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**ÖRGÜTSEL DAVRANIŞ ÇALIŞMALARI DERGİSİ**

**ÖRGÜTSEL DAVRANIŞ ÇALIŞMALARI  
DERGİSİ**

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## THE ROLE OF INTELLECTUAL CAPITAL IN INNOVATION WITH THE MEDIATION EFFECT OF ORGANIZATIONAL CAPITAL: AN EMPIRICAL STUDY OF PAKISTANI BANKS

### İNNOVASYONDA ENTELLEKTÜEL SERMAYENİN ROLÜ VE ÖRGÜTSEL SERMAYENİN ARACILIK ROLÜ: PAKISTAN BANKALARINDA AMPİRİK BİR ÇALIŞMA

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#### ABSTRACT

This research aims to analyze the effects of intellectual capital on organization innovation. The approach of this study is positivist, and the research methodology is chosen to be a quantitative method. Multiple regression modeling has been used for analyzing relationships among variables. The research findings indicate the positive association between intellectual capital and organizational innovation and found that administrative capital has a significant mediating role in the relationship between intellectual capital and corporate innovation. The contribution of intellectual capital and innovation in the service sector literature is found in this study. It suggests that intellectual capital should be viewed as a catalyst for organizational innovation.

**Keywords:** Intellectual capital, organizational capital, organizational innovation, structural capital, relational capital and human capital.

#### ÖZET

Bu araştırma, entelektüel sermayenin organizasyon yeniliği üzerindeki etkilerini analiz etmeyi amaçlamaktadır. Bu çalışmanın yaklaşımı pozitivisttir ve araştırma metodolojisi nicel bir yöntem olarak seçilmiştir. Değişkenler arasındaki ilişkileri analiz etmek için çoklu regresyon modellemesi kullanılmıştır. Araştırma bulguları, entelektüel sermaye ile örgütsel inovasyon arasındaki pozitif ilişkiye işaret etmekte ve idari sermayenin entelektüel sermaye ile kurumsal inovasyon arasındaki ilişkide önemli bir aracılık rolüne sahip olduğunu ortaya koymaktadır. Entelektüel sermaye ve inovasyonun hizmet sektörü literatürüne katkısı bu çalışmada tespit edilmiştir. Entelektüel sermayenin örgütsel inovasyon için bir hızlandırıcı olarak görülmesi gerektiğini öne sürüyor.

**Anahtar Kelimeler:** Entelektüel sermaye, örgütsel sermaye, örgütsel yenilik, yapısal sermaye, ilişki sermayesi ve insan sermayesi.

## 1. Introduction

Intellectual Capital (IC) is a significant intangible asset in today's economy and plays a vital role in the value creation for an organization. Contrary to the past, where the firm's significant resources were physical primarily assets such as land, building and property, plant and equipment (PPE), as Johnson (1999) stated, the firm's IC is always essential compared to other financial aspects such as financial capital. The organization's IC value is four times more than its book value (Edvinson and Malone, 1997). Moreover, increased value generates tangible assets more frequently as IC supports valuing both market and the book value because of its essential role in backing up firms.

Since independence in 1947, the banking sector of Pakistan has adopted several governmental changes as well, as they experienced intimidating challenges. In the past, the economic growth slowdown due to lack of financial resources, human resources, political interference, and political uncertainty. The bank performance can be affected by the manager's behaviour and attitude toward internal bank policies and management risk (Yao et al., 2018). Before the 1971 war, different policies managed the banking sector and helped guide credit. Initially, banks adopted a closed-door policy because numerous banks faced several problems such as a deficit in trade and a weak structure. Later in 1974, Nationalized banks showed poor performance due to govt. Protection and economic growth, the Open-door policy (ODP) was introduced. However, the banking sector started improving day by day (Ahmad et al., 2010).

In recent years, Pakistan has observed a growing change towards branchless banking, which involves the distribution channel strategy to deliver financial services independent of bank branches. It is essential to explore the relation and attain the network goals. Empirically, it also observes the effects of IC on innovation through organization capital. This study focuses on the connection with structural equation models. Past studies expose its importance through the positive effect of IC on the OI of products in the manufacturing-based sectors. Nowadays, the study used to understand quantitative research is Actor-Network Theory. In previous days, the study used RBV (resource-based view) to find a connection between IC and organizational innovation (OI). The second motivation is for the bank's managers concerning the components of the IC in implementing several types of effective and successful innovation for the provision of detailed analysis of these connections.

