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## REINFORCING INNOVATION THROUGH KNOWLEDGE MANAGEMENT: MEDIATING ROLE OF ORGANIZATIONAL LEARNING

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### ABSTRACT

Aim/Purpose	The purpose of this study is to investigate the relationship between knowledge management (KM) and organizational innovation (OI). It also enriches our understanding of the mediating effect of organizational learning (OL) in this relationship.
Background	KM's relationship with OL and OI has been tackled extensively in developed countries' literature. Nowadays, the challenges of developing countries lie in the process of knowledge application. This study attempts to develop a new managerial knowledgeable tool and present a theoretical model and empirical analysis of the relationship between KM and innovation in Jordan, a developing country. To the knowledge of the author, no attempt has been taken to investigate this relationship in any Jordanian sector.
Methodology	The sample of this study consists of 457 managers representing strategic, tactical, and operational levels randomly selected from 56 manufacturing companies in Jordan. A questionnaire-based survey has been developed based on KM, OL and OI literature to collect data. A structural equation modeling (SEM) approach was applied to investigate the proposed research model.
Contribution	This study contributes to the literature in different ways. First, it asserts that OL assists in improving OI in manufacturing organization of developing countries. Second, it highlights the substantial benefits of applying KM, OL and OI in manufacturing companies in Jordan. Furthermore, it enhances the relationship between KM and innovativeness' literature by providing empirical evidence, suggesting that OL is as important as KM to advance organizational innovation. Most importantly, it identifies the problem of a developing economy which is not promoting OL or taking care of it as much as they attended to KM in their organizational practices.

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Findings	Study findings indicate that the relationship between KM and OI is significantly positive. Results also reveal that the relationship between KM and organizational learning is significantly positive. Empirical results emerging from this study indicate that there is partial mediation to support the relationship between OL and OI.
Recommendations for Practitioners	This study suggests that managers ought to recognize that organizational learning is equally important to KM. This entails that OL should be utilized within organizations to achieve organizational innovation. Moreover, managers ought to comprehend their importance and encourage their employees to adopt knowledge from various sources; which, if implemented correctly, will enhance the OL environment.
Recommendations for Researchers	The research model can be used or applied in different manufacturing and service sectors across the globe. The findings of the current study can serve as a foundation to perform different studies to understand KM processes and recognize its antecedence.
Impact on Society	This study presents insights on how to apply KM, OL and OI methodologies in Jordanian manufacturing companies to achieve a competitive advantage; hence, positively influencing society.
Future Research	Future research may include conducting a similar study in the context of developed countries and developing countries which allows for comparison. Also, future research may examine the impact of KM on organizational performance applying both OL and OI as mediating variables.
Keywords	knowledge management, organizational learning, organizational innovation, Jordanian manufacturing companies

## INTRODUCTION

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Competitive pressures have inspired organizations to re-assess their strategies and develop their competencies. Knowledge management (KM) is considered one of the modern management disciplines identified by organizations as a critical factor affecting organizations' endeavors in products and services development (Baxter, Roy, Doultsinou, Gao, & Kalta, 2009). KM emerged to emphasize an organization's ability to encourage individuals to learn and innovate new knowledge and ideas in order to apply them in decision making and to sustain a competitive advantage (Karasneh & Al-Zoubi, 2018). The emergence of knowledge as invaluable assets and an essential source of a firm's sustainable competitive advantage (Nonaka, Toyama, & Konno, 2000) has inspired researchers and initiatives to develop a critical relationship between KM and organizational learning (Bagheri, Hamidizadeh, & Sabbagh, 2015; Brockman & Morgan, 2003; Jiménez-Jiménez & Sanz-Valle, 2011; Liao & Wu, 2010; Ngah, Tai, & Bontis, 2016; Thomas, Sussman, & Henderson, 2001) as well as KM and organizational innovation (e.g., Bagheri et al., 2015; Baker & Sinkula, 2002; Darroch, 2005; Darroch & McNaughton, 2003; Du Plessis, 2007; Goh, 2005; Jiménez-Jiménez & Sanz-Valle, 2011; Massa & Testa, 2004; Tamer Cavusgil, Calantone, & Zhao, 2003).

The literature of developed countries has extensively researched KM's relationship with organizational learning (OL) and organizational innovation (OI). Bagheri, et al. (2015) indicate that knowledge is considered an important asset in developed countries which can evoke change and innovation in organizations. Nowadays, the challenges of developing countries lie in the process of knowledge application. Jordan faces certain challenges and obstacles for evoking knowledge assets for a number of reasons. First, Jordanian industries are not capable of satisfying customers nor competing with international industries. This can be seen through the industry recession and the prosperity of international industries. Second, Jordan is a developing country and manufacturing companies

still applying traditional less innovative procedures. Although these challenges are present, compared to countries in the region, Jordan's human capital is a resource of strength that has the capabilities of innovation for progression. This can be seen through the extensive enhancement of economic status that is being applied.

