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Mediating Role of Board of Directors' Functions Between Intellectual Capital Components and Overall Firm Performance in Iranian High IC Firms

Majid Jamshidy, Saudah Sofian, Norkhairul Hafiz Bajuri,
Mohammad Rahmani Karchegani and Bahaedin Mousavi

Department of Accounting and Finance, Faculty of Management, Universiti Teknologi Malaysia (UTM),
Jalan Iman, Skudai, 81300, Johor Bahru, Malaysia

Abstract: The main purpose of this investigation was to examine the relationships among Intellectual Capital (IC) factors, Board of Directors' Functions (BoDF) and Overall Firm Performance (OFP). Moreover, the role of BoDF as a mediator in the development of OFP (includes non-financial and financial performance) as the dependent variable also was investigated. In this study, six research questions and twelve hypotheses were surveyed. The population of this study was top management. A questionnaire containing 84 questions with a likert-type scale from 1 (strongly disagree) to 5 (strongly agree) was used as the vital instrument in gathering data and a total of 314 respondents were involved in the survey. This study utilized the survey method to describe IC components, BoDF factors which are the determinants for OFP and propose that all these factors would contribute to better performance in practice. The collected data were analyzed by using descriptive statistics and inferential analysis through the SEM and SPSS. As an analytical method, structural equation modeling was selected using AMOS 20.0 version. The outcomes of this study recognized the mediating role of board of directors functions in the relationship between IC factors [including of Human Capital (HC), Structural Capital (SC), Relational Capital (RC) and Spiritual Capital (SpC)] and OFP. However, the results of the SEM analysis also exposed that "board of directors functions" do not have a significant role between SpC and OFP. The results also showed that RC and SC, respectively have directly the highest contribution toward the prediction of BoDF and OFP, while HC and SpC were the second and third predictors, respectively. From an academic point of view, the results of this study, especially its mediating relationship helps scholars understand the processes further which might be supportive in discovering further mediator at different levels of analysis.

Key words: Intellectual capital, human capital, relational capital, structural capital, spiritual capital, corporate governance, board of directors, firm performance

INTRODUCTION

These days in various countries, including Iran, managers are excited to create intellectual capital management systems in firms with the goal of taking competitive advantages for their firms of its useful results. In general, most companies are governed, directed and controlled by the Board of Directors (BoD). The BoD is recognized as an agent for the stockholders to govern the firms who are answerable and accountable for the corporate performance (Collin, 2008). They are also the essential components of the firm corporate mechanism (Rezaee and Riley, 2009). Effective BoD reduces costs in production of Intellectual Capital (IC) and ensures to publish the best practices working in firm and enables firms to solve their problems.

Thus, board of directors for undertaking a variety of BoDF requires bringing some abilities to the board like experiences and expertise (Lester, 2003) that is called Intellectual Capital (IC) components. Gan and Saleh (2008) described many elements of HC in which loyalty as a base of fiduciary board function (Recalde, 2011) is one of them. What does the board of directors as gatekeeper need for doing an effectual function? Kosnik (1987) stated in new era, they should stimulate and upgrade their abilities in order to be as an effective board. Therefore, intellectual capital components can play the significant role for enforcement of board of directors. This kind of board as a vigilant and effectual board can perform important functions for ensuring the interest of shareholders, quality, integrity and reliability of business affairs and financial report (Rezaee and Riley, 2009). Furthermore, in line with their position, they have to be intellectual and power board (Wolf, 2007) to identify and evaluate some policies, procedures and practices in the firm (Rezaee and Riley, 2009).

Corresponding Author: Majid Jamshidy, Department of Accounting and Finance, Faculty of Management,
Universiti Teknologi Malaysia (UTM), Jalan Iman, Skudai, 81300, Johor Bahru, Malaysia

On the other word, board of directors for carrying out its functions need some abilities (Wolf, 2007), so that its effectiveness is largely depended on these capabilities which are recognized as intellectual capital. As such, they are expected to distinguish what is the best in long and short term for the firm and their shareholders as well as other stakeholders because they are identified as the final fiduciary for the interests of shareholders with social responsibility (Ward, 2003). Thus, the success of a firm is determined by an effective and professional board style as the key component of CG (Jamshidy *et al.*, 2014). In this sense, their unique and exceptional skills and experiences are the most important factors that help to shareholders to recognize and elect the appropriate members for playing function as a board member. Obviously, members of a board have different IC and knowledge but it is vital and important that any member in order to be active, try to use the skills, knowledge and experience of other members (Housing, 2002).

Despite the growing investigation and realization on the issues concerning OFP, this includes CG, BoDF and IC literature (Petrovic, 2008) which debates the effect of IC in BoDF as a significant factor of corporate governance in linking to OFP remains scant (Kalyta, 2011; Lester, 2003; Nadler *et al.*, 2006; Nicholson and Kiel, 2004a; Nicholson and Kiel, 2003) especially in the context of high IC firms in developing and conservative economies like Iran. Mobasheri (2010) indicated that most Iranian studies concerning IC merely provide a listing about the location of the Iranian firms relative to international terms but very few studies have actually utilized some measures of reporting and managing the IC. Therefore, lack of empirical study in Iranian firms affects the generalization of the findings. Contemporary literature discussing IC reports that Iranian high IC firms highly under explored. Thus, this study intends to fill this knowledge gap by examining the influence of IC and its components on OFP through the mediating functions of the board of directors in the Iranian high IC firms. The issues related to the proposed relationships, which this study intends to examine are discussed next. Due to lack of enough experience in the field of IC in many firms, shareholders must understand the problems when selecting and appointing BoD systems in their firm based on intellectual capital board.

BOARD OF DIRECTORS' FUNCTIONS

A board of directors that is often simply called as "the board" is a body of corporate governance who are elected or reelected by shareholders (Rezaee, 2010). Generally, shareholders delegate their power to business managers by election of the board of directors as mediators (Page, 2005). They are the linkage between capital providers and a group of managers that employ those capitals with the aim of create value (Jamshidy *et al.*, 2014). Board of directors are recognized as important bodies of human resources and key component of Corporate Governance (CG) and perform certain functions to the OFP (Rezaee, 2002a). Figure 1 shows the corporate structure that the BoD as a formal representative of shareholders is recognized as their trustees in the firm (Kosnik, 1987; Monks and Minow, 2008; Network, 2011; Rezaee, 2002a). Although, there is not an ideal and perfect answer to what is the appropriate function of the Board of Directors (BoDF) but the overall legal responsibility and different functions of the board are legislated and determined by the corporate charter and general meeting of shareholder that is based on the corporate law of countries and approval of shareholders (Kaen, 2003; Lester, 2003). In general, BoD is appointed who jointly supervise the different activities of a firm. In
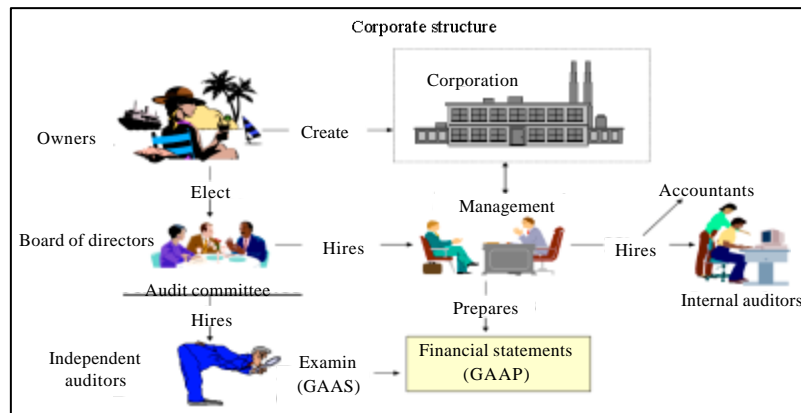

