

## **Impact of Intellectual Capital on Organizational Creativity through Technical Innovation in Telecom Sector Sizes**

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### **Abstract**

The purpose of the study was to examine the impact of Intellectual Capital on organizational creativity through Technical Innovation in telecom sector. The level of Intellectual Capital was measured through its three elements. The first one is human capital, second is relational capital, and last is organizational capital. The telecom sector was selected as it is the most growing sector of the economy and its employees are highly educated. A questionnaire was used as research instrument and data is collected by using the Stratified Random Sampling technique. Study used sample size of 303 employees working in telecom sector of Lahore. Data of the study was analyzed with the help of different tests; Cronbach's Alpha Estimates for the Reliability, Frequency Test, descriptive Statistics, Regression Analysis, Correlation Test and Mediation Analysis is applied to check the Mediation Effect through Bootstrapped method. The study results showed the significant impact of Intellectual Capital on organizational creativity through mediating role of Technical Innovation. The response rate of the respondents was 80.33%. This study will help these organizations to develop their Intellectual Capital which brings creativity in organizations by providing new products and services according to the changing demand of the market. The future guidelines and limitations of the study are discussed.

### **Keywords**

Intellectual Capital, Organizational creativity, Technical innovation

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## **1. Introduction**

Today's business environment is changing with the passage of time because of competition, globalization, short product life cycle and rapid changing technology. Due to this environmental change, business organizations are continuously facing the challenge to provide the better and quality products and services in order to perform better than competitors (TEECE, 2007). In this context, tangible resources are insufficient for maintaining the competitive position in the market because just financial resources and physical resources are include in that type of resources. So there is also the need of intangible resources which are called the knowledge and intellectual of the employees of organization (Andriessen, 2004). Intellectual Capital is considered an important asset for organization in today's knowledge based economy because organizations can identify the Intellectual Capital and utilize their Intellectual Capital to stay in the competitive environment (Khalique, 2011). The survival of any organization depends largely on its ability to innovate, within the increasingly globalized world. Organizations must be innovative to face the competition to remain viable in this context. The Intellectual Capital increase the business performance and overall country's economic growth because it is considered the most vital source of competitive advantage of various organizations (Kaimenakis, 2007). Creativity is the basic element of invention and thus Innovation because Innovation exists in a place where creativity is present. Organizational creativity begins with creative people (Oldham and Cummings, 1996). Innovation in organizations can come in case of creating and applying better knowledge for organizations to attain the competitive position in the market. The main focus of the study is to examine the impact of Intellectual Capital on organizational creativity through Technical Innovation in telecom sector. The research objectives of study are:

- To examine the Intellectual Capital impact on the organizational creativity in telecom sector.
- To examine whether Technical Innovation (Product/Process Innovation) mediate the relationship of Intellectual Capital (human/organizational/relational capital) to organizational creativity in the telecom sector.

This study is quantitative in nature as data is collected from the employees of the five telecom companies Mobilink, U-fone, Telenor, Warid and Zong by using questionnaire as a tool for data collection. The results of this study give the better

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understanding about the dimensions of Intellectual Capital and components of Technical Innovation. This study also provides the information about organizational creativity. It is helpful in determining the intellectual capabilities of employees working at middle level, lower level and at top level in the mobile network operators of Lahore. Organization can become more creative by improving the intellectual capabilities of employees and improving the organization structure.

## **2. Literature Review**

Intellectual Capital (IC) is knowledge or information which grants the owner competitive advantage (Wang, 2005). Intellectual Capital is also defined as knowledge generation, knowledge about knowledge and how these processes might be leveraged into some form of social or economic value (Jørgensen, 2006). Intellectual Capital is also called the sum of the skills and knowledge ability of each employee who takes performance and creates wealth for business. Intellectual Capital is defined as collection of useful knowledge about structure of organization, human capabilities of organization and external relationships with suppliers (Stewart, 1997). Intellectual Capital is considered very much important for business success in form of inter organizational and social relationship. Social Capital (SC) provides a base for creating inter organizational relationship. The processes of Intellectual Capital are facilitated through social interaction and consistent social relationships. Therefore, firms can improve management relationship with organization and generate more Intellectual Capital for firms (Agdal and Nilsson, 2006). The researcher has explored the concept of knowledge management and Intellectual Capital and their relationship with Innovation in the organization. Some critical factors are considered to increase the Innovation level and Intellectual Capital level. Critical factors to successful Innovation are having vision and innovative strategy, having Innovation supporting culture and Innovation champion. Innovation and knowledge management are considered as long term strategic concerns (Egbu, 2004). The researcher has explored the concept of Intellectual Capital and new product development. Newly developed product is accepted easily and instantly in the market as the Intellectual Capital of the organization increases. Due to structural capital of organization, organizational learning capacity is affected negatively and relational capital significantly affects the absorption capacity (Ahmadi and Saeidpour, 2012). The concept of Intellectual Capital is developed by including the three elements which are human's knowledge ability, organization's ability to use new technologies and ability of organization to maintain relationship with external world. These three