Banks faced different problems while providing services to their customers. For that purpose, they had to engage with new technologies such as Automated Teller Machine (ATM), telephone, and internet banking to enhance their situation in the growing competitive markets. This technology had access to engage the banks with national and international markets. It is considered a core competency for innovation and improvement for profit and productivity. At this phase, they realized the need for innovation for satisfying their current customers and by investing in Information Technology (IT) to reduce costs to attract new customers from time to time (Metwally et al., 2012). After 2001, the banking sector observed unprecedented growth because of the low-interest rate and product innovation in financing. Over recent decades, the banking sector has adopted significant changes towards technology in such an uncertain environment by transforming the old ideas into new ideas. Innovation is crucial for both the manufacturing and service sectors to achieve a competitive advantage in the service sector; the role was not elaborated empirically as in the manufactured sector. Online banking has accelerated financial inclusion, which





gradually changed the country's financial landscape. However, the banking industry sector faces stiff competition in the global arena.

The study of Rehman et al. (2012) reported that at the macroeconomic level, the banks play a vital role in the growth and progress of the economy. To survive several competitions, the firms need to be progressed and adaptable to various products. They need to compete with their competitors to deal with new products and processes to improve their competitive environment. According to Johnson (2010), with the constant changes in markets, the customer demands, financial defaults, and technology, the firms deal with a situation known as (innovate or die) and Innovation (also known as a basic element for survival for the cause of the human race). While supporting Innovation in several firms, tangible or intangible resources play major involvements as proclaimed. According to the growth of knowledge-intensive organizations, economic success depends upon knowledge and its several applications instead of tangible resources.

Similarly, Khedr (2008) signifies the significant knowledge-intensive industries which propose the IC to retain Innovation. According to Ketchen (2007), Innovation is recognized as a new tool in producing wealth by stockholders, staff, and other clients. In reinforcing a firm's efficiency, Innovation plays a major role. It has become more important from time to time to enhance the growth for survival purposes in the era of aggressive competition and environmental uncertainty (Syropoulous, 2007; Tonveronachi, 2010).

Alwis (2004) stated that organizations should realize that intangible assets should be dealt with competitive advantage can be organized to participate with the various problems or challenges in the well-informed economy. The innovation for manufacturing purposes is somehow different from the banking sector one as suggested by (Adams, 2003) which also says that a theory suggested in one segment might be different from the other segment. Davies (1996) also states that for economic activities of firms, governments, and different bank services are the major invention of all economic engagements. In O'Keefe et al. (1998), the banks are defined as financial instruments adopting IT and internet claims.

According to Dost et al. (2016), the most innovative research focuses on finding out the individual effects of IC on the adaptation and the generation of innovation in the manufacturing sector. Perks, Gruber, and Edvardsson (2012) comprehended that most innovation research had emphasized the manufacturing sectors; however, innovation is considered significant to attain competitive gain for both the manufacturing and service sector at a time. Huang et al. (2011) has tested the effects of IC, OC, and the capabilities of innovation by using the (RBV) resource-based view method. Chen et al. (2006) investigated the relationship between the performance of product and OC, while Wu et al. (2008) also investigated the effect of Human capital and OC on the various types of innovation. Whereas (Damanpour 2000) stated that the service sector seems to be understated for the research identifying innovation for general purposes. The previous studies have introduced a straightaway connection between HC, OC, and OI, especially using different types of innovation in the manufacturing sector, as inspired by Youndt (2005).

This study mainly emphasizes the banking industry for different reasons, one of which is identifying the relationship between IC and OI. For the last few years, the banking industry has professed bankruptcy due to several changes in the financial markets and undue pressure. Consequently, it concludes that previous studies did not test the direct and indirect relationship between the Intellectual Capital and the Organization Innovation with having the mediating role of Organization Capital. Furthermore, their interaction in the banking



sector has not been examined. Therefore, there must be a need to test the relationship between IC and OI in the private and public banking sectors. The following research questions have been formulated:

**RQ1:** Does Intellectual Capital have the impact on Organization Innovation?

**RQ2:** Does Intellectual Capital have any impact on Organization Capital?

**RQ3:** Does Organization Capital have any impact on Organization Innovation?

**RQ4:** Does organizational capital have any mediating role between Intellectual Capital and Organization Innovation?

In line with this, the study fundamentally answers the following objectives:

- To Study the effect of Intellectual Capital on Organization Innovation
- To Study the effect of Intellectual Capital on Organization Capital.
- To Study the effect of Organization Capital on Organization Innovation.
- To Study the mediating role of Organization Capital in the relationship between IC and OI.

