European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.9, No.19, 2017

What Drive Innovative Work Behavior among Engineers? The Role of Transformational Leadership

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Abstract
This paper intends to examine the relationships between Transformational Leadership, and Innovative Work Behavior among telecommunication engineers in Jordan telecommunication Industry. Its purpose is to study the effect of Transformational Leadership on engineers Innovative Work Behavior. A total of 218 questionnaires were collected from telecommunication engineers working in telecommunications organizations in Jordan. The data were analyzed using Partial Least Squares (PLS). Findings of this study found that Transformational Leadership has a positive and significant relationship with Innovative Work Behavior. These findings provide a better understanding of the Transformational Leadership style in the attainment of telecommunication engineers' Innovative Work Behavior.
Keywords: Innovative Work Behavior, Transformational Leadership, Engineers, Jordan.

1. Introduction

Jordan is a small country with scarcity of natural resources located in the Middle East region (Department of Statistics 2015). The scarcity of natural resources has pressed the country to focus on the service industry. Service industry in Jordan accounted more than 67% of the national GDP in 2013 and employed more than 70 percent of the total labor force (Central Bank of Jordan 2014, Central Intelligence Agency 2014, Information and Communication Technology Association-Int@j 2014).

Among the service industries, telecommunication industry is contributing to the national GDP of 15.1 in 2013 (Central Intelligence Agency 2014) and employed more than 4000 employees making it the sector that provide most employment opportunities (Central Bank of Jordan 2014). Recognizing the telecommunications industry as the largest contributor to Jordan's national economy as well as one of the foremost employers, the success and sustainability of telecommunication industry is crucial.

Scholars and practitioners acknowledged that for technology based business, the capability to innovate is the key for the business survival and sustainability (Burns and Stalker 1961, Bass 1985, Damanpour 1991, Scott and Bruce 1994, Laursen and Foss 2003, Jiménez-Jiménez and Sanz-Valle 2005). Realizing this fact, The Ministry of Information and Communication Technology of Jordan urged telecommunication organizations in the country to keep abreast with innovation in order to enhance the competitiveness of the country (Ministry of Information and Communication Technology 2012).

According to de Jong (2007), organization innovation is largely relying on the innovative behavior of their employees. In the context of the telecommunications industry, it is recognized that telecommunication engineers are the core employees who could help to elevate the innovation in the telecommunication organizations. Telecommunication engineers often work on systems and equipment that are new and complex, provide best solution for the lowest cost to the organization (Queensland Government 2014). More often, telecommunication engineers are regarded as the backbone of the telecommunications industry (Baugh and Roberts 1994, Job Responsibilities 2014, Queensland Government 2014). Hence, cultivating innovative work behavior (hereinafter labeled as IWB) among engineers would be the key in achieving the competitiveness and sustainability of the telecommunication organizations (Muthuveloo and Raduan 2005, Abdul Hamid and Yahya 2011, Ministry of Information and Communication Technology 2012, Queensland Government 2014).

According to Scott and Bruce (1994) IWB refers to "the production or adoption of useful ideas and idea implementation, and begins with problem recognition and the generation of ideas or solutions"(p. 581). Problem recognition and ideas or solutions generation, either novel or adopted, are the first step of individual innovation. The process of seeking a sponsorship for an idea and attempts to build a coalition of supporters for the idea is the second stage of individual innovation. The third stage of this process is to materialize the idea.

In the past, a myriad of research has been undertaken on how to cultivate and promote IWB. In several studies conducted in the western context has showed that transformational leadership (hereinafter labelled as TL) as the key contributor in fostering IWB (Bass 1985, Basu 1991, Scott and Bruce 1994, Aryee, Walumbwa et al. 2012, Choi, Kihwan et al. 2016). These well-established links have triggered studies to focus on TL and its impact in fostering positive employee work outcomes and behaviors such as IWB (Avolio, Walumbwa et al. 2009). Despite the well documented empirical results on TL and IWB in the western culture, very limited research study the effect of TL (e.g. Khasawneh, Omari, & Abu-Tineh, 2012; Nusair et al., 2012; Raed. Awamleh & Hani. H. Al-Dmour, 2005; Sabri, 2007) in Middle East context such as in Jordanian organizations. In addition, Jordanian researchers have noted the dearth of literature in the field of TL in Jordan, and called for

more investigation regarding TL in the Jordanian context. Hence, this study fills in the gap by studying the role of TL in stimulating IWB in Jordanian telecommunication industry.

2.0 Literature Review

2.1 Innovative Work Behavior (IWB)

According to Farr and Ford (1990), work role innovation is "the intentional introduction within one's work role of new and useful ideas, processes, products, or procedures" (p. 63). Corroborates with this view, Spreitzer (1995) defined IWB as the reflection of creating something new or different. More specifically, Scott and Bruce (1994) defined IWB as the production of useable products, processes, or services that were originated from problem identification and ideas generation.

