EXAMINING THE ROLE OF INTELLECTUAL CAPITAL IN DETERMINING THE FIRM PERFORMANCE: A STUDY FROM CONSTRUCTION INDUSTRY OF UAE

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Abstract*: It is believed that intellectual capital is among the core organizational resources which play their significant in defining the organizational performance. However, its components like human capital, structural capital, relational capital, and spiritual capital have achieved little attention from the context of construction industry. The aim of this study is to examine the role of stated components of intellectual capital on the performance of construction industry in UAE. Primary data was collected through structural questionnaire based on the study items from existing literature. A valid sample of 408 respondents from the construction industry was collected and analyzed through measurement model and structural model assessment. It is observed that all the tests for measurement model assessment have confirms the validity and reliability of the constructs. Furthermore, the findings through structural equation modelling approach suggest that there is a significant and positive impact of human capital, structural capital, spiritual capital, and relational capital on the performance of construction industry. The findings of this study would be of great support for various policy makers like project managers, owners, and various stakeholders specifically in the construction industry. Besides, this study is limited in the form of quantitative analysis, consideration of construction industry, and four components of intellectual capital. Future studies are highly recommended to consider these limitations for providing some better generalization and advance implications too.*

Keywords*: Intellectual capital, firm performance, construction industry, supportive work environment, two step approach.*

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Introduction

In contemporary business environment, a remarkable level of rapid changes in the social, technological, economic, and financial infrastructure has been observed. This is due to the fact that firms are now working under complex business situation and changing market dynamics. Furthermore, there is a growing level of risk and uncertainties which has changed the way of doing business operations. In such environment, the significance of knowledge as a role player towards achieving competitive advantage is very important. Therefore, knowledge is to be considered as among the core organizational resources which effectively helps the firms to worker under competitive environment (Omotayo, 2015).

It is stated that knowledge is any organization is created through talent, learning, experience and creating a collaboration among different efforts. For this purpose, business organizations are suggested to develop their skills and capabilities to adapt the market changing as per the demands from the customers and industry (Teece, Pisano, & Shuen, 1997). One of the core source to achieve learning and capabilities is through focusing on the employees; the core organizational resource (Albrecht, Breidahl, & Marty, 2018). It means that towards achieving higher growth in the industry and marketplace, more attention is required towards the human resource management in any organization. Furthermore, it is also suggested that firm should be capable enough to develop new products, ideas, and services in order to sustain itself for a longer period of time. As expressed by Nonaka and Takeuchi (1995), knowledge is to be considered as the most effective tool for observing the changes in the market. In this regard, as per the research findings of Gomezelj and Antončič (2008), it is observed that 18 percent of the performance variation is due to knowledge, hence lack of knowledge and experience is to be considered as among the core reasons of the firm's failure (Awotoye & Singh, 2017; Matlay, 2005; Shepherd, Douglas, & Shanley, 2000). Similar example is provided by Hanifa, Ahmad, Halim, and Vafaei (2017) who have claimed that failure of SMEs in Malaysia is due to lack of knowledge, hence the significance of knowledge for the success of failure of the firm can not neglected.

Over the last couple of decades, the term knowledge has been defined by various researchers which indicates that there is no single agreed definition of knowledge is observed in the literature (Al-Emran, Mezhuyev, & Kamaludin, 2020; Ode & Ayavoo, 2020; Santoro, Vrontis, Thrassou, & Dezi, 2018). However, the term intangible is often used to express the title of knowledge as expressed by (Stewart & Kirsch, 1991), whereas on the other side, the titles like capital is referred as those resources which are being utilized by the firm to create some value as expressed by (Dean & Kretschmer, 2007). In this regard, the term knowledge refers to as intellectual capital in an organization which may be treated either as a resource or as an asset (Pulic, 2004; Youndt & Snell, 2004). Therefore, intangible assets in any organization are considered as the components of intellectual capital and also known as knowledge-based resource for any organization (Garcia-Perez, Ghio, Occhipinti, & Verona, 2020; Zhou & Fink, 2003). As stated earlier, the title of intellectual capital in any organization is a knowledge-based resource which plays a major role towards success or failure in case a firm is lacking with it. Additionally, a positive linkage is observed by the researchers between IC components, economic value and market performance as stated by (Cheng, Lin, Hsiao, & Lin, 2010). Based on their valuable assets, firms can explain why the market value of their share is higher than the book value (Pucar, 2012) where the key reason is that such firms put more focus on intellectual capital as a primary source towards profit generation and value creation as well (Sharabati, Naji, & Bontis, 2010).

