relationships and their direct effects will facilitate the understanding of owners/managers and policy makers about the relationship between human capital dimensions and firm performance. Indeed, poor human resources and capabilities are often quoted as a key reason for why firms fail (Chandler, & Hanks, 1998;Duchesneau, and Gartner,1990; Eesley, & Roberts, 2012). However, researchers still believe that competent micro-firm owners/managers will explore ways of arriving at the required human resources and capabilities. Given the theoretical and practical significance of the issue, and relying on the literature of RBV and DCV, first, we develop and validate the human capital dimensions with respect to a measurement model; and then, we verify the direct effect of human capital dimensions on firm performance and their relationships. Finally, we test for contingency relationships.

We use mixed method research which is a combination of both qualitative and quantitative approaches (Creswell, & Clark, 2007). In the qualitative approach, we use content analysis on relevant literature and field study findings. Based on the results of the field study, we conducted a survey over a four-month period in Bangladesh, to establish the human capital dimensions and their relationship with firm performance. The survey was conducted on the service industry of micro-firms, such as restaurants, in Bangladesh. Collected data was analysed using the partial least squares structural equation modelling (PLS-SEM) approach (Hair, Ringle, & Sarstedt, 2011).

Our work makes several vital contributions to the existing literature both for theory and practice. Particularly, this research offers a solution to the existing fragmented concept of human capital dimensions and their interrelations with firm performance; and consequently, extends the RBV and DCV by incorporating the effect of human resource factors to enhance firm performance. Further, the investigation of the impacts of human capital dimensions in a developing country offers insights on how firms may handle and manage their human resources and capabilities in a micro context in order to increase business performance. By examining the factors related to human capital contributing to firm performance in a developing country, we enrich this literature base.

The paper is organised as follows: the following section provides background literature with hypothesis development, followed by the sections on research method, findings of survey, and discussion of results. The paper concludes with a brief sketch of future directions for research.

Literature review

RBV and DCV of firm addresses the set of resources and capabilities of firm that can lead to competitiveness and firm performance. Arguing that the human capital embedded in employees is likely to satisfy these criteria, researchers have repeatedly recommended that human capital resources and capabilities can be a source of a firm's superior performance and success (Chadwick, & Dabu, 2009; Hatch, and Dyer, 2004; Mayer et al., 2012). Many academics also have claimed that resources and capabilities may take the form of human capital (Coff, 1997). Therefore, from the RBV and DCV perspective of firm, a firm's human capital is defined as the training, knowledge, and skills of its professionals that can be used to produce professional goods and services (Pennings, Lee, & Van Witteloostuijn, 1998; Samran, Majeed, & Qureshi, 2012). Vidotto, Vidotto, and Aisenberg Ferenhof, 2017: 317) supported this definition by stating that human capital is "a set of knowledge, skills, and abilities that reside in the individual and that are used by him/her". Ployhart and Moliterno (2011) also define human capital as a unit-level resource and capability created from individuals' knowledge, skills, abilities or other characteristics.

Human capital dimension

The assumptions of human capital dimensions are now coming under question as anecdotal evidence and new empirical evidence have suggested that a gap may exist in these assumptions. Folloni and Vittadini (2010) claimed that human capital is a complex, multifaceted phenomenon with numerous intangible dimensions that are difficult to observe and measure with precision by one variable, a set of items, or their amalgamated sum on individuals or households. Further, they observed that human capital is a multidimensional construct that is related not only to explicit knowledge and training but also to values and norms, family profiles, social context and, to a significant extent, innate and non-cognitive abilities and skills. Addressing the importance and difficulties of measuring human capital dimensions, Bozbura, Beskese, and Kahraman, 2007: 1100) stated that " you cannot manage what you cannot control, and you cannot control what you do not measure". In their study, they used fuzzy analytic hierarchy process (AHP) techniques to measure human capital dimensions, and proposed several indicators such as knowledge, skills, sharing and reporting knowledge, and training. Vidotto et al. (2017) pointed out that knowledge is a main component for human capital and can be presented in two forms: explicit or tacit. They grouped human

capital dimensions into three factors – leadership and motivation; qualifications; and satisfaction and creativity, and argued that these would contribute in the organisation's human capital measurement setting. An extensive literature review by Nyberg, Moliterno, and Hale (2012) led them to summarise human capital into three core dimensions and eight subcategories. They found that each of the 92 empirical articles could be categorised into at least one of these dimensions and subcategories, and that many were characterised by two or more. Their study clearly indicated that human capital is a multidimensional construct. Dagum and Slottje (2000) have identified human capital at a microeconomic level as the multidimensional non-observable construct generated by personal ability, home and social environments, and the education of the household head.

Given the above, and considering the human capital dimensioning relevance for the organisation's management, the authors of this paper highlight that it is important to develop new research to facilitate human capital assessment with respect to a measurement model. Therefore, the authors have attempted to establish the human capital factor by focussing on two dimensions – demographic and psychographic – which can assist in the micro-firm's human capital measurement.