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elements of Intellectual Capital are used for developing the intellectual capabilities of any organization (Bontis, 1998).

Human Capital (HC) is called the value of the knowledge and talent of people who make up the organizations. It is representing human's capacities, knowledge and talent or competence of the employees (Bontis, 2002). Some other researchers have defined that Human Capital refers to the human aspect of the organization which may include the combination of skills, qualifications and experience of individual. It was further emphasized on the importance of human ability to develop change and make Innovation within the organization by motivating them. In this way organization remain sustainable for long time period (Bontis, et al., 1999). Currently, the knowledge and skills of employees are very much important to any organization; however, several research studies have recognized that additional formation and knowledge creation does not necessarily lead to improved performance (Santos-rodrigues, 2010). Employee's training is considered as a springboard to raise the educational level of the company and consequently influence the Innovation capacity (Sanchez, 2000). An organization must show innovative attitude towards its employees so that they can perform well by utilizing their own capabilities to innovate. An organization never expects that innovative behavior is the result of isolated employee's initiatives. Therefore, incentives of company are crucial for the retaining the employees in the organization. (Mouritsen, 2001). Many industries consider it the important resource for their software development, management and some other financial service. Software developers with high level of intelligence, competencies and skills lead to level of organizational performance. Human Capital is also the cause of production of goods and provides services. New Innovation in the marketplace take place due to development of this capital (Seleim and Ashour, 2007).

Structural Capital (SC) refers to the capital allocated to the structure of the organization. Structural Capital can be defined as the knowledge and skills of employees which are used for the structure of organization and new technology and software are used. The organization's non-material assets are also considered Structural Capital. It also refers to the transformation of the individuals knowledge who actively share information (Youndt and Snell, 2004). A company with poor organizational structure can not avail from the intellectual ability of individuals because an individual with high intellectual ability employed in this company cannot utilize its abilities and efficiencies (Cabrita, 2008). Structural Capital refers to the environment which is created among employees that

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improves behavior of individuals and they are considered as the culture of Innovation (Sashittal, 2003).

Relational Capital (RC) is defined as the level of interaction among the alliance partners. Relational Capital develops confidence among the individuals so that nobody can exploit others even if he has opportunity to do this. The learning level of individuals can be increased by developing this capital. Partners of strategic alliances can also protect their core proprietary assets through relational capital (Kale, 2000). Relational Capital is considered the heart of relationship management. For relationship marketing, managers focus on individuals and individual's relationships and their interaction with the organizational level of relationships (McLaughlin, 2010). The some other researcher has conducted the research to examine the association of relational capital with the start-up firms. This relationship is explained by the surrounding of the firms which increase the firm's value creation. Firms can be successful at very early stage with support of large social network of entrepreneur. As the entrepreneur increases relationship with customers and suppliers, the more firm will be successful. (Hormiga, 2011). When Employees working in a social environment create useful products and services and develop new business processes, procedures and ideas for creation of value for organization, it is called creativity in the organization (Woodman, 1993). Creativity is the basic element of invention and thus Innovation because Innovation exists in a place where creativity is present. If creative ideas of employees are implemented within an organization successfully, it is called Organizational Innovation which is better for long term organization success (Amabile, 1997). Another researcher studied the creativity as a fuel of Innovation. A creative work environment starts with management. If management is able to be creative within organization, a creative work environment can be created for all organizational members. So, there is a need to develop organization culture that value creativity, Innovation and change. In this way performance of organization can be increased (Gilmartin, 1999).