Fig. 1: Corporate structure (Rezaee, 2010)

other words, the main and central function of the board of directors is responsible for managing and directing the activities of the firm in the best interests of the shareholders, whose capitals are consigned to the care of corporate directors (Carver and Oliver, 2002; Rezaee, 2002b). While the various BoDF described by different authors that are more repeated by some scholars, the first and preeminent function of the board of directors as the agent of the owner is monitoring management. To put a great point on it, the first function as the supervisory body, aggressively questioning, challenging and supervising management are stated by Nadler *et al.* (2006) as monitoring or controlling function. This function is considered as a necessary task to separate ownership from (management) control (Nicholson and Kiel, 2004a). In addition, Hillman and Dalzie (2003), Monks and Minow (2008) and Rezaee (2002a) believe that the monitoring, controlling and overseeing managers is one of the most important of BoDF on behalf of shareholders' interests of shareholders.

The second function is strategy formulation. Based on the management literature, this important function is described by Tricker (2009) as the process of producing and assessing different instructions for use in the firm that can get better results and performance according to the policies and aims (Hendry and Kiel, 2004; Hendry *et al.*, 2010; Pearce and Zahra, 1991; Tricker, 2009). The board must have the ability to think strategically with enough knowledge about the strategic environmental condition, market, customers, products, service and their company's competitors. This kind of capability of the board can help them who play important roles in making a suitable decision and policy making. Policies are made and determined by the board of directors and some of them can be developed and implemented through the CEO and top management of the company (Tricker, 2009).

Although, board of directors as agents of shareholders is generally not involved in daily actions within the company (Monks and Minow, 2008; Rezaee, 2002a) but the CEO establishes a link between the board and management for implementing determined directions and decisions of the company (Tricker, 2009). In this regard, any relationship between the board and business performance will be mediated through an effective CEO/management team. The CEO as an informed person plays an important role in running the firm and he/she is considered as a bridge between the firm and the board of directors (Nicholson and Kiel, 2004b). Moreover, some functions and responsibilities' delegate to CEO and senior managers for implementing (Mallin, 2007; Rezaee and Richard, 2009). Therefore, selecting and appointing a CEO with high qualification is another important function of the board.

According to the resource dependence theory, providing access to different resources including access to information, finances and power is another important function of the board (Nicholson and Kiel, 2004a; Nicholson and Kiel, 2004b). This function as forth BoDF can influence the performance of the firm. According to the resource-based view (Barney, 2000), the board of directors is seen as a potentially central human resource for the firm that especially play a vital role between the firm and different resources (Hillman *et al.*, 2000; Kiel and Nicholson, 2003) such as physical, financial and Intellectual Capital (IC).

It would be interesting to assess the effects of the IC elements on providing advice to management function of the board and corporate performance because most organizations these days face complexity. Hence, CEO and senior managers need to be as the management team. To address this issue, advising function of the board as one more BoDF plays a significant role in helping management of the firm (Tricker, 2009). These tips and point's advice of the board of directors can positively help and promote CEO and senior management for doing better functions. If the advice offers as an honest recommendation, it can accept without making the CEO feel guarded (Nadler *et al.*, 2006). In general, it can be expected that effective CEO/management team will result in an efficient corporate performance. Correspondingly, CEO like board of directors is an important organizational entity as CEO is a carrier of responsibilities delegated upon him/her by the board in making decisions and running the affairs of the firm (Mallin, 2007; Ong and Lee, 2000).

Retrospectively, CEO supplies information in facilitating decisions in the boardroom; this implies that CEO plays more than a mediating role between board of directors and firm managers and employees. This suggests that strong integration amid CEO and board of directors influence the OFP through consented decisions (Adams and Ferreira, 2007; Adams *et al.*, 2010). Thus, selection of CEO has turned to a significant board function in recent years in addition to four keyboard functions (advice and counsel, strategizing, monitor and control and access to resources) proposed by Nicholson and Kiel (2004a, b).

Several studies on the other hand, report that monitoring and advising functions of the board at times to produce conflicts with CEO as she/he does not like to be monitored and advised all the times (Adams and Ferreira, 2007) which necessitate on the part of the firm to enhance the application of components of IC, particularly SpC to create a friendly environment for the board room in communicating with CEO and other members of the organization for a firm to enhance performance (Adams and Ferreira, 2007).

On the other hand, weak board may remove the effect of management on productivity, decrease business performance and vice versa. When a firm has an effective board and an inefficient management team, this situation led to the most complex interaction (Nicholson and Kiel, 2004b). Hence, the board should be the main source of knowledge and experience for selecting and advising CEO and senior managers of the company (Nicholson and Kiel, 2004a).

Generally, various BoDF are more repeated and identified by many authors and scholars that are summarized, mentioned and discussed in this study. As a whole, four functions (monitor and control, accesses to resources, advice and counsel and strategizing) identified by Nicholson and Kiel (2004a) and Nicholson and Newton (2010) are considered the most common functions of the board. Besides these functions, selection CEO is also identified as a fifth important function of the board (Eisenberg, 1969; Monks and Minow, 2008).

INTELLECTUAL CAPITAL

IC in last decade has been recognized as a decisive resource for firms to perform and acquire competitive advantage (Choo and Bontis, 2002; Kong and Thomson, 2009; Stewart, 1997; Sullivan, 1998). Several scholars have evaluated the role of the IC in connection to OFP and value creation capabilities of the firm (Edvinsson and Malone, 1997; Roos *et al.*, 1998; Sullivan, 1998; Sveiby, 1997) and the phenomenon of IC has now been recognized a worthy idiom in both theoretical and empirical research (Maditinos *et al.*, 2010) even in the presence of conflicting findings.

Literature indicates that IC comprises of three components; HC, SC, RC or customer capital (Bontis, 1998; Bontis, 2003; Cabrita and Bontis, 2008; Seleim *et al.*, 2007; Stewart, 1997), however, Ismail (2005) in his thesis extended the model of IC to include SpC. All four components of IC are referred in literature as significant predictors of performance, for instance, Seleim *et al.* (2007) examined the impact of HC on OFP in 38 software firms as high IC firm in Egypt and reported the positive impact of HC on OFP. According to Bontis *et al.* (2000) and Seleim *et al.* (2007), HC is acknowledged as the largest and most significant intangible asset, because it ultimately provides goods or services for the customers or resolves their issues. In addition to three components of IC, Zohar and Marshall (2004) asserted that SpC is another component of IC, as inspirit aptitude with great ideas is significant for the firms to acquire the opportunity and competitive advantage and is very relevant to the context of underdeveloped and developing economies.

They contended that SpC takes the broadening of capital as it is associated to wealth, profit and power and it also transcends the usual notion of capital altogether (Zohar and Marshall, 2004). Correspondingly, Ismail (2005) averred that SpC is a new component of IC and is positively linked to various dimensions of performance; this includes operating efficiency, OFP and organizational leadership.

