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# The Mediating Role of Knowledge Sharing on Relationship between IT Capability and IT Support as Predictors of Innovation Performance: An Empirical Study on Mobile Companies in Iraq

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**Abstract**

The purpose of this research is to examine the relationship between the IT capability and IT Support to predict Innovation performance via the mediating role of knowledge sharing as a vital matter in mobile communication companies in Iraq. The suggested model was designed of IT capability and IT Support as an independent variables, while Innovation performance as a dependent variable. To determine IT capability and IT support on Innovation performance and may asked of the employees in these companies for questionnaire responses. Population was consisted of four mobile communication companies in Iraq and participants 276 employees were selected. Based on a number of relevant measures of research topic, the hypotheses have been prepared. The data were analyzed statistically using structural equation model (SEM) and factor analysis to extract results. The regression analysis results indicate to a positive and statistically significant association between IT capability and IT Support on Innovation performance. Based on this, the researcher recommends the staffs to encourage the use of IT support for expand knowledge and promote innovation performance in these companies.



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*Keywords:* IT Capabilities, IT Support, Innovation Performance and knowledge sharing;

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## 1. Introduction

In the literature of strategic management recognizes innovation as a crucial catalyst for companies to create value, maintain competitive advantage in an increasingly complex, and change environment (Madhavan and Grover, 1998; Subramaniam and Youndt, 2005). Companies that have largest innovation be more successful in responding to the complex environments and the development of new capacity allow it to achieve the best performance (Montes et al., 2004; Chen and Huang, 2009). Actually, innovation is very important for companies that are trying to find their place in the market and to ensure survival in the long term (Kamasak & Bulutlar, 2010, p.306). Today, innovation is a key to an organization's success and sustainable development. However, the innovation process relies heavily on knowledge and how can sharing this knowledge which represents more than data or information simple. Nonaka (1994) claimed that the knowledge creation is a considered as a prerequisite of innovation and competitiveness. Gloet and Terziovski (2004) confirmed Knowledge power is lies in the owned, the underlying implicit values that support the learning process.

The previous studies about the knowledge and competencies recognize the value of human resources assets for companies because of the characteristics of a specific company (Collins and Clark, 2003; Wright et al., 2001; Youndt et al., 1996; Lado and Wilson, 1994). The knowledge-based view describes companies as warehouses of knowledge and competencies (Spender, 1996; Grant, 1996). Although, there is a lot of the debate on knowledge and their relations with innovation in the present literature, but a few studies have addressed the influence of sharing of knowledge on innovation performance (Abidin, Mokhtar & Yusoff, 2011). Based on this, the present study attempts to address the link of IT capability, IT support and innovation performance from the knowledge-based view. In spite of company has access to the knowledge, skills and experience of the staff, may be need to possess a good technology capabilities in the management tools to ensure the effective use of human capital in the develop of technological expertise for innovation (Chen & Huang, 2009). One very important element that affects innovation performance of an organization is information technology which enhance of knowledge sharing (Jie and Zhengang, 2010). Sohail and Daud (2009) confirmed the knowledge sharing is to making available of knowledge and utilized into learning. Indeed, the knowledge sharing allows members of the organization to acquire more knowledge and provides an effective tool to maintain competitive advantages. Based on this, the aim of this research is to examine the relationship between IT capability, IT support and innovation performance through mediating role of knowledge Sharing. The next sections of this research considers the relevant literature of hypotheses, methodology, presented the results of this research and highlights future research directions.

## 2. Research background and hypotheses

### *2.1 Innovation Performance*

The researchers have identified the relevant literature of innovation performance of a different points of view. Dan and Yi-Qin (2011) Innovation performance is a concerted effort from different of innovative elements. Based on Alshekaili and Boerhannoeddin (2011), innovation performance is orientation of the company to support new and creative ideas. Leavengood and Anderson (2011) innovation performance is defined as a multi-dimensional aspects include product innovation and process innovation, and business systems innovation. Furthermore, Wang and Ellinger (2011, p.516) defined innovation performance as "an idea, product, process, system or device which is seen as a new to an individual, a group of persons or companies or a society as a whole". Prajogo, Power and Sohal (2004) they identified two types of innovation performance are product and process. Also, stressed that knowledge management has substantial positive relationship to both product innovation and process innovation. On the other hand, Kaewchur, Anussornnitisarn and Pastuszak (2013) Knowledge sharing and information technology can significantly affect the innovation and can play a critical role as an important factor in the success of this process.