In any economy, construction industry is to be considered as a backbone in terms of development and infrastructure. For the economy of United Arab Emirates (UAE), construction industry is playing its major role towards the economic development and growth. As per the findings of Ministry of Economy (2019), It is found that during the year 2018, construction and building sector in UAE is contributing 8.5 percent in terms of gross domestic product (at constant price) which is to be considered as third in ranking after Extractive industries (including oil and natural gas) and wholesale and retail trade and repair of motor vehicles and motorcycles whose contribution in GDP is 30 percent and 11.6 percent, respectively. In addition, Figure 1 provides an outlook for the gross fixed capital formation according to sector in current prices of 2017 and 2018 in AED million, where it is found that construction and building sector in UAE has contributed 9183 AED million or 3.1 percent during the year 2017, and 9029 AED million or 3.1 percent, respectively. This would justify the argument that the significance and growth dynamics of construction industry in UAE cannot be neglected. Furthermore, in terms of private employment share, it is stated that overall 33.9 percent employees are registered in construction industry, followed by trade and repair services which accounts for 22 percent (Annual Economic Report, 2019). This study aims to examine the trends in performance of construction industry while considering the four components of intellectual capital as main independent variables.

Economic Sectors	2017		2018	
	Value	Contribution %	Value	Contribution %
Agriculture, Forestry and Fishing	1,548	0.5%	1,331	0.5%
Extractive Industries (including crude oil and natural gas)	43,350	14.5%	44,312	15.0%
Manufacturing	31,712	10.6%	30,708	10.4%
Electricity, Gas and Water and Waste Management Activities	21,499	7.2%	19,832	6.7%
Construction and Building	9,183	3.1%	9,029	3.1%
Wholesale and Retail Trade and Repair of Motor Vehicles and Motorcycles	20,433	6.8%	21,458	7.3%
Transport and Storage	32,912	11.0%	31,336	10.6%
Accommodation and Food Service Activities	5,972	2.0%	6,320	2.1%
Information and Communications	7,862	2.6%	7,734	2.6%

Figure 1: Gross Fixed Capital Formation According to Sector in Current Prices of 2017 and 2018 in AED million

Source: Annual Economic Report (2019)

Literature Review

Buenechea-Elberdin, Sáenz, and Kianto (2017) argued that the skills and understanding are associated with human capital which represents the views of people like if the firm is unable to make use of these individuals, their training and expertise should be neglected and unable to be transformed into the benefit to the organization. Accordingly, Raineri (2017) found that business performance can be improved using initiatives to boost technical expertise (human capital) including learning, professional experience, and involvement in different training programs. It was also noted from the same source of study that businesses must enable a workforce to accomplish enough useful knowledge, training, including exposure to ensure efficiency as well as protracted staff capacity strategies to enhance performance. However,

Ruíz, Gutiérrez, Martínez-Caro, and Cegarra-Navarro (2017) concluded that the workforce who are poorly educated, under-skilled, incompetent, and inexperienced have been ended up finding to be unable to optimize the business performance. Additionally, the same source states that the learning regarding human capital investment, which always prioritizes information, gained throughout professional experience, formal training, parenting experience, including skill expertise does not always increase businesses' commercial performance. They inferred that human capital has a positive impact on businesses' performance, especially elements such as education, emotions, and cognitive agility.

