

# The Relationships among Knowledge Management Processes, Innovation, and Organisational Performance in the Iraqi MTS

Laith Ali Yousif AL-Hakim<sup>1</sup> and Shahizan Hassan<sup>2</sup>

<sup>1</sup>*Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia, [s91869@student.uum.edu.my](mailto:s91869@student.uum.edu.my)*

<sup>2</sup>*Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia, [shahizan@uum.edu.my](mailto:shahizan@uum.edu.my)*

## ABSTRACT

Present study examines of the relationships among knowledge management processes, innovation, and organisational performance in the Iraqi mobile telecommunications sector. The perspective of this research suggests that knowledge processes are essential capabilities for effective innovation and organisational performance. Through analysis of surveys collected from 220 mid-level managers, present study empirically tested a proposed theoretical framework by estimating structural equation model. The results show that knowledge management processes had a statistically significant and direct positive effect on innovation. Additionally, the direct relationship of knowledge management processes with organisational performance was positively affected, but it was not statistically significant. More importantly, the findings indicate that knowledge management processes had a positive and statistically significant effect on organisational performance through the partial mediation effect of innovation. Present study concludes with a conclusions and contribution of the research.

**Keywords:** Mobile telecommunications sector, knowledge management processes, innovation, balanced scorecard, and organisational performance.

## I INTRODUCTION

In today's Mobile Telecommunications Sector (MTS), many companies seek to survive in an ever-changing sector due to technological development, increasing mobile subscribers and increasing fierce competition (Cegarra-Navarro & Martínez-Conesa, 2007; Chong, 2006; Chong *et al.*, 2007, 2009). They are now facing the need to improve their Organisational Performance (OP) to gain more benefits and cope with the changes (Chong *et al.*, 2009; Cegarra-Navarro & Martínez-Conesa, 2007). As a consequence, the OP measurement (financial perspective, customer

perspective, internal process perspective, and learning and growth perspective) and the factors that affect it, has become ever more prominent in the MTS (Chen & Mohamed, 2008; Lee & Lee, 2007; Visser & Sluiter, 2007; Yu & Liying, 2009).

The rapid diffusion of MTS is mainly due to technological development, which reflects on the success of technological innovation. The technological innovation is regarded a critical key to development of MTS. Many studies in this sector show the real role of technological innovation in the dissemination of mobile services (Al-Enzi, 2008; Blazeovic, 2003; Jaspers *et al.*, 2007). Hence, these companies are now giving priority to technological innovation to support other innovation types such as administrative, radical, and incremental (Al-Enzi, 2008; Oke, 2007). For that reason, the types of innovation have attracted considerable attention of several companies and studies in this area in order to maintain the innovation continuity and achieve high OP (Al-Enzi, 2008; Chen *et al.*, 2007; Lee & Park, 2008; Oke, 2007).

From Resource-Based View (RBV) and Knowledge-Based View (KBV) theories, several studies have revealed that Knowledge Management Processes (KMPs) are important for innovation and OP (Asoh *et al.*, 2007; Jantunen, 2005; Lin, 2007; Rhodes *et al.*, 2008; Sáenz *et al.*, 2009). Organisations are searching for ways to enhance their innovation and improve OP during the rapid and dynamic change of business environment. There is increasing evidence that effective management of KMPs will lead to a positive result for organisations (Chong, 2006; Chong *et al.*, 2009).

Recent studies have provided evidence that KMPs have a critical affect innovation (Brachos *et al.*, 2007; Jantunen, 2005; Jiang & Li, 2009; Lin,

2007; Sáenz *et al.*, 2009). However, Darroch and McNaughton (2002) noted a mixed evidence of a link between KMPs and innovation. This makes the relationship between KMPs and innovation still not clear. Furthermore, Jantunen (2005) and Jiang and Li (2009) emphasized that there is a gap in the investigation of the relationship between KMPs and innovation. For that reason, the first objective of present study is to investigate the relationship between KMPs and innovation.