Hypothesis development

Demographic factor and firm performance

The demographic resources of a firm are the demographic features of the firm members such as their education or explicit knowledge, experience and skills, and age range. Firm-level education or explicit knowledge has been widely accepted and studied in entrepreneurship research and has been seen to have an influence on firm success or failure (Unger, Rauch, & Frese, 2011; Watson, Stewart, and BarNir, 2003; Samran et al., 2012; Hejazi, Ghanbari, & Alipour, 2016). A firm with members with good educational backgrounds contributes more rational capability and explicit knowledge (Hitt, Biermant, & Shimizu, 2001;Chow, 2006; Lee et al., 2008). Mengistae (2006) asserted that the firm owner's years of schooling is related to firm profitability. It has also been recognised that the best results are achieved by those firms with prior work experience (Samran et al., 2012;Hejazi et al., 2016; Shrader, & Siegel, 2007). In the case of the micro-firm, owners rely upon their own and family members' experiences and skills to set up and operate a business (Sharma, & Salvato, 2011). A study conducted by Batjargal (2005) among entrepreneurial Russian firms found that firm experience related positively to firm growth. The number of firm members and their maturity/age levels are reflective of the firm's education, knowledge, skills and ability (Samran et al., 2012;Hejazi et al., 2016; Coleman, 2007). Furthermore, they suggested that members (in number and maturity level) foster the reliability of an enterprise to potential lenders and other constituents. Ouimet and Zarutskie (2014) have stated that the firm members' age leads to the growth of the firm.

Findings from the field study demonstrated that many participants perceived that demographic factors are important predictors in determining firm performance. In explaining the influence of demographic factors on firm performance, micro-firm F, for example, stated: "There are four members in my family. My youngest son sometimes helps me with this". To quote another example, non-governmental organisation (NGO) I said, "I found the micro-firm owners have some experience in work such as in restaurants, as a labourer, in tailoring, or as a maidservant. Their previous experience helps them directly or indirectly in the business". Based on the literature review and field study evidence, the following hypothesis is proposed.

H1: Demographic factors positively influence micro-firm performance.

Psychographic factor and firm performance

The psychographic resources of a firm describe the psychographic characteristics of the firm members such as their tacit knowledge, extraordinary commitment, and voluntary labour, and this leads to a new dimension of a firm's psychographic human capital. Tacit knowledge is referred to as "know-how", the often non-codified component of activity (Anderson, & Eshima, 2011). Cabrera-Suárez, De Saá-Pérez, and García-Almeida (2001) indicated that firms' know-how can be generated by learning-by-doing as well as by research. Previous studies proved that tacit knowledge is the proxy measurement of economic outcome (Harlow, 2008;Harlow, and Imam, 2006; Mostafa, & Klepper, 2017). Meyer and Herscovitch (2001) defined commitment as a power experienced as a sketch of the mind, or emotional state that forces an individual towards an act of relevance to one or more targets. At the beginning stages of the micro-firm, survivability is the crucial factor. Therefore, all members of the micro-firm put their best efforts and commitment to surviving and going forward. Empirical evidence suggested that commitment can, in principle, enhance firm performance (McClean, & Collins, 2011;Ceylan,2013; Zhou et al., 2013). In addition, voluntary labour is a vital component to sustain a firm and firm performance. In the case of the micro-firm, during survival and poor economic times, free labour from family members helps to grow and sustain the firm (Sirmon, Hitt, & Ireland, 2007). Therefore, family members' voluntary labour contribution may be a unique resource of micro-firms that encourages the micro-firm to implement strategies and acquire firm goals.

Findings from the field study demonstrated that all the participants except E, G, J, K, L, M and N perceived that psychographic predictors are important predictors in determining firm performance. In explaining the influence of psychographic factors, the owner of micro-firm A, for example, stated: "I cannot read at all. However, I do not face any problem in operating the business. I manage the business with my own tacit knowledge. I can recall everything in my memory. If I sell by credit to customers . . . how much I sold, I could easily memorize when I meet customers the next time". NGO I, another example, narrated: "In the case of the micro-business, owners need a supporting hand. If they hire a labourer from outside, then they have to pay Bangladeshi Taka (BDT) 100 per day. They think if they use their sons or daughters, then they can save BDT 100 per day". Referring to the existing literature and the field study, the following hypothesis is proposed.

H2: Psychographic factors positively influence micro-firm performance.

Demographic factor and psychographic factor

There has been little research that looks at the link between demographic factors (such as education and experience) to psychographic factors (such as tacit knowledge, and commitment) (Grant, 1996). The current paper argues that firms with greater degree of demographic factors will achieve higher than average psychographic factors. The overall psychographic characteristics of the firm members is dependent on the degree to which the firm can use all of the firm members' demographic featurés selected by the firm (Han et al., 2014). Harlow (2008) assumed that education is an important component of tacit knowledge. Brătianu and Orzea (2009) suggested that the education is likely to require a deeper understanding of tacit knowledge. Chen, Ragsdell, and O'Brien, 2014 recommended that experience and skills create an accurate way to predict and anticipate one's store of tacit knowledge. Tulgan (2000) suggested that age/maturity levels might affect a worker's willingness to share or use tacit knowledge. Park et al. (2015) also addressed the role of age on tacit knowledge. The relationship between education and commitment has long been debated. However, a study by Lok and Crawford (2004) found that level of education had a positive effect on commitment. Similarly, Akinyemi (2014) also focussed on the influence of education on commitment. Meyer and Allen (1988) established the link between work experience and commitment. Lok and Crawford (1999) found a positive association between age and commitment. There is little work on the relationship between voluntary labour and other components of demographic factors. However, Sirmon et al. (2007) recommend that during survival times of a firm, voluntary contributions by family members support to sustain the firm. These voluntary contributions depend on the level of education, work experience and skills, and also age and maturity level of the firm members.

