

The Effects of Transformational Leadership on Process Innovation through Knowledge Sharing

Sawsan J. Al-Husseini, Talib A. Dosa

Abstract—Transformational leadership has been identified as the most important factor affecting innovation and knowledge sharing; it leads to increased goal-directed behavior exhibited by followers and thus to enhanced performance and innovation for the organization. However, there is a lack of models linking transformational leadership, knowledge sharing, and process innovation within higher education (HE) institutions in general within developing countries, particularly in Iraq. This research aims to examine the mediating role of knowledge sharing in the transformational leadership and process innovation relationship. A quantitative approach was taken and 254 usable questionnaires were collected from public HE institutions in Iraq. Structural equation modelling with AMOS 22 was used to analyze the causal relationships among factors. The research found that knowledge sharing plays a pivotal role in the relationship between transformational leadership and process innovation, and that transformational leadership would be ideal in an educational context, promoting knowledge sharing activities and influencing process innovation in the public HE in Iraq. The research has developed some guidelines for researchers as well as leaders and provided evidence to support the use of TL to increase process innovation within HE environment in developing countries, particularly in Iraq.

Keywords—Transformational leadership, knowledge sharing, process innovation, structural equation modelling, developing countries.

I. INTRODUCTION

TODAY, HE sector is facing challenges and rapidly changing environment characterized by technological changes increased demand [1]. These external pressures are forcing the education sector to be not only efficient and effective but also innovative. Obendhain and Johnson [2] pointed out that higher education institutions (HEIs) are important as they are producers of innovation, as a result of creating products and services.

As the world moves toward competition and innovation, transformational leadership (TL) has been identified as the most important factor affecting innovation. This style can generate commitment from subordinates and produces a greater quantity of work and more creative problem solving [3]. TL try to turn threats associated with mistakes and failure into opportunities to learn [4]. They can cope with complexity, uncertainty, and ambiguity.

Although TL may affect innovation directly, previous research has suggested that the direct effects may be too

complex to isolate. It is recognized that knowledge and knowledge sharing (KS) is the most significant resource for competitive advantage [5] and the key to enhancing innovation. KS is considered to be a building block of efficient performance within higher education environments and to play a key role in enhancing the innovation of universities [1]. It is thought to be the foundation of learning and research at universities and a vital pillar of KM that is critical to academic innovation [6].

HE in developing countries like Iraq is also facing rapidly changing challenges that require extraordinary leadership. In the past, the level of higher education in Iraq was advanced, making it the best in the Middle East. HE in Iraq enjoyed government funding as well as funding by private individuals [7]. Due to wars and the economic embargo imposed between 1991 and 2003, Iraq was distanced from the rest of the world, whilst government support for the teaching cadre in the areas of training and other relevant services weakened [8]. As a result, there was a deterioration in the infrastructure and information technology of HEIs. Educational markets are becoming increasingly global nowadays, and the ability of the education system in Iraq to reach a global market will depend on changes in the systems, methods, curricula, and leadership style.

Lin [9] noted that understanding KS enablers, processes, and outcomes is highly necessary in organizations. Previous studies have linked TL with KS and innovation in isolation. However, a causal link amongst these factors has not been developed to date. Therefore, this research seeks to examine the impact of TL on process innovation via KS. A few empirical studies to date have produced evidence in favor of these claims, particularly in HE in general within developing countries, specifically, Iraq.

II. THEORETICAL BACKGROUND AND HYPOTHESES

A. Transformational Leadership (TL)

Bass and Riggio [10] described TL as a process in which people are changed and transformed. It involves attempts to make changes that increase organizational effectiveness and the performance of the followers, by transforming the latter's personal values and self-concepts. The existence of this kind of leadership is reflected in subordinates who are enthusiastic about the leader's opinions and ideas. It emphasizes intrinsic motivation of followers, ethical behavior, the development of leadership among team members, and a shared vision and goals [3].

Bass and Riggio [10] indicated that there are four behaviors that form the basis of TL: Idealized influence, inspirational

S. J. Al-Husseini is with the Middle Technical University, Institute of Administration Rusafa, Baghdad, Iraq (e-mail: swasn.al-husseini@hotmail.com).

