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Moderating effect of board characteristics in the relationship of structural capital and business performance: An evidence from Pakistan textile sector

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Abstract
The curent paradigm has changed and firms are shifted towards the knowledge-based economy and hence, knowledge become a new engine for the corporate development. Structural captial (SC) is considered a vital component of the intellectual capital (IC) which plays an essential role to increase the performacne of the business in the knowledge-based economy. The aim of the research is to examined the relationship between the SC and BP through the moderating effect of board characteristics (BC) in the listed textile firms of Pakistan. Data has been collected from 290 senior managers of listed textile firms. Based on collected data, further analysis was done by Smart PLS 3.2.8 through the Structural Equation Modeling (SEM) for the measurement and strutructural model. The SEM analysis has shown SC has a significant and positive associaton with the BP in the listed textile firms of Pakistan. On the other hand, indirect effect has shown BC did not significantly moderates in the relationship of SC and BP. The findings of the current study reveals that textile firms in Paksitan should more emphasize on the SC to uphold their BP. The current study contribute in the extent literature of SC where there has a absence of reasearch works in Pakistan context. Moreover, current research might provide help to both the Practitioners and academicians in the organizations.

Key words: Structural capital, business performance, board characteristics, textile firms of Pakistan.

Introduction
In contemporary environment, business organization faces many challenges in the knowledge-based economy because of globalization. Such competition generates a need for the new tool that has a competitive advantage for the product which provides in the market. The new weapon is information that organization uses in the knowledge-based society. In this regards, Knowledge becomes new source of business development. Successful companies rely more knowledge other than tangible assets. Intangible assets are more essential for enhancing the performance of the business. It is also an awareness age of intangible asset which includes knowledge, researches, trademark, customer relation and innovation which are more important than tangible assets.

Three decades back, for the business firms, knowledge becomes the most vital strategic economic source to achieve the competitive advantage Gavious and Russ (2009). The lack of knowledge and experience is a key reason for the failure of the business (Matlay, 2005; Shepherd, Douglas, & Shanley, 2000). According to Stewart (1997) new economy stands on three pillars; awareness of

market, knowledge base assets and strategies to explain them. The current knowledgeable economy provide help that business which have a mainly focus on wealth creation over improvement, operation, and consumption of company's intangible assets or intellectual capital (Dženopoljac, Janoševic, & Bontis, 2016). The first step towards the knowledge based economy from the production economy is to, organization should be clearly known about the knowledge which is available in the organization is known as intellectual capital (IC) (Montequín, Fernández, Cabal, & Gutierrez, 2006).

Intellectual capital (IC) is very crucial in knowledge base society (Gavious & Russ, 2009). The business growth could be measured through the performance of the business which is supported by the both real and intangible assets of the business also knowing IC (Xinyu, 2014). The Economic Co-operation and Development (OECD, 2008) mentioned that most of the organizations have more investment in training and human resource development program customer relation, research and development and technology based managerial system. Such type of investment enhance the value creation of the IC as compare to physical. IC, it is elaborated by has three components (Sharabati, Naji, & Bontis, 2010) human capital (HC), structural capital (SC), and relational capital (RC).

Among the other two components, SC is a collection of knowledge within the organization which is embedded in systems, programs, and databases. With respect to other researchers, Zeghal and Maaloul (2010) defined that it is the knowledge that remains in the organization when the employees go at home. In other words, it is a knowledge which stays inside the firm (Bontis, 1998). Additionally, Stewart (1997) further added the notion that SC belongs to the organization as a whole. It is a supportive infrastructure, databases, and process of organization that helps the HC in functioning (Bontis, Chua, & Richardson, 2000). Besides, Roos and Roos (1997) well-defined that it explains the organizational capital like; innovation, process, creativity, and cultural values. Moreover, Roos, Bainbridge, and Jacobsen (2001) believed that SC represents processes, systems, brands, intellectual property rights (IPRs) and further intangibles which are maintained within the company but does not appear on its balance sheet. Likewise, Bontis, Dragonetti, Jacobsen, and Roos (1999) also stated that SC is "everything that remains in the organization and does not go in the home".