This study attempts to develop a managerial tool based on KM that touches the essence of the contemporary work environment for Jordanian industry. It aims to present a theoretical model and empirical analysis of the relationship between KM and innovation. It also enriches our understanding of the mediating effect of OL in this relationship. Moreover, this study may shape the thinking abilities of Jordanian industry managers in particular and employees in Jordanian organizations, in general, to gain knowledge and aid their organizations into competing in the global market. To the knowledge of the author, no attempt has been taken to investigate this relationship in any Jordanian sector.

The next section highlights the literature review and develops the hypotheses. Then the author presents a description of the research methodology adopted in this paper. Followed by an analysis of the findings. The subsequent section discusses the empirical analysis of results. Finally, the paper provides contributions, conclusions and recommendations for future research, and theoretical and managerial implications.

## LITERATURE REVIEW AND HYPOTHESES

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### *KNOWLEDGE MANAGEMENT*

Literature conceptualizes KM and provides distinct processes that enhance organizations' abilities to sustain a competitive advantage (Nonaka & Von Krogh, 2009). Building on Nonaka's work, authors (e.g., Ahn & Chang, 2004; Andone, 2009; Bryant, 2005; González, Giachetti, & Ramirez, 2005; Hsu, Lawson & Liang, 2007; Huang, Chen & Yieh, 2007; Karasneh, 2002; Karasneh & Al-Khalili, 2009; Kuah, Wong & Wong, 2012; Lopez-Nicolas & Soto-Acosta, 2010; Patton, 2001; Uotila, 2017 ) indicate that KM consists of different processes and activities. Karasneh (2002) asserts that KM consists of five main processes (i.e., creation, adoption, adaptation, embodiment and evaluation). He argues that as knowledge is required by organizations, it should be either internally created or externally adopted from best-practice organizations. Subsequently, knowledge either created or adopted ought to be adapted in the specific context of an organization. The embodiment process distinguishes the ability of the organisation to codify, distribute, transfer, and translate the adapted knowledge into practice. The knowledge evaluation process is necessary for assessing all forms of knowledge in the application within organizations. Bryant (2005) concludes that the presence of high levels of knowledge creation leads to higher perceived levels of peer mentoring. Dul, Ceylan, and Jaspers (2011) study the impact of the physical work environment on workers' creativity in comparison with the effects of personality innovation and the socio-organizational work environment. Results support HR practices that put emphasis on the individual, socio-organizational work environment, and physical work environment to elevate workers' creativity.

The success of KM depends on the ability of organizations to promote a critical synthesis between KM processes capabilities and KM infrastructure capabilities. Bharadwaj, Chauhan, and Raman (2015) investigate the impact of KM capabilities (i.e., creation/acquisition, storage, dissemination, and application) and infrastructure capabilities on organizational knowledge effectiveness. They conclude that organizations have started realizing the importance of managing knowledge as a strategic asset. Svetina and Prodan (2008) investigate the extent to which different knowledge sources contribute to the firms' innovation performance. They conclude that internal sources have the most important influence on firms' innovative performance. They also conclude that in-house learning is not sufficient for generating innovation and that firms need to supplement internal knowledge with knowledge acquired outside the firm. McAdam (2000) conclude that the proper application of knowledge embodiment in an innovative manner is critical for an organization's success as well as the competitiveness. Karasneh & Alkalili (2009) investigate the actual practice of KM activities in the

Ministry of Education in Jordan. They conclude that the practicing level of (knowledge creation, knowledge adoption) is high while the practicing level for (knowledge adaptation and knowledge embodiment) is medium.

### ***KM AND ORGANIZATIONAL INNOVATION***

KM literature conceptualizes innovation as a critical factor for organizations to create value and maintain a competitive advantage in a highly complex and dynamic environment (Bagheri et al., 2015; Bose, 2004). Nonaka and Von Krogh (2009) indicate that the theory of organizational knowledge creation targets developing a comprehensive view of knowledge that could recognize organizational creativity, learning, innovation, and change. Nonaka and Takeuchi (1995) argue that the dissemination of innovation depends on the capability of an organization to produce, use, and disseminate knowledge. KM practices encourage the generation of new knowledge and organizational learning which is fundamental for achieving advantages based on innovation (Zack, McKeen, & Singh, 2009). Organizational innovation is the process in which new knowledge is adopted, adapted, disseminated and integrated to generate new knowledge. The integration of KM and organizational innovation leads to sustainable competitive advantage (Bashir & Farooq, 2019; Gloet & Terziowski 2004).

knowledge is the starting point for the development of innovations and can be generated either externally or internally. Ferraris, Santoro, and Dezi, (2017) argue that firms which develop and possess superior knowledge management capabilities have the ability to better manage external knowledge and combine it with the internal one. Cantner, Joel, and Schmidt (2011) conclude that firms that apply KM are more successful with product and market innovations compared to firms that do not apply KM. Kiessling, Richey, Meng, and Dabic (2009) conclude that KM practices contribute significantly to product progress, employee innovation and firm innovation. Palacios, Gil, and Garrigos (2009) identify several KM abilities that are essential for innovation development, such as skills development, knowledge flow management, acquisition of internal knowledge, transfer, dissemination and internal application of accumulated knowledge and increase in the variety of the organizational memory. Darroch (2005) asserts that the KM process would positively affect organizational innovation. Thus, the relationship between KM and innovation is closely related. Therefore, the following hypothesis is proposed:

H1: Knowledge management positively affects organizational innovation.