However, Stewart (1997) stated that SC is the "knowledge that does not go home at night" is the know how that is incorporated into processes and intellectual property. Consequently from his point of view, SC is more important than the HC and as such should be in the spotlight as it belongs to the firm as a whole. Whereas, Wang and Chang (2005) argued that OFP does not depend only on any single component of IC though HC has a weighted influence on OFP (Nicholson and Kiel, 2004a; Shih *et al.*, 2011).

Wu *et al.* (2012) examined the effect of IC on OFP in listed Taiwan IC design firms. The results of their study certified that OFP is positive and significantly influenced by IC and CG. Likewise, Hillman and Dalziel (2003) developed an integrated model of board functions which by providing resources and performing monitoring functions, also links board capital as the mediator of the OFP. Despite their attempt, which links board capital and two other functions to performance, researchers treated board capital only as a general term and did not examine the effects of the components of IC on the access to resources and monitoring functions which strategically are related to OFP. Moreover, they used OFP as a common term instead of categorizing the concept of performance. Nicholson and Kiel (2004a, b) argue that study on CG till to date is concentrated on one or a few functions of the board for instance; monitoring management on behalf of shareholders and providing resources to the firms and board functions have not been examined in full in one model (Hillman and Dalziel, 2003). Nicholson and Kiel (2007) on the other hand examined the relationships between BoDF and OFP using three theories of CG (agency theory, stewardship theory and resource dependence theory). This implies that action on the advice of a single theory separated from the others cannot be considered by practitioners (Nicholson and Kiel, 2004a, b). To address this issue, they proposed a model of board effectiveness, which uses structures of the board intellectual capital. They interestingly deployed main theories of CG to examine how OFP is influenced by the BoD. They finally asserted that performance of the board of directors can be enhanced by evaluating their IC (Nicholson and Kiel, 2004b). Ismail (2005), one year later pointed out that Nicholson and Kiel (2004b) did not

include SpC as a component of IC in their model, which influence the atmosphere of the firm and also a strong predictor of OFP.

HYPOTHESES AND HYPOTHESIZED (MEDIATION) MODEL

This study attempts to test the relationships among IC factors and BoDF. In addition, the role of BoDF processes as the mediator in the development of OFP are investigated. Subsequently, this study tries to answer the following research questions:

- Is there a significant relationship between IC components (HC, SC, RC and SpC) and OFP?
- Is there a significant relationship between IC components (HC, SC, RC and SpC) and BoDF?

- Do board of directors' functions play a significant and positive role between IC components (HC, SC, RC and SpC) and OFP?
- Is there a significant relationship between BoDF and OFP?
- Which of the IC components has the most effect on the OFP?
- Which of the IC elements has most effect on BoDF in Iranian high IC firms?

The hypotheses of this study originate from the theoretical statements made in the literature on BoDF. These hypotheses are offered through the subsequent variables in Table 1.

Based on the understanding evidence from literature and the aforementioned hypotheses, the conceptual framework of the study is shown in Fig. 2.

Table 1: Research hypotheses

| Items	Hypotheses
Ha1	Positive and significant relationship between HC and OFP
Ha2	Positive and significant relationship between SC and OFP
Ha3	Positive and significant relationship between RC and OFP
Ha4	Positive and significant relationship between SpC and OFP
Hb1	HC has a positive effect on the Board of director's functions
Hb2	SC has a positive effect on the Board of director's functions
Hb3	RC has a positive effect on the Board of director's functions
Hb4	SpC has a positive effect on the Board of director's function
Hc1	Board of directors' functions as the mediator plays the significant and positive role between HC and OFP
Hc2	Board of directors' functions as the mediator plays the significant and positive role between SC and OFP
Hc3	Board of directors' functions as the mediator plays the significant and positive role between RC and OFP
Hc4	Board of directors' functions as the mediator plays the significant and positive role between SpC and OFP
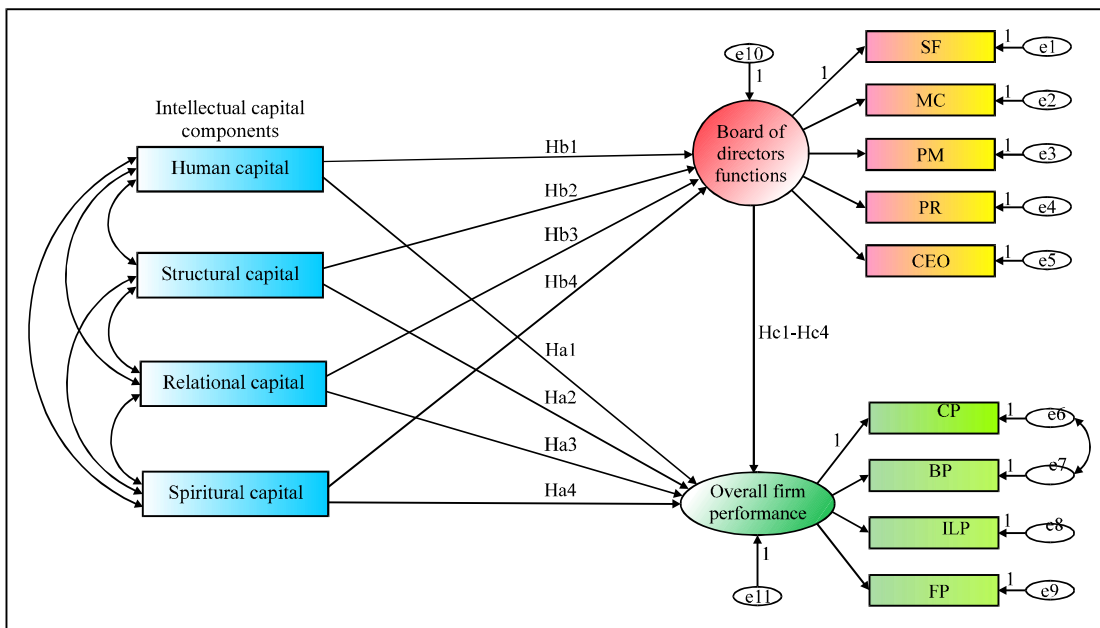
Fig. 2: Conceptual framework of the study based on the research hypotheses

METHODOLOGY

Population and data collection: Target population is defined as a group of people, events or things of interest that a researcher wishes to investigate (Sekaran, 2003). The population of this study was top management. Firms that contain high IC value are named and considered as high IC firms (Usoff *et al.*, 2002). Hence, the majority profits of these kinds of firms are depending on their knowledge (Edvinsson and Sullivan, 1996).

According to literature classification, a total 314 firms have been identified from two sources; Tehran Stock Exchange (TSE) and Industrial Management Institute (IMI) (dependent to Ministry of Industry and Trade). IMI based on some indices such as the amount of firm's sales, introduces big and top Iranian firms in the years. In 2013, four hundred firms were selected as top and big Iranian firms. From among the introduced firms, those that were coincident with definition of high IC firms are identified and totally divided to eight groups based on their nature of operations (banking, financing and leasing, investment and finance, insurance and retirement, consulting, computer software, media companies and chemical and pharmaceutical products firms) as the target population of this study in 2013 that it employs census (IMI, 2013a-d; Tehran Stock Exchange, 2013).