T. A. Dosa is with the Ministry of Immigration and Displacement, Office of Information and Researches, Baghdad, Iraq (e-mail: dosa.talib@yahoo.com).

motivation, intellectual stimulation, and individualized consideration. Idealized influence involves setting an example for followers to follow. This style can be regarded in terms of "behavior and attributes". It refers to the charismatic behavior shown by transformational leaders who express confidence in the organizational vision [3]. Leaders using this style show a sense of purpose, and demonstrate high standards of ethical and moral conduct. With inspirational motivation leaders encourage members to focus on organizational objectives, and have the ability to motivate them by providing meaning and challenge to their work. Bass and Riggio [10] noted that this style can enhance followers' self-efficacy beliefs and improve their motivation. Such leaders, challenge followers with high standards, and talk optimistically and with enthusiasm.

Leaders with intellectual stimulation have the ability to encourage followers to be creative and innovative and to challenge their own beliefs and values. Followers are encouraged to reframe problems to find new methods of solving them from different perspectives [3]. When practicing individualized consideration leaders act as coaches and mentors when trying to assist their followers to become fully actualized and to develop job-related competencies with empathy and consideration [11]. Such leaders have the ability to build and develop a sense of determination and self-confidence [10].

B. Knowledge Sharing (KS)

Vandaie [12] stated that data represent the raw facts, which are processed to become information, while information reflects the experiences of individuals, which is considered to be knowledge.

Researchers acknowledge two types of knowledge: tacit and explicit. Tacit knowledge describes the personal, the subjective, and the intangible. While explicit knowledge denotes knowledge that is articulated, objective and captured, and has a more tangible format [5].

KM include people, process, and technology [6]. It involves the creating, sharing and using of knowledge [13]. It has been noted that, when considering the application of KM initiatives, it is important to create a culture of KS [6]. KS includes activities in which information, skills, and insights are exchanged among organizational members [5]. Through KS, organizations can develop their skills, and competence, and increase their value. It is argued that, through KS, individuals can improve their capacity to solve unstructured and complicated problems, reduce their mistakes and increase their learning [14].

KS refers to a two-dimensional process whereby organizational members share and exchange their tacit and explicit knowledge. Daily interaction creates new knowledge through the process of knowledge exchange, donation, and collection [15]. The donating of knowledge refers to the exchange process and communicating to others what one's personal intellectual capital is. It refers to the owner of knowledge, and includes listening, talking to others, and providing them with information so as to help them develop their self-knowledge and solve problems more quickly [9].

Knowledge collecting, on the other hand, refers to the recipient of knowledge who must consult colleagues through observation, listening or practicing so as to encourage them to share their intellectual capital [15]. Knowledge collecting is a key aspect of organizations' success because the organization with proficiency in gathering knowledge is more likely to be unique and rare. Knowledge collecting occurs when organizational members are willing to learn from others [15].

C. Process Innovation

Innovative organizations have the capacity to improve individual and organizational performance and solve problems by effecting change and creating opportunities for them [16]. It is argued that innovative behavior is essential if organizations are to adapt and respond to rapid and unstable environmental and technological changes and survive in the present environment [17]. Lagrosen [18] noted that innovation can provide entry to new markets and enhance the effectiveness of organizations. It is a primary source of economic growth, providing organizations with opportunities to grow faster and gain profits [16].

Daft [19] defined innovation as the adoption of new ideas, behaviors, products, systems, processes, policies, and programmers that are new to an organization.

Tidd and Bessant [16] noted that innovation can be achieved through process they argued that this type of innovation is essential for organizations as it gives them the capability to solve problems and improve performance. Process innovation has the ability to improve production and distribution processes. It is argued that, through this type of innovation, organizations can reduce the costs of production and become more efficient [17].

In HE environments, process innovation is important and the universities should rely on it [20]. Obendhain and Johnson [2] asserted that educational institutions were a way to adopt and apply innovation. Trott [17] found that process innovation has the ability to improve the learning outcomes and quality of the provision of education. It is argued that innovations in the educational system can help customize the educational process [20]. This research defined process innovation as accepting, developing, and implementing new processes by developing and using new technology, good financial management, and the continuous improvement of skills.