In the same manner, KMPs are important tools used to investigate the relationship between knowledge management and OP from various perspectives. Studies have generally agreed that there is a complex relationship between KMPs and OP (Asoh *et al.*, 2007; Chong *et al.*, 2009; Hass & Hansen, 2005; Lee & Choi, 2003; Liao & Wu, 2009; Tsai & Li, 2007). However, Darroch (2005) indicated that some KMPs do not positively affect OP. This means that the relationship between KMPs and OP is still unclear. Moreover, to date, very limited studies have attempted to look at the relationship between KMPs and OP measured by Balanced Scorecard (BSC) indicators. Despite the substantial body of BSC literature, empirical studies evaluating KM and innovation based on the BSC perspective are extremely limited (Chen & Mohamed, 2008; Lee & Lee, 2007; Yu & Liying, 2009). Therefore, Hongmei and Yujun (2010) argued that many issues require further research and discussion in this area. Furthermore, the BSC has been recommended as a suitable measurement for measuring the OP in the MTS (Visser & Sluiter, 2007). Then, the second objective of present study is to investigate the relationship between KMPs and OP.

There are also limited studies that investigate the relationship between innovation and OP. Despite the claim that innovation is broadly described as a critical tool to improve OP (Akgün *et al.*, 2009; Li *et al.*, 2006; Lin & Chen, 2007), several organisations are not able to develop it appropriately (García-Morales *et al.*, 2008). In this regard, several studies have shown that OP improvement does not depend much on the clear mission or competitive ability of the organisations, but on other factors that have a direct effect on innovation (Aragón-Correa *et al.*, 2007; Darroch, 2005). However, there are few studies in the field of innovation, particularly those that determine the significant factors that influence directly innovation to improve OP

(Akgün *et al.*, 2009; Aragón-Correa *et al.*, 2007; Calantone *et al.*, 2002; Camisón & López, 2010; García-Morales *et al.*, 2007). Furthermore, very limited studies have examined the relationship between innovation and BSC indicators (Yu & Liying, 2009), particularly in the MTS context (Visser & Sluiter, 2007). Then, the third objective of present study is to investigate the mediating role of innovation on the relationship between KMPs and OP.

In the case of Iraq, the country is under the redeveloping stage. It has encountered many crises and hard conditions, such as the first and second Gulf War, economic sanction and lastly the U.S. occupation from 2003 to 2011. These conditions have considerably contributed to the collapse of the infrastructure in various sectors, such as oil, education, electricity (Al-Azzawi, 2011; Hafedh *et al.*, 2007), and particularly telecommunications (Report of United Nations Economic and Social Commission for Western Asia, 2005). According to the Report of the United Nations Economic and Social Commission for Western Asia (2005), mobile phone penetration in Iraq is much less than it should be, especially in rural areas. Certainly, many obstacles adversely affect the development of MTS. The most important is the security issue. Other factors include the existing bad infrastructure and the lack of training of professionals that hinder the knowledge management. Moreover, IZ Technology Team (2009) emphasized that the government should be committed to a plan to develop information technology and telecommunications infrastructure. This should be combined with adopting long-term plans to create knowledge and paying attention to knowledge transfer at all levels in this sector. Mahdi (2008) similarly noted that knowledge management in the Iraqi MTS is still in its earliest stage, but its possibility of acceptance is high because knowledge management is strongly related to technological organisations. Therefore, it is necessary to conduct extensive studies on the influence of KMPs on MTS. Moreover, the role of innovation in improving the OP of Iraqi MTS needs more empirical studies (Al-Enzi, 2008).

In a nutshell, the Iraqi MTS is currently facing numerous problems that need to be addressed. Consequently, present study seeks to address the issues of KMPs in this sector to enhance innovation and improve OP.

## II THEORETICAL BACKGROUND

### A. Knowledge Management Processes

Many researchers generally agree that KMPs are systematic stages aimed at providing the knowledge needed for an organisation to succeed through knowledge creation, organisation, storage, sharing, and utilisation (Allameh *et al.*, 2011; Asoh *et al.*, 2007; Lin, 2007; Ramachandran, 2010; Yang *et al.*, 2010). Accordingly, present study examines the role of these processes as part of KMPs in the Iraqi MTS. The following sections introduce each of KMPs concepts.

#### 1. Knowledge creation

Knowledge creation is defined as an organisational ability to create and disseminate new knowledge throughout the organisational levels and embody it in its outcomes (Yang *et al.*, 2010).

#### 2. Knowledge organisation

After creating knowledge, the organisation resorts to refine and liquidate the knowledge through useful ways. The useful knowledge carries value that can be added to the product or service (Ramachandran, 2010).