### *2.2 IT Capability*

In mostly IT capability has been identified as a major construct influencing on the business value generated from IT (DeLone & McLean, 1992; Devaraj & Kohli, 2003; Bhattacherjee & Hikmet, 2008). Rather than focus on a

particular kind of software platform or system used in organizations, we adopt a broad concept of information technology to include a several different kinds of software platforms and systems usually available in organizations (Dewett & Jones, 2001). Therefore, Knowledge sharing are considered add value to institutions, IT capabilities can be provide to human capital more time, whereby allows greater participation in strategic decisions. Hence, Concept of IT capabilities by (Bharadwaj, 2000) refer to the ability to create and mobilize the resources that is based on information technology in line with the joint capabilities and other resources. Mithas et al. (2004) confirms IT capability is an acquisition of special administrative skills, management and use of information technology strategies and essential business processes, including the ability of the IT infrastructure, partnerships, business information systems (IS), providing solutions, seller's partnership and strategic planning of the organization. There is a lot of research on the impact of information technology on the performance firms as an enabler tool in business growth and innovation (Aiken, Bacharach, & French, 1980; Anderson, & Gerning, 1988). Lepark, Takeuchi, and Snell (2003) Nevertheless, there is a few empirical evidence offering positive effects for this purpose (Ang & Slaughter, 2004).

### *2.3 IT support*

IT support indicates that the company's systems can be allows access of IT and use knowledge through projects (Smith, 2006). Another side, The expanded use of ICT could speeds up change to achieve a different mechanisms like the rate of innovation within ICT is high and its diffusion to all sectors of the economy imposes change on these sectors. In addition, ICT has become an important tool in speeding up innovation in many sectors (Lundvall & Nielsen, 2007). Inadequate training and technology support to use available communication technology is an obstacle to sharing of knowledge (Han & Anantatmula, 2007). Hence, the investing of IT alone cannot lead to knowledge sharing but lead to facilitate process of knowledge sharing and human interaction (Hsiu & Lee, 2006). According to Chang and Chuang (2011), technology based of knowledge is defined as the technical systems within a firm that determine how knowledge is disseminated throughout the enterprise. Information technology contributes of knowledge sharing effectively. Knowledge management of technology tools can classification to hardware, software, databases, collaboration teamwork tools, and smart and tools (Rasli, Madjid & Asmi, 2004).

### *2.4 Knowledge Sharing*

Wang and Noe (2010) suggested the sharing of knowledge to provide important information and know-how to help others and cooperate with others to solve problems and develop ideas. King (2006, p. 498) referred to knowledge sharing is "the exchange of knowledge among individuals, and within teams and organizational units". On the other hand, Hooff and Van Weenen (2004) successful knowledge sharing can lead to create intellectual capital which is important resource in world economy. So, the knowledge sharing is very necessary In order to create new knowledge and product innovation. Sharing of knowledge may encourage the exchange of knowledge and creativity in the organization in order to develop competitive advantages, such as intellectual capital (Liao, Fei & Chen, 2007). Organizations' enhancement of the knowledge sharing and changing traditional notions of intellectual resources and staff work methods through the provision of new procedures, different disciplines and diverse cultures, hence form organizational innovation (Darroch & Mcnaughton, 2002). The style of knowledge sharing may turn into organizations unique and typical which effects of the company performance (Liao et al., 2007). Knowledge sharing is an important factor effect of the company's innovation performance, explicit knowledge has a direct effect on the speed of innovation, while that tacit knowledge has an effect on innovation quality (Becerra-Fernandez, Xia, Gudi & Rocha, 2008).