D. TL and Process Innovation

Transformational leaders can encourage followers to act on an organization's vision in order to foster innovation [21]. Such leaders have an interactive vision and the capability to encourage an appropriate environment for process innovation [3].

Transformational leaders with idealized influence emphasize the importance of having a collective sense of the organization's mission [11]. These characteristics, encourage members to work hard and be more innovative [10]. With inspirational motivation leaders can motivate the followers around them to achieve the required performance by creating a climate of collaboration and teamwork [3].

By providing intellectual stimulation, leaders encourage the imagination and creativity of their followers, so that they re-examine some of their assumptions and old ways of doing things, which could enhance process innovation [22]. Using individualized consideration, transformational leaders help their subordinates to realize their own competence through encouragement, support, and feedback [3]. When leaders are concerned with their followers' personal feelings, and offer support, the followers will be more likely to respond with innovation [23].

Vaccaro et al. [24] found that transformational leaders who inspired team success and developed trusting and respecting relationships in Dutch firms enabled those firms to make changes in management innovation, mainly: regarding practices, processes, and structures. Morales et al. [25] examined the mediating role of innovation in the relationship between TL and performance in pharmaceutical organizations in the US. They found that TL through idealized influence, inspirational motivation, and intellectual stimulation had a positive direct effect on performance and an indirect one through product innovation. Therefore, this research suggests the following:

H1: TL positively influences process innovation in Iraq's public HE.

E. TL and KS

Organizations will become more effective through creating, sharing, and reusing knowledge [26]. According to Bollinger and Smith [27], organizational culture plays an important role by enabling organizational members to work together and share their knowledge. TL can create a collaborative team environment, and encourage communication and the sharing of knowledge [3].

Leaders with idealized influence can encourage followers to accomplish their work based on a collective sense of beliefs, values and purposes [11]. When members feel that their leaders have confidence in them, trust in their capabilities and appreciate their efforts to create knowledge such as new ideas, they will be more willing to give their opinions and are more likely to share knowledge [28]. TL with inspirational motivation can display enthusiasm, optimism and inspire other members to imagine the attractive future state that could be achieved [10]. Such leaders can encourage KS through communication, dialogue.

When they exhibit intellectual stimulation, transformational leaders generate different ways of thinking, challenge followers' assumptions, and seek new solutions to problems from multiple perspectives. When transformational leaders facilitate the search for new opportunities and the establishment of a common vision among employees, the employees' sense of responsibility will increase along with their KS [29]. Transformational leaders with individualized consideration behave as mentors, aiming to foster social interaction and help their followers to develop job-related competencies by showing them empathy and consideration [10]. Leaders who consider the unique knowledge of their

members and listen to their views are more likely to motivate them to share their knowledge with others [30].

Seba et al. [31] found that, within public organizations in the UAE, the main barriers to the practicing of KS activities among employees were trust, the organizational structure, and the leadership style. Meanwhile, Singh's [32] findings suggested that consulting and delegating behaviors exhibited by leaders are positively associated with knowledge creation and application. A survey of 73 individuals working in software development organizations in China, carried out by Humayun and Gang [33], found that supportive leadership has the ability to stimulate the intentions of employees to seek knowledge through knowledge management systems.

Although, the previous studies studied the relationship between TL and KM, research into how leadership affects KS in public organizations has not fully examined. Thus, this research specifies the following hypothesis:

H2: TL positively influences KS in Iraq's public HE.

F. KS and Process Innovation

The role of knowledge and KM has emerged as an important area in the investigation of innovation in organizations [34]. When considering the application of KM initiatives, it is important to create a KS culture [6]. Through KM processes, and particularly KS, organizations can create opportunities to generate new ideas and develop innovation [35].

The knowledge-based view suggests that organizations need to exhibit knowledge creation but more importantly KS [5]. Since knowledge is embedded in individuals, it is necessary for it to be shared among organizational members so that they can establish new routines and mental processes that may help them to solve their problems [34]. It is argued that organizations that promote a KS culture among organizational members are likely to generate new ideas that lead to process innovation [36].