Referring on basis of previous literature and definitions on SC, the researcher found that various scholars have different views on SC divisions. For instance, Edvinsson (1997)divided the SC into organization and customer capital. Based on this distribution, organization capital was further divided into process and innovation capital. Ramírez, Santos, and Tejada (2011) more divided SC into organizational and technological capital. With respect to classification of SC, organization capital is referring to organize the knowledge which is derived from interaction within the organization to sustain organization capability. It is a non human store of knowledge in the organization (Alipour, 2012). Moreover, later on technological capital; it refers to all the technological resources in the organization (Ramírez *et al*., 2011).

Besides, customer refers to the values of relationship with the people with whom it does business such as suppliers, customer, and market (Phusavat, Comepa, Sitko-Lutek, & Ooi, 2011). Likewise, innovation capital is an ability to develop new products as well as new creative idea (Tseng & James, 2005). It refers to the explicit organization knowledge in the organization, for instance, intellectual property (business designs, patents, and trade secrets) etc. Seeking the indicator intellectual property in the SC, the creations, consumption and protection are very difficult to accomplish and also called a hard asset in the organization. Wyatt (2008) used patents as intellectual property. He was further indicated that intellectual property items are output matrices of the organizational capital. Then, Roos, Edvinsson, and Dragonetti (1997) further added that SC elements legally can be protected in the intellectual property through the investment on the research and development (R&D).

In this regards, recently with the specification of intangible assets, there are many studies investigated the concept of R&D and explored that it is a part of IC (Aboody & Lev, 1998; Amir & Lev, 1996; Fukui & Ushijima, 2007; Oswald & Zarowin, 2007) which comes under the umbrella of SC. It is considered a strategic asset which consist of non- human assets, such as intellectual property rights (IPRs), R&D and systems and programs (S&P). All of these provide help to the organization for achieve their organizational goals, objective and business performance. SC as a result is a strategic asset which is comprised of non-human assets, for instance, S&P, IPRs and R&D which provides help in enhance their BP.

Overview of the Textile Industry of Pakistan

The society welfare depends on the profitability and growth of the industry (Diaz Hermelo, 2007). Performance of firms plays an important role in the nation's economic gain (Gupta, Guha, & Krishnaswami, 2013) and in the employment of country (Arrighetti & Lasagni, 2013; Diaz Hermelo, 2007). Textile is a major sector in the export and employment generation. Any improvement in this sector profitability and growth improve the living standard of people and reducing poverty (Ahmad, Ahmed, & Shabbir, 2015). All listed firms in Pakistan Stock Exchange (PSE) are 560 and 35 sector are included in all listed companies. All of them 153 firms are related with the textile sector and after agriculture industry this is the second largest industry in Pakistan textile. related to textiles which consist of three main segments; composite, weaving and spinning. The total market capitalization of all listed firms is Rs. 9,522.358 billion, in which Rs.342.9 billion is contributed by three textile segments. All Pakistan Textile Mills Association (APTMA) has a link with the association of the trade textile mills and is a big association which deals with the textile firms.

In the world, Pakistan is ranked as the 4th largest producer in the cotton and has a suitability capitalized on the current capability through rising and encouraging the textile sector. Moreover, in all over the Asia, Pakistan has a third position in production of Yarn which comes in ranked after china and India and also contribute 5 percent in global spinning capacity (Noor, 2017). The Importance of textile is very crucial because it contribute in 60 percent of national export, 40 percent of the labor force, 40% of banking credit and 8.5 percent GDP. All Pakistan textiles mills ssociation Chairman Tariq Saud explored Nawaiwaqt (2016) that financial of the textile industry is heavily under pressure only 30% of the company performing well other 70% companies showing discolor and showing a negative result. Hence, there is need of contribution given by structural capital (SC) towards the performance of such sector.