The unit of analysis was members of top management teams from these firms asked to participate in the survey and the questionnaires were distributed to all mentioned firms. For the first step, the investigator obtained agreements from the top management of the participating high IC firms through the contacts with the central firm. Then, the questionnaires were sent to all the population members. Since, intellectual capital was an interesting issue for many of the top managers of the Iranian high IC firm; they cooperated well in the distribution and collection of the questionnaires. Accordingly, a total of 212 questionnaires were returned (212/314 = 68%) and 6 of them were not acceptable. Since 6 questionnaires had been missing answering more than 5% of whole items, those questionnaires refused. Finally, only data of 206 Iranian high IC firms (206/314 = 65%) were acceptable as participants of this study for analysis. A questionnaire encompassing 84 questions with a likert-scale from strongly disagree (1) to strongly agree (5) was used as the key instrument in collecting data.

Measures: All research variables and their instruments come from literature review and previous researches. However, the "SpC" as a fourth component of IC just grew up Ismail (2005). The driving with creating this questionnaire is with measurement weighing scales which are endorsed through earlier analysis. A guiding rule with the purpose of development, the survey questionnaire is usage of measurement scales that have been validated by previous study. In general, it is better to apply variables and measures from former investigation when available, rather than developing original ones (Naghavi *et al.*, 2014). Existing variables have already been empirically experienced and it is possible to determine their empirical validity and stability of variables in different samples and their influence on the dependent variables.

There are a number of methods to establish construct validity. Factor analysis is a complex statistical technique which is conducted for various purposes, one of which is to evaluate the construct validity of a test or a number of tests. Confirmatory Factor Analysis (CFA) is a more complex approach that tests the hypothesis that the items are associated with specific factors (Polit and Beck, 2012). The CFA uses Structural Equation Modeling (SEM) to test a measurement model whereby loading on the factors allows for evaluation of relationships between observed variables and unobserved variables (Polit and Beck, 2012). The SEM approaches can accommodate measurement error and are less restrictive than least-squares estimation (Polit and Beck, 2012). Hypothesized models are tested against actual data and the analysis would demonstrate loadings of observed variables on the latent variables (factors) as well as the correlation between the latent variables (Polit and Beck, 2012). In addition, as an analytical method, SEM was selected using Amos 20 version.

Testing for mediation: In this study, the mediating role of BoDF on the relationship between IC and OFP was examined. There are three main types of simple mediation; (1) Partial, (2) Full and (3) Indirect. The Fig. 3 illustrates these types of mediation.

Partial mediation means that both the direct and indirect effects from the IV to DV are significant. Full mediation means that the direct effect drops out of significance when the mediator is added and that the indirect effect is significant. Indirect effect means that the direct effect never was significant but that the indirect effect is (Hair *et al.*, 2009).

Mathieu and Taylor (2006) and Naghavi *et al.* (2014) approach in the relationship X–>M–>Y address "a hypothesis of full mediation is predicted on a significant total X–>Y (βyx) relationship." Accordingly, Fig. 4 shows decision tree for evidence supporting different
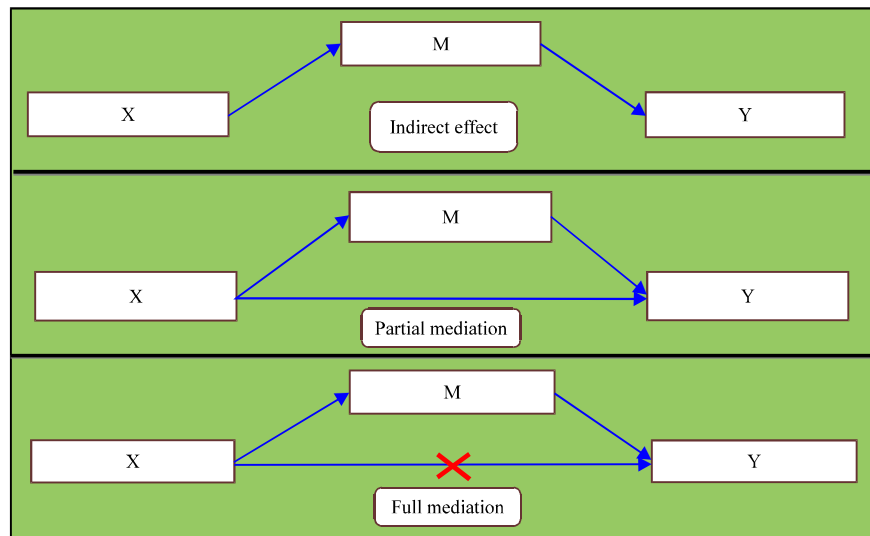
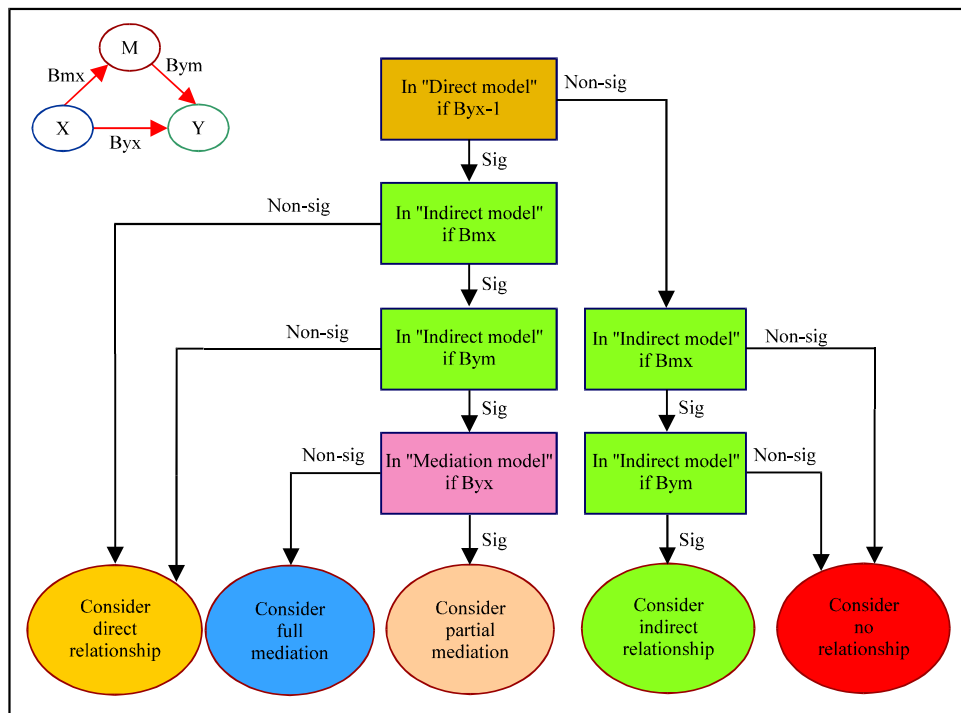Fig. 3: Indirect effect, partial and full mediation

Fig. 4: Decision tree for evidence supporting different intervening effects (Adopted by Mathieu and Taylor, 2006; Naghavi *et al.*, 2014)

intervening effects. Further, the results of significance of the indirect effects can be analysed by using the bootstrap procedure in AMOS software.

On the other hand, Mathieu and Taylor (2006) mentioned when the βmx and βym are significant and "if neither $\beta yx.m$ or $\beta ym.x$ are significant and the previous condition were satisfied then the data are consistent with the hypothesis of full mediation". Whereas, in partial mediation hypothesis all three paths: $X \rightarrow M$ (βmx) and both $X \rightarrow Y$ ($\beta yx.m$) and $M \rightarrow Y$ ($\beta ym.x$) are significant when considered simultaneously (Mathieu and Taylor, 2006). Furthermore, in the relationship $X \rightarrow M \rightarrow Y$, failing in the full mediation role, one might consider an alternative hypothesis of an indirect effect. On the other when the

βmx and βym are significant, βyx is not significant and if neither βyx.m or βym.x are significant (Mathieu and Taylor, 2006) then the data are consistent with the hypothesis of indirect effects.