Andreeva and Kianto [13] examined the effect of knowledge processes, namely creation, documentation and storage, sharing, acquisition and intensity, on innovation performance. The study highlighted that knowledge creation can predict product, management and marketing innovation. Holsapple and Jones [37] found that the acquisition of knowledge can help firms to create new products. Furthermore, Ferraresi et al. [38] showed that the KM processes of capturing, sharing, and application had a significant impact on innovation through strategic orientation within Brazilian companies.

Although previous studies have looked at the relationship between KM and innovation, few touch the practical difficulties of KS for process innovation [39] within developing countries and particularly the Iraqi environment. Therefore, the current research suggests:

H3: KS positively influences process innovation in Iraq's public HE.

G.KS as a Mediator of the Relationship between TL and Process Innovation

Knowledge is the key to innovation in organizations, tacit knowledge is embedded in different individuals and has to be converted into explicit knowledge. KS processes followed by organizational members help them to convert the knowledge, create new routines and mental models, and solve problems [34].

To fully leverage the knowledge and exchange the skills and experiences that reside in individual minds, TL can encourage and promote a KS culture among employees by instilling admiration, faith and respect among organizational members [3]. When knowledge can be shared among organizational members through donating and collecting, the stock of knowledge will be made available, and this will help to generate new ideas, which in turn can improve process innovation [36]. Therefore, this research argues that TL encourages a KS culture among members of staff through idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Tacit knowledge is converted to explicit knowledge about teaching operations and administrative issues among faculty members through the donating and collecting of knowledge, and this will lead to innovative ideas for developing the process innovation of the university:

H4: The influence of the TL on process innovation will be mediated by KS in Iraq's HE.

III. METHOD

A. Measures

TL was measured using a multifactor leadership questionnaire [40]. In this research, each participant (teaching staff) was asked to rate aspects of his/her leadership behavior related to each of the four TL components: 1) idealized influence, under which style leaders encourage their members of staff to have pride and respect in themselves and their college. 2) Inspirational motivation, through which leaders attempt to stimulate their members of staff by motivating them to get involved in a shared vision for the university. 3) Intellectual stimulation, by which leaders promote learning and creativity among staff, and 4) individualized consideration, through which leaders provide satisfaction to members of staff by advising and coaching them and listening to their individual needs.

KS developed from Hooff and Weenen [15] using 8 items reflecting the exchange of knowledge, experiences, and skills regarding teaching operations and administrative issues among members of staff, through the donating and collecting of knowledge.

The dependent variable in this research is process innovation, reflecting the use of new approaches in service and delivery through the development and use of new technology, and the implementing of incentives and reward systems for members of staff. Ten items were developed from work done in previous study [19] and modified so as to be suitable for the Iraqi context.

B. Sample and Data Collection

The research used a quantitative research to test theories by examining the causal relationships among variables [41]. A self-administered questionnaire and five-point Likert scale ranging from 1= (strongly disagree) to 5= (strongly agree) was used in this research. The researchers used delivery-and-collection method of distribution the questionnaire. This technique is suitable for the Iraqi environment because the participants prefer to deal with paper work. Furthermore, direct contact between the researcher and the respondents can induce a greater proportion of people to complete the questionnaire and allows the researcher to explain an ambiguous question to the participants. The questionnaire was translated into Arabic using the translation back-translation procedure [42].

500 questionnaires were sent to eight public colleges of which 254 were returned and usable for analysis.

IV. RESULTS

Structural equation modelling-SEM with AMOS 22 was used in this research to examine the impact of TL on process innovation through the mediating role of KS processes. SEM establishes a measurement and a structural model to analyze the relations between factors as suggested by Hair et al. [41]. The measurement model addresses and evaluates the reliability and validity of the indicators for measuring the hypothetical constructs. The structural model addresses the relations among the unobserved variables, specifying the direct and indirect relations among them. Thus, it deals with the causal relations among the variables according to the proposed hypotheses.