According to Matos, Vairinhos, Dameri, and Durst (2017), it was concluded that the branding, investment of creativity, inventions, techniques, societal innovation, database, work instructions, plans, and some other elements that deliver more utility than with the worth of both the material are examples of structural capital. They further found that the efforts to formalize the firm's knowledge and generate structural capital necessary to create an improved business performance. Additionally, as per the study of Nawaz and Haniffa (2017), it was inferred that an excessive technological development-related creativity is not always advantageous to process improvement and business performance. They argued that the structural capital refers to something like a firm's capacity to achieve its operations and systems in a way that supports both human as well as business performance. It was further revealed from the same study that even though an employee does have a great intellectual capacity, unless the firm's processes and techniques don't complement it, the human capital will not be able to fulfill its maximum capabilities. Likewise, a study examined by S. Sharma and Dharni (2017), it was found that the small businesses must also pay close attention to creative works, workplace structure, organizational processes, as well as innovations, but also make additional initiatives to implement a method that enables staff members' expertise to be transformed into successful organizational outcomes. To prevent financing everything without any solid return on that investment, every investment group or asset in the development of change must precisely analyze the effectiveness.

Furthermore, Agostini, Nosella, and Filippini (2017), the relational capital, also known as customer capital, is indeed the information associated with the business's relationships with many stakeholders. Additionally, it was also noted from the research study that the company is required to completely manage the integration of the supply network and earn value from the supply chain learning outcomes. However, the study conducted by Orugun and Aduku (2017), it was concluded that the businesses may boost their value by creating relationships with clients. They further stated that the client, vendor, especially state partner relationships are critical in governance practices, and relationships that are not managed for maximum business results will lead to reduced business performance. Furthermore, the usage of such capital facilities by stakeholders must be optimized to improve business performance. . However, the research study as examined by Urban and Joubert (2017), it was concluded that the relational capital has been determined to play an important influence mostly for the enhancement of business performance.

According to the study conducted by (Bakhtiar, Haider, & Adnan, 2017), the spiritual capital is indeed very essential in companies and communities because it influences how an organization or even a business has been managed. . They further stated that the spiritual capital, as well as other elements of intellectual capital, is indeed a key driver of business performance, according to the particular research conducted on businesses. Their research found that spiritual capital has a positive impact on performance. They further concluded that spiritual