Problem Statement

Different scholars have contended on the extent intellectual capital (IC) enhance business performance (BP). IC which is considered a knowledge based resources is reflected a foundation of competitive advantage. Structural capital (SC) as a component of IC, in various researches has found the significant relationship between SC and BP (Khalique, Bontis, Shaari, Yaacob, & Ngah, 2018; Sharabati et al., 2010). SC is not proper entitled in the textile sector of Pakistan. This is a reason that textile products are not so innovative as compared to other countries because of low investment on R&D (SC) (Alvi & Shahid, 2016; Kazmi & Takala, 2014; khan, 2017; Shah, Syed, & Shaikh, 2014). In the same vein, also found by Jabbar and Afza (2014) that SC has insignificant association with with BP due to less importance in innovation (SC). As the SC played a valid role in the success of the business and hence, if the SC is not encouraged in the textile sector of Pakistan, then the textile firms will be lagged behind in their endeavor to improve their BP. Moreover, it has also shown in the extant literature that relationship between SC and BP is still inconsistent. It might be because in the previous research there was a direct effect of SC on BP. So, there a need an another variable in their relationship to see the clear relationship. So, based on this gap, board characteristics has been used as moderating variable in their relationship. In this perspective, the aim of the study is to establish the association between SC and BP through using the BC as a moderator in the listed textile firms in Pakistan.

Literature Review

Structural Capital and Business Performance

It seems in the extant literature that SC is equally important for all the organization. Whether profitable or non-non profitable, either public or private but all of them give importance of SC for the business performance (BP). In this regards, it has found in the study of Khalique, Bontis, Jamal, and Isa (2015) that SC has the significant association with the BP. On the other hand, it is also established a study by Ismail (2005) and found that SC has positive and significant association with the BP of Telecom industry of Malaysia. In Malaysia, the investment level on the SC is purely linked with the BP, and also the ability to respond for the future events (Sofian, Tayles, & Pike, 2004). In contrast, a nonlinear relationship between the innovation capital and BP has been found in the study (Huang & Liu, 2005) in Taiwan. Furthermore, other study of Wang (2011)found that SC has the positive and significant association with the BP.

More it was explored by María, Lizet , Begona , and Santidrián (2010)that SC not only empowered to the human capital (HC) but also reveals the organizational aptitude to transmit and to store the intellectual material. Therefore, it is found by AL-DUJAILI (2012)that SC and HC have the influence on the innovation of organization, while the rest of component has no association. As it was concluded by Kontić and Čabrilo (2009)that organizations product innovation and process innovation development, such as research and development (R&D), were not considered as a key which effect the SC to improve the BP. But, in other study of Gruian (2011)elaborated that organizations with the good SC has better impact on the BP. Likewise, research established by Sharabati et al. (2010) and determined that SC among other components also has the positive and significant association with the BP. In the same vein, Khalique *et al.* (2018) further found that SC has the significant association with the BP. In addition, Kamukama, Ahiauzu, and Ntayi (2010)found that there is robust correlation among SC and innovation capital, and SC and BP.

Mention and Bontis (2013) further found the fact that HC is considered the main value creation component within the Luxemburg banking sectors, whereas SC also shown the positive association with the BP. This is supporting the evidence that SC not only the main value driver, yet it also offers some kind of the supporting infrastructure for the overall value addition. In line with this, Ciğer and Topsakal (2016) further empirically found the positive and significant association of SC with the BP. Furthermore, conversely, several other studies found that SC has no significant association with the BP (Hashim, Osman, & Alhabshi, 2015; Linda & Megawati, 2017). Based on findings it is evidenced SC is a value driver for the BP and results are still inconsistent. So, till now, there is an option to research on the influence of SC on BP of textile sector in Pakistan. The following hypothesis tries to find out the fact regarding this issue that:
Main hypothesis is.,

H:1 There is a significant association between SC and BP in the listed textile firms of Pakistan.
The subdivisions of SC are based on his dimension as follows.
H:1a There is a significant association between systems and programs (S&P) and BP in listed textile firms of Pakistan.
H:1b There is a significant association between research and development (R&D) and BP in listed textile firms of Pakistan.
H:1c There is a significant association between intellectual property rights (IPRs) and BP in listed textile firms of Pakistan.

Board Characteristics, Structural Capital and Business Performance.