## 2. Review of Relevant Literature

IC is the most important area, and extensive research has been done on it. It has been studied with the help of various authentic authors such as (Barkat et al., 2018), (Maboudi et al., 2015), (Badir et al., 2016), (Young et al., 2009). Research on Intellectual Capital gained a lot of importance in the mid-90s. It was aimed to understand the implications of all theories to manage the corporations via analysis of intangible assets work to an organization (Roos et al., 2001). According to Petty and Guthrie (2000), the perspective of IC surfaced as the means to understand the constituent of the business value better and manage the elements more successfully, which generate the value effectively. The IC can be defined as the stocks of knowledge, resources, and developed capabilities that allow fundamental growth of business processes, enabling the attainment of competitive benefits (Martín-de-Castro et al., 2011, p. 650). It is a multidimensional concept that is in the present time accepted that the fundamental components of IC can be categorized as 3 dimensions, HC, SC, and CC (Guthrie et al., 2012).

Different researchers apply intellectual capital to many international countries to study the banking sector. According to many researchers, they determined that IC is an important component that measures financial performance, and they also developed the application of IC in the banking sector of these countries like Japan (Mavridis, 2004); Malaysia (Goh, 2005); UK(El-Bannany, 2008), Hong Kong (Chan, 2009a, b) and India (Singh, Sidhu & Joshi, 2016). In the early years, IC was explained as an intangible asset useful to provide a competitive advantage over others, such as providing information related to business and technology (Itami, 1987). Klein and Prusak (1994) referred to the formalization of intellectual capital or intangible material that produces high-value assets. The change of acceptance of IC is based on knowledge-focused. To make business more competitive, IC has been used as a resource in many sectors all over the market. Edvinson & Malone (1997) claimed that IC is the process of transformation into value and knowledge, which facilitates an organization's resources. Intellectual capital not only evaluates the firm's performance but also helps to enhance business value. The firms need to consider the effects, and their importance as the concept of intellectual capital becomes complicated and broader.



Additionally, Low (2000) stated that the organizational performance based on the importance of IC hasn't only about the internal and external improvement of the management but also examine for the accounting reporting base. Bharathi (2010) and Young et al. (2009) stated that there are differences in ordinary measures and intangible resources for the development of business value in various service-based industries. By reviewing the influences on business value creation based on IC management (Alipour, 2012).

In the past two decades, many researchers motivated to find out the relationship between the IC and financial performance institutions. Over the period (2007-2018) in that era, they considered knowledge-based intellect, where this study viewed the impact of IC on 111 Pakistani Financial Institutions performance (PFIs). To examine its profitability, VAIC value-added intellectual coefficient and MVAIC modified value-added intellectual coefficient were applied. According to Robust, results analyzed from fixed effect regression and generalized method of momentum confirmed the inverse u-shaped relationship, suggesting that the intellectual capital of Pakistan financial institutions increases the profitability for certain levels. After that, it causes a decrease in profitability or productivity. Human Capital is considered to influence intellectual resources that increase performance significantly.

According to the study of Iranmahd, Moeinaddin, Shahmoradi & Heyrani (2014), IC affects the value of firms and the finance cost. Through the VAIC approach, the IC was measured and considered the stock value as the firm value. After applying regression analysis and correlation, the researcher concluded that IC has no relation to firm value. The effects of IC on the firm were also observed by Nejati and Pirayesh (2015). The study has also been conducted on 132 firms of the Tehran stock exchange through systematic removal methods. The Tehran stock exchange gathered the information in six years (2008 to 2013). A positive relation was observed between IC and firm value. The conclusion stated a significant relationship between IC, SC, and HC, which is likely beneficial for management, academicism, and policymakers suggesting that IC improves sustainable performance to a certain extent.