#### 3. Knowledge storage

The main idea of the KM approach relates to storing useful knowledge in the organisational memory so that others in the organisation can access it (Allameh *et al.*, 2011).

#### 4. Knowledge sharing

Knowledge sharing is defined as a social interaction culture, involving the exchange of employee knowledge, skills and experience through all departments in the organisation (Lin, 2007).

#### 5. Knowledge utilisation

Knowledge utilisation is defined as the application of knowledge toward the attainment of organisational goals (Asoh *et al.*, 2007).

## III INNOVATION

Innovation is defined as "the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services" (Plessis, 2007, p. 21). Literatures on innovation indicate a variety of types of innovation (Damanpour *et al.*, 2009), ranging from incremental to radical, for example. Some researchers group the types of innovation into three main categories: administrative and technical, product and process, and radical and incremental (Yang, 2007). The reasons why

organisations adopt different types of innovations are because of environmental conditions, organisational factors, generation processes of innovation, and organisational sector. Despite innovation is a multi-type activity, present study will adopt the results of previous studies that considered the technological innovation, administrative innovation, radical innovation and incremental innovation as a main reason to survival and growth organisations (Blazevic, 2003; Jaspers *et al.*, 2007; Oke, 2007).

In the MTS context, technological innovation is the knowledge that links methods, components, and techniques with processes to create services (Popadiuk & Choo, 2006). Administrative innovation refers to the changes in organisational structure and processes, like the authority, tasks structuring, personnel recruitment, resources allocation and rewards (Lin *et al.*, 2010). Radical innovation is a main change that represents a new technological pattern (Pedersen & Dalum, 2004), and requires more organisational capabilities and superior profundity of knowledge (Darroch & McNaughton, 2003). Incremental innovation is defined as cumulative and gradual nature of technological changes in organisation to create services (Pedersen & Dalum, 2004). As such, unlike incremental innovation, it does not require much organisational capability (Darroch & McNaughton, 2003).

## IV ORGANISATIONAL PERFORMANCE

The OP indicators have become an important issue in evaluating organisational success (Moullin, 2007). It is defined as "comparing the expected results with the actual ones, investigating deviations from plans, assessing individual performance and examining progress made towards meeting the targeted objectives" (Nghah & Ibrahim, 2010, p. 503). Based on this definition, OP indicators can provide assistance for managers to evaluate the organisational activities and maintain the competitive position or superiority over competitors (Liao *et al.*, 2009; Visser & Sluiter, 2007).

In this regard, the BSC approach is one of different well-known ways for evaluating the knowledge management and innovation performance by examining the gap between a target and an actual performance of the organisation (Wegmann, 2008; Yu & Liying, 2009), particularly from the RBV and KBV theories' perspectives (Bose & Thomas, 2007;

Gonzalez-Padron *et al.*, 2010). According to Lee and Lee (2007), several assessment methods are included in the knowledge management performance. These methods can be classified into four groups (financial measures, intellectual capital, tangible and intangible benefits, and BSC), but the BSC is considered to be more useful than intellectual capital or tangible and intangible approaches because it provides a comprehensive view of the organisation's actual performance. In a similar context, Wegmann (2008) indicated that the BSC approach is compatible with knowledge management. It is the best approach to evaluate knowledge management within any organisation (Hongmei & Yujun, 2010). On the other hand, Yu and Liying (2009) claimed that BSC has become the main approach and a prerequisite for assessing innovation performance. Furthermore, Kaplan and Norton's (2006) BSC provides the evaluation of innovation performance as the first priority in its approach.

Kaplan and Norton developed the first BCS in the early 1990s, which encompassed financial and non-financial measures. The original BSC recommends that an OP should be assessed from four perspectives (Creamer & Freund, 2010, p. 365):

1. The financial perspective emphasizes the long-term objectives of the organisation in terms of revenue growth and productivity improvement. The financial objectives should be the final goals for the other perspectives.
2. The customer perspective emphasizes the lifetime relationship and service delivery with customers.
3. The internal process perspective focuses on the use of customer information to sell new services according to their needs.
4. The learning and growth perspective is the foundation of the BSC; this perspective looks at the motivation, training, and capacity to innovate that employees need in order to implement organisational objectives.