Innovation is complicated and continuing process that requires individual and organizational creativity (Patterson, 2002). Innovation can be defined a system, process or product and idea that can be perceived new by the individuals (Rezgui, 2000). Innovation is also called the generation of new ideas and knowledge for development of new products and facilitation of business operations continually (Yang and Lu, 2009). On the other hand, Innovation may be considered Process Innovation, Product Innovation or service and organization (Damanour, 1991). Technical Innovation refers to the development of knowledge, skills and

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information which can be used for adoption of new products, services, or process. The other types of Innovation are also considered for adoption of Innovation and knowledge development (Cooper, 1998). Considering the relationship of Intellectual Capital with Innovation, firms can create a favorable environment with strong Structural Capital and can utilize Human Capital with full potential. In this way firms can boost its Innovation Capital and Customer Capital. The researcher suggests that organization not only hire the creative people for expectation of superior Innovation performance but also examine the role of organizational creativity mechanism in enhancing innovative performance of the firm.

### **3. Theoretical Framework**

Figure 1 shows the variables of the study in which independent variable is Intellectual Capital with dimensions and dependent organizational creativity and mediator is Technical Innovation.

### **4. Research Methodology**

The main focus of the study is to inspect the Intellectual Capital impact on organizational creativity through Technical Innovation in telecom sector. This study is Cross Sectional as the data is collected only once. The study is deductive in nature as the investigation involves Hypothesis Testing. The targeted population of the present study is all the Mobilink, U-fone, Warid, Zong and Telenor franchise in Lahore. The population studied is the employees who are working in these organizations at top level, middle level and lower level. Stratified Random Sampling technique is used for collection of data. Data is collected from 15 branches of each company. So, the sample consists of 75 franchises which are working in the Lahore. For this study, 370 questionnaires were distributed and 330 were returned and 303 were analyzable, remaining was rejected due to incorrect filling. Five point Likert Scale is used and response rate of respondents was 80.33%. To analysis the data, SPSS software is used and Descriptive Test, Reliability Test, Pearson Correlation, and Multiple Regression and Mediation Test are applied to test the data. Reliability is checked by using the tool which is Cronbach's Alpha. The Reliability for whole scale instrument is .912 and for individual variables, the Reliability for Intellectual Capital is .824, for Technical Innovation is .701 and for dependent variable organizational

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creativity is .835. All these Cronbach's values are showing the most significant nature of the variables. Multiple Regression equation formed for test is,

$$\text{Organizational creativity} = \alpha + \beta_1(\text{HC}) + \beta_2(\text{OC}) + \beta_3(\text{RC}) + e$$

This equation shows the effect of Intellectual Capital components on organizational creativity and  $e$  shows the error term which is added for reducing the other variables effect on organizational creativity directly or indirectly effect.

## **5. Study Findings**

**5.1 Demographic Analysis:** Table 1 shows the demographics profile of the respondents. The majority of the respondents are male. i.e. 59.1% and 40.9% are female respondents. Respondents with graduate degree are 28.7%, respondents with master degree are 42.9% and respondents with M.Phil degree are 28.4%. The majority of respondents are from age group 20-30 years and the percentage is 57.8%. The percentage of respondents from age group 31-40 is 33% and 21 respondents are from 41-50, their percentage is 6.9% and there are only 7 respondents whose age is less than 20 years. Most of the respondents have experience of less than 5 years and between 5-10 years which percentage is same as 42.2%, 36 respondents have the experience between 11-15 years with 11.9%. 10 respondents have experience of 16-20 years which percentage is only 3.3%. Only 1 person has experience above 20 years. Out of 303 employees, 82 are top level, 164 are middle level and 47 are low level employees. The majority of the employees are middle one.

**5.2 Descriptive Analysis:** The Table 2 shows that mean value of Human Capital is 4.0198 and its standard deviation is .53500 which shows mean value is greater than 2 and standard deviation is also appropriate that indicate responses strongly exhibit Human Capital. The mean value for Organizational Capital and Relational Capital is 3.9678 and 4.0515, and standard deviation is .62805 and .50270, respectively. Both values are appropriate which shows the existence of variables. The mean for Product/Service Innovation and Process Innovation is 3.8977 and 4.0561 and standard deviation is .60852 and .49474, respectively. All values are appropriate and mean value is greater than 2 which show variables existence. The mean value and standard deviation of organizational creativity is 3.9713 and .58219, respectively indicating the prevalence of organizational creativity.