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The cognitive views emphasize main concepts and the methods needed to achieve a common goal (Tsai and Ghoshal, 1998). According to Nahapiet and Ghoshal (1998), the relation between SC and IC is that the relationship network of a department will improve the IC. Furthermore, the coevolution of IC and SC gives a dynamic view on the development of organizational benefits. The levels of SC will improve the IC via communications between the concerned members. The SC is the non-human capital that supports the HC (Kalkan et al., 2014). The capital which gives the structural support to increase the employee's



performance is the SC Sveiby (1998). According to Roos Pike & Fernstrom (2007), SC is defined by the instrument that remains when the employees leave the office. According to Zerenlet et al., these three elements, HC, SC, CC, are the indicators of IC. He also found that all of the three dimensions of IC have positive and strong relationships with innovation. The CC has a more significant effect on innovation, while the remaining two dimensions have less effect. The IC management can be defined as the direction of the value-based transformation of HC and Relation capital in SC to enhance innovation (Lynn, 1998).

According to (Damanpour and Daniel Wischnevsky, 2006; Pérez-Luño et al., 2011), all firms are required to generate or adopt innovation. The generation of innovation generates the product, which is something latest in the market related to adopting innovation utilization. This difference is quite similar to the ones which can be seen between imitation and innovation (Brozen, 1951; Schumpeter, 1934; Dell'Era and Verganti, 2007). The academic literature in the context of innovation is very confined. According to Subramaniam & Youndt (2005), the extent of innovation is incremental and radical. In contrast, according to Zheng Zhou (2006), whose vision is of creativity, it produces incremental innovation by using radical innovation as its key. According to the studies of Damanpour & Daniel Wischnevsky (2006) and Pérez-Luño et al. (2011), they addressed the existing confusion about the scope of innovation merely by focusing instead on a scale of innovation. They adopted the terminology for this specific research. They believed that innovation needs new studies or information derived from observation, experimentation, and discovery (March 1991).

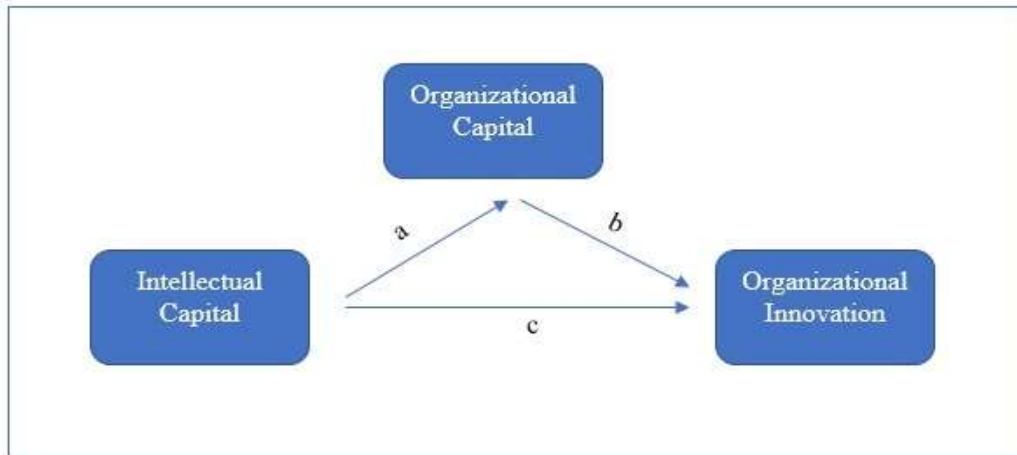
Both two types of innovation result from combining the new and the already existing knowledge, for instance, according to (Alguezaui and Filieri, 2010), a generation of innovation needs the establishment and application of new knowledge, and the attainment of the new knowledge is the direct result of SC (Nahapiet and Ghoshal, 1998; Kogut and Zander, 1992) as well as HC whereas the adoption of innovation depends on the duplication of existing knowledge. Yet, one needs to adopt a planned process that depends more on refinement and execution properties for such modifications. The two types of innovation offer different opportunities to attain newness in the market (Damanpour and Daniel Wischnevsky, 2006; Pérez-Luño et al., 2011; Pérez-Luno et al., 2014). For example, the type of innovation works for an organization's competitiveness by creating a new set of circumstances. In contrast, the adoption helps the organization tackle the performance gaps and the lack of new opportunities. According to Chahal & Bakshi (2014), the key role of firms' IC on OI influences the two dimensions such as OC and SC. The first finding shows that social capital favors firm product innovation. Secondly, OC has a positive effect on SC and also has an indirect effect on product innovation. Innovation activity can help the firm to stimulate communication and interaction between people.