capital is critical to the success of small businesses. The findings show that spiritual capital does have a substantial impact on recognizing business opportunities.. Furthermore, it was also inferred from the same studies that the substantial interdependencies are detected among the aspects of IC . The approach encourages people to construct a spiritual capital by focusing on important characteristics as well as personal traits such as humble, tolerance, forgiving, sensitivity, good sentiments, communications, and perhaps a feeling of teamwork. Ultimately, it is hoped because attempting to establish an SC will contribute to a sense of very well but also increased work endurance in the individuals (O'Brien, 2017; O'Sullivan, 2017; Sudarma & Maskie, 2017). Figure 2 shows the conceptual framework of the study.
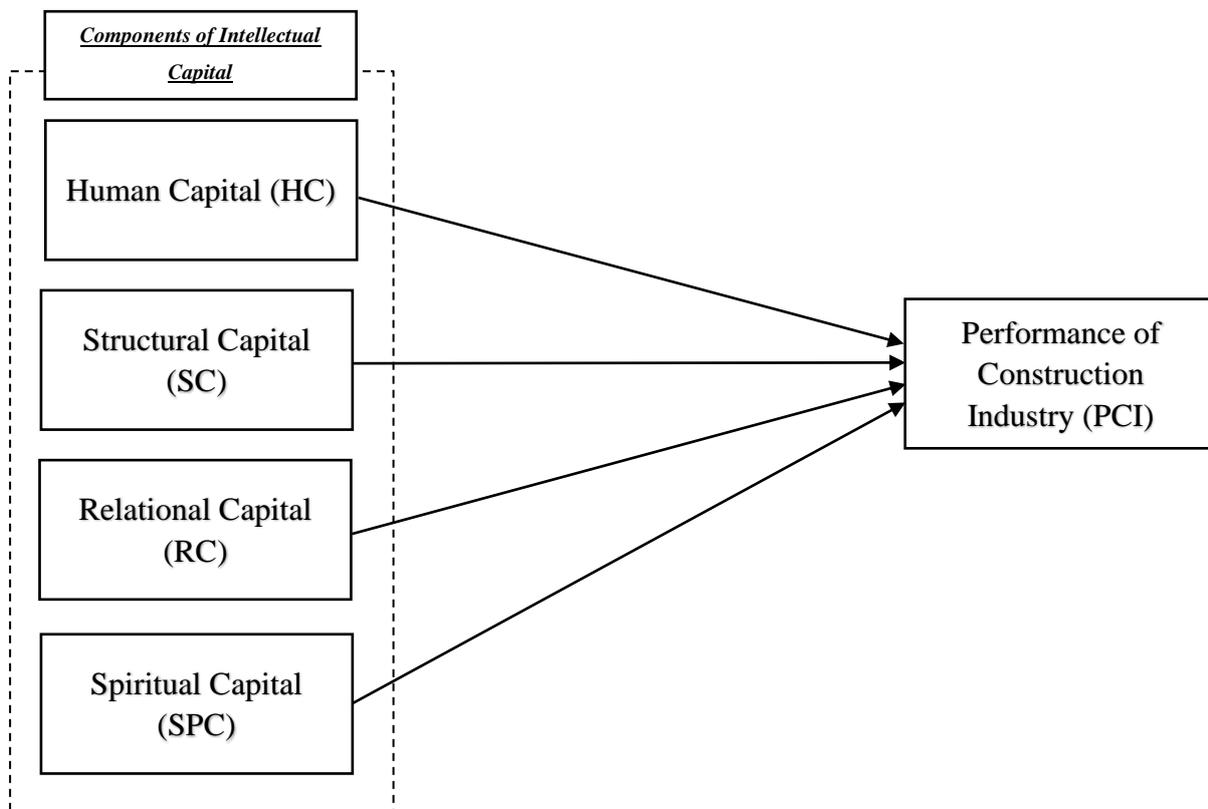

Figure 2: Research Framework of the Study

Research Methodology

The nature of this study is deductive and quantitative where primary data was collected through questionnaire survey which was developed through extracted the items of both independent and dependent variables from the existing literature. The population under present study consist of various employees who are working in the construction industry of UAE. A valid sample of 408 respondents was collected and empirically analyzed. For the purpose of data analysis, descriptive statistics, correlation analysis, and two steps approach was applied.

Operational Definitions

Human Capital (HC)

The term human capital is among the core dimension of intellectual capital which is based on the competencies, values, attitude and education of the employees (Martins, Martins, & Pereira,

2017). HC has the potential in aiding an organization to be successful and sustain its competitive advantage over its competitors (Abudaqa et al., 2020).

Structural Capital (SC)

Structural capital is the set of procedures, processes, and internal structures that contribute to the implementation of the objectives of an organization (Barão & da Silva, 2014).

Relational Capital (RC)

Relational capital is the value of internal and external social relationships of a given organization (Barão & da Silva, 2014).

Spiritual Capital

The term Spiritual Capital is defined as "individual and collective capacities generated through affirming and nurturing people as having intrinsic spiritual value" as expressed by (Palmer & Wong, 2013).

Performance

A wide range of indicators that can focus on profitability, growth, productivity or social performance of companies (Fernández-Torres, Palomo-Zurdo, & Gutiérrez-Fernández, 2019).