Furthermore, based on the findings of the field study, all participants except E, G, J, K, L, and M agreed that demographic factors were important factors, connecting with psychographic factors. For instance, the owner of micro-firm A narrated that "In my childhood, I had a guru. He was my senior brother. He had a restaurant. I worked in his restaurant. I used to cook snacks and breakfast, etc. From there, I learnt how to make tea ...". To quote another example, the owner of micro-firm D said, "Earlier, I had a sweet shop. I worked for 14 years in a sweet shop. From that time, I had a plan in my mind to open a big shop". In accordance with the above premises, the following hypothesis is proposed.

H3: Demographic factors positively influence the psychographic factors of the micro-firm.

Mediating role of psychographic factor

The relationship between psychographic factors and firm performance seems to be highly complex. Furthermore, the psychographic factors may not affect firm performance directly; rather, they may be stimulated by various demographic factors which, in turn, influence firm performance (Huang, & Lin, 2016; Han et al.,2010; Wu, & Lin, 2013). Tacit knowledge gained through knowledge sharing is applied to co-production purposes (Wu, & Lin, 2013). Han et al., (2010)

addressed the mediating role of commitment in relation to knowledge sharing. Similarly, micro-firms use voluntary labour and extraordinary commitment acquired through age or maturity (Anderson, 1982). In addition, studies have shown that a very high proportion of people working in the micro-firms are trained by the sector itself and contribute to firm performance (Walther, 2011). Hence, the micro-firm psychographic factors require demographic human resources to play a vital role in the firm's ability to be entrepreneurial. In other words, the micro-firm's psychographic factors should be equipped with demographic human resources essential to firm development. Therefore, there is a relationship between psychographic factors and demographic factors, the relationship that finally leads to firm performance. In addition, the three hypotheses that have been developed above also implicitly suggest the mediating role of psychographic factors. Therefore, whether psychographic factors mediate the demographic factors and firm performance relationship warrants an empirical enquiry.

The field study also supported the mediating links. In order to establish the mediating links, the subjective judgments of the respondents have been considered. For example, the owner of micro-firm A stated: "I have been running this business for more than 5 years [demographic factor: age, experience]. However, I do not face any problem in operating the business. I manage the business with my own tacit knowledge [psychographic factor: tacit knowledge]. I can recall everything in my memory. I have two sons and one daughter. My son also helps in the business [psychographic factor: voluntary labour and extraordinary commitment]. One of my sons is studying in college and the other in school". This statement represents mediating links, for example, psychographic factors → demographic factors → firm performance. Hence, the following hypothesis is proposed.

H4: Psychographic factors mediate the relationship between demographic factors and firm performance.

Proposed model

Based on the hypothesised relationships, a conceptual model was developed which is shown in Fig. 1. The model presents several direct relationships: demographic factor to firm performance, psychographic factor to firm performance, demographic factor to psychographic factor. The model also shows the mediating role of psychographic factor between the demographic factor and firm performance denoted by the links by a, b, and c. The model is grounded on the RBV and DCV to justify relationship.

Research method

To understand the research topic, to validate the model, and to obtain and analyse data, a combination of both qualitative and quantitative methods (mixed method) is applied in this study. Creswell and Miller (2000) assert that the mixed method utilises the capability of various data collection and enhances the validity of research measurements.
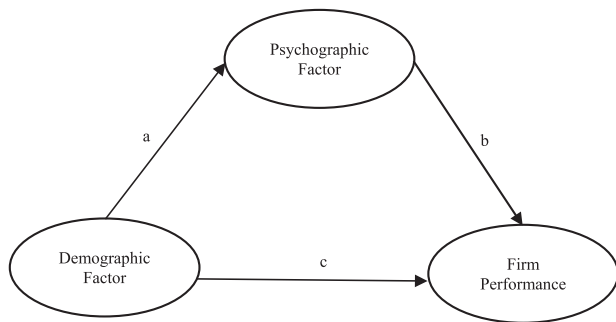
Figure 1 The conceptual research model, Note: Mediator: Psychographic factor; Independent variables: Demographic factor; Dependent variable: Firm performance.

Qualitative approach

Denzin and Lincoln (2000: 3) assert that qualitative research involves an "interpretive and naturalistic" approach: "This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them". This qualitative study attempts to explore the phenomena of human capital in terms of demographic factors and psychographic factors, and firm performance to validate and enhance the variables, factors and links that were identified as part of the literature review.

Case selection: This study samples 14 cases: eight restaurant owners, three NGOs, and three local government authorities (see Table 1). Since restaurants are prominent among micro-firms, they were chosen as the main sample category. This technique is appropriate as King, Keohane, and Verba (1994) state that researchers should choose a community very carefully in order to make sure that it is especially representative of the population. In addition, by way of triangulation, purposeful sampling of NGOs and local governments who were knowledgeable about micro-firms settings were interviewed as this approach was likely to produce valuable and consistent data (Weiss, 2008). All

interview participants were from Khulna City, the third largest city of Bangladesh.