According to Karchegani et al. (2013), the intellectual capital of a company indicates the value of ideas and the capability to be innovative for a longer period. Their findings show positive and significant relationships, which encourages the idea to assess the literature specifying the relationship between Innovation and IC. To accomplish the role of IC, only a little work is performed in Pakistan-specific sectors such as the Pakistan Banking sector. To our knowledge Makki (2008), Lodhi (2008), Kamath (2010), and Rehman et al. (2011) etc. are a few of them. They have mostly worked on different sectors in Pakistani banks, and still, there is a need for serious efforts to be placed in the Pakistan banking sector. As shown in Figure 1.





**Figure 1**  
*Conceptual Framework*



### 3. Research Methodology

In this part, the author reports the research methodology to accomplish the objective of research and resolve research problems. It specifically relates to the pattern of research performance by adopting logical steps that help study research problems. Research methodology defines the techniques and procedures for collecting data and statistical techniques to evaluate accurate results. According to Kothari (2004), discussing the methodology of research is not only the method, but it also includes the content and logic behind the specific research study. Also, the reason behind using such techniques and why to prefer it on other to capable the research results to be evaluated. Research philosophy is mainly related to the nature of knowledge with certain facts that show the importance of philosophical issues (Saunders et al., 2012). Firstly, it helps to identify the research method used for this research and judge the strategy to be applied. It also helps us know how to gather the data and obtain the answers to our research questions. Secondly, research philosophy also supports the assessment of methodologies to maintain appropriate methods for a research study. Thirdly, it also informs about the adjustment in research like selection and alteration (Easterby Smith et al., 2008). It is suitable for every research, and ignorance can affect research quality (Neuman, 2010).



#### 3.1. Research Measures

Research measurement outlines the study of the dependent variable (innovation), independent variable (Intellectual capital), and mediating variable. Mediating variable denotes organizational capital (OC), dependent variable denotes the Organizational Innovation (OI), and independent variable denotes intellectual capital (IC), including its components such as HC, SC, and CC, which measures through the quantitative survey. Measurement of variables in research held with reflective indicators as first-order factors where items are measured occurs on a five-point scale appropriate to the banks that ranging “1= strongly disagree” to “5 = strongly agree”.

#### 3.2. Research Design

The study utilized Barron & Kenny's (1986) mediation analysis that includes steps and procedures, as shown in Figure 1 above.

- Intellectual capital predicts organizational capital, which is Path a.

- Organizational capital predicts organizational innovation, which is Path b
- Intellectual capital predicts organizational innovation, which is Path c.

Haye's (2009) approach has been followed to check whether the mediation is partial or full. Below is the mathematical expression for Mediation Analysis.

$$Y = \alpha y + \beta X + e \quad (1)$$

$$M = \alpha m + \beta X + em \quad (2)$$

$$Y = \alpha y + c'X + \Omega M + ey \quad (3)$$

$$Y = \alpha y + c'X + \Omega(\alpha m + \beta X + em) + ey \quad (4)$$

$$Y = (\alpha y + \alpha m) + \Omega\beta + (c')X + (ey + \Omega(em)) \quad (5)$$

To save time and money and obtain accurate results, we gather data from the selected population sample using different sampling methods that will probably be littler and progressively particular. Scientists should not accept that the outcomes rely upon gathering information from the whole populace (Lohr, 2009). Data collected from surveys are more valuable. Thus, the sample selection is important (Howitt and Cramer, 2011). Due to certain reasons, the sample seems to be a valid option compared to the census. Reasons given by (Kotharia 2004) are:

1. Generally, a sample study is associated with experienced and prepared investigators. Consequently, it might be estimated precisely.
2. The sampling method is time-saving and less money-consuming than a census.
3. Sampling is viewed as the best technique to gather information among a huge or unlimited populace.