Data analysis

Descriptive Results

Descriptive scores are very much helpful to provide the information about the trends in the study data. Therefore, this study has covered both measure of central tendency and measure of dispersion under Table 1 of the study. The findings indicate that against each of the study items for independent, dependent, and moderating variable of the study, total number of observations (N) are 408, indicating the clear evidence for the valid and usable responses as explained earlier in Table 1 of the study. Additionally, mean score of each of the study items have been presented. It is observed that the mean score for all the items of spiritual capital (SC) is ranging from 3.152 to 3.135 in terms of highest and lowest mean score. This would indicate that all the five items of SC have a mean score of above 3, expressing the fact that respondents are showing their view about the neutral point which is coded as 3 on the five-points Likert scale. In terms of standard deviation, SPCI is showing the lowest risk in the mean, followed by SPC2, SPC4, and SPC5, respectively. The responses on the Likert scale in terms of minimum and maximum values have indicate that for all of the study items, lowest and highest scale is under observation. Additionally, p1 and p99 are also presented for the study items. Finally, the scores for the skewness and kurtosis have shown both positive and negative scores for all of the study items. In addition, the mean trends for the relational capital (RC) have shown that out of four items (RC1-RC4), two items are showing their mean score above 3, whereas 2 have a mean score of below 3. This would indicate that for item number 1-2, respondents are showing their opinion towards agreed point on the Likert scale, whereas for 3-4 item of RC, respondents are more interested towards neutral points.

Table 1: Descriptive Results

Variables	N	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
Spiritual Capital (SPC)									
SPC1	408	3.152	.99	1	5	1	5	.073	2.247
SPC2	408	3.135	1.106	1	5	1	5	-.115	1.985
SPC3	408	3.022	1.233	1	5	1	5	-.081	1.955
SPC4	408	3.130	1.2	1	5	1	5	-.26	2.072
SPC5	408	3.005	1.15	1	5	1	5	-.146	2.013
Relational Capital (RC)									
RC1	408	3.520	.927	1	5	1	4	.443	2.192
RC2	408	3.674	.852	1	5	1	4	.295	2.477
RC3	408	2.775	.921	1	5	1	5	.423	2.617
RC4	408	2.699	.953	1	5	1	5	.275	2.345
Human Capital (HC)									
HC1	408	3.422	1.03	1	5	1	5	-.857	3.156
HC2	408	3.343	1.15	1	5	1	5	-.395	2.498
HC3	408	3.404	.967	1	5	1	5	-.783	2.911
HC4	408	4.169	1.02	1	5	1	5	-.301	2.363
HC5	408	3.284	1.041	1	5	1	5	-.457	2.399
Social Capital (SC)									
SC1	408	4.674	1.027	1	5	1	5	.057	2.253
SC2	408	2.760	1.137	1	5	1	5	.289	2.074
SC3	408	4.806	1.238	1	5	1	5	.317	2.042
SC4	408	2.797	1.115	1	5	1	5	.109	2.049
Performance of Construction Industry (PCI)									
PCI1	408	4.539	1.062	1	5	1	5	.544	2.619
PCI2	408	2.547	1.064	1	5	1	5	.294	2.265
PCI3	408	4.446	1.031	1	5	1	5	.414	2.509
PCI4	408	4.417	1.017	1	5	1	5	.43	2.729
PCI5	408	3.422	.991	1	5	1	5	.734	3.037

However, in terms of standard deviation, all the items of RC are showing their scores below 1 as shown in Table 1 of the study. Furthermore, Human capital has also reflected the fact that respondents have provided their clear view towards the agreed point on the Likert scale as all the mean scores are above 3. More specifically, the HC4 has a mean score of 4.169 with the standard deviation of 4.02, respectively. This indicates a highest mean score not only among all the items of HC, but for the RC, and SC, as well. The mean scores for the social capital's items were 4.674, 2.760, 4.806, and 2.797, respectively. This would justify the argument that mean score for the social capital are showing a mix trend. However, the value of standard deviation for all of the items under social capital are above 1. Finally, the scores for the performance of the construction industry items are shown in Table 1 where it is observed that PCI2 or second item is showing lowest mean score, and PCI1 is showing highest mean score of 4.539. The scores above 3 are indicating that respondents have shown their response above the neutral point and touching the agree and strongly agree points of the study. However, PCI5 has demonstrated lowest value in terms of standard deviation which is 0.991.