### ***KM AND ORGANIZATIONAL LEARNING***

Organizational learning has been widely identified in the literature. Jiménez-Jiménez and Sanz-Valle (2011) indicate that organizations develop new knowledge from common experiences through OL process. The development of new knowledge influences behaviors and improves the firm's capabilities. They argued that OL processes include knowledge acquisition, knowledge distribution, knowledge interpretation, and organization memory. Garvin, Edmondson, and Gino (2008) state that organizational learning is “the only sustainable competitive advantage” for organizations. Senge (1992) defines the learning organization as the comprising of a group of people continue to enhance their capacity to create what they aspire. OL is a crucial concept for organizations to sustain and achieve a competitive advantage and a nucleus in organizational innovation (Bukowitz & Williams, 1999; Liao & Wu, 2010; Nonaka & Von Krogh, 2009; Therin, 2003; Wang & Xu, 2018). Jerez-Gomez, Céspedes-Lorente, and Valle-Cabrera (2005) state that knowledge and, more specifically, its acquisition or creation, along with its dissemination and integration within the organization, become a key strategic resource to OL.

Liu, Zhou, and Gao (2008) investigate the inter-relationships among organizational learning, knowledge transfer and dynamic capabilities. They conclude that organizational learning has a direct positive impact on knowledge transfer but no direct positive impact on organizational dynamic capabilities. Lin & Lee (2005) examine the impact of organizational learning factors and knowledge man-

agement processes. They conclude that organizational learning factors and knowledge management processes are closely related to the level of e-business systems adoption. Yang (2007) investigate the extent to which knowledge sharing and organizational learning affect organizational effectiveness. He concludes that knowledge sharing facilitates the transformation of collective individual knowledge to organizational knowledge. Furthermore, this would result in the advancement of organizational learning and eventually, the enrichment of organizational effectiveness.

Attia and Essam Eldin (2018) examine the effect of KM capabilities on organizational learning (OL) and supply chain management practices (SCMPs). They conclude that SCMP and OL are positively affected by KMC. Walczak (2008) examine international studies of knowledge management (KM) and organizational learning (OL). He concludes that there is a need to increase research that examines KM and OL existing in different and multiple countries. Additionally, cultural factors should be included in KM and OL research analysis. Actually, most of the theoretical and empirical work suggests a positive relationship between KM and OL. Therefore, the following hypothesis is proposed:

H2: Knowledge management positively affects organizational learning.

### ***ORGANIZATIONAL LEARNING AND INNOVATION***

Organizational learning and innovation have been identified by many scholars (e.g., Jiménez-Jiménez & Sanz-Valle, 2011; Nonaka & Takeuchi, 1995; Sørensen & Stuart, 2000; Stata, 1989). Karasneh and Al-zoubi (2018) indicate that individuals utilize existing knowledge and share it within the organization to create new knowledge. The utilization of knowledge depends on the capacity of individuals to understand, learn, apply, and innovate new knowledge. Jiménez-Jiménez and Sanz-Valle (2011) state organizational learning allows the development, acquisition, transformation and exploitation of new knowledge that enhances organizational innovation. The relationship between organizational learning and innovation has been conceptually recognized, there is still a dearth in empirical evidence (Darroch & McNaughton, 2003; Jiménez-Jiménez & Sanz-Valle, 2011). For example, Salehi and Naseri (2018) conclude that organizational learning capability has a significant impact on organizational innovation in the Iranian food industry. Jain and Moreno (2015) conclude that organizational learning factors were found to be the positive predictors of KM practices and firm's performance. Kiziloglu (2015) concludes that there is a positive relationship between organizational learning and innovation in the Turkish banking sector. Hurley and Hult (1998) conclude that a high level of innovativeness is associated with a learning culture. Generally, most current literature finds a positive relationship between OL and innovation. Therefore, the following hypothesis is proposed:

H3: Organizational learning positively influences organizational innovation.

### ***MEDIATOR BETWEEN KM AND OI***

Current literature identifies the role of OL as a mediating variable between different perspectives. For example, Imran, Ilyas, and Fatima (2017) utilize OL to mediate the relationship between organizational performance and KM capabilities. Raj & Srivastava (2013) examine the mediating role of OL on organizational culture, HRM Practices and Innovativeness. Kalmuk and Acar (2015) use OL to mediate the relationship between Innovation and Firm's Performance. Real, Roldán, and Leal (2014) study the mediating role of OL on the influence of entrepreneurial orientation and learning orientation. Wang and Xu (2018) perceive OL to mediate the relationship between Customer knowledge management and radical innovation. Vieira (2013) indicates that OL has emerged as an organizational capability to face the change forthcoming from the turbulent and dynamic environment. Previous studies rarely investigated the mediating role of OL between KM and OI. For instance, Nouri, Ghorbani and Soltani (2017) investigate the influence of KM on organizational innovation concerning the mediating role of organizational learning. They conclude that KM has an insignificant impact on organizational innovation but has a significant and positive impact on organizational learning. Jerez-Gomez, et al. (2005) state that "knowledge and, more specifically, its acquisition or creation,