Data collection and analysis procedure: The field study was conducted in Khulna city, Bangladesh between January and February in 2012. This study used semi-structured interview as a method of collecting relevant qualitative data to explore and refine key variables, factors and their links. Data were obtained via one-on-one personal interviews. This technique allows for the freedom to further probe into in-depth explanations and details in specific key areas. During the interview sessions, the interviewees were able to express ideas freely, while clarifications could be made by interviewers. Rigour of the data was enhanced by having the transcripts back-translated into Bangla and validated by another researcher. The transcribed interviews were analysed using content analysis method. Content analysis can determine key variables, factors and their links. Miles and Huberman (1994) assert that content analysis technique is useful in exploratory research to examine the determinants of behavioural patterns. Inductive logical thinking skills were applied to extract and classify the data and constructs. The inductive process started with conducting, transcribing, and analysing the interview transcripts. The transcripts were reviewed in full to uncover key patterns/themes. The inductive process was completed by using key words to identify the emerging themes. The field study findings are shown in Appendixes A and B.

Quantitative approach

To develop an instrument for measuring human capital factors and firm performance in the context of micro-firm, this study began by exploring cited variables under each factor as outlined in the literature. Through this process, variables and factors were identified. Next, the field study attempted to discover new variables and to confirm existing variables that matched with the literature. After confirming the factors and variables with assistance from the literature review and the field study (see Appendixes A and B), the quantitative phase of the research aimed at finding and validating the important variables, factors and their links.

Table 1 Profile of field study participants.

Participant	Gender	Age	Position	Profile
A	Male	32	Sole proprietor	Restaurant business
B	Male	18	Sole proprietor	Restaurant business
C	Female	22	Sole proprietor	Restaurant business
D	Male	55	Sole proprietor	Restaurant business
E	Female	35	Sole proprietor	Restaurant business
F	Male	60	Sole proprietor	Restaurant business
G	Male	30	Sole proprietor	Restaurant business
H	Male	25	Sole proprietor	Restaurant business
I	Male	25	Assistant executive	Non-governmental organisation
J	Male	28	Assistant executive	Non-governmental organisation
K	Female	30	Assistant executive	Non-governmental organisation
L	Male	40	Ward commissioner	Local government
M	Male	55	Ward commissioner	Local government
N	Male	38	Ward commissioner	Local government

Sample and data collection procedure: The target population establishes the boundary line between respondents and non-respondents, therefore it is important to determine the specific target population during the sampling design process. Similarly, the target population represents the sample elements that have the relevant information and about which inferences are drawn. A total of 438 survey questionnaires were completed. A sufficiently large sample is very important so that generalisation trends can be derived by studying this sample. The sampling approach was based on a simple random sample. The data-gathering strategy under the survey method is generally predicated on the nature of survey interaction and the mode of questionnaire administration (Malhotra, 2008). This study used location intercept techniques because these methods ensure good response rates in comparison to other methods (Andaleeb, 2001; Malhotra, 2008). This strategy was executed in a physical setting in the local language in Bangladesh (Andaleeb, 2001). The survey instrument, together with a covering letter explaining the purpose and instruction of the survey, was provided to the restaurant micro-firm owners. The response rate for the study was 87%. As this was a study intended to measure effects and make generalisations about a population, the size of the response rate compellingly exceeded the minimum threshold level ($>$60%) for a face-to-face survey (Wholey, Hatry, & Newcomer, 2010). The surveys were conducted in Khulna city, Bangladesh between June and September in 2012. Table 2 presents the demographics of the valid respondents.

Instrument selection: In order to produce an items pool for each factor, items were recognised from the literature, and finally, field study analysis was aligned with current scales to match factor definitions (Churchill Jr, 1979; MacKenzie, and Podsakoff, and Podsakoff, 2011; Moore, & Benbasat, 1991) by an analyst having proficiency in both English and Bangla. A Likert scale was used as a measure in this study. Hair, Money, and Samouel, 2007 suggested that there are two choices, odd or even numbers, in selecting scale categories. Many studies have used a seven-point Likert scale, having a central "neutral" point. Based on the experience or judgment of the researcher, the central point is used when it is perceived that some portion of the respondents is likely to feel neutral about the issue being examined. However, Matell and Jacoby (1971) advised researchers to either use or not use the neutral point when the scale consisted of many points. Furthermore, another reason to use a six-point scale was to avoid the central tendency error of respondents. The central tendency error is observed when respondents answer a middle choice with "neutral" or "neither agree or disagree" without really meaning that. Therefore, it is thought worthwhile to use a six-point Likert scale.

Measures: We adapted the items from existing literature to measure the constructs. Demographic factor was measured with four items adapted from Coleman(2007). Similarly, psychographic factor was measured with three items adapted from Sirmon and Hitt (2003). . Firm performance was conceptualised from a financial viewpoint and measured by three items adapted from Gatersleben and Vlek (1998). The decision to model a construct as either reflective or formative was made based on four major criteria suggested by Jarvis, MacKenzie, and Podsakoff, 2003: (1) direction of causality from construct to items, (2) interchangeability of items, (3) covariation among items, and (4) nomological net of construct items. Demographic factor and psychographic factor items were formative in nature, while firm performance items were reflective. These items are listed in Appendix C.