Correlation Analysis

After descriptive statistics, next step is to examine the correlation between the study variables. It is observed that correlation expresses the level of association between the variables through strength and direction of association. The strength of association is measured through value of correlation coefficient which ranges from 0 to 1 (Black, 2019; McEvoy, 2018; Nguyen-Newby & Fraser, 2020). The value of 0 indicates no correlation, whereas 1 specifies perfect correlation between the two variables or construct (J. Sharma, 2010; J. K. Sharma, 2012). Meanwhile positive sign reflects direct of positive correlation whereas negative sign indicates that the correlation between the study variable is inverse or indirect. Based on the above discussion, our study has also examined the correlation between the study variables. Table 2 provides the correlation matrix. It is found that the correlation between Spiritual capital and relational capital is negatively low but significant with the coefficient of 0.117. This correlation indicates that there is an adverse association between SPC and RC. Meanwhile, the level of interdependency between spiritual capital and SC is 0.776 which indicates a good and positive level of association between them. This correlation is significant at 10 percent. Additionally, the level of correlation between SPC and SWE is 0.203 indicating a low but positively significant relationship between both. Similarly, the correlation between SPC and PCI is 0.131, significantly positive but low in nature.

Table 2: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) SPC	1.000				
(2) RC	-0.117*	1.000			
	(0.018)				
(3) HC	-0.021	0.091	1.000		
	(0.673)	(0.066)			
(4) SC	0.776*	0.093	0.038	1.000	
	(0.000)	(0.060)	(0.440)		
	(0.000)	(0.000)	(0.000)	(0.000)	
(5) PCI	0.131*	0.420*	0.229*	0.279*	1.000
	(0.008)	(0.000)	(0.000)	(0.000)	

Assessing the Measurement Model Output

Table 3 shows the findings for the measurement model of the study where loadings for each of the study variables are presented along with other findings. It is found that the loadings score for the human capital, performance, relational capital, structural capital, and spiritual capital is greater than 0.70 which indicates that all the study items are good enough to reflect each of the latent construct. Furthermore, Cronbach alpha for all the study variables is also greater than 0.70 which means that no problem for the reliability. Finally, the scores entitled as composite reliability and average variance extracted are also showing the fact that there in acceptable range. For this reason, it is claimed that the outer model assessment is quite perfect while going for the structural model assessment under present study analysis.

Table 3: Measurement Model Output

Variable	Item	Loading	CA	CR	AVE
Human capital	HC1	0.727	0.873	0.905	0.657
	HC2	0.816			
	HC3	0.872			
	HC4	0.823			
	HC5	0.809			
Performance of construction Industry	PCI1	0.727	0.856	0.897	0.636
	PCI2	0.777			
	PCI3	0.848			
	PCI4	0.831			
	PCI5	0.799			
Relational Capital	RC1	0.823	0.795	0.866	0.618
	RC2	0.839			
	RC3	0.702			
	RC4	0.773			
Structural Capital	SC1	0.889	0.899	0.928	0.765
	SC2	0.872			
	SC3	0.797			
	SC4	0.934			
Spiritual Capital	SPC1	0.848	0.888	0.911	0.673
	SPC2	0.857			
	SPC3	0.743			
	SPC4	0.827			
	SPC5	0.822			

Structural Model Output

The study findings under Table 4 indicates that there is a positive impact of human capital on the performance of construction industry as reflected through beta coefficient of 0.104 and standard error of 0.037. This would justify the argument that one unit change in the value of HC is causing a positive change of 0.104 in the value of PCI and vice versa. With the help of beta coefficient and stated standard error, a t-score of 2.844 is achieved which indicates a significant impact of HC on the PCI. Furthermore, the p-value as shown in Table 4 for HC-PCI relationship is also less than 0.05 percent which means that there is a significant and direct impact of HC on PCI under full sample consideration. During recent and the past decades, a range of research studies have been found while covering the positive and significant role of human capital in determining the performance of different industries. For example, Raineri (2017) found that business performance can be improved while using initiatives to boost technical expertise (human capital) including learning, professional experience, and involvement in symposia, etc.