along with its dissemination and integration within the organization, become a key strategic resource to organizational learning”. According to (Crossan, Lane, and White,1999; Huber, 1991; Jerez-Gomez et al., 2005) Organizational learning is seen as a dynamic process based on knowledge, which implies moving among the different levels of action, going from the individual to the group level, and then to the organizational level and back again. Similarly, Allameh, Rezaei, and Bagheri (2014) concluded that organizational learning functions as a significant mediator between critical success factors of KM and organizational innovation.

Liao and Wu, (2010) investigate the effect of the knowledge creation process on organizational innovation and the mediating effect of organizational learning. They conclude that organizational learning is the mediating variable between KM and organizational innovation. Consequently, KM is an important input, and organizational learning is a key process. Finally, organizational innovation is a critical output. Thus, by extending the current literature, the following hypothesis is proposed:

H4: Organizational learning moderates the relationship between knowledge management and organizational innovation.

The interrelationships among the four postulated hypotheses shape the research conceptual model (Figure 1).

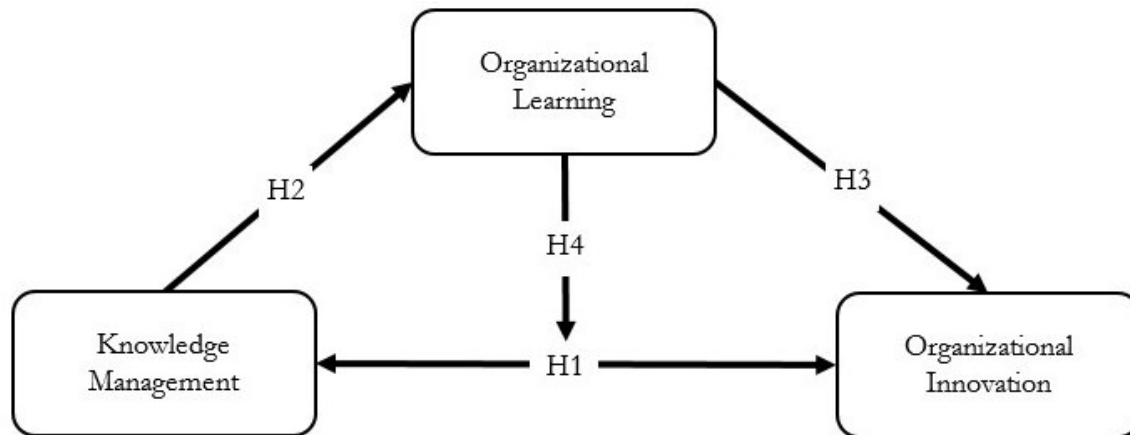


Figure 1: Conceptual Model

## RESEARCH METHODOLOGY

### SAMPLE

Data was collected from the manufacturing sector which is thought to be an effective medium for KM applications and practices (Birasnav & Rangnekar, 2010; Corfield, Paton, & Little, 2013; Karasneh & Al-Zoubi, 2018). The community of this study consists of managers in the strategic, tactical, and operational management levels who were randomly selected from manufacturing companies in Amman, Jordan. Fifty-six industrial companies (i.e., Chemical, medical, food, petrochemicals, Mining, pharmaceutical, steel and iron, Aluminum, Cable) listed in Amman Stoch Exchange were selected.

### INSTRUMENTS

A questionnaire for data collection was developed based on previous work (Appendix) with some modifications to fit the nature and need of the study (Table 1). Knowledge management dimension is measured by (16) items based on four variables suggested by (Karasneh, 2002). These variables are knowledge creation, knowledge adoption, knowledge adaptation, and knowledge embodiment. The

measurement items of these variables are synthesized and developed based on previous literature. Organizational learning dimension is measured by (5) items suggested by (Ju, Li, & Lee, 2006). Organizational innovation is measured through (20) items based on five variables adopted by (Wang & Ahmed, 2004). These variables are knowledge behavior innovation, product innovation, process innovation, market innovation, and strategic innovation.

The first draft of the questionnaire was pilot tested for authenticity (Recker, 2011) on (20) managerial staff working in various industries and attending a KM workshop with the author. The managers of those companies provided the author with the e-mails of their managerial staff. The final authorized version of the questionnaire was e-mailed to the managers.