Data analysis technique: The quantitative data analysis was conducted using the SEM technique. This technique allows the simultaneous modelling of associations among multiple independent and dependent variables (Chin, 2010). Coupling the econometric perspective of prediction and the psychometric perspective of construct validity, it enables the measurement of unobservable (latent) variables using observable measures (or manifest variables, items or indicators) by explicitly modelling measurement error (Chin, 1998). It is widely used for its inherent flexibility in testing a theoretical model with multiple predictors and criterion variables against empirical data. The data of the questionnaire survey was analysed through Partial Least Square approach (PLS). Partial Least Square path modelling is based on an algorithm that, firstly, estimates the best weights of each block of the measurement model, and then estimates the path coefficients in the structural model (Chin, & Newsted, 1999). Thus, the latent variable component scores or weight estimates depend on how well the measurement model and structural model are specified. Partial Least Square is more appropriate when the measurement items are not well established and are used within a new measurement context (Barclay, Higgins, & Thompson, 1995). Moreover, the capability to handle formative as well as reflective indicators and constructs was one of the greatest incentives to adopt PLS.

To analyse the measurement properties of the factors, we conducted a confirmatory factor analysis (CFA). For the result of CFA, we assessed the convergent validity and discriminant validity of the scales for reflective measurement model. Convergent validity measures the correlations of items in a single construct. The goal is to ensure that items are correlated and measure the same underlying dimensions. The reflective items were tested for convergent validity by determining item reliability, composite reliability (CR) and average variance extracted (AVE). Discriminant validity

Table 2 Survey participants' (organisation) profile.

Monthly average sales	Fre.	(%)	Number of employees	Fre.	(%)	Firm age	Fre.	(%)
Below BDT. 20000	52	11.87%	Below 2	69	15.75%	Below 3 years	53	12.10%
BDT. 20001–BDT. 30000	101	23.06%	3 – 4	98	22.37%	4 – 6 years	104	23.74%
BDT. 30001 –BDT.. 40000	132	30.14%	5 – 6	127	29.00%	7 – 9 years	128	29.22%
BDT. 40001–BDT. 50000	90	20.55%	7 – 8	81	18.49%	10 – 12 years	86	19.63%
Above BDT. 50000	63	14.38%	Above 8	63	14.38%	Above 12 years	67	15.30%

Notes: USD - US Dollar; BDT- Bangladeshi Taka;1 USD = 80 BDT. (approximately); Fre. - Frequency.

analysis was used in this study to test statistically, the degree of variance shared among items and constructs in the model. To establish discriminant validity, the square root of the AVE was compared to the inter-construct correlations. In the final analysis for discriminant validity, cross-loadings for each item were explored and compared across all constructs and have been presented in the form of a cross-loading matrix. In addition, nomological validity was also calculated. The formative items are not correlated; therefore, convergent validity and discriminant validity could not be applied. The formative model was assessed by the item level loadings\weights and their *p*-value, and multicollinearity statistics. Multicollinearity was tested by calculating the variance inflation factor (VIF). This was to ensure that each indicator had a distinct influence on the intended latent variable.

Results

Assessment of measurement model

The current model presents both formative and reflective items. To assess the adequacy of the measurement model, reflective and formative items and constructs, convergent validity (item reliability, internal consistency, AVE), and discriminant validity (AVE analysis, cross loading) were tested (Fornell, & Larcker, 1987). Low loading items would decrease the correlation between items in the construct (Nunnally, & Bernstein, 1994). On the other hand, the formative items are not correlated; they do not measure the same underlying dimensions. Content validity is verified to examine the appropriateness of the formative items and constructs of the measurement model. To establish empirical support and theoretical relevance it is also recommended that *t*-value of both the loadings and weights be observed (Hair et al., 2011). In this study, cut-off point of item loadings was considered 0.7, and item weights were measured on the basis of relative importance. Critical *t*-value was considered at least 1.65 (Hair et al., 2011).

In data analysis, where the cut-off point for all the items loadings was above 0.7, and the items loadings' *t*-value was found significant, all the items were retained. Also, all the items weights were retained on the basis of relative importance, and where *t*-value was significant (Hair et al., 2011). In addition, a test of multicollinearity was conducted.