Previous empirical researches have been clearly shown that association between the SC and BP is not consistent. This specify that there are some other indicators which could affect the relationship of SC and BP. As, it is explored by Veltri and Mazzotta (2016) that board of directors are responsible to manage the intellectual capital (IC) of the organization. In this regards, the boards of directors are considered a more important to manage the IC of the organization through organizing and formation of relevant strategies (Musalli & Ismail, 2012; Williams, 2001). Accordingly, to set a such attribute in the firms, IC involve the proper attention from the management attention through using the board governance of the company to increase the performance. In this regards, the board characteristics (BC), such as, board size (BS) and composition (BCOM) and board independence (BI) are considered very important for management of IC to enhance the performance of organization. As, BC have the ability to manage all the rules and regulations for allocation of the resources (Safieddine, Jamali, & Noureddine, 2009). Previous empirical researches has established the positive correlation between the BC and BP (Coles, Daniel, and Naveen (2008), whereas, on the other hand Beiner, Drobetz, Schmid, and Zimmermann (2006) found negative association between BC and BP. Nevertheless, Parviz and Nateghian (2015) further found the insignificant association between the BC and BP. Thus, this indicates that relationship between BC and BP is still inconsistent. Further, it is also shown that relationship between SC and BP sill not consistent and BC are essential for IC to enhance the BP of organizations. Thus, based on this it is hypothesized that,

H:2 BC significantly moderates in the relationship of SC and BP in listed textile firms of Pakistan.

Research Model

Based on the previous discussion, current study framework has established on two theories, resources based view for the structural capital and resources dependency for the board characteristics in the relationship of business performance.

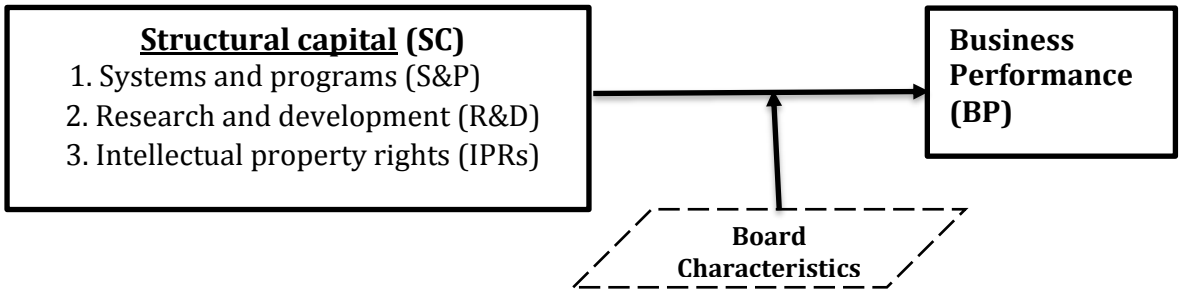

Figure 1; Conceptual Framework of the Study

Methodology

The correlational and cross sectional in nature and this research was use quantitative research design for analyzing the relationship among the variables. Quantitative method is suitable for the correlational study (Saunders, Lewis, & Thornhill, 2009). For providing the data, this technique is considered to be a practical that is used to established a basis for the wider generalization (Zikmund, 2003). The survey was conducted from the December 2018 to march 2019. The questionnaires were distributed among the 422 senior managers of the listed textile firms of Pakistan. Out of these 297 questionnaire were collected from the respondents. From the 297 questionnaires, 290 questionnaires were able for further analysis because seven questionnaires were not properly from the respondents. So, there was 69 percent response rate was from the total sample size. The questionnaire was comprising of demographic and 5-point Likert-type scale (1= strongly disagree to 5= strongly agree) to collect the responses from the respondents to each mode of the hypotheses.

Instrumentations

General Approach of Questionnaire

The current study was conducted on primary data and for data collection has been used the self-administered questionnaire. The main reason for selection of the self-administered questionnaire was that it helps the respondents to give response in an easy way and also provides help in research to summarize and gather the responses more professionally (Corbetta, 2003; William, 2006). Questionnaire has been divided into six sections: respondents' information, use of structural capital (system and program), (research and development), and (intellectual property rights), board characteristics, and business performance. For the current study, independent variables are established from the study of Sharabati et al. (2010) along with their key 3 dimensions system and program (S&P), research and development (R&D), and intellectual property rights (IPRS) and adapted all 30 items. Discussing further, board characteristics is a moderating variable that was measured from the 11 items which were adapted from the study of (Solomon, Lin, Norton, & Solomon, 2003). Out of 11 items, 3 items were relating to board size and composition and 8 items were relating to board independence. The dependent variable that was business performance was measured by 10 items that was adopted from the study of (Sharabati et al., 2010).