**Table 1: KM Measurement item references**

Variables	No. of Items	References
Knowledge creation	4	(Ahn & Chang, 2004; Bryant, 2005; Huang et al., 2007; Kuah et al., 2012).
Knowledge adoption	4	(González et al., 2005; Hsu et al., 2007; Lopez-Nicolas & Soto-Acosta, 2010; Patton, 2001).
Knowledge adaptation	4	(Karasneh, 2002; Karasneh & Al-Khalili, 2009; Uotila, 2017).
Knowledge embodiment	4	(Andone, 2009; Karasneh, 2002; Karasneh & Al-Khalili, 2009; Kuah et al., 2012).
Organizational Learning	5	Ju et al., 2006
Organizational Innovation	20	Wang & Ahmed, 2004

## ***PROCEDURE***

A total of 666 questionnaires were distributed via email between December 2018 and January 2019. Follow up was carried out in two forms. First, email reminders for participants. Second, multiple WhatsApp messages to the surveyed companies' executives one week later to encourage their managers in different managerial levels for participation. 457 complete and valid questionnaires were returned with a response, return rate of 68.6 percent. Respondents were fit in terms of the desire to adopt knowledge and its antecedents to encourage employees to innovate, create and learn. The high respondent rate may be attributed to the determination of those executives attending the workshop with the author to diagnose their problem. Moreover, the chance of a non-response bias test was carried out between early and late respondents and results suggest that non-response bias is not significant.

## ***DATA ANALYSIS***

Statistical Package for Social Sciences (SPSS) program was used to analyze the questionnaire of participants to examine the demographic characteristics of the questionnaire items (i.e., 457). Among these participants, 70.5 percent were males, while 29.5 percent were females. The average age of respondents is 38.6 years. The analysis of targeted group is as follows: Team leaders (38.5 percent), Managers (23.6 percent); Chief officers (19.3 percent); Directors (15.1 percent); and Supervisors (3.5 percent). The average experience of respondents is 14.33 years. The minimum qualification of respondents is a bachelor's degree.

The statistical analysis reveals that KM dimension is significantly and positively correlated with OL and OI. Moreover, the correlation between KM and OL is (0.711), between KM and OI (0.671), and between OL and OI (0.728). This indicates an expected relationship between KM and OL and organizational innovation. Additionally, OL revealed a positive relationship with OI variables. The correlation among KM, OL and OI dimensions are statistically significant showing low indications of multicollinearity. Cronbach's coefficient alpha reliability estimates were utilized to measure the internal consistency of the questionnaire items. Cronbach's alpha reliability estimate for KM dimension is

(0.83); for OL dimension is (0.86); and for OI dimension is (0.82). These estimates reveal that the scale is reliable.

**VALIDITY**

Confirmatory factor analysis (CFA) was carried out to test convergent validity for all the three dimensions separately. A five-point Likert scale was used to measure all items. The detailed description of CFA is as follows:

**Knowledge management (KM):**

This dimension is measured by 16 items. CFA results (Table 2) show that the proposed model did not fit the data well. Model improvement can be utilized by deleting some items based on exploratory factor analysis (Hair, Black, Babin, & Anderson, 2014 p. 630). In fact, five items have been deleted. The fit measures of the revised four variables model are shown in (Table 2) and suggest that the scale is valid. The standardized factor loadings ( $\gamma$ ) of the four variables are  $\gamma = 0.74$  ( $p < 0.05$ ),  $\gamma = 0.79$  ( $p < 0.01$ ),  $\gamma = 0.73$  ( $p < 0.05$ ), and  $\gamma = 0.74$  ( $p < 0.05$ ) respectively. The Cronbach's alpha coefficient ( $\alpha$ ) for the revised scale was 0.85.

**Table 2: CFA of knowledge Management four factors model**

Dimension	CMIN/df	p-value	RMSEA	GFI	CFI
KM four variables model	3.77	0.000	0.09	0.74	0.72
KM four Variables revised model	2.12	0.08	0.05	0.97	0.97

**Organizational Learning (OL):**

This dimension is measured by five items. Results of CFA (Table 3) show that the proposed model fit the data well. The standardized factor loadings ( $\gamma$ ) of the five variables are 0.73, 0.70, 0.72, 0.70, and 0.73 respectively. The Cronbach's alpha coefficient ( $\alpha$ ) for the scale was 0.86.

**Table 3: CFA of Organizational Learning model**

Dimension	CMIN/df	p-value	RMSEA	GFI	CFI
Organizational Learning	1.688	0.107	0.039	0.992	0.996

**Organizational Innovation (OI):**

This dimension is measured by 16 items. CFA results (Table 4) show that the proposed model did not fit the data well. Model improvement can be utilized by deleting some items based on exploratory factor analysis (Hair et al, 2014 p. 630).

The fit measures of the revised five variables model are shown in Table (4) and suggest that the scale is valid. The standardized factor loadings ( $\gamma$ ) of the five variables are  $\gamma = 0.57$  ( $p < 0.05$ ),  $\gamma = 0.59$  ( $p < 0.05$ ),  $\gamma = 0.85$  ( $p < 0.05$ ),  $\gamma = 0.81$  ( $p < 0.05$ ), and  $\gamma = 0.55$  ( $p < 0.05$ ) respectively. The Cronbach's alpha coefficient ( $\alpha$ ) for the revised scale was 0.86.