RESULTS

Confirmatory Factors Analysis (CFA) and structural model: The CFA is used as a statistical technique to explore the relationships between the observed variables and the constructs which were also called latent variables (Byrne, 2009). Here separate CFA were conducted for all of the latent variables, including IC components, BoDF and OFP. The overall fit of a measurement model is determined by confirmatory factor's analysis (Ho, 2006). The measurement model focuses on the linear functions between latent variables and their indicators in the model. The relationship between exogenous and endogenous variables are examined by structural model (Byrne, 2009). It reveals a path analysis process with latent constructs to examine the mediation, direct and indirect structural relationship between variables.

In this study, the structural model evaluates the relationship between: Four intellectual capital predictor variables include HC, SC, RC and SpC and BoDF as the mediator variable such as Sterategy Formulation (SF), monitoring and Controlling Management (MC), Providing advice to Management (PM), Providing access to Resources (PR) and CEO selection (CEO) and Overall Firm Perormance (OFP) includes Customer Perspective (CP), Internal Business Process Perspective (BP), Innovation and Learning Perspective (ILP) as non financial performance and Financial Perspective (FP) as the dependent variable.

Additionally, the model fit of path analysis was evaluated by examining the Root Mean square Residual (RMR), Goodness of Fit Index (GFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) (Byrne, 2009; Hair *et al.*, 2009; Ho, 2006). Figure 5 and Table 2 present the fit indices for mediation model. So that all of the fit indices including of CFI, GFI, AGFI, RMR, IFI and TLI are above 0.90. Based on shown results for mediation path model, these indexes are acceptable and statistically significant. Accordingly, the

Table 2: Parameters of the models of IC components, BoDF and OFP

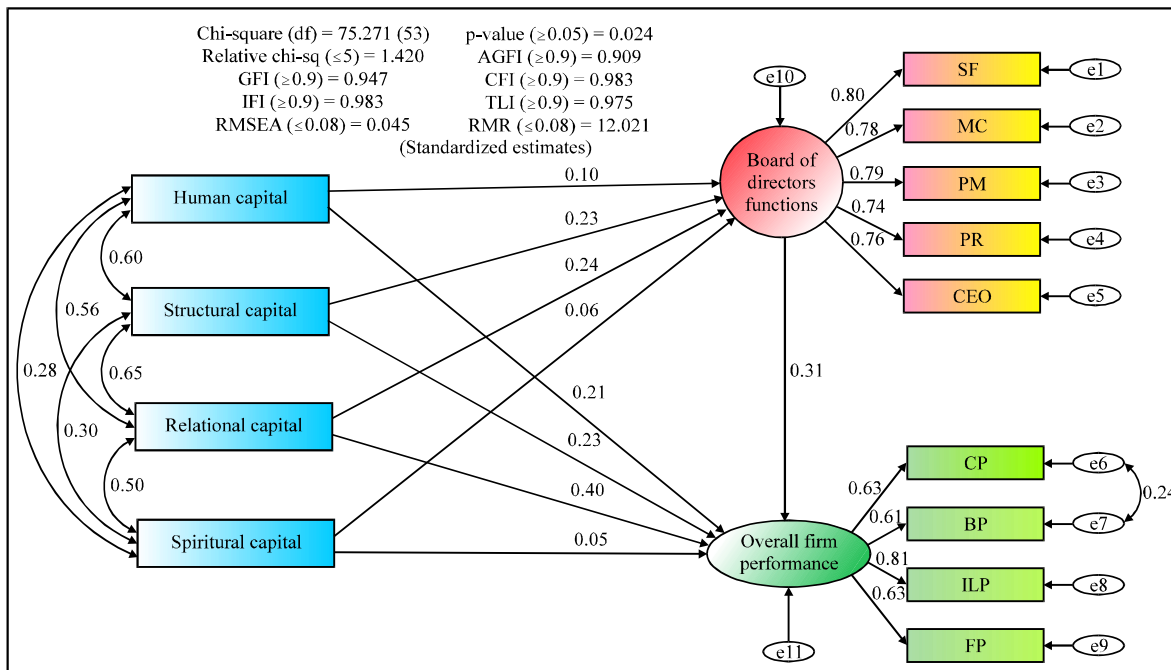| Model	NPAR	CMIN	DF	p	CMIN/DF	RMR	GFI	AGFI	IFI (Delta2)	TLI (rho2)	CFI	RMSEA
Mediation model	38	75.271	53	0.024	1.420	12.021	0.947	0.909	0.983	0.975	0.983	0.045
Saturated model	91	0.000	0	-	-	0.000	1.000	-	1.000	-	1.000	-
Independence model	13	1392.496	78	0.000	17.853	113.719	0.297	0.179	0.000	0.000	0.000	0.278

Fig. 5: Mediation effect of BoDF in the relationship between IC components and OFP

RMSEA as the most important index is 0.045 suggest that the fit of the model is adequate. These values indicate the improvement in the fit of a model relative to the null model (Ho, 2006).

Hypotheses testing: Based on the research framework in order to access the research objectives and answer the research questions, some suitable statistical tests are used to consider the relationships between the independent, mediation and dependent variables. To examine the bivariate relationship between the research variables, the Person correlation coefficients are measured. The magnitude of coefficients reveals the strength of relationship and the value closer to +1 or -1 indicates the strong relationship. The sign of correlation coefficients determines a direction of the correlation. Moreover, for test, the mediating effects between the independent and dependent variables, a statistical method as Sobel's test is applied. It explores the mediation effect by using 4 steps. Accordingly, this study tests 12 research hypotheses. Each research question was related to one or a set of hypotheses and the researcher has used the structural model (Fig. 5). The hypothesized research model was tested using Maximum Likelihood (ML) estimation. The standard regression weights of the mediation, direct and indirect model for testing the study's hypotheses are presented in Table 3.

The research questions with related hypotheses were examined through p-value at the level of 0.01. Results are presented as follows:

Research question 1: Is there a significant relationship between IC components (HC, SC, RC and SpC) and OFP? The hypotheses; Ha1, Ha2, Ha3 and Ha4 are related to this question.

Ha1: There is a positive and significant relationship between human capital and overall firm performance: An appropriate statistical method as Pearson's correlation was applied to address the relationship between HC and OFP. According to the results of the Pearson correlation test (Table 4), there is a statistically positive significant relationship between HC and OFP ($r = 0.597$, $p<0.05$). The results of the analysis clear that the higher level of HC is linked to the higher level of OFP and vice versa. In other words, firms in the category of high HC displayed a better OFP. So, H_0 is rejected and hypothesis is accepted.

Ha2: There is a positive and significant relationship between structural capital and overall firm performance: According to the results of the Pearson correlation test (Table 4), there is a statistically positive significant relationship between SC and OFP ($r = 0.667$, $p<0.05$). The results of the analysis clear that the higher level of SC is linked to the higher level of OFP and vice versa. In other words, firms in the category of high SC displayed better OFP. So, H_0 is rejected and hypothesis is accepted.