## V HYPOTHESES DEVELOPMENT

### A. Knowledge Management Processes and Innovation

In fact, the effect of KMPs plays a vital role in the continuity of innovation (Darroch, 2005; Tan & Nasurdin, 2010; Wei & Xie, 2008). Despite in Darroch and McNaughton's (2002) research identified mixed results in the relationship

between KMPs and innovation. A number of recent empirical studies showed a significant and positive relationship of KMPs with innovation, such as Chang and Lee (2008), Darroch (2005), Huang and Li (2009), Jantunen (2005), Jiang and Li (2009), Liao and Wu (2010), Tan and Nasurdin (2010), and Wei and Xie (2008). For example, Huang and Li (2009) found that KMPs, which consist of acquisition, sharing, and application, have a significant and positive relationship with administrative and technological innovation. Furthermore, Darroch (2005) explored KMPs' (i.e. knowledge acquisition, dissemination, and responsiveness) significant and positive effect on radical innovation and incremental innovation. Thus, it is expected that:

H1: KMPs have a significant and positive effect on innovation.

### B. Knowledge Management Processes and Organisational Performance

Under this relationship, KMPs are becoming the most valuable activities for any organisation (Chang & Chuang, 2011; Darroch, 2005). In specific terms, they lead all organisational efforts to achieve an ideal OP, particularly in the MTS context (Chong *et al.*, 2009). However, understanding of how KMPs are related to OP is limited due to the mixed and not significant results in prior studies that examined the relationship between KMPs and OP (Anderson, 2009; Darroch, 2005; Zack *et al.*, 2009). However, a number of recent empirical studies have shown how KMPs are significantly and positively to OP; these studies include Asoh *et al.* (2007), Chang and Chuang (2011), Gold *et al.* (2001), Lee and Lee (2007), Liao and Wu (2009), and Omerzel (2010). For example, Gold *et al.* (2001) found that KMPs, which include acquisition, conversion, application, and protection, are significantly and positively related to organisational effectiveness. Furthermore, Omerzel (2010) revealed that KMPs consisting of acquisition, storage, transfer, use, and measure of knowledge have a significant and positive relationship with OP. Chang and Chuang (2011) also argued that knowledge choice, knowledge access, knowledge storage, and knowledge sharing, measured as KMPs, have a significant and positive effect on OP. Thus, it is expected that:

H2: KMPs have a significant and positive effect on OP.

### C. Possible Mediating Role of Innovation

The extant literature reveals that a gap remains in the innovation field, particularly in the determination of the significant factors that have a direct effect on innovation to improve OP (Akgün *et al.*, 2009; Aragón-Correa *et al.*, 2007; Calantone *et al.*, 2002; Camisón & López, 2010; García-Morales *et al.*, 2007). In this regard, the indirect relationship between core requirements of KM implementation KMPs (creation, organisation, storage, sharing, and utilization) and OP (financial perspective, customer perspective, internal process perspective, and learning and growth perspective), through innovation (technological innovation, administrative innovation, radical innovation, and incremental innovation) has never been previously explored within a single study. In such conditions, where a relationship has never been previously explored, an indirect hypothesis should be formulated (Sekaran & Bougie, 2010). Therefore, in line with many researchers (Akgün *et al.*, 2009; Aragón-Correa *et al.*, 2007; Calantone *et al.*, 2002; Camisón & López, 2010; García-Morales *et al.*, 2007), the present study proposes that innovation plays a significant and positive mediating role in the relationship between KMPs and OP, based on RBV and KBV theories' perspectives that provide a theoretical basis for explaining the influence of KM implementation on OP through innovation. Thus, it is expected that:

H3: Innovation mediates the effect of KMPs on OP.

## VI PROPOSED RESEARCH MODEL

The research framework of the present study is developed based on RBV and KBV theories' perspectives (Liao & Wu, 2009; Mehta, 2008). These perspectives generally assert that knowledge leads to enhanced innovation and improved OP (Asare, 2008; Greiner *et al.*, 2007; Pathirage *et al.*, 2007). The framework, based on RBV and KBV theories' perspectives, is conceptualized based on a number of previous studies (Anderson, 2009; Asoh *et al.*, 2007; Bierly & Daly, 2007; Chen & Huang, 2009; Damanpour *et al.*, 2009; Darroch, 2005; Liao & Wu, 2009; Li *et al.*, 2006; Lopez-Cabrales *et al.*, 2009; Tan & Nasurdin, 2010; Tsai & Li, 2007; Zack *et al.*, 2009). Then, the research framework of the present study is shown in Figure 1.