Table 4: Structural Model Results

Path	Beta	STDEV	T Statistics	P Values	Decision
HC -> PCI	0.104	0.037	2.844	0.005	Accepted
RC -> PCI	0.161	0.037	4.359	0.000	Accepted
SC -> PCI	0.226	0.065	3.479	0.001	Accepted
SPC -> PCI	0.189	0.064	2.951	0.003	Accepted

In addition, the findings under Table 4 show that there is positive and direct impact of relational capital on the value of performance of construction industry in UAE. This impact is observed through coefficient of 0.161 and standard deviation of 0.037. This means that higher relational capital tends to increase in the value of performance for the construction industry and vice versa. The value of T-score for the relative coefficient of RC is 4.359, and p-value is 0.000, significant at 5 percent. Therefore, it is inferred that RC has its significant and positive impact on PCI under SEM approach. More specifically, authors like Agostini and Nosella (2017), claims that the development, and maintenance of high-quality relationships with the organization, individual, or group that affects the company's operations is the foundation of relational capital. The association between SC and PCI is also examined and findings are shown in Table 4. It is found that like other two components of intellectual capital (HC, and RC), there is a significant and positive impact of SC on the value of PCI under full sample consideration. This means that for every single unit increase in the value of SC, there is positive and direct change in the value of PCI and vice versa. This impact of SC on PCI is observed as positively significant at 1 percent level of significance (i.e. beta=0.226, standard deviation=0.064, T-statistics=3.479, P-value=0.001). In this regard, findings under present research are reasonably supported in the previous literature too. For example, Matos et al. (2017) further found that the efforts to formalize the firm's knowledge and generate structural capital necessary to create an improved business performance. Finally, the fourth component of intellectual capital is referred to as spiritual capital which is under consideration among the exogenous constructs of this study. The findings through SEM indicates that there is a significant and positive impact of SPC on PCI as shown in Table 4 (beta=0.189, standard deviation=0.064, T-statistics=2.951, P-value=0.003). This would also justify the significant presence of spiritual capital in determining the higher organizational performance in the construction industry of UAE. More specifically, increasing investment in spiritual capital is a positive indication for the betterment of construction industry in UAE. In this regard, Abudaqa et al. (2021) have argued that SPC would also contribute towards higher performance in the organization. Campos et al. (2020) concluded that the spiritual capital as well as board qualities are thought to be important factors for improving a firm's growth and performance outlook. Conclusively, the studies examined by Rahman, Khan, AlAbri, and Taghizadeh (2021), and (Vasconcelos, 2021) concluded that the spiritual capital and other aspects of Intellectual Capital, is a key driver of business performance. Therefore, this study has also accepted H4 and claim that spiritual capital is a good sign in leading towards more performance in the construction industry of UAE.
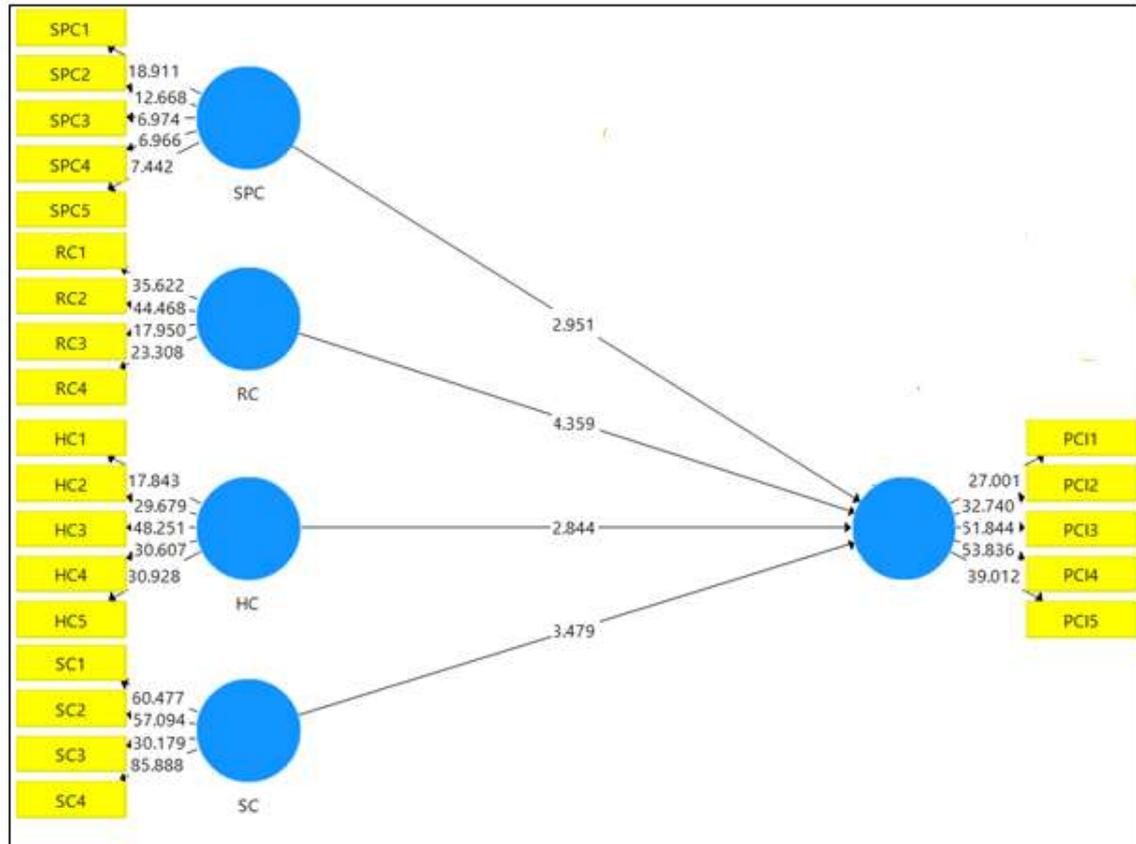
Figure 3: Structural Model Output