**Table 4: CFA Organizational Innovation five variables model**

Dimension	CMIN/df	p-value	RMSEA	GFI	CFI
Organizational Innovation five variables model	20.696	0.000	0.09	0.926	0.799
Organizational Innovation five Variables revised model	1.524	0.206	0.034	0.996	0.998



**STRUCTURAL MODEL**

Structural equation modeling (SEM) of AMOS (v-21) is carried out to test the model (Hair et al, 2014). Fit indices for the model are CMIN/df =2.246,  $p < 0.000$ , RMSEA= 0.052, GFI = 0.952 and CFI = 0.958 (Table 5). The fit model turned out to be satisfactory indicating that the interrelations are consistent with the given data.

**Table 5: Fit indices for hypothesized model**

hypothesized model	CMIN/df	p-value	RMSEA	GFI	CFI
	2.246	0.000	0.052	0.952	0.958

**Hypothesis testing**

To test the four postulated hypotheses, Path analysis estimates is utilized. A holistic study to the standardized parameter estimates indicates that the four hypotheses revealed a significant relationship and were as foreseen. The results of (Table 6) revealed that the relationship between knowledge management and organizational innovation is significantly and positively related to organizational innovation. The statistically significant parameter estimates ( $\beta = 0.52$ ,  $p < 0.01$ ) between KM and OI indicated support for H1. Moreover, the results of Table (6) provide enough support for hypothesis H2 and H3, Knowledge management is significantly and positively related to organizational learning, the path coefficient ( $\beta= 0.79$ ,  $p < 0.01$ ) between KM and OL, and the path coefficient ( $\beta= 0.37$ ,  $p < 0.01$ ) between OL and OI. Figure 2 shows the factor loading and standardized path coefficients.

Finally, the mediation effect of OL between KM and OI (H4) is tested based on Baron’s and Kenny’s (1986) suggestions. According to them, the mediation is at its strongest when there is “full mediation” (i.e., when there is an indirect effect but no direct effect.) However, when there are both indirect and direct effects, they refer to it as “partial mediation”. The results in (Table 7) of direct, indirect and total effects for each dimension reveal a significant path from KM to OL and from OL to OI. The importance of the indirect effect was utilized using the Sobel z-value (Sobel, 1982) and it was 6. 75 ( $p < 0.01$ ). Therefore, regarding the current study, OL is a mediator between KM and OI. Yet, the mediation is only partial as both path coefficients are significant. Authors (e.g., Awang, 2015; Preacher & Hayes, 2008; Raj & Srivastava, 2016) indicate that when the coefficients of direct and indirect effects are significant, a partial mediation explains such a phenomenon. Thus, H4 is supported. This result is consistent with (Hsiao, Chang & Chen, 2014; Raj & Srivastava 2016).

**Table 6: Standardized path coefficients for the model**

Hypotheses	Paths	Estimates	S.E.	C.R.	P-Value	Result
H1	OL<--- KM	0.79	0.111	9.894	0.000*	Supported
H2	OI <--- KM	0.52	0.070	4.721	0.000*	Supported
H3	OI <--- OL	0.37	0.048	3.649	0.002*	Supported

\*Significant at  $p < 0.01$ .

**Table 7: Direct and indirect relationship**

Dimension	Endogenous					
	Organizational learning			Organizational Innovativeness		
Exogenous	Direct	Indirect	Total	Direct	Indirect	Total
Knowledge Management	0.79*	0.00*	0.79*	0.520*	0.190*	0.710*
Organizational learning	0.00	0.00	0.00	0.37*	0.00	0.37*