Indicator weight provides information on the relative importance of the formative items towards the formation of the corresponding latent constructs. There is no general rule of thumb to specify the formative items or constructs. In test of multicollinearity, low collinearity among items is vital in ensuring the stability of the estimates (Mathieson, Peacock, & Chin, 2001). To examine multicollinearity, the variation inflation factor (VIF) scores for each item is calculated. The higher the VIF score, the higher is the degree of multicollinearity. The maximum level of VIF score is 05 suggested by Hair et al., 2011. In our study, the maximum level of VIF score was found to be below 05 for all the formative items. Therefore, all the formative items were retained. Further, internal consistency and AVE were tested. The minimum value for internal consistency is specified as 0.7 (Nunnally, & Bernstein, 1994; Fornell, & Larcker, 1987). The reason cited for low internal consistency by Hulland (1999) is multidimensionality of constructs due to poor construct definition. Firm performance construct meets the criterion of a minimum value of 0.7. The AVE indicates the amount of variance in the item that is explained by the construct (Fornell, & Larcker, 1987). Results of the statistical analysis show that the AVE cut-off values were above 0.5 (Nunnally, & Bernstein, 1994; Fornell, & Larcker, 1987). Therefore, the measurement model (reflective and formative items) satisfied all the three necessary criteria and achieved convergent validity. In the next step, the discriminant validity of the reflective variables was assessed to determine the degree to which the constructs differ from each other. To meet the discriminant validity criteria, the square roots of the AVE were calculated. Discriminant validity is achieved when the square root of the AVE of a construct is larger than its correlation with other constructs (Barclay et al., 1995). In analysis, firm performance was found significant in terms of the square root of the AVE. In cross loading analysis, firm performance items met the criteria (see Tables 3 and 4).

Assessment of structural model

The explanatory power of the proposed model was assessed by estimating the variance associated with exogenous constructs. The coefficient of determination R^2, path coefficient, and *t*-value of the hypothesised relationship were calculated to evaluate the significance of the relationship (see Tables 4 and 5). R^2 values of 0.75, 0.50, or 0.25 for

Table 3 Assessment of measurement model (Lodgings, weights, VIF, CR, and AVE).

Constructs	Items	L	W	Lt-v	Wt-v	VIF	CR	AVE
Demographic (DE)	DE1	0.841	0.209	32.525	3.540	2.850		
	DE2	0.908	0.212	63.034	3.994	4.284	0.846	0.648
	DE3	0.917	0.214	61.778	3.589	4.257		
	DE4	0.935	0.466	78.730	8.935	3.039		
Psychographic (PS)	PS1	0.820	0.220	40.746	5.214	2.179		
	PS2	0.964	0.542	116.232	11.256	3.519		
	PS3	0.891	0.334	45.221	6.400	2.586		
Firm performance (FP)	FP1	0.821	0.343	33.198	0.343			
	FP2	0.720	0.274	17.082	0.274			
	FP3	0.867	0.601	59.541	0.601			

Notes: L-Loadings, W-Weights, L *t*-v-Loadings *t*-value, W *t*-v- Weights *t*-value, VIF-Variation Inflation Factors, CR-Composite Reliability, AVE-Average Variance Extracted 0.05=1.645; 0.025=1.96; 0.01=2.32; 0.005=2.57 *Significant *p<0.05, **p<0.01, ***p<0.005.*

Table 4 Assessment of measurement model (AVE SQRT, Cross-loadings, R^2, and Q^2).

	AVE SQRT				Cross-loadings		
Constructs	DE	PS	FP	Items/Constructs	DE	PS	FP
DE	-			DE1	0.841	0.760	0.528
PS	0.906	-		DE2	0.908	0.813	0.581
FP	0.624	0.630	0.805	DE3	0.917	0.847	0.549
				DE4	0.935	0.846	0.586
				PS1	0.771	0.820	0.477
R^2 for PS 0.822				PS2	0.872	0.964	0.609
R^2 for FP 0.421				PS3	0.792	0.891	0.584
Q^2 for PS 0.657				FP1	0.386	0.390	0.821
Q^2 for FP 0.218				FP2	0.284	0.332	0.720
				FP3	0.688	0.674	0.867

Notes: DE - Demographic, PS - Psychographic, FP - Firm Performance, AVE - Average Variance Extracted.

endogenous latent variables in the structural model can be described as substantial, moderate, or weak, respectively (Hair et al., 2011). The current study has accounted R^2 value as 0.82 for the outcome factor (firm performance), which is substantial. Also, R^2 value for the psychographic factor has accounted as 0.42 (see Table 4). In addition to evaluating the magnitude of the R^2 values as a criterion of predictive accuracy, this study also examined the predictive sample reuse technique or Q^2. Using the blindfolding procedure with the omission distance of 7 (Hair et al., 2011), the study obtained a cross-validated redundancy Q^2 of 0.657 for psychographic factor and 0.218 for firm performance (see Table 4). All these values of Q^2 were greater than zero ($Q^2 > 0$), which was indicative of a highly predictive model (Chin, 2010). The path coefficient indicates whether the direction of the relationship is positive or negative, whilst t-value assesses whether this relationship is significant or not. The path coefficient value indicates a positive impact of demographic and psychographic factors on firm performance, and a positive impact of demographic factor on psychographic factor. The t-values were highly significant $p < 0.005$ (see Table 5).