Ha3: There is a positive and significant relationship between relational capital and overall firm performance: Based on the results of the pearson correlation test (Table 4) there is a statistically positive significant relationship between RC and OFP ($r = 0.726$, $p<0.05$). The results of the analysis clear that the higher level of SC is linked to the higher level of OFP and vice versa. In other words, firms in the category of high RC displayed better OFP. So, H_0 is rejected and hypothesis is accepted.

Ha4: There is a positive and significant relationship between spiritual capital and overall firm performance: The results of the pearson correlation test (Table 4) show that there is a statistically positive significant relationship between SpC and OFP ($r = 0.396$, $p<0.05$). The results of the analysis clear that the higher level of SpC is linked to the higher level of OFP and vice versa. In other words, firms in the category of high SpC displayed better OFP. So, H_0 is rejected and hypothesis is accepted.

Research question 2: Is there a significant relationship between IC components (HC, SC, RC and SpC) and BoDF? The hypotheses allied to this question are Hb1, Hb2, Hb3 and Hb4.

Table 3: Standardized regression weights in the models

SEM model of IC components, BoDF and OFP

DV		IV	Mediation model		Indirect model		Direct model	
			β	p	β	p	β	p
BoDF.	←	HC	0.10	0.196	0.13	0.102	-	-
BoDF.	←	SC	0.23	0.021	0.25	0.006	-	-
BoDF.	←	RC	0.24	0.022	0.29	0.004	-	-
BoDF.	←	SpC	0.06	0.44	0.06	0.383	-	-
Firm. performance	←	BoDF	0.31	0.001	0.8	0.001	-	-
Firm. performance	←	HC	0.21	0.002	-	-	0.25	0.002
Firm. performance	←	SC	0.23	0.004	-	-	0.30	0.004
Firm. performance	←	RC	0.40	0.002	-	-	0.46	0.002
Firm. performance	←	SpC	0.05	0.278	-	-	0.08	0.196

DV: Dependent variable, IV: Independent variable, β: Estimate of standardized regression weight, p: p-value

Table 4: Correlations

Correlation	HC	SC	RC	SpC	BoDF	OFP
Human capital (HC)						
Pearson correlation	1					
Sig. (2-tailed)						
N	206					
Structural capital (SC)						
Pearson correlation	0.602**	1				
Sig. (2-tailed)	0.000					
N	206	206				
Relational capital (RC)						
Pearson correlation	0.559**	0.654**	1			
Sig. (2-tailed)	0.000	0.000				
N	206	206	206			
Spiritual capita (SpC)						
Pearson correlation	0.282**	0.301**	0.497**	1		
Sig. (2-tailed)	0.000	0.000	0.000			
N	206	206	206	206		
Board of directors functions (BoDF)						
Pearson correlation	0.376**	0.447**	0.456**	0.266**	1	
Sig. (2-tailed)	0.000	0.000	0.000	0.000		
N	206	206	206	206	206	
Overall firm performance (OFP)						
Pearson correlation	0.597**	0.667**	0.726**	0.396**	0.606**	1
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
N	206	206	206	206	206	206

**Correlation is significant at the 0.01 level (2-tailed), HC: Human capital, SC: Structural capital, RC: Relational capital, SpC: Spiritual capital, BoDF: Board of directors functions, OFP: Overall firm performance

Hb1: Human capital has a positive effect on the board of director's functions: As said by the results of the pearson correlation test (Table 4), there is a statistically positive significant relationship between HC and co BoDF (r = 0.376, p<0.05). The results of the analysis show that the higher level of HC is linked to the higher level of BoDF and vice versa. In other words, firms in the category of high HC displayed better BoDF. So, H_0 is rejected and hypothesis is accepted.

Hb2: Structural capital has a positive effect on the board of director's functions: According to the results of the pearson correlation test (Table 4), there is a statistically positive significant relationship between SC and co BoDF (r = 0.447, p<0.05). The results of the analysis show that the higher level of SC is linked to the higher level of BoDF and vice versa. In other words, firms in the category of high SC displayed better BoDF. So, H_0 is rejected and hypothesis is accepted.

Hb3: Relational capital has a positive effect on the board of director's functions: The results of the Pearson correlation test (Table 4) show that there is a statistically positive significant relationship between RC and co BoDF (r = 0.456, p<0.05). The results of the analysis show that the higher level of RC is linked to the higher level of BoDF and vice versa. In other words, firms in the category of high RC displayed better BoDF. So, H_0 is rejected and hypothesis is accepted.

Hb4: Spiritual capital has a positive effect on the board of director's functions: An appropriate statistical method as pearson's correlation (Table 4) indicates that there is a statistically positive significant relationship between SpC and BoDF (r = 0.266, p<0.05). The results of the analysis show that the higher level of SpC is linked to the higher level of BoDF and vice versa. In other words, firms in the category of high SpC displayed better BoDF. So, H_0 is rejected and hypothesis is accepted.

Research question 3: Do board of directors' functions play a significant and positive role between IC components (HC, SC, RC and SpC) and OFP? The hypotheses associated to this question are Hc1, Hc2, Hc3 and Hc4.

Hc1: Board of directors' functions as the mediator play the significant and positive role between human capital and overall firm performance: Human Capital (HC) has a significant relationship with BoDF. Then HC is related indirectly to the OFP, being mediated by BoDF. BoDF mediate the relationship between HC and OFP. The results of Table 5 show that the direct effect of HC on the BoDF is significant (B = 0.404, SE = 0.070, t = 5.787, p = 0.000).

In statistics, the Sobel test is also used for whether a mediator variable significantly carries the influence of an independent variable to a dependent variable; i.e., whether the indirect effect of the independent variable

Table 5: Regression coefficients[a]

Model	Unstandardized coefficients		Standardized coefficients		
	B	Stdandred error	β	t	Sig.
1 (Constant)	45.444	4.119		11.033	0.000
BoDF	0.404	0.070	0.376	5.787	0.000

[a]Dependent variable: Human capital

Table 6: Regression coefficients[a]

Model	Unstandardized coefficients		Standardized coefficients		
	B	Stdandred error	β	t	Sig.
1 (Constant)	33.058	3.517		9.400	0.000
Structural capital	0.397	0.056	0.447	7.132	0.000

[a]Dependent variable: BoDF

Table 7: Regression coefficients[a]

Model	Unstandardized coefficients		Standardized coefficients		
	B	Stdandred error	β	t	Sig.
1 (Constant)	32.050	3.566		8.988	0.000
Relational capital	0.403	0.055	0.456	7.317	0.000

[a]Dependent variable: BoDF

on the dependent variable through the mediator variable is significant. It is returned to both one-tailed and two-tailed probability values (Sobel, 1982). In the other word, the Sobel test is a method of testing the significance of a mediating effect (Sobel, 1982). Thus, the results of the Sobel test statistic are: $z = 2.19836650$, p-value with one-tailed probability = 0.01396150 and Two-tailed probability = 0.0279230 and SE = 0.043 and SE = 0.046 ($z = 2.18$, SE = 0.059 and SE = 0.049, p<0.01).

Accordingly, these results prove the mediation model BoDF between HC and OFP, the relationship between the HC (HC) as the independent variable and the OFP as the dependent variable is hypothesized to be an indirect effect that exists due to the influence of the BoDF as the mediator. In the other words, when the BoDF is included in a regression analysis model with the HC, the effect of the HC is reduced and the effect of the BoDF (mediator) remains statistically significant.