Inspired by Scott and Bruce (1994), Janssen (2000, Janssen 2004) viewed IWB in the workplace as a complex behavior, which consists of three essential processes namely: idea generation, idea promotion, and idea realization. Idea generation refers to the production of novel and useful idea in any domain (Kanter 1988, Amabile, Conti et al. 1996). Idea promotion involves finding potential allies that can help in powering up the generated idea (Kanter 1983, Kanter 1988) while idea realization concerns about producing a prototype or a model of the innovation that can be experienced and ultimately applied within a work role, group, or total organization (Kanter 1988). Although Janssen (2000) views IWB as consisting three main stages, he deduced that his items are best combined into one single additive scale (de Jong 2007). In harmony with Janssen (2000), Janssen (2004), the present study conceptualizes IWB as a complex behavior, which consists of three essential processes namely: idea generation, idea promotion, and idea realization.

2.2 Transformational Leadership (TL)

A transformational leader motivates others to do more than they originally intended to and often even more than they thought possible (Bass and Riggio 2006). In harmony with Bass and Avolio (1994), TL in this study is conceptualized as a leadership style that enhances the motivation, morale, and performance of employees through four attributes namely idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration.

A transformational leader is the one who changes the way of doing things, encourages innovation by thinking outside of the box, and utilizes the potential of people to support the change (Bass and Riggio 2006, Choi, Kihwan et al. 2016). According to Bass and Avolio (1994), TL consists of four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration.

In particular, Burns (1978) explained that idealized influence (II) as the behavior in which leader serve as a role model for his or her followers. In this light, leaders are regarded as a role model as they exhibit certain personal characteristics (Kirkbride 2006). In addition, according to Bass and Riggio (2006) leaders who possess a high level of idealized influence are willing to take risks and are more consistent than arbitrary. They are reliable and demonstrate high standards of ethics and moral conduct.

Meanwhile inspirational motivation (IM) refers to the behavior of the leader sharing a compelling vision/goal with his or her followers and constantly motivating them to reach for the goal, fueling the followers with the confidence and reassuring the followers that any obstacles can be overcome (Bass and Avolio 1994).

While transformational leadership also involves intellectual stimulation in which the leader awaken followers' on problem awareness and problem solving (Bass 1985). Through this behavior, transformational leaders will be able to boost followers' efforts to be innovative and creative by questioning assumptions, reframing problems, and approaching old situations in new ways (Bass and Riggio 2006).

Last but not least, transformational leadership also involves the behavior in which the leader gives attention and consideration to each of his or her follower's needs (Judge and Piccolo 2004). Specifically, the leader will deal with followers as mentor or coach; listens to their problems and concerns (Judge and Piccolo 2004). Scholars acknowledged that such TL behavior empowered the followers (Behling and McFillen 1996). Likewise, Dionne, Yammarino et al. (2004) suggest that such one-to-one relationship between leader and the follower provide better communication among the group members as well as between the leader and followers.

2.3 Transformational Leadership and Innovative Work Behavior

Researchers have agreed on the benefits of TL on IWB of employees (Reuvers, van Engen et al. 2008, Nusair, Ababneh et al. 2012). Specifically, through intellectual stimulation, transformational leaders encourage followers to re-evaluate problems and their working environment from which innovative ideas are risen (Bass and Avolio 1990). A transformational leader through inspirational motivation, articulates an exciting vision of the future, directs the employees to believe in their abilities to. When employees are confident of their ability/skills to successfully implement their competencies they are prone to exhibit IWB (Reuvers, van Engen et al. 2008). In addition, by showing individualized consideration, a transformational leader builds a one-to-one interactive relationship with employees, understands, emphasizes on the diversity of their skills/abilities and needs, and

aspiration (Nusair, Ababneh et al. 2012). Using idealized influence, the transformational leader instills admiration, respect, and commitment and emphasizes the importance of having a collective sense of the organization's mission.

In the western context, several studies have evidenced the positive outcomes of TL. For instance, Jung, Chow et al. (2003) claimed that transformational leaders encourage employees to be more innovative by providing a supportive climate for employees' innovative behavior. Corroborates with the findings, in a study among 335 participants over four hospitals in Australia, Reuvers, van Engen et al. (2008) found that employees exhibit a higher level of IWB when they perceived higher levels of TL showed by their leaders. In the Eastern society such as China, in a study among 639 employees and 87 leaders from five most innovative companies in China, Afsar, Badir et al. (2014) found that TL positively influences IWB. In a more recent study conducted by Pons, Ramos et al. (2016) in Spain, among 458 employees from 16 Spanish companies found that there is a strong relationship between TL and IWB.

Within the Arab context, specifically Jordan, to the best knowledge of the researchers, limited of studies has examined the role of TL in stimulating IWB. Nevertheless, several studies have evidenced the positive outcomes of TL. For