Standardized path estimates are reported; \* $p < 0.01$

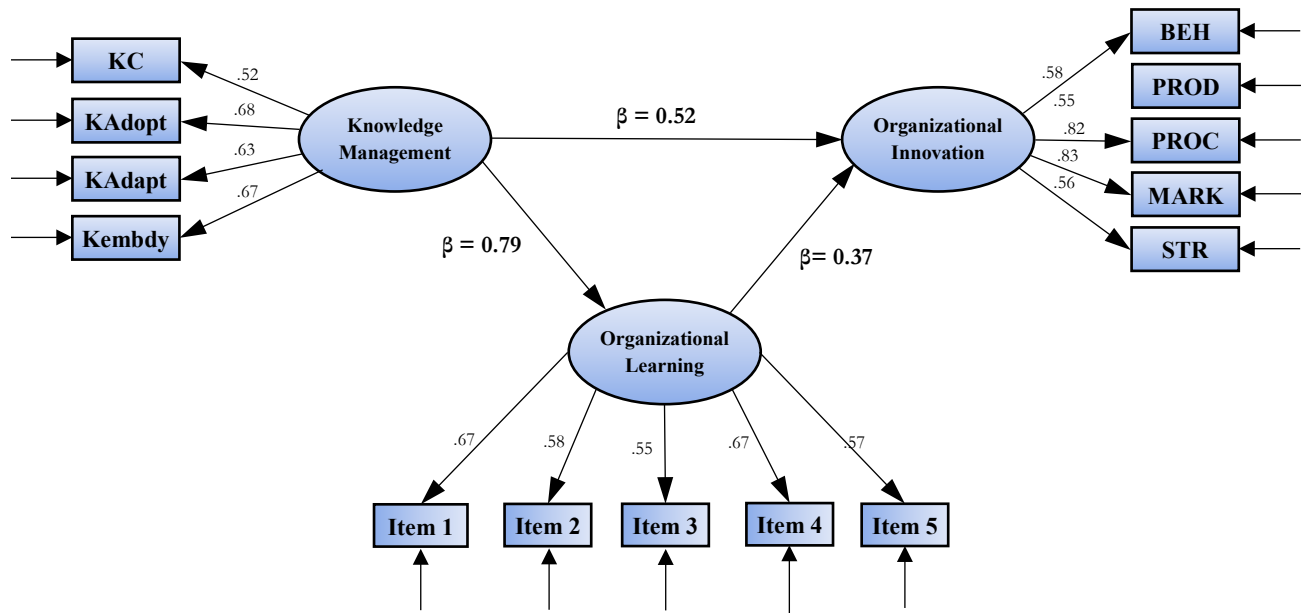


Figure 2: Path coefficients of the research model

## FINDINGS AND DISCUSSION

Little is known about the interrelationships among knowledge management, organizational learning, and organizational innovation, especially in developing countries. The majority of work undertaken up to date tackling such an interrelation is mainly highlighted the domain of developed countries. This research investigates the mutual relations amongst knowledge management, organizational learning, and organizational innovation in a developing and promising economy. Study results and implications are discussed as follows:

First, study results reveal that the relationship between knowledge management and organizational innovation is significantly positive. This result is consistent with Jerez-Gomez et al. (2005), Nonaka & Von Krogh (2009), Stanovcic, Pekovic, and Bouziri (2015), and Zack et al. (2009). Second, results also reveal that knowledge management and organizational learning are significantly positive. Many scholars have established critical and important relations between KM and OL. They assert that KM is a key strategic resource to organizational learning (Jerez-Gomez et al., 2005); OL is complementary to KM (King, 2009); therefore, OL has to do with embedding what has been learned into the fabric of the organization and is gradually absorbed within KM (Castaneda, Manrique, & Cuellar, 2018). Moreover, OL develops a strategic learning capability by linking learning with KM in and among organizations (Dimitriadis, 2005).

Third, empirical results emerging from this study indicate that there is partial mediation to support the relationship between OL and OI. This result is consistent with (Hsiao et al., 2014; Raj & Srivastava, 2016). These results suggest that surveyed organizations should focus on organizational learning and its process, in the same manner, to promote innovation in their organizations. The management's problem in the surveyed organizations may lie in the fact that managers exert their efforts to embrace KM leaving out OL component and its processes. The partial mediation of OL entails that organizations ought to develop certain means of improving their innovativeness. It is important to recall that KM consists of four dimensions (i.e., creation, adoption, adaptation, and embodiment). These dimensions ought to encourage managers to enhance learning and innovation. For example, the adoption of best practice knowledge may afford a valuable source of learning. The adaptation of adopted

knowledge to organizational context ought to enhance the employee's ability to learn and hence innovate new ideas and knowledge. Knowledge embodiment, on the other hand, should improve employees' learning hence innovation (Nonaka & Takeuchi, 1995). McAdam, (2000) states that "knowledge embodiment can build on new knowledge construction and enable the process of innovation to be further incorporated within the organization".

Moreover, this study contributes to the literature in different ways. First, it asserts that OL assists in improving OI in manufacturing organization of developing countries. Second, it highlights the substantial benefits of applying KM, OL and OI in manufacturing companies in Jordan. Furthermore, it enhances the relationship between KM and innovativeness' literature by providing empirical evidence, suggesting that OL is as important as KM to advance organizational innovation. Most importantly, it identifies the problem of a developing economy which is not promoting OL or taking care of it as much as they attended to KM in their organizational practices.

## **IMPLICATIONS**

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This study presents theoretical and practical implications. The theoretical implication is taking part in the growing body of research by identifying organizational learning as a mediator between knowledge management and organizational innovation. To the knowledge of the author, this is the first study to empirically examine these interrelations in the economy of developing countries (i.e., Jordan). The study results may be an important tool for future researches as they can be the foundation for upcoming studies covering the topic of KM, OL, & OI in developing countries.

Regarding the managerial implications of the research, managers ought to recognize that OL is equally important to KM. This entails that OL should be utilized within organizations to achieve OI and thus a competitive advantage for those who apply it. The problem of the surveyed organizations' managers is that they exert their effort to promote KM especially that part of adoption from best practice organizations without the proper adaptation of that knowledge which in turn results in an inefficient organizational learning environment. Moreover, managers ought to value their significance and encourage their employees to adopt knowledge from various sources; which, if implemented correctly, will enhance the OL environment. In other words, managers should recall (Senge, 1990, p. 7) indication concerning a learning organization "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together".