A. Validity and Reliability of the Model

The validity of the measurement model depends on establishing acceptable levels of goodness of fit for the model, and finding specific evidence of construct validity [41]. To evaluate the validity of the measurement model, construct validity, consisting, of convergent and discriminant validity was assessed through confirmatory factor analysis- CFA using AMOS 22. The convergent validity was tested by investigating the factor loading and average variance extracted (AVE) which were deemed significant if they were 0.5 or higher, according to Hair et al. [41]. Three factors TL, KS and process innovation were measured using a total of (34) items.

The reliability was assessed based on the Cronbach's alpha and composite reliability (CR), each of which should exceed 0.7. Table I shows that the convergent validity and internal reliability are satisfactory since all factor loadings, CR and AVE values are acceptable and significant.

Discriminant validity was assessed using the criteria established by Fornell and Larcker [43]. According to them, the AVE should be greater than the squared correlations between the two constructs. The constructs for all of the data were found to be empirically distinct and the discriminant validity was confirmed statistically. Table II displays the means and standard deviations. Additionally, it shows that the

variances extracted from the constructs were greater than all of the squared correlations between the items.

TABLE I
 VALIDITY AND RELIABILITY OF THE MODEL

Constructs	Item code	N=254							
		Loading	AVE	CR	α				
TL	TL1	0.822	0.73	0.89	0.89				
	TL2	0.824							
	TL3	0.845							
	TL4	0.858							
	TL5	0.816							
	TL6	0.911							
	TL7	0.877							
	TL8	0.860							
	TL9	0.777							
	TL10	0.889							
	TL11	0.845							
	TL12	0.895							
	TL13	0.896							
	TL14	0.870							
	TL15	0.830							
	TL16	0.853							
KS	KS17	0.920	0.72	0.90	0.90				
	KS18	0.878							
	KS19	0.589							
	KS20	0.967							
	KS21	0.798							
	KS22	0.850							
	KS23	0.839							
	KS24	0.820							
	Process innovation	PC25				0.778	0.67	0.88	0.88
		PC26				0.820			
PC27		0.880							
PC28		0.876							
PC29		0.749							
PC30		0.760							
PC31		0.870							
PC32		0.855							
PC33		0.865							
PC34		0.789							

Note: AVE = average variance extracted, CR = composite reliability, α = Cronbach Alpha.

TABLE II
 MEANS, STANDARD DIVISION AND DISCRIMINANT VALIDITY ANALYSIS

Factor	Mean	SD	1	2	3
1-TL	3.420	0.980	0.73		
2-KS	3.468	0.881	0.332*	0.72	
3-process innovation	3.425	0.870	0.327**	0.292**	0.67

Note: S.D = standard deviation, N= 254

The research evaluated the measurement model by using fitness of fit indices. The levels of goodness of fit for the measurement model was found to be acceptable, as shown in Table III. There are two basic indices: 1) Absolute fit indices, this includes χ^2/df , and the root mean square error of approximation (RMSEA) and 2) the Model comparison indices. The fit indices used most often are the incremental fit measurement, which includes a normed fit index (NFI) and a comparative fit index (CFI).

A. Testing Hypotheses

According to the results from AMOS for the SEM, the structural model fits the data and all fit indices lie within the

recommended criteria in Iraqi HE. Table III shows the effect of TL on process innovation is 0.213 and 0.690 on KS as predicted in Hypotheses *H1* and *H2* respectively. Furthermore, the direct effect of the KS on process innovation as show in Table IV is 0.729 providing support for *H3*.

TABLE III
 THE FIT INDICES OF THE MODEL

Fit index	N=254			Recommended criteria
	TL	KS	Process Innovation	
χ^2/df	1.322	1.387	1.495	$\leq 2-5$
GFI	0.930	0.946	0.950	≥ 0.90
RMSEA	0.038	0.032	0.041	$< 0.05 - 0.08$
NFI	0.950	0.949	0.975	≥ 0.90
CFI	0.987	0.985	0.988	≥ 0.90

TABLE IV
 RESULTS FOR THE DIRECT EFFECT IN THE MODEL BASED ON AMOS ANALYSIS

Hypothesis	Hypothesis path	Path coefficient	Results
H1	TL \rightarrow process innovation	0.213*	Supported
H2	TL \rightarrow KS	0.690**	Supported
H3	KS \rightarrow Process innovation	0.729**	Supported
Fit index	$\chi^2 / df = 1.244$, GFI = 0.941, RMSEA = 0.043, NFI = 0.937, CFI = 0.989		