Assessment of mediating effect

The current study also examines the effects of the process on the possible outcomes by mediating effect. Indirect effect or mediation exists when a predictor affects a dependent variable indirectly through at least one intervening variable, or mediator. Table 6 and Fig. 2 illustrate that Model 1 shows a direct relationship between the initial variable demographic and the criterion variable firm performance ($c = 0.628$, $t = 19.775$); Model 2 shows a relationship between the initial variable demographic and the mediating variable

psychographic ($a_\iota = 0.909$, t 101.932), while Model 3 shows that the mediating variable psychographic has significant effects on the criterion variable firm performance ($b2 = 0.633$, $t = 20.318$). Since all of the above mentioned relationships are significant, it may be assumed that psychographic factors may perform an indirect role in explaining the relationship between demographic factors and firm performance. To further prove whether any indirect relationship exists and, if it exists, what type of indirect relationship it is, the researcher should estimate whether the relationship between the initial variable and criterion variable is no longer significant (in control of the mediating variable). As shown in Table 6, Model 4 illustrates a significant effect of psychographic factors on firm performance ($b2 = 0.363$, $t = 4.160$): the effect of demographic factors on firm performance is also significant ($c0.307 = \prime$, $t = 3.554$). It is important to note that, although the effect of demographic factors on firm performance is significant (in control of psychographic factors), the magnitude of the effect is reduced in comparison to the direct relationship between demographic factors and firm performance ($c = 0.628$, $t = 19.775$). Thus, in applying the basic concept of indirect or mediation analysis (Baron, & Kenny, 1986), it is observed that psychographic factors play a partial indirect role in explaining the relationship between demographic factors and firm performance (see Fig. 2).

The significance of indirect effects is examined by the z statistic (Sobel, 1982).

$$z = \frac{0.909 \times 0.633}{\sqrt{(0.633)^2 \times (0.009)^2 + (0.909)^2 \times (0.032)^2 + (0.009)^2 \times (0.032)^2}}$$
$$= 19.412$$

Table 5 Assessment of structural model (Path coefficient and t-Value).

Hypothesis	Path coefficient	t-Value
Demographic → Firm performance	0.906	104.901
Psychographic → Firm performance	0.361	3.622
Demographic → Psychographic	0.297	2.950

Notes: 0.05=1.645; 0.025=1.96; 0.01=2.32; 0.005=2.57 *Significant *p<0.05, **p<0.01, ***p<0.005.*

Table 6 Assessment of mediation effect.

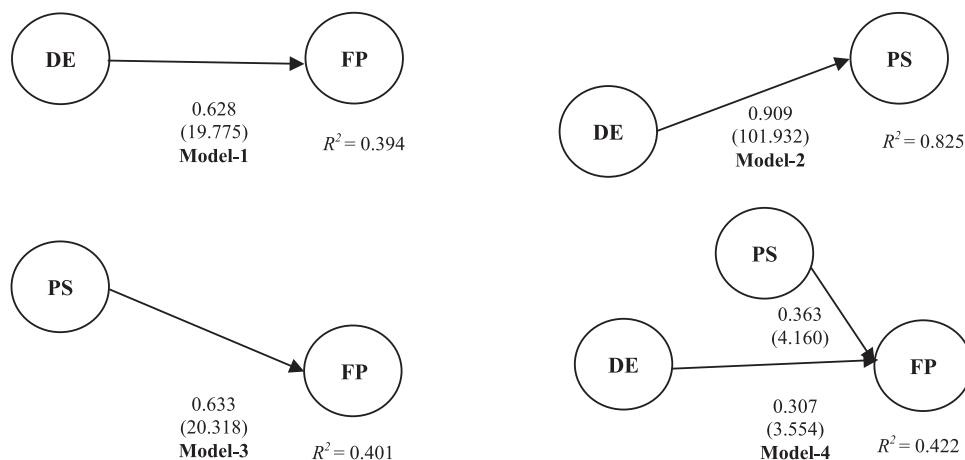|	Model 1	Model 2	Model 3	Model 4	Comments
c or $c\prime$	0.628 (19.775)			0.307 (3.554)	Partial mediation
a_ι		0.909 (101.932)			
$b2$			0.633 (20.318)	0.363 (4.160)	
R^2	0.394	0.825	0.401	0.422	

Figure 2 The mediating role of psychographic factor, Notes: DE - Demographic, PS - Psychographic, FP - Firm performance.

The results support the mediating effects of psychographic factors which implies that they have an indirect influence on firm performance. The variance accounted for (VAF) value is used to estimate the ratio of the indirect effects.

$$VAF = \frac{0.909 \times 0.633}{0.909 \times 0.633 + 0.628} = 0.478$$

The VAF value indicates that 48% of the total effect of demographic factors on firm performance is explained by indirect effects through psychographic factors.

Discussion

At first, we addressed the possible human capital dimensionality in terms of demographic and psychographic factors with respect to a measurement model. Second, we focussed on the relationship between demographic factors and firm performance; psychographic factors and firm performance, and the link between demographic factors and psychographic factors. Finally, we analysed the mediating role of psychographic factors in explaining the relationship between demographic factors and firm performance. The findings have several important theoretical and practical implications.

Theoretical implications

This study has several theoretical implications. First, in addressing the possible human capital dimensionality with respect to measurement model, this study has identified and validated a comprehensive, yet parsimonious, set of factors and variables that help predict the human capital factors of micro-firm. More specifically, from a resource and capability perspective, identification and validation of factors and variables, this study has extended the RBV and DCV by specifying and estimating a scale for micro-firm human capital factors. In addition, this study has proposed two factors of the human capital measurement model that are unique in the sense that they have been developed based on the literature review and field study data analysis. Further, this study

has advanced a formative measurement model of human capital factors using PLS approach which will deliver new thoughts for variance based SEM.