Findings

Measurement model

Convergent validity

It is need to examine the construct reliability, individual reliability, convergent and discriminant reliability of all the items which are measured. For this purpose, the loading of Cronbach's alpha value of each construct should be at least 0.70 or greater. Furthermore, for the average variance (AVE) extracted value cold be minimum 0.50 or higher that explains that the construct more than half variance of the indicators (Hair, Hult, Ringle, & Sarstedt, 2014). Convergent validity has been measured through

the examined the composite reliability (CR) and AVE (Hair *et al*., 2014). The value of the CR could be considered a satisfactory on point 0.70 (Hair, Hollingsworth, Randolph, & Chong, 2017; Hair *et al*., 2014; Yaseen, Dajani, & Hasan, 2016). In this regards, the table 4.1 predicted the value of reliability and convergent validity. The data demonstrates, that all the measures are vigorous with respect to internal consistency. Moreover, the value of Cronbach's alpha, factor loadings, all are greater than 0.7.

Table 4.1
Results Summary for Reliability and Validity of the Constructs

First Order Construct	Second Order Construct	Items	Loadings	Alpha	CR	AVE	Items deleted to low loadings
S&P		SP1 SP2 SP3 SP4 SP6 SP7 SP8	0.786 0.844 0.774 0.746 0.788 0.737 0.533	0.866	0.898	0.561	SP5, SP9, SP10
R&D		RD3 RD4 RD5 RD6 RD7 RD8 RD9	0.824 0.754 0.633 0.696 0.793 0.715 0.800	0.867	0.898	0.559	RD1,RD2,RD10
IPRs		IPR4 IPR5 IPR6 IPR7 IPR8 IPR9	0.739 0.745 0.579 0.723 0.625 0.777	0.778	0.849	0.531	IPR1, IPR2, IPR3, IPR6, IPR10
	SC	S&P R&D IPRs	0.859 0.805 0.643		0.82	0.60	
BI		BI1 BI2 BI3 BI4 BI5 BI6 BI7	0.805	0.938	0.95	0.73	BI8
BS&Com		BS&CM1 BS&Cm2 Bs&cm3	0.643	.801	0.883	0.716	
	BC	BI BS&Com	0.982 0.879		0.93	0.87	

BP		BP1	0.579	0.92	0.934	0.588	
		BP2	0.843				
		BP3	0.649				
		BP4	0.812				
		BP5	0.797				
		BP6	0.78				
		BP7	0.813				
		BP8	0.80				
		BP9	0.787				
		B10	0.766				

Discriminant validity

The discriminant has shown that there is a strong relationship of reflective construct with it indicators in the path model(Hair Jr, Hult, Ringle, & Sarstedt, 2017). At first, in table 4.2 predicted the Fornell-Larcker criterion value which ensured that AVE squared root (signified through the values in the diagonal calculated) should always be grater from each of the construct correlations (signified through the values in off-diagonal) (Hair, Hult*et al.*, 2014). At second, for the Heterotrait-Monotrait ratio of correlations (HTMT) of criterion results, if the value of HTMT is below than 0.90, then the discriminant validity is recognized among the reflective constructs (Hair et al., 2017). The value of fornell-Lacker and HTMT has been shown in table 4.2, 4.3, 4.4 and 4.5 respectively.

Table 4.2

Fornell-Larcker Criterion Analysis for Checking Discriminant Validity of first order construct

	BI	**BP**	**BS&Com**	**IPRS**	**R&D**	**S&P**
BI	**0.855**					
BP	0.408	**0.766**				
BS&Com	0.769	0.352	**0.846**			
IPRS	0.078	0.105	-0.036	**0.689**		
R&D	0.353	0.171	0.295	0.306	**0.745**	
S&P	0.188	0.231	0.185	0.414	0.45	**0.744**

Table:*4.3*

Fornell-Larcker Criterion Analysis for Checking Discriminant Validity of second order Constructs.