Hc2: Board of directors' functions as the mediator play the significant and positive role between structural capital and overall firm performance: Structural Capital (SC) has a significant relationship with BoDF. Then SC is related indirectly to the OFP being mediated by BoDF. BoDF mediate the relationship between SC and OFP. The results of Table 6 display that the direct effect of SC on the BoDF is significant (B = 0.397, SE = 0.056, t = 7.132, p = 0.000).

In statistics, the Sobel test is also used for whether a mediator variable significantly carries the influence of an independent variable to a dependent variable; i.e., whether the indirect effect of the independent variable on

the dependent variable through the mediator variable is significant. It is returned to both one-tailed and two-tailed probability values (Sobel, 1982). In the other word, the Sobel test is a method of testing the significance of a mediating effect (Sobel, 1982). Thus, the results of the Sobel test statistic are: $z = 4.31147972$, p-value with one-tailed probability = 0.00000811 and two-tailed probability = 0.00001622 and SE = 0.041 and SE = 0.046 ($z = 4.3$, SE = 0.041 and SE = 0.046, p<0.01).

Accordingly, these results prove the mediation model BoDF between SC and OFP, the relationship between the SC as the independent variable and the OFP as the dependent variable is hypothesized to be an indirect effect that exists due to the influence of the BoDF as the mediator. In the other words, when the BoDF is included in a regression analysis model with the SC, the effect of the SC is reduced and the effect of the BoDF (mediator) remains statistically significant.

Hc3: Board of directors' functions as the mediator play the significant and positive role between relational capital and overall firm performance: Relational Capital (RC) has a significant relationship with BoDF. Then RC is related indirectly to the OFP being mediated by BoDF. BoDF mediate the relationship between RC and OFP. The results of Table 7 prove that the direct effect of RC on the BoDF is significant (B = 0.403, SE = 0.055, t = 7.317, p = 0.000).

In statistics, the Sobel test is also used for whether a mediator variable significantly carries the influence of an independent variable to a dependent variable; i.e., whether the indirect effect of the independent variable on

Table 8: Regression coefficients[a]

	Unstandardized coefficients		Standardized coefficients		
Model	B	Stdandred error	β	t	Sig.
1 (Constant)	39.112	4.726		8.276	0.000
Spiritual capital	0.287	0.073	0.266	3.934	0.000

[a]Dependent variable: BoDF

Table 9: Overall hypotheses results

Items	Hypotheses	Result
Ha1	Positive and significant relationship between HC and OFP	Supported
Ha2	Positive and significant relationship between SC and OFP	Supported
Ha3	Positive and significant relationship between RC and OFP	Supported
Ha4	Positive and significant relationship between SpC and OFP	Supported
Hb1	Human capital has a positive effect on the Board of director's functions	Supported
Hb2	Structural capital has a positive effect on the Board of director's functions	Supported
Hb3	Relational capital has a positive effect on the Board of director's functions	Supported
Hb4	Spiritual capital has a positive effect on the Board of director's functions	Supported
Hc1	Board of directors' functions as the mediator plays the significant and positive role between HC and OFP	Supported
Hc2	Board of directors' functions as the mediator plays the significant and positive role between SC and OFP	Supported
Hc3	Board of directors' functions as the mediator plays the significant and positive role between RC and OFP	Supported
Hc4	Board of directors' functions as the mediator plays the significant and positive role between SpC and OFP	Not Supported

the dependent variable through the mediator variable is significant. It is returned to both one-tailed and two-tailed probability values (Sobel, 1982). In the other word, the Sobel test is a method of testing the significance of a mediating effect (Sobel, 1982). Thus the results of the Sobel test statistic are: $z = 4.75061693$, p-value with one-tailed Probability = 0.00000101 and two-tailed probability = 0.00000203 and SE = 0.038 and SE = 0.043 ($z = 4.7$, SE = 0.038 and SE = 0.043, $p<0.01$).

Accordingly, these results prove the mediation model BoDF between RC and OFP, the relationship between the RC as the independent variable and the OFP as the dependent variable is hypothesized to be an indirect effect that exists due to the influence of the BoDF as the mediator. In the other words, when the BoDF is included in a regression analysis model with the RC, the effect of the RC is reduced and the effect of the BoDF (mediator) remains statistically significant.

Hc4: Board of directors' functions as the mediator play the significant and positive role between spiritual capital and overall firm performance: The SpC has a significant relationship with BoDF. Then SpC is related indirectly to the OFP being mediated by BoDF. BoDF mediates the relationship between SpC and OFP. The results of Table 8 display that the direct effect of SpC on the BoDF is significant ($B = 0.287$, SE = 0.073, $t = 3.934$, $p = 0.000$).

However, the results of the Sobel test statistic are: $z = 1.11437498$, p-value with one-tailed probability = 0.13255918 and two-tailed probability = 0.26511835 and SE = 0.053 and SE = 0.049 ($z = 1.11$, SE = 0.053 and SE = 0.049, $p = 0.01$). This means BoDF does not mediate the relationship beween SpC and OFP. Then, hypothesis (Hc4) is not supported.

Research question 4: Is there a significant relationship between BoDF and overall firm performance?

An appropriate statistical method as pearson's correlation (Table 5) indicates that there is a statistically positive significant relationship between BoDF and OFP ($r = 0.606$, $p<0.05$). The results of the analysis show that the higher level of BoDF is linked to the higher level of OFP and vice versa. In other words, firms in the category of high BoDF displayed better OFP. So, answer to this question definitely is yes.

Research question 5: Which of the IC components has the most effect on the OFP?

Research question 6: Which of the IC elements has most effects on BoDF in Iranian high IC firms?

The response to these two questions definitely is yes because the results of Table 5 and Fig. 3 showed that RC and SC, respectively have the highest contribution toward the prediction of BoDFand OFP while HC and SPC factors were the third and fourth predictors, respectively.

Totally, this is concluded that some IC components are related indirectly to the OFP being mediated by the BoDF. However, the SpC is not significantly related to the OFP by mediating board of directors' functions. Finally, the extracted concepts of the mediation effect of the BoDF on the relationship between IC and OFP have been shown in Table 9.

Partial mediation: According to result of Table 10, SC and RC in direct model separately have a significant relationship with OFP ($β = 0.30$, $p = 0.004$ and $β = 0.46$, $p = 0.002$, respectively) and in indirect model these variables also have a significant relationship with BoDF ($β = 0.25$, $p = 0.006$ and $β = 0.29$, $p = 0.004$, respectively),

Table 10: Test "Board of directors function" as mediator between "IC components" and "Overall firm performance"

Direct model				Indirect model				Mediation model				
IV on DV	β	p-value	Sig.	IV on DV	β	p-value	Sig.	IV on DV	β	p-value	Sig.	Result
OFP←HC	0.25	p = 0.002 p≤0.05	Yes	BoDF←HC	0.13	p = 0.102 p≤0.05	No	--	-	-	-	Direct (No mediation)
				OFP←BoDF	0.8	p = 0.001 p≤0.05	Yes					
OFP←SC	0.30	p = 0.004 p≤0.05	Yes	BoDF←SC	0.25	p = 0.006 p≤0.05	Yes	OFP←SC	0.23	p = 0.004 p≤0.05	Yes	Partial mediation
				OFP←BoDF	0.8	p = 0.001 p≤0.05	Yes					
OFP←RC	0.46	p = 0.002 p≤0.05	Yes	BoDF←RC	0.29	p = 0.004 p≤0.05	Yes	OFP←RC	0.40	p = 0.002 p≤0.05	Yes	Partial mediation
				OFP←BoDF	0.8	p = 0.001 p≤0.05	Yes					
OFP←SpC	0.08	p = 0.196 p≥0.05	No	BoDF←SpC	0.06	p = 0.383 p≥0.05	No	--	-	-	-	No relationship
				OFP←BoDF	0.8	p = 0.00 p≤0.05	Yes					(No Mediation)