Note: $p < 0.05$, $p^{**} < 0.01$

For the indirect effect, *H4* predicts a positive effect of TL on process innovation via KS. Table V and Fig. 1 shows the total effect in the Iraqi public HE is 0.631 which consists of the sum of the effect of TL on process innovation 0.213 and the indirect effect of TL on process innovation via KS 0.418, confirming the association between TL and process innovation is mediated by the KS processes:

TABLE V
 DIRECT AND INDIRECT EFFECTS OF THE HYPOTHESIZED MODEL

Hypothesis	Hypothesis path	Effect	Estimate	Total effect
H1	TL \rightarrow Process Innovation	Direct	0.213	0.631
H4	TL + KS \rightarrow Process innovation	Indirect	0.418	

V. DISCUSSION

The results of the SEM supported the proposed relationships, TL was found to be positively related to process innovation in Iraqi public HE (*H1*). The findings of this research suggest that the members of staff surveyed prefer leaders with vision. This style of leadership helps public HEIs in Iraq to go through destabilizing phases that are part of the change process and are needed to meet long-term goals. Such leaders have the necessary skills to make members of staff feel valued and to help them realize the importance of the work they do.

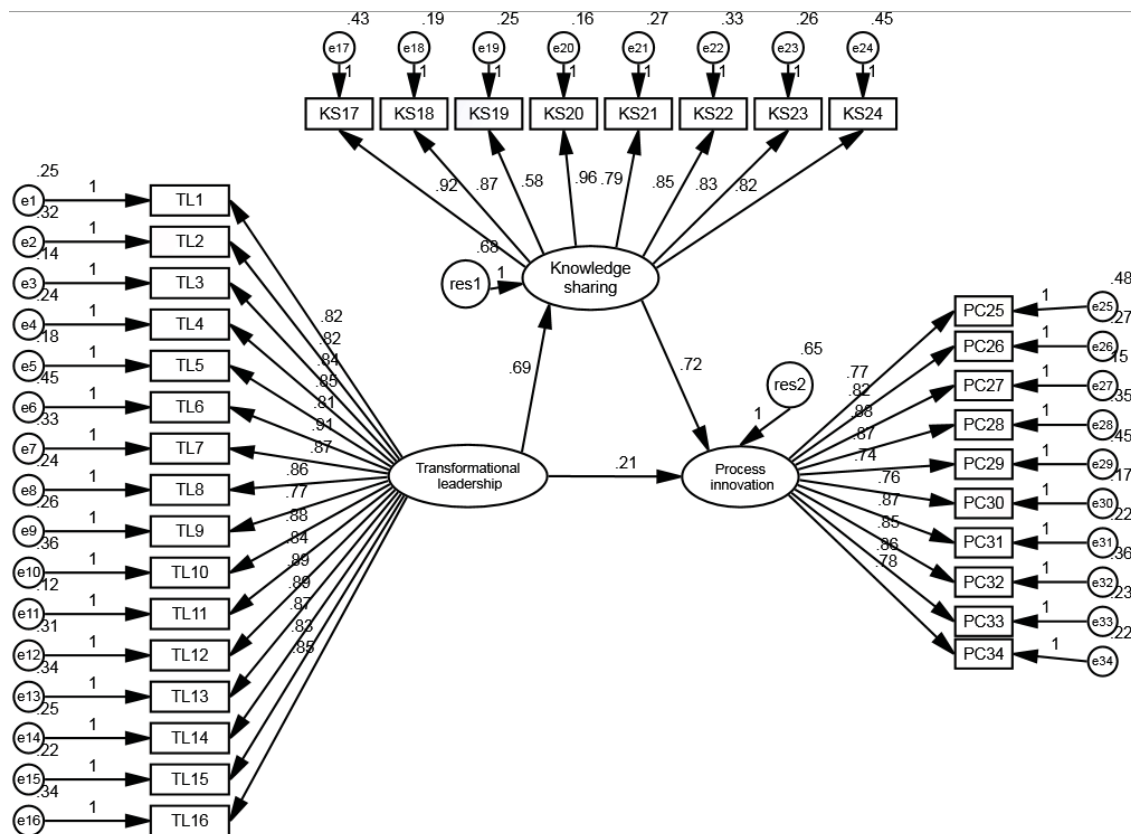


Fig. 1 Structural model

The research found that TL significantly affects KS (H2). It's suggest that the teaching staff of the public HEIs in Iraq believe that their leaders encourage them to donate and collect their knowledge by discussing and exchanging their views, learning, experiences, and skills within and outside of their departments and their universities/institutes. Their leaders do so by demonstrating that they are trustworthy and care about their work. These results are consistent with Nguyen and Mohamed [26] who pointed out that leaders who instill respect, and trust are able to facilitate knowledge acquisition and sharing among organizational members.

KS processes were found in this study to be positively related to process innovation in this research (H3). The knowledge-based view suggests that organizations need to generate as well as share knowledge [5]. When knowledge is used, learning takes place, which in turn leads to changes of behavior and innovation [34]. The results of this research demonstrate that the members of staff surveyed in public Iraqi HEIs are willing to donate and collect their skills, insights, experiences, expertise, information and notes both inside and outside of their own departments, which enables their universities to improve their process innovation (taking and developing training programs and adopting new technology). Furthermore, the results from the SEM support the mediating role of KS in the TL to process innovation relationship (H4). It is indicated that transformational leaders promote a KS culture among their teaching staff by practicing idealized influence, inspirational motivation, intellectual stimulation and

individualized consideration. Consequently, members of staff are willing to donate and collect knowledge, skills, experiences, notes and teaching materials, which in turn lead to new ideas for courses, curricula, research projects, and new technology, aiding process innovation.