### *2.5 Development Hypotheses*

Technology has enabled the efficiency and effectiveness within the organization that is brings a competitive advantage and profitability, as well as provide learning by facilitating knowledge processes (Engman & Holmberg (2007); Sher and Lee (2004); Handzic, 2003). The IT infrastructure includes supporting efforts to share knowledge

by technology tools (Bechina & Bommen, 2006). Tippins and Sohi (2003) refer technological support to promote communication between individuals in order to promote and facilitate knowledge exchange process. Lee and Choi (2003) and Kim and Lee (2005) indicated of technology support is a provider of information and communication technology to facilitate storage and retrieval, and sharing of knowledge. Belkahla and Triki (2011) suggested IT infrastructure allow of relevant knowledge to individuals with a highest level of accuracy and reliability. On the other hand, Kharabsheh (2007) has developed a clear relation between technology and knowledge sharing.

The relation between technologies, innovation performance is not necessarily one-way. Companies that have a good performance may be easier access to capital to fund more investments and innovations (Koellinger, 2008). Many studies in the field of IT have demonstrated of IT importance to improve performance (Wang & Wang, 2012). Wang and Wang (2012) argue that innovation initiatives tend to depend heavily on employees' knowledge, skill, and experience in the value creation process. In addition, Knowledge-sharing has a positively effect on organizational performance and innovation (Becerra-Fernandez, Xia, Gudi & Rocha, 2008). Wang and Han (2011, p.803) considered that a company's innovation performance depends on potential capacities to convert this knowledge into action, and capability of the company to identify the knowledge value and used can enhance innovation performance. About the mediating effect of knowledge sharing, the previous studies related to the relationships between IT usage, IT support, knowledge sharing, and innovation performance. Tacitly, the discussions indicate that the IT usage affects the innovation performance for companies through the sharing of knowledge. This means, companies can use an information technology to develop level of capacities in the acquisition and sharing of knowledge, which in turn, enhances trends of employees to innovation and improve the performance. Hence, this research suggests that knowledge sharing can play role of mediator in the relationship between independent and dependent variables. This study proposes the following hypotheses:

Hypothesis 1, IT capability relate positively to innovation performance.
Hypothesis 2, IT support relate positively to innovation performance.
Hypothesis 3, IT capability relate positively to knowledge sharing.
Hypothesis 4, IT support relate positively to knowledge sharing.
Hypothesis 5, Knowledge sharing relates positively to innovation performance.
Hypothesis 6, Knowledge sharing mediates the relationship between IT capability and innovation performance.
Hypothesis 7, Knowledge sharing mediates the relationship between IT support and innovation performance.

## 3. Theoretical Framework

Based on the previous studies on IT capability and IT support as an independent variables. IT capability will adopt on the ideas of (Mithas et al., 2004). IT support adopt on the ideas of (Gold et al., 2001). While the Innovation performance, as a dependent variable through two dimensions including: administrative and technical which adopted on the ideas of each (Seba et al., 2012; Sawal et al., 2012), and with knowledge sharing as a mediator variable adopt on the ideas of each (Hung et al., 2011). Figure 1 summarizes our research as follows:

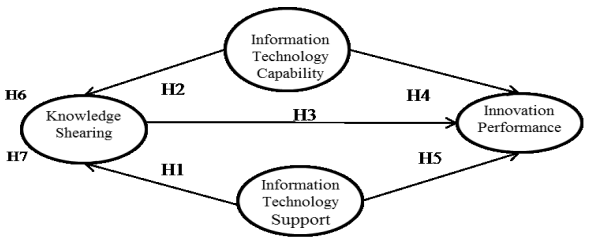


**Figure 1, Proposed Research Model**

## 4. Research methodology

This researcgh is a descriptive-statistical study with a practical aim. Population of the study consisted of 4 mobile telecommunication companies in Iraq. The respondents were selected the questionnaire of employees in information technology department of these companies. Simple non-random sampling was used, in which 276 individuals were chosen for the sample group. A Likert-type questionnaire has used to collect data, with options ranging from completely disagree (1) to totally agree (5). The validity of the study was examined by experts, and test the reliability of the questions was approximately calculated as 0.889. coefficient variation tests were used for data analysis simple regression coefficient, Simple linear correlation coefficient, Friedman, and mean. In addition, SEM was used to analyse the data. The intention had to catch five observed variables with the measurement model: IT usage, IT support, and IT capability and innovation performance. In this research was used AMOS software, in order to conduct the Confirmatory factory analysis. Also, maximum likelihood method was used to identified whether the various indicators within expectations.