Second, this study is based on RBV and DCV and verifies the direct relationships of two human capital dimensions, demographic and psychographic, that contribute to firm performance; and test the direct influence of demographic factor on psychographic factor. In addition, this study examines the partial mediating role of psychographic factor of human capital that facilitates firm performance. This finding is important for micro-firms because previous scholars have argued that there is little integrative theoretical research about the concept of human capital and its nomological network in the micro-firm context (Kelliher, & Reinl, 2009; Abell et al., 2008; Teece, 2007). We thus contribute to RBV and DCV literature by addressing the effect of human resources and capabilities on micro-firms.

Third, by integrating human capital theory (Dimov, & Shepherd, 2005) and the theoretical model of RBV and DCV as firm behaviour (Barney, 1991; Teece, 2007), we identify the influence of demographic human resources and capabilities and psychographic human resources and capabilities on firm performance. This relationship suggests that higher than average psychographic human resources of the firm members is dependent on the degree to which the firm can use all of the firm members' demographic human resources selected by the firm (Han et al., 2014). We also verified a mediation from demographic human resources to firm performance, by psychographic human resources. This mediation suggests that a firm's decision makers and managers may use and mobilise resources and capabilities they obtain from their critical demographic human capital to translate them into psychographic features that lead to high firm performance. By weaving human capital theory, the RBV and the DCV literature, our findings extend prior meta-analytic findings.

Practical implications

The implications of these findings are highly relevant to policy makers and to the decision making process of related agencies in the micro-firm context. This is because

demographic and psychographic factors in the context of micro-firm activity have been confirmed to have an influence on an individual, group and society. These findings also improve the understanding of NGOs and donors about the extent to which demographic and psychographic factors influence firm performance in the micro-firm context. Wrong specification of measurement models have significant impact on research outcome and may even mislead policy setting (Khan, & Quaddus, 2015). Similarly, the observed relationship between human capital factors and firm performance offer some practical implications for policy makers and relevant agencies. They may design specific micro-firm-based vocational and technical education programmes to improve the condition of micro-firm-level demographic factors. Further, the local governments and NGOs may arrange regular fortnightly or monthly meetings by inviting local micro-firms as well as other professional bodies (e.g., suppliers, banks, instructors). This interactive meeting would create scope for exchanging and sharing of ideas and information among external parties and provide opportunities. This, in turn, will lead to nurturing more psychographic features of micro-firms.

Limitations and future research suggestion

While this study makes a substantial contribution by studying miro-firm in the context of a developing country, and its analysis of the effects of a range of human capital variables, and its consequences for micro-firm performance, it has some limitations. First, this study was conducted within the specific domain of the micro-firm under study (i.e. restaurant) and in one country. Thus, there may exist some variation in the applicability of the components and consequences in areas such as agriculture, and manufacturing. Replication in other contexts would increase confidence in the research model. Second, the sample only represents micro-firm from an Asian developing country (i.e. Bangladesh). Therefore, there is a limitation regarding the generalisability of findings to other micro-firms in other developing countries. Future research would benefit from international data collection and analysis. Third, data were collected under a cross-sectional design, so the study contains typical limitations associated with this kind of research methodology. Future research would benefit from longitudinal research designs.

Appendix A: Dimension and variables supported by field study

Constructs and Variables	Field study participants														Supported by literature
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
Demographic (DE)															
-relevant or other work experience	✓		✓	✓	✓	✓	✓		✓			✓	✓		✓
-relevant or other skills	✓	✓	✓				✓								✓
-explicit knowledge or education level	✓	✓	✓	✓	✓			✓			✓		✓	✓	✓
-age or maturity level					✓			✓							✓
Psychographic (PS)															
-tacit knowledge	✓	✓	✓	✓		✓			✓						✓
-extraordinary commitment	✓							✓							✓
-voluntary labour	✓	✓		✓					✓				✓		✓
Firm Performance (FP)															
-sales growth	✓	✓		✓			✓		✓			✓			✓
-income stability	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓			✓
-profitability	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓			✓

Notes: √ symbol indicates the field study participants response in corresponding factors/items.

Appendix B: Causal linkages among the dimensions-explored from the quantitative analysis

Linkages	Field study participants														Supported by literature
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
Demographic → Firm Performance	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
Psychographic → Firm Performance	✓	✓	✓	✓		✓		✓	✓						✓
Demographic → Psychographic	✓	✓	✓	✓		✓		✓	✓				✓		✓

Notes: √ symbol indicates the field study participants response in corresponding links.

Appendix C: Measurement items

Constructs	Items		References
		Following attributes add value to our business.	Coleman (2007), Field study
Demographic (DE)	DE1	Relevant or other work experiences of micro-firm members.	
	DE2	Relevant or other skills of micro-firm members.	
	DE3	Explicit knowledge or education level of micro-firm members.	
	DE4	Age or maturity level of micro-firm members.	
Psychographic (PS)		The following features add value to our business.	Sirmon and Hitt (2003), Field study
	PS1	Tacit knowledge of micro-firm members.	
	PS2	Extraordinary commitment of the micro-firm members.	
	PS3	Voluntary labour provided by the micro-firm members.	
Firm Performance (FP)		Our "business's" economic performance is at an acceptable level in terms of …	Gatersleben and Vlek, (1998), Field study
	FP1	sales growth.	
	FP2	income stability.	
	FP3	profitability.	

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