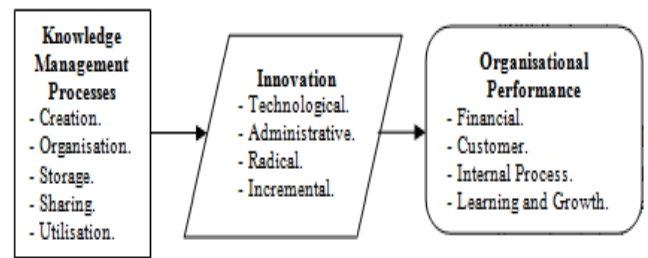


Figure 1 Theoretical framework of the study

As contributions to the body of knowledge, the proposed theoretical framework shown in Figure 1 describes the causal relationships among three variables of the KMPs, innovation, and OP. In this framework, the independent variable is KMPs and the dependent variable is OP. While innovation acts as the mediating variable between the KMPs and OP.

## VII METHODOLOGY

### A. Sample and procedures

Based on an application of proportionate stratified random sampling technique, questionnaires were randomly distributed among 300 mid-level managers. They were chosen from various branches and offices services of the mobile companies in the by personal delivery and collection of questionnaires from March to June 2011. From the 300 questionnaires which were randomly distributed, present study used the remaining 220 valid and complete questionnaires for the quantitative analysis, and the sample data was acceptable for Structural Equation Model (SEM) analysis.

### B. Measures

For the present study, there are 65 items on a five-point Likert scale were used to measure responses. The 23 items of KMPs measurement were adapted from Calantone *et al.* (2002), Chen (2007), Gómez and Manzanares (2004), and Lawson (2003) with 2 items of knowledge organisation and knowledge storage were developed based on theoretical study of Bhatt (2000) and Supyuenyong *et al.* (2009), respectively. Additionally, the nineteen items of innovation measurement were adapted from Darroch (2005), Darroch and McNaughton (2002), Herrmann *et al.* (2007), Li *et al.* (2006), and Lin *et al.* (2010), with a new item of incremental innovation was developed based on the theoretical study of Salavou (2004). Finally, the 16 items of OP measurement were adapted from Gonzalez-Padron *et al.* (2010) and new 4

items were developed based on the theoretical study of Visser and Sluiter (2007).

## VIII ANALYSIS AND RESULTS

### A. Structural Relationships Among Exogenous and Endogenous Latent Variables

In order to test the substantive hypotheses, a final structural model was developed. It was run with 65 items to assess three latent variables (KMPs,

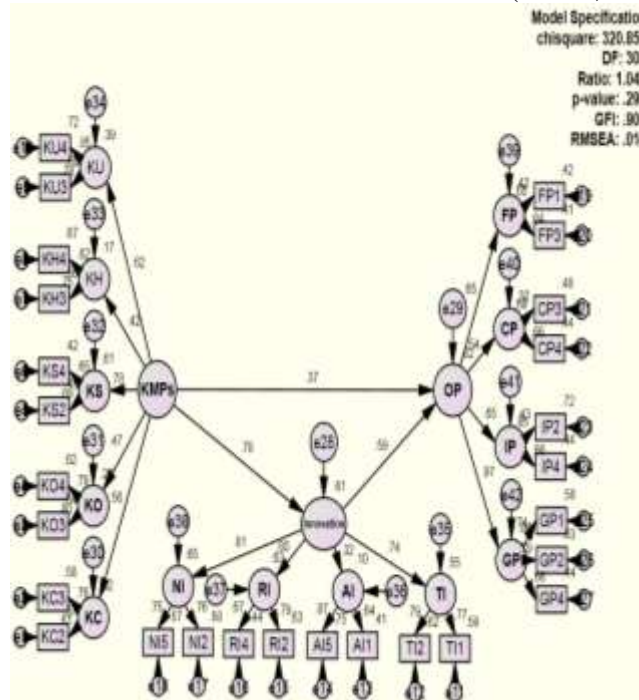


Figure 2 Final Structural Model

### B. Convergent Validity of Final Measurement Model

In SEM analysis, convergent validity can be assessed by computing Composite Reliability (CRI) and Average Variance Extracted (AVE). Then, convergent validity in the present study was examined by evaluating the values of CRI and AVE (Fornell & Larcker, 1981). Table 1 obtained the convergent validity of the final structural model.