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**5.3 Correlation:** In the current study, Normality of data is fulfilled thus Pearson Correlation is applied to examine the relationship of the organizational creativity with Intellectual Capital and its three dimensions and with Technical Innovation. The Correlation matrix in Table 3 shows the highly positive and significant relationship between all the study variables. The association between Human Capital and Product/Service Innovation is significant as  $r$  value .596 shows the moderate Correlation. The relation of Organizational Capital and Product/Service Innovation is also significant as  $r$  value is .579. The relation of Relational Capital and Product/Service Innovation is significant as  $r$  value is .483. The  $r$  value of Process Innovation for Human Capital is .486, for Organizational Capital the value is .406 and for Relational Capital the value is .392. All these values are showing significant relation with these variables. The  $r$  value of organizational creativity for Product/Service Innovation and Process Innovation is .585 and .467, respectively, showing significant correlation at 0.01 level of significance.

**5.4 Regression Analysis:** Through Regression Analysis, we can check how one variable is affected by making the change in another variable. If there is no change in variables or it remains constant, the Effect of variable is not checked. Adjusted  $R^2$  value shows that 49.9% change explained in organizational creativity is due to Intellectual Capital. The value of F-test shows the significance level mean showing the Good Fit model as it is 101.43 at 5% level of significance. The beta values for Human Capital, Organizational Capital and Relational Capital are .299, .287 and .292 respectively, all these relationship are significant at 1% level of significance as shown in Table 4, 5 and 6. The largest beta coefficient is 0.299 which is for Human Capital. Therefore, Human Capital has the strongest impact on organizational creativity.

**5.5 Mediation Analysis:** Mediation Analysis is applied to examine the relationship of the independent variable and dependent variable through the inclusive of third explanatory variable, known as the mediator variable. The Mediation model shows the P value = .000 which is showing the significant impact of Intellectual Capital on organizational creativity through Technical Innovation. Technical Innovation is showing the partial Mediation between the Intellectual Capital and organizational creativity because Intellectual Capital may also directly affect the organizational creativity. At 95% confidence interval, the range for Total Effect is .1178 - .3529 and Estimated Effect is .2001 for Total Effect column. The Estimated Effect value for individual Mediator is .1310 which lies between the upper and lower limit of the Technical Innovation and zero does



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not lie between this ranges. So, Technical Innovation acts as mediating variable between Intellectual Capital and organizational creativity. (Table 7-13)

## **6. Conclusion**

From the above results it is concluded that three dimensions of Intellectual Capital have significant impact on the organizational creativity. One of the elements of Intellectual Capital that is Human Capital has greater impact on creativity of organization than other two elements. The reason behind is that as the human intellectual of the organization increase, the creativity also increase in the organization. Three dimensions of Intellectual, Human, Organizational and Relational capital have positive significant relation with the elements of Technical Innovation Product and Process Innovation. Organizational creativity has positive and highly significant relation with two elements of Technical Innovation which are Product and Process Innovation. The study objective was to see the impact of Intellectual Capital on organizational creativity which is achieved by accepting the hypothesis and the second objective was to examine the impact of Intellectual Capital on organizational creativity through the Mediation of Technical Innovation which is also attained by accepting the proposed hypothesis. From study finding it is concluded that Intellectual Capital impact on organizational creativity through the Mediating Effect of Technical Innovation, as Technical Innovation play a Mediator role between the relationship of Intellectual Capital and organizational creativity.

The study was concluded only in franchise sector which is the sub sector of services sector. Due to time and financial constraints the study was able to conduct field research in few franchises and to collect only limited number of response. Due to the shortage of time data was only collected from single city Lahore. The data was cross sectional as it was not longitudinal as the cross section does not provide the casualty of inferences. There were no personal interviews as the data was only collected through questionnaire.

This study provides a complete investigation on the Mediating Effect of Technical Innovation on Intellectual Capital and organizational creativity relationship in telecom sector. This type of study may be conducted in another sector like manufacturing sector, energy sector and banking sector. In this study questionnaire was adopted for data collection. The other researchers can use the interview technique for collection of data for achievement of more reliable results. The elements of Intellectual Capital should strengthen. In order to fortify the

Structural Capital manager should focus on organizational culture, information technology and organizational processes. To strengthen the Customer Capital, firm should improve the communication with customer on regular basis.