Sample size should be chosen cautiously to represent the population (Vogt, 2007; Bordensand Abbott, 2014). Two strategies can be adopted for sampling purposes from a population: random sampling and non-random sampling. Non-random sampling is grouped into other kinds: quoted sampling, snowball sampling, and purposive sampling (Saunders et al., 2009). Most analysts are inclined toward random sampling because such an example improves the outer legitimacy, and therefore in choosing the sample, researchers can avoid bias. Four strategies are distinguished from sampling: simple, systematic, stratified, and cluster random sampling. They can be directed in two different ways: single-stage testing and multi-stage group (Saunders et al., 2009).

Before selecting a sample, the researchers should determine a sampling unit in different ways, such as a social unit, a geographical unit, or a construction unit that may be an individual (Kotharia, 2004). Hence the study aims to know about the relationship between IC & OI in Pakistani banks.

#### 4. Results and Discussion

The statistical package for social sciences (SPSS) version 20 is used to analyse data. The researchers suggested rules of thumb for minimal sample size that rely on the number of measured variables; our sampling size is 384 – the present population of the study is between 75000 and one Million, therefore according to Sekaran (2003, p. 294), table 384 sample



should be selected. The frequency distribution and descriptive statistics analysed the respondent's demographic characteristics. The questionnaire method was used for descriptive and is considered the most appropriate data collection method for researchers. Frequency table, Descriptive statistic, Reliability test, and simple regression results are found for each path. Reliability is checked through Cronbach alpha. The Barron & Kenny (1986) procedure is followed to investigate the relationships.

**Table 1**  
*Gender Profile of the Respondents*

Particulars	Frequency	Percent	Cumulative Percent
Female	43	11.3	11.3
Male	336	88.7	100
Total	379	100	100

In this survey, the total questionnaire was distributed was 384, and the number of respondents who replied was 379. Among them, 336 were male, and 43 were females, according to which male respondent percentage is 88.7 and female respondent percentage is 11.3. It also shows that the male gender obtained the most responses. As shown in Table 1.

**Table 2**  
*Education Level of Respondents*

Particulars	Frequency	Percent	Cumulative Percent
Bachelor's degree	76	20.1	20.1
Graduate and Post-Graduate Studies	303	79.9	100
Total	379	100	100

My survey participants were the people of the banking sector having the following qualification, i.e., bachelor's degree and advanced studies. Approximately 20% of the respondents had a bachelor's degree. In comparison, nearly 80% of the respondents had higher education which shows that most respondents of my survey belong to the advanced studies group. As shown in Table 2.

**Table 2**  
*Descriptive Statistics*

Particulars	N	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Intellectual Capital	379	4.2817	0.82605	-1.32	0.125	0.694	0.25
Organizational Innovation	379	4.2982	0.92693	-1.254	0.125	0.286	0.25
Organizational Capital	379	4.2076	0.852	-1.155	0.125	0.505	0.25

The three variables were intellectual capital, innovation, and organizational capital, and the sample size was 379. The average score for Intellectual Capital Awareness was 4.28, innovation agreement was 4.29, and organizational capital awareness was 4.20. The dispersion for sample for intellectual capital was 0.82, innovation was 0.92, and organizational capital was 0.85, which showed that according to the data, the sample size is negatively skewed for intellectual capital, innovation, and organizational capital such that they are mostly on the negative side. Therefore, they are negatively skewed while keeping the value for standard error is 0.12. The values for kurtosis were close to zero for all three variables, so as we know that if the kurtosis value is greater than or close to zero, then the



distribution is the heavier tail, and called leptokurtic, its distribution has the positive kurtosis value. As shown in Table 3.

**Table 4**

*Reliability Statistics*

Variables	Cronbach's Alpha	Items
Organizational Innovation (DV)	0.947	9
Intellectual Capital (IV)	0.973	8
Organizational Capital (Mediator)	0.887	6

Source: Author's Analysis on SPSS V20

The data has been checked for reliability testing to check whether we can use the data for future analysis. The method used for testing reliability was Cronbach's alpha. Value for innovation was 0.94, value for intellectual capital was 0.97, and the value for organizational capital was 0.88, which showed that the values for the three variables were above 0.7, so the reliability value is more than 0.7, so we can use it for further analysis. Total questions for innovation were 9, for intellectual capitals were 8 and for organizational capitals were 6, through which we are measuring this phenomenon for reliability. We test for reliability to check whether the responses of the people in the sample are reliable or not, and we can use it for analysis or not. As shown in Table 4.