VI. CONCLUSIONS, LIMITATIONS AND FUTURE DIRECTIONS

The current research aimed to examine the mediating role of KS in TL-process innovation relationship in Iraqi public HE. The research developed a model consisting of three constructs: TL, KS and process innovation.

Using SEM, the research found that KS plays a pivotal role in the TL-process innovation relationship and that TL would be ideal in an educational context by promoting KS and influencing process innovation of teaching staff. This gives an indication as to the most important factors that influence KS and provides a clue regarding how HEIs can promote KS activities. Furthermore, the findings indicate that KS is an antecedent of process innovation and a source of competitive advantage as it converts the tacit knowledge embedded in teaching staff into explicit knowledge, through their interaction within and outside their departments and universities/institutes. Therefore, leaders in Iraqi HE should design strategies aimed at encouraging their teaching staff to engage in KS activities such as sessions, conferences, workshops, etc.

This research conducted only in HE sector, while there is also need to explore such relationship in other sectors like

manufacturing. The model was applied in a developing country, namely Iraq. Future research could examine the model in other countries that share similar structures, cultures, and contexts with Iraq. The research focuses on the TL style only, while this style is usually combined with transactional leadership theory, according to Bass [44]. Thus, future research could explore the impacts of both TL and transactional leadership to attempt to detect which is more influential on process innovation among teaching staff.

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Sawsan J. Al-husseini is currently a lecturer at Middle Technical University, Institute of Administration Rusafa, Baghdad, Iraq and a senior member at International Economics Development Research Centre (IEDRC)/Hong Kong.

Sawsan Al-Husseini did her B.Sc. degree in Business Administration at Baghdad University and M.Sc. from Al-Mustansiriya University, Iraq. She received her PhD degree in Management Information Systems (MIS) from Plymouth University, School of Management, Plymouth, UK.

Dr. Al-Husseini's publications are related to the innovation, leadership style, knowledge management and knowledge sharing, she has more than 24 papers published at national and international journals and conferences.

Talib A. Dosa is currently an assistant professor and the general director of the Information and Researches Office at Immigration and Displacement Ministry, Iraq.

Talib Dosa did his B.Sc. and M.Sc. in Business Administration from Al-Mustansiriya University, Baghdad, Iraq.

His publications are related to strategic change, innovation, leadership style and knowledge management. He has more than 22 papers published at national and international journals and conferences.