	BC	**SC**
BC	**0.933**	
SC	0.125	**0.774**

Table 4.4

The Heterotrait-Monotrait ratio of correlations (HTMT) of First Order Construct

	BC	**BI**	**BP**	**BS&Com**	**IPRS**	**R&D**	**S&P**
BC							
BI	.042						
BP	0.44	0.437					
BS&Com	.012	0.841	0.406				
IPRS	0.106	0.096	0.114	0.122			
R&D	0.392	0.391	0.18	0.356	0.353		
S&P	0.21	0.198	0.245	0.218	0.494	0.502	

Table 4.5
The Heterotrait-Monotrait ratio of correlations (HTMT) of second Order Construct

	BC	SC
BC		
SC	0.184	

The Structural Model

The analysis of the current research has been analyzed through Structural Equation Modeling (SEM) by using the Smart PLS 3.2.8 tool that provide help to assess the psychometric properties of measurement model. Furthermore, it also assesses a parameters of the structural model. In the same vein, it also asses the component based approach for the structural equation model through using the bootstrapping method. Moreover, there are two essential paths for the structural model in the Smart PLS, (Inner) measurement model and (outer) structural model (Ringle et. al, 2015; Yaseen et. al,2016). In the table 4.6, The SEM analysis has shown that structural capital (SC) has positive and statistically significant association with the business performance (BP). On the other hand, the dimensions of SC also shown that there is a positive and significant association between systems and programs (S&P) and BP, intellectual property rights (IPRs) and BP, while research and development (R&D) and BP has negative and significant association.

It means that higher SC implemented by the textile firms in Pakistan, the better its BP. Thus, this indicates that there is potentially significant effect of SC at 95% level of confidence on the BP. These results are consistent with the findings of (Cabrita & Bontis, 2008). In this regards, proposed hypothesis which are summarized in Table 4.6 and it has shown that all the path coefficients (β) are statistically significant ($p<0.05$). Whereas, on the other hand, it has clearly shown in table 4.6 that BC did not significantly and positively moderate in the relationship of SC and BP. Hence, this indicates that BC did not consider a significant moderator in the relationship of SC and BP. This might be raised that in the textile firms board of directors have a conflict of interest and has conflict with the other directors, which characterize their principal.

Table 4.6
Results of Hypotheses

	Beta	T Statistics	P Values	Result
SC -> BP	0.24	5.203	0.000	Supported
IPRS -> BP	0.387	8.659	0.000	Supported
R&D -> BP	-0.054	2.655	0.009	Supported
S&P -> BP	0.162	2.551	0.011	Supported
SC * BC->BP	-0.073	1.593	0.112	Not Supported

Discussion and Conclusion

The aim of the study was to examined the association between the structural capital (SC) and business performance (BP) through the moderation effect of board characteristics (BC) in the listed textile firms of Pakistan. The key findings have shown that SC has a positive significant association with the BP through the systems and programs, research and development, and intellectual property rights. Thus, this indicates that dimensions of SC are considered a significant predictor for the BP. Moreover, on the other hand, it has shown that BC did not significantly moderates in the relationship of SC and BP. This might be raised that board of directors were not significantly contributing in the listed textile firms of Pakistan and have a conflict of interest.

With the significant of the research, current study has some limitations such as, the study was limited on the listed textile firms, so the findings could be generalizing on the other industries which are small or non-listed because the hierarchal structure is different in every organization. So the future research could be done on other sectors. At second, respondents were included only managers so, in future other respondents such as other employees could be included as a respondent. At third, research

could be generalizing in the developed country because is considered a developing country. At forth, BC was based on three dimensions as a moderating variable, so in future it could be included other dimensions of BC in their relationship to find the clearer results. At fifth, a comparative study could be done among the industries because this study limited on the single industry. On the other hand, the findings of the current research might provide help to both the Practitioners and academicians. This study extends the viewpoint of prior research about the association of SC and BP with the empirical evidence. In this regards, the findings of current research could provide help as a for the more research about their relationship.

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