Table 1 Convergent Validity of the Final Structural Model

| Variable   | No. of Original Items | No. of Final Items | CRI $\geq .70$ | AVE $\geq .50$ |
|------------|-----------------------|--------------------|----------------|----------------|
| KMPs       | 25                    | 10                 | .822           | .772           |
| Innovation | 20                    | 8                  | .851           | .814           |
| OP         | 20                    | 9                  | .845           | .803           |

When we consider the results in Table 1, it was shown that all the variables (KMPs, innovation, and OP) had generally exhibited acceptable level of CRI with values (.822, .851, .831, and .845)

innovation, and OP). Only 27 items of overall latent variables were presented in this model. This is because the overall results presented evidence of a good model fit ( $p = .295$ , GFI = .906, CFI = .996, TLI = .995, and RMSEA = .014) and the Chi-square index was significant ( $\chi^2 = 320.850$ ,  $df = 308$ ,  $\chi^2/df = 1.042$ ). The final structural model is shown in Figure 2 below:

respectively, which are more than the recommended cutoff value .70. Additionally, Table 1 displayed all the variables (KMPs, innovation, and OP) had generally exhibited acceptable level of AVE with values (.772, .814, and .803) respectively, all above the recommended minimum level of .50. Jointly, these tests suggest adequate convergent validity of the final structural model.

### C. Hypotheses Testing and Discussion

Comparing the results of SEM with the hypotheses, the standardised path coefficient of (.779) seems to indicate that KMPs have a positive and statistically significant effect on innovation use (H1). Then, H1 was supported. The findings of the present study reinforce the work by Huang and Li (2009) who indicated that KMPs, which include acquisition, sharing, and application, have a significant and positive related to administrative and technological innovation. Additionally, Darroch (2005) examined the relationship between KMPs and innovation types from the RBV perspective. The knowledge acquisition, dissemination, and responsiveness were measured as KMPs, while radical innovation and incremental innovation were measured as innovation types. The results indicated that KMPs have a significantly positively effect on innovation.

Furthermore, the standardised path coefficient of (.371) suggests positive affect of KMPs on OP, but it was not statistically significant use (H2). Hence, H2 was rejected. According to Liao and Wu (2009), there are still some different results in the relationship between KMPs and OP. Hence, it requires being proven very carefully. In Darroch's (2005) study, the author found that both acquisition and dissemination negatively affected OP, while knowledge responsiveness positively affected OP. Anderson (2009) argued that the results of KMPs (including acquisition and application) were significantly positive related to organisational effectiveness. Meanwhile, the results of KMPs (conversion and protection) were

positively related to organisational effectiveness, but did not appear to be significant. In the same vein, Zack *et al.* (2009) also mentioned that KMPs' capabilities refer to the ability to locate and share existing knowledge, the ability to experiment and create new knowledge, a culture that encourages knowledge creation and sharing, and a regard for the strategic value of knowledge and learning. All of them had a positive related to financial performance, but were not statistically significant. Furthermore, the results of Mills and Smith's (2011) study highlighted that the knowledge conversion capability has a positive related to OP, but not a statistically significant. As a search result, even though several empirical studies have presented that KMPs are essential for OP improvement; the results to date have been mixed. There are many different results in the literature that declare KMPs affect OP some significantly positive, some significantly negative, and some not significantly positive. Thus, there are still some confusing relationships between KMPs and OP.

Moreover, the findings indicate that KMPs had a positive and statistically significant effect on OP through the partial mediation effect of innovation use (H3) with indirect relationship estimates (.456). Then, H3 was supported. In bringing this gap, the present study contributes to the knowledge by investigating the direct and indirect relationships among those variables. Indeed, the mediating role of innovation on the relationship between KMPs can be considered an original contribution of the present study. In fact, the results from the present study have revealed that the outcome of the research was furthered by the partial mediating role of innovation on the relationship between KMPs and OP.

## IX CONCLUSIONS

As revealed from the research results, the present study represents the empirical investigation of the partial mediation role of innovation in the relationship between KMPs and OP under RBV and KBV theories' perspectives, especially in the Iraqi MTS. To recap, these results provide evidence of mutually beneficial for both the theoretical and practical implications of the study and will help both academics and the practitioners in the KM area. Further studies are necessary to confirm the findings and incorporate additional variables that may have influenced the results.

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