Table 11: Standardized total effects in mediation model

Effects	HC	SC	RC	SpC	BoDF	OFP
Standardized total effects in mediation model of IC components, BoDF on OFP						
BoDF	0.10	0.23	0.24	0.06	0.00	0.00
OFP	0.24	0.30	0.48	0.07	0.31	0.00

Table 12: Direct, indirect and total effects of latent exogenous variables on overall firm performance

Exogenous variables	DE	IE	TE
Human capital	0.21	0.10×0.31 = 0.031	0.21+0.031 = 0.24
Structural Capital	0.23	0.23×0.31 = 0.071	0.23+0.071 = 0.30
Relational capital	0.40	0.24×0.31 = 0.075	0.40+0.075 = 0.48
Spiritual capital	0.05	0.06×0.31 = 0.018	0.05+0.018 = 0.07

DE: Direct effect, IE: Indirect effect, TE: Total effect

so in this condition, significant or no significant of βxy in mediation model determine partial mediation or full mediation, respectively. Based on result of Table 10 in mediation model SC and RC have a significant relationship with OFP (β = 0.23, p = 0.004 and β = 0.40, p = 0.002, respectively), thus partial mediation are considered.

In sum, the results of Table 10 indicate that BoDF variables partially mediate the effects of SC and RC as two components of IC on OFP. On the other hand, HC has all the condition for direct effects on OFP. Since HC in direct model has a significant relationship on OFP (β = 0.25, p = 0.002) but in indirect model HC do not have a significant relationship with BoDF (β = 0.13, p = 0.102). According to result of Table 10, the data is consistent with the hypothesis of direct effects so that direct relationship is considered and the results indicate that HC has direct influences on OFP. Then again, based on results of the direct model SpC do not have a significant relationship with OFP (β = 0.08, p = 0.196), also this variable in indirect model do not indicate a significant relationship with BoDF (β = 0.06, p = 0.383), so no relationship is considered.

Total effect of IC components, BoDF and overall firm performance: Since a total effect is defined by Hair *et al.* (2009) as the sum of direct effect and indirect effect (Total effect = Direct effect+indirect effect) so based on structural model (Fig. 5) and Standard Regression Weights in the models (Table 3), the results are tailored for reporting the direct, indirect and total effects of IC components and BoDF as latent variables on OFP in the mediation model that the summary results are shown in Table 11 and detail in Table 12.

The standardized direct (unmediated) effect of HC on OFP is large and positive (0.21). That is, due to the direct (unmediated) effect of HC on OFP, when HC goes up by 1 standard deviation, OFP goes up by 0.21 standard deviations. This is in addition to any indirect (mediated) effect that HC may have on OFP.

The standardized indirect (mediated) effect of HC on OFP is positive and small (0.031). That is, due to the indirect (mediated) effect of HC on OFP, when HC goes up by 1 standard deviation, OFP goes up by 0.031 standard deviations. This is in addition to any direct (unmediated) effect that HC may have on OFP.

Whereas the standardized total (direct and indirect) effect of HC on OFP is large and positive (0.24). That is, due to both direct (unmediated) and indirect (mediated) effects of HC on firm performance, when HC goes up by 1 standard deviation, firm performance goes up by 0.24 standard deviations. As results of Table 12 show the total (direct and indirect) effect of SC on OFP is positive and small whereas the direct effect is large and positive. The total effect is then 0.23+0.071 = 0.30. Similarly, the results of Table 12 indicate the total (direct and indirect) effect of RC on firm performance is positive whereas the direct effect is large and positive. The total effect is then 0.40+0.075 = 0.48. On the other hand, the results of Table 12 specify the indirect and direct effect of SpC on OFP is positive and small (0.05+0.018 = 0.07).

LIMITATIONS

A number of important limitations need to be considered. Firstly, the respondents in this study were limited to top-managers of Iranian high IC firms. Accordingly, the generalization of the findings is limited to similar groups within the IC field. Secondly, theoretical limitation to this study is related to social factors. IC, BoDF and OFP can be influenced by forces outside the firms, such as economic, cultural and politics. Therefore, the findings of this study cannot be generalized to other countries, although, it is believed that these principles are applicable to any situation. Thirdly, this study was limited to examining non-managerial employees' perceptions of IC and BoDF and OFP of Iranian high IC firms. The high IC firms were selected by the census from Iran. Accordingly, the generalization of the findings is limited to these Iranian firms. Fourthly, according to limitation of this study concerning to method of data collection, additional research is needed to explore the mediation role of BoDf on the relationship between the IC components and OFP dimensions based on other methods of data collection (such as interview).

CONCLUSION

In a nutshell, the findings of this study suggest that board of directors functions play a critical role in enhancing OFP. The study investigated the factors of firm performance in the Iranian high IC firms. The research framework provides evidence in support of a theoretical framework that predicts OFP. The outcomes of the structural model analysis of IC components indicated that there is only a significant direct relationship between HC and OFP, while the indirect relationship between SC and RC and OFP through the mediation effect of BoDF partially were significant. However, there is no relationship between SpC and OFP through the mediation effect of BoDF. Therefore, it could be concluded that the high IC firm in high levels of IC components (expect SpC) can be better in BoDF (Including of monitoring and controlling, strategizing (Strategy formulation), providing access to resources, providing advice to management and Chief Executive Officer (CEO) selection) and then be better in OFP than those which were in low levels of IC. Thus, accomplishment of appropriate Intellectual Capital Management (ICM) in firms is fundamental toward high board of directors functions and suitable OFP in the Iranian high IC firm.

In addition, the correlation and SEM analysis of this study showed that RC latent constructs (consists of four indicators of supporting by vendors, consideration to recommendations, supporting by stakeholders, satisfaction from distribution channels and business collaboration) practices had the highest contribution toward the prediction of OFP. Furthermore, the results showed that after RC, SC latent constructs, (consists of five indicators which include knowledge and information as basement, guidelines set database, access to the information, using of integrated mission and process improvement and innovation) had a direct and indirect significant relationship with OFP.

Moreover, the correlation and SEM analysis showed that SpC latent constructs (environmental health and conducive working environment, key values: commitment, integrity, stability and respect, share a "common belief, practice good business ethics, truth, sincere, honest and truthful and working at the best capabilities is part of the act of devotion to God) did not have an indirect (through BoDF) strong relationship with OFP. The mediating effects of BoDf variable on the relationship between SpC were not confirmed from the findings of this study. In addition, HC has the direct effect on the OFP. This could be due to spirituall capital latent construct to take into account of HC. Based on literature review of this study, SpC is just identified as fourth component of IC while the most latent construct of SpC is labeled by other authors under the HC, RC and SC. However, one should consider the fact that, based on the obtained results; BoDF mediates the effects of IC components on OFP. So, in line with the previous studies and is noted in the theory, the findings of this study have remarkable implications for both theory and practices. This study also indicates that the success of firms needs to be addressed at the mediating role of BoDF cannot be ignored. Firms and their top managers should pay attention to these important issues. The significance of the IC variable is due to the importance of this kind of capital for creating competitive advantages for the high IC firms.

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