Since Intellectual Capital is the forecaster of organizational creativity. Through creativity, organizations generate different ideas. In order to succeed in the competitive world, one must create different ideas and brings different Innovations in the market. When an organization is representing itself with different innovative ideas, this thing makes them uniquely identified from others. An organization should hire employees with more creativity skills, so they along with other creative employees make organization distinctive from competitors. This study would help the telecom sector to know the importance of Intellectual Capital and what are the factors that are contributing to it.

**Table 1:** Demographics profile of respondents

Descriptions		Frequency	Percentage
Gender	Male	179	59.1
	Female	124	40.9
Qualification	Graduate	87	28.7
	Master	130	42.9
	M.Phil.	86	28.4
Age	Less than 20	7	2.3
	20-30	175	57.8
	31-40	100	33.0
	41-50	21	6.9
Experience	Less than 5 Years	128	42.2
	5-10 years	128	42.2
	11-15 years	36	11.9
	16-20 years	10	3.3
	Above 20 years	1	.3
Position level	Top level	82	27.1
	Middle level	164	54.1
	Lower level	57	13.3

**Table 2:** Mean and standard deviation of variables

Variables	Mean	Std. Deviation
Human capital	4.0198	.53500
Organizational capital	3.9678	.62805
Relational capital	4.0515	.50270
Product/service Innovation	3.8977	.60852

Process Innovation	4.0561	.49474
Organizational creativity	3.9713	.58219

**Table 3:** Correlation matrix

	1	2	3	4	5	6
1 -Human capital	1					
2 -Organizational capital	0.636**	1				
3 -Relational capital	0.518**	0.573**	1			
4 -Product/service	0.596**	0.579**	0.483**	1		
5 -Process Innovation	0.486**	0.406**	0.392**	0.432**	1	
6-Organizational creativity	0.602**	0.629**	0.572**	0.585**	0.467**	1

\*\*Correlation is significant at the 0.01 level (2-tailed)

**Table 4:** Model summary

R	R square	Adjusted R square	Std. error of the estimate
.710	.504	.499	.41191

**Table 5:** ANOVA model

Model	Sum of Square	DF	Mean Square	F	Significance
Regression	51.629	3	17.210	101.430	.000*
Residual	50.731	299	.170		
Total	102.360	301			

**Table 6:** Regression coefficients

Variables	B	Stan. Error	t-statistics	Sig.
Constant	.447	.214	2.094	.037
Human capital	.299	.059	5.052	.000
Organizational capital	.287	.053	5.460	.000
Relational capital	.292	.059	4.923	.000

**Table 7:** Independent variable to Mediators

Variable	Coefficient	Se	T	P
Technical Innovation	.6866	.0413	16.6388	.0000

**Table 8:** Direct Effect of Technical Innovation on organizational creativity

Variable	Coefficient	Se	T	P
Technical Innovation	.3251	.0675	4.8125	.000

**Table 9:** Total Effects of Independent Variable on Dependent Variable

Variable	Coefficient	Se	t	P
Intellectual Capital	.8769	.0501	17.5013	.000

**Table 10:** Direct Effects of Intellectual Capital on Organizational creativity

Variable	Coefficient	Se	t	P
Intellectual Capital	.6537	.0670	9.7569	.000

**Table 11:** Model summary for Dependent Variable model

R2	Adj-R2	F	Df1	Df2	p
.5399	.5368	176.0028	2.0000	300.0	.000

**Table 12:** Indirect Effect of Independent Variable on Dependent Variable through Proposed Mediator

Variable	Effects	Se	Z	P
Technical Innovation	.2232	.0481	4.6378	.0000
Total	.2232	.0481	4.6378	.0000

**Table 13:** Indirect Effect of Independent Variable on Dependent Variable through Proposed Mediator

Effects	Data	Boot	Bias	Se	Lower	Upper
Technical Innovation	.2232	.2254	.0022	.0607	.1178	.3529
Total	.2232	.2254	.0022	.0607	.1178	.3529

Confidence level for Confidence Intervals: 0.95

Number of Bootstrap Re-samples: 1000

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