Conclusion and Limitations

This study is dealing with the various components of intellectual capital like human capital, structure capital, spiritual capital, and relational capital in order to examine the trends in performance of construction industry of UAE. For this purpose, study has provided some significant background discussion to provide better understanding of the topic. The association between human capital, structural capital, spiritual capital, relational capital and performance of construction industry is testing while applying two step approaches under Smart PLS. The study findings have confirmed the fact that there is a significant and positive impact of human capital, structural capital, relational capital, and spiritual capital on the performance of construction industry. This study has provided several theoretical contributions in the existing literature. Firstly, the provided framework for exploring the association between components of intellectual capital and performance of construction industry along with the moderating role of supportive work behavior is a very first theoretical contribution in the literature due to the fact that none of the earlier studies have covered this gap. Secondly, the theoretical framework under present study is widely supported with the help of underpinning theory named as resource-based view. This would justify the argument that the theoretical foundation is also added by the current study while exploring the dynamic association between exogenous, endogenous and moderator of the study. Thirdly, this study has provided a significant discussion about the performance outlook in the construction industry of UAE through which various upcoming studies can avail the benefits. This would indicate a good theoretical addition by this research in the literature work till date.

Besides, this study has come limitations as well. For example, the first limitation of this study is that it is entirely focusing on the performance of construction industry in UAE while ignoring the very important performance factors from the customer's perspective or customer satisfaction. This would indicate that this research has limited implications as well as recommendation while entirely considering the performance of construction industry in UAE. The second limitation of this study specifies that it has considered the intellectual capital components like human capital, relational capital, spiritual capital, and structural capital while ignoring the other dimensions like social capital and information capital which are also considered as among the integral components. This would justify that both theoretical and empirical suggestions as provided by current research are entirely based on the selected four dimension of intellectual capital. Finally, the third limitation of this study shows that this research is based on the construction industry in UAE while ignoring all of the other sectors under similar economy. It means all the suggestions; policy implications and recommendations are firstly based on the construction industry. Future studies are highly suggested to consider these limitations in order to generalize the results in a more appropriate way.

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