Table 1, Summary of the Measurements of Variables in this study

| Variables | Source | Items | Scale |
|---|---|---|---|
| IT support | (Gold et al., 2001) | 10 | 1-5 |
| IT Capability | (Mithas et al., 2004) | 10 | 1-5 |
| Knowledge Sharing | (Seba et al., 2012; Sawal et al., 2012) | 11 | 1-5 |
| Innovation Performance | (Hung, et al., 2011). | 11 | 1-5 |

## 5. Data Analysis

Table 2, show the results indicated that 44% of the respondents were of female group 56% male, were the age group of 41 to 50 years is a higher rate 30%, were the education level 8% of the doctorate and 24% of master, and 68% of bachelor. The respondents were in the Job address group 14% of the Programmers, and 10% of the Systems analysts, 20% of the Database official, 79% of the Software official, and 74% of the Communications Officer, accumulated at least 31 years and above to work experience at the company.

Table 2, Demographic characteristics of the respondents

| Age | N | % | Experience | N | % | Job Address | N | % | Education Level | N | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25-30 | 35 | 13 | 3-9 | 56 | 20 | Programmers | 39 | 14 | Doctorate | 23 | 8 |
| 31- 40 | 49 | 17 | 10-16 | 99 | 36 | Systems analysts | 28 | 10 | Master | 66 | 24 |
| 31- 40 | 77 | 28 | 17-22 | 71 | 26 | Database official | 56 | 20 | of bachelor | 187 | 68 |
| 41-50 | 82 | 30 | 23 -30 | 44 | 15 | Software official | 79 | 29 | Gender | | |
| 51and above | 33 | 12 | 31 and above | 6 | 2 | Communications Officer | 74 | 27 | Male | 121 | 44 |
| | | | | | | | | | Female | 155 | 56 |
| Total | 276 | 100 | | 276 | 100 | | 276 | 100 | | 276 | 100 |

Table 3, shows the all correlations among variables in the surveyed companies with the mean, standard deviation, Cronbach's alpha. Based on the perceptions of respondents, the results show that all bivariate relationships between the study variables were statistically significant.

Table 3, Descriptive Statistical, CR, AVE, and Cronbach's Alpha

| Variables | Mean | Standard Deviation | Cronbach's Alpha | Composite Reliability | AVE |
|---|---|---|---|---|---|
| IT support (ITS) | 3.84 | 1.35 | .876 | .851 | .537 |
| IT Capability (ITC) | 3.40 | 1.50 | .884 | .875 | .634 |
| Knowledge Sharing (KS) | 3.69 | 1.51 | .953 | .944 | .774 |
| Innovation Performance (IP) | 3.34 | 1.59 | .890 | .910 | .601 |

Table 4, correlations of variables in the measurement model (AMOS)

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| IT T capably (ITC) | 1 | 0 | 0 | 0 |
| IT support (ITS) | .55 | 1 | 0 | 0 |
| Knowledge Sharing (KS) | .59 | .72 | 1 | 0 |
| Innovation Performance (IP) | .64 | .66 | .72 | 1 |

Table 4, show the results, p-value lower than 0.01 level. This means, a positive correlation between all variables in this study. Based on the results above, the second step was testing of values $\chi 2$, convergent, and discriminant validity. All factor loading were 0.5 and all correlations between all constructs are less than 0.9. The model has correlations between all constructs. Then, this model was supported as shown in Table 5.

Table 5, Measurement Models Evaluation

| Variables | $X^2$ | DF | CFI | CMIN/df | RMSEA | P-Value |
|---|---|---|---|---|---|---|
| IT Usage (ITU) | 3131.02 | 1190 | .91 | 2.61 | .06 | .000 |
| IT support (ITS) | 3601.81 | 1193 | .90 | 3.01 | .07 | .000 |
| IT capably (ITC) | 3998.01 | 1193 | .83 | 3.91 | .08 | .000 |
| Knowledge Sharing (KS) | 3909.08 | 1193 | .87 | 3.27 | .06 | .000 |
| Innovation Performance (IP) | 3901.98 | 1193 | .85 | 3.57 | .07 | .000 |

## 6. Structural Modeling and Results of Hypothesized

Hair et al. (2006) identifies structural equation modeling (SEM) as a statistical model to clarify the relationships between multiple variables through the examine of the relationships in the equations. The Structural Model is assessed to empirical data support and to helps to decide whether theory /concept has been practically confirmed. This includes testing of the model's predictive potential and the relationships among the constructs.