## **LIMITATIONS AND FURTHER RESEARCH**

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This study has several limitations which may lay the foundation for future research. First, the study's sample was only tested on managers in surveyed organization leaving out employees. Hence, conducting a similar study that sheds light on employees may widen the results spectrum. Second, the study was undertaken in the context of a developing country (i.e., Jordan). Therefore, the results are of relatively accurate significance in developing countries but may ignore developed ones. Thus, researching both developed and underdeveloped organizations could make the current study's results more beneficial and further highlight the drawbacks of developing countries' organizations. Third, although the sample size may be referred to as acceptable, a wider sample may introduce a more advanced result analysis making the study's outcomes further punctual and applicable. Fourth, this study applies only four KM variables (i.e., creation, adoption, adaptation, and embodiment) in fact, KM disciplines consist of a plethora of dimensions (e.g., acquisition, conversion, application, donating, transfer ...etc.). Therefore, investigating all KM variables may result in robust identification of developing countries. At last, the current study utilizes the snapshot research method. Thus, as KM is dynamic, longitudinal research highlighting that dynamism would be beneficial.

## CONCLUSION

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The current study highlights the significance of knowledge management with organizational learning and organizational innovation. The study results were based on a sample of 457 managerial level respondents. To examine the research hypothesis, the researcher implemented structural equation modeling. Study results reveal a significantly positive relationship between both KM and organizational learning; and, KM and organizational innovation. Empirical results further indicate the existence of partial evidence to support the relationship between OL and OI. Hence, proper implementation of organizational learning by default indicates the necessity to implement KM leading to organizational innovation.

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## APPENDIX

<b>Knowledge management, Organizational Learning and Organizational Innovation Measurement Scale</b>	
Constructs	Statements
Knowledge creation	My corporation [...] 1. encourages its employees to generate new ideas or methods. 2. uses brainstorming and know-how of employees to generate novel ideas. 3. 's work environment encourages creativity and innovation. 4. has systems that capture its employees' knowledge.
Knowledge adoption	In my corporation, management [...] 1. encourages the adoption of external knowledge. 2. has the ability to learn from external knowledge processes. 3. invites external specialists to exchange their knowledge and experiences with its employees. 4. benefits from global best-practice knowledge and adopts it.
Knowledge adaptation	My corporation [...] 1. adapts created or adopted knowledge to meet the requirements of their internal context. 2. exploits created knowledge and explores adopted knowledge. 3. refines created or adopted knowledge to disseminate it among its employees. 4. utilizes adapted knowledge innovatively to achieve a competitive advantage
Knowledge embodiment	My corporation [...] 1. documents its created and/or adopted knowledge to be put into real practice. 2. puts organizational knowledge into a form that makes it accessible to those who need it. 3. stores specialists' knowledge as reference programs on databases. 4. codifies new knowledge using databases, artificial intelligence, and information systems.
Organizational Learning	My corporation [...] 1. has processes for incremental improvements to existing product, market or service 2. has processes for stimulus-response to react to discrete environmental changes. 3. breaks routine behaviors and addresses problem directly 4. actively responses to dramatically environmental changes 5. has continuous experiment and feedback with examining the appropriateness of current behavior
Behaviour innovation	1. We get a lot of support from managers if we want to try new ways of doing things. 2. In our company, we tolerate individuals who do things in a different way. 3. We are willing to try new ways of doing things and seek unusual, novel solutions. 4. We encourage people to think and behave in original and novel ways.
Product innovation	1. In new product and service introductions, our company is often first-to-market. 2. Our new products and services are often perceived as very novel by customers. 3. In comparison with our competitors, our company has introduced more innovative products and services during the past five years. 4. In comparison with our competitors, our company has a lower success rate in new products and services launch.
Process innovation	1. We are constantly improving our business processes. 2. Our company changes production methods at a great speed in comparison with our competitors. 3. During the past five years, our company has developed many new management approaches 4. When we cannot solve a problem using conventional methods, we improvise on new methods

Market innovation	<ol style="list-style-type: none"><li>1. Our recent new products and services are only minor changes from our previous products and services</li><li>2. New products and services in our company often take us up against new competitors</li><li>3. In comparison with our competitors, our products' most recent marketing program is revolutionary in the market.</li><li>4. In new product and service introductions, our company is often at the cutting edge of technology.</li></ol>
Strategic innovation	<ol style="list-style-type: none"><li>1. Our firm's R&amp;D or product development resources are not adequate to handle the development need of new products and services.</li><li>2. Key executives of the firm are willing to take risks to seize and explore "chancy" growth opportunities.</li><li>3. Senior executives constantly seek unusual, novel solutions to problems via the use of "idea men".</li><li>4. When we see new ways of doing things, we are last at adopting them.</li></ol>

## BIOGRAPHY

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**Abed Al-Fatah Karasneh** is an Associate professor of Knowledge Management in the School of Business at Yarmouk University, Jordan. His teaching and research interest focus on knowledge management, creativity, innovation and organizational renewal. His current research interests include the measurement of knowledge management and focus on the developing economy. He believes that developing countries economy rely mainly on the ability of organizations to reinforce knowledge management and its antecedents as a strategic tool to a achieve a competitive advantage.