#### 4.1. Path “c” Findings

In Path c, we have one dependent variable, OI, and one independent variable, IC; therefore, it's a simple regression. To check whether this model is adequately fitted statistically or not, we performed an F-Test which showed that we could test this model because the p-value is less than 0.5. Beta value 0.99 and standardized beta value is 0.89, which showed that it's positively significant. Therefore, it showed that intellectual capital affects innovation in the banking sector because the value of standardized beta and unstandardized beta is significant, and the t-value is greater than 1.96; therefore, we claim that intellectual capital affects innovation positively and statistically significant. R<sup>2</sup> is 0.78, which means that the intellectual capital gives 78% of the explanation of the innovation. In comparison, the remaining 22% is unobserved, so this 78% is called the coefficient of the determination. We claim that the IC explains 78% of the explanation of the changes in innovation. As shown in Table 5.

**Table 5**

*Regression Analysis for Intellectual Capital and Organizational Innovation*

IV	B	t-value	Sig	R2	Standardized Beta
Intellectual Capital	.99**	37	0.000	.78	0.89

\*P < 0.05, \*\*p < 0.01, \*\*\*p < .001 N=379 unstandardized and Standardized regression coefficient reported. Because. F (1,377) =1370, P-value<0.01

#### 4.2. Path “a” Findings

In Path a, we have one dependent variable (Organizational Capital) OC and one independent variable (Intellectual Capital) IC; therefore, it's a simple regression. To check whether this model is adequately fit statistically or not, we performed an F-Test which showed that we could test this model because the P-value is less than 0.5. The beta value is 0.79, and the standardized beta value is 0.77, which shows that it's positively significant.





Therefore, it showed that intellectual capital affects organizational capital in the banking sector because the value of standardized beta and unstandardized beta is significant. The T-value is greater than 1.96; therefore, we claim that intellectual capital positively affects innovation statistically significantly. R2 is 0.59, which means that the intellectual capital gives 59% of the explanation of the organizational capital. In comparison, the remaining 41% of observations were unobserved, so this 59% is called the coefficient of the determination. We claim that the IC explains 59% of the change in OC. As shown in Table 6.

**Table 3**

*Regression Analysis for Intellectual Capital and Organizational Capital*

IV	B	T-value	Sig	R2	Standardized Beta
Intellectual Capital	.79	23.35	0.000	.59	0.77

\*P < 0.05, \*\*p < 0.01, \*\*\*p < .001 N=379 unstandardized and Standardized regression coefficient reported. Because F (1,377) =545, P-value <0.01

### 4.3. Path “b” Findings

In Path b, we have one dependent variable, OI (Organization innovation), and one independent variable, OC (Organizational Capital); therefore, it's a simple regression. To check whether this model is adequately fitted statistically or not, we performed an F-Test which showed that we could test this model because the p-value is less than 0.5. The beta value is 0.39, and the standardized beta value is 0.36, which shows that it's positively significant. Therefore, it showed that Organizational capital affects innovation in the banking sector because the value of standardized beta and unstandardized beta is significant, and the T-value is greater than 1.96; therefore, we claim that Organizational capital affects innovation positively and statistically significant. R2 is 0.84, which means that the Organizational capital gives 84% of the explanation of the innovation. In comparison, the remaining 16% is unobserved, so this 84% is called the coefficient of the determination. We claim that the organizational capital explains 84% of the explanation of the changes in innovation. As shown in Table 7.