Tables 6 and 7, shows the relationship between IT usage, IT support, IT Capability, knowledge sharing and Innovation Performance. Statistically, there are a significant relationship between the IT Capability, IT support as an independent variables and the Innovation Performance as a dependent variable with the knowledge sharing as a mediator. Hence, the researcher discussed the results of path analysis of relationships in hypotheses as follows:

Table 6, Standardized Regression Weights (β) for Structural Model and Hypothesis Direct Influence

| Path | (β) | S.E | C.R. | P-Values | Hypotheses Result |
|---|---|---|---|---|---|
| ITS → IP | .16*** | .07 | 2.45 | .00 | H1) Supported |
| ITC → IP | .16*** | .05 | 3.10 | .00 | H2) Supported |
| KS → IP | .15*** | .07 | 3.16 | .00 | H3) Supported |
| ITS → KS | .18** | .06 | 3.10 | .01 | H4) Supported |
| ITC → KS | .16** | .07 | 2.45 | .01 | H5) Supported |

ITU= IT Usage, ITS= IT support, Knowledge Sharing =KS, Innovation Performance IP, S.E= Standardized Error, C.R = Critical Ratio, β = Standardized Regression Weights.

Table 7, Mediating hypotheses, indirect effects in Structural Model

| Innovation Performance (DV) Knowledge Sharing (M) | Independent Variable (IV) | |
|---|---|---|
| | IT support (ITS) | IT capability (ITC) |
| Total Effect of IV on DV without M (path a) | .203** | .161** |
| Direct Effect of IV on DV with M (path a') | .121** | .102** |
| Indirect Effect of IV on DV through M (path bc) | .081** | .059** |
| Effect of IV on M (path b) | .181** | .131** |
| Effect of M on DV (path c) | .449** | .449** |
| Mediation Path | ITS→KS→IP | ITC→KS→IP |
| Hypothesis Result | H7) Supported | H6) Supported |

Based on the results in Table 6, Hypothesis 1 to 5 have been supported. There is a significant path coefficient of ($p<.01$) from IT support, capability of IT to innovation performance. From the results in Table 7, Hypothesis 6 and 7 have been supported from knowledge sharing as a mediating. The hypothesized model is explained in Figure 2. The overall model facilitated a direct and indirect assessment of the mediating effect of internal versus knowledge sharing, in structural equation models. The compared the results of the hypothesized model with the equal model found that all the path estimates were positively associated with IT usage, IT Support, and IT capability ($p<0.05$).

## 7. Discussion

Generally, the results of this research showed that the IT capability and technological support to affect performance of innovation. Precisely, IT capability and IT support were positively associated with innovation performance. As well as, the results showed support for the mediating effect of knowledge sharing on the relationship betwee capabilities, Technological support and innovation. Therefore, IT capabilities and technological support working beneficial effects on innovation via ability of knowledge acquisition and sharing. These results were focused on the vitals roles of IT capabilities, Technology support and knowledge sharing in the processes relating to innovation. Moreover, the best level of information technology can motivate innovative thoughts that may eventually lead to improve innovation performance. Hence, the results shed light on the importance managers in the IT departments to implement of works initiatives in innovation. Where, the employee need to recognize the importance of knowledge sharing in order to development a level of knowledge and skills which is lead to innovation outcomes. This research is empirical support to predict of models using data from concrete issues. This research also contributes to the literature through empirically examining the relations between IT capability, IT support, knowledge sharing, and innovation performance. So, this research is proving that knowledge sharing has a mediator role via IT capability and IT support that influence on innovation performance. finally, the future research may possibly is useful to using objective measurements for innovation.

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