**Table 4**

*Regression Analysis for Organizational Capital and Organizational Innovation*

IV	B	T-value	Sig	R2	Standardized Beta
Organizational Capital	0.39	18.7	0.000	.84	0.36

\*P < 0.05, \*\*p < 0.01, \*\*\*p < .001 N=379 unstandardized and Standardized regression coefficient reported. Because. F (2,377) = 970, P-value <.001

### 4.4. Mediation Analysis

Tables 5, 6, and 7 reported three individual regression models, which fulfil the criteria for mediation analysis. Table 8 shows the impact of intellectual capital on organizational innovation with the mediation role of organizational capital. According to Baron & Kenny (1986), mediation is present when the direct path results are reduced. The findings showed that the direct path relationship was reduced when organizational capital was introduced as a mediator. Initially, the values for an unstandardized bet of 0.89 and 0.99 for organizational innovation and organizational capital reduced to 0.61 and 0.68, respectively. Thus, it is

observed that partial mediation ( $0.79 \times 0.39 = 0.308$ ) of organizational capital is present between intellectual capital and organizational innovation.

**Table 8**  
*Mediation Analysis*

IVs	B	T-value	Sig	R2	Standardized Beta
<b>Organizational Capital</b>	.31	11.13	0.000		0.36
<b>Intellectual Capital</b>	.68	18.7	0.000	.84	0.61

\* $P < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < .001$  N=379 unstandardized and Standardized regression coefficient reported. Because.  $F(2,377) = 970$ ,  $P\text{-value} < .001$

#### 4.5. Summary of Hypotheses Testing

**Table 9**  
*Hypotheses Testing*

Hypotheses	Statement	Findings
<b>H1</b>	Intellectual Capital has a significant positive impact on organizational innovation	Supported
<b>H2</b>	Intellectual Capital has a significant positive impact on organizational capital	Supported
<b>H3</b>	Organizational Capital has a significant positive impact on Organizational Innovation	Supported
<b>H4</b>	Intellectual Capital has a significant positive impact organizational innovation with the mediating role of organizational capital	Supported

From the findings, it is observed that all the projected hypotheses are accepted. All the references discussed in the prior section have supported the proposed hypotheses that several prior scholars have studied. For instance, according to Barkat et al. (2018), Intellectual capital (IC) has much influence in value creation for established nations that seems to be in progressing stage. The study found significant positive effects of organizational performance among the dimensions of IC. Maboudi et al. (2015) explain that correlation tests discovered a significant positive relationship between IC and OI. Structural and human capital did not specify any significant relationship with innovation. But it is observed that the elements of intellectual capital can be used as predictors of innovation. Badir et al. (2016) explains the individual and interrelated effect of IC on OI where the result suggests that OC brings a significantly positive effect on OI.

Furthermore, the interaction of social capital enhances the impact of OC on OI. According to Karchegani et al. (2013), the intellectual capital of a company indicates the value of ideas and the capability to be innovative for a longer period. Their findings show positive and significant relationships, which encourages the idea to assess the literature on the relationship between OI and IC. According to H. Chahal and P. Bakshi's (2014) findings, the First finding shows that social capital favors firm innovation. Secondly, the OC positively affects social capital and indirectly affects product OI. All these statements support my hypotheses which show the direct effect of IC on OI and the indirect mediating effect of OC on OI. As shown in Table 9.



#### 4.6. Conclusion

Over the last decades, great changes have been witnessed by the banking industry, and banks have existed in a highly uncertain and competitive environment. Banks have suffered from the financial crisis, and even many declared bankruptcies. Many fast-growing economies experienced this crisis, in some cases leading to the complete collapse of the economy. To survive in this environment, the banks have adopted a variety of innovative tools. By searching for the most significant resources in the knowledge-based economy, IC played an important role in reinforcing innovations.

The study was designed to investigate the causal relationship between innovation and intellectual capital in the Pakistani banking sector. The study adopted positivist philosophy, and the tools for the analysis were a simple linear and multiple regression model and the other descriptive statistics. The study findings indicated that the measurement scale used is reliable and valid. The results also suggest that all mentioned variables have a significant causal relationship, and hence all the proposed hypotheses stand accepted. The study explores and confirms the causal relation between IC and OI with the mediating role of OC.

#### 4.7. Limitations and Future Research Directions

Like any other study, this study also has some restrictions. At first, it was a cross-sectional study, so it could not gather longitudinally to observe the modification through the innovation process in IC. Secondly, this study has been applied to the banks of Pakistan so it could be approved in the created nation. Thirdly there are various other mediators one may look for in future investigations regarding IC, such as its other impacts on innovation and different sorts of development. Fourthly, the investigation of this study suggested the benefits of innovation for the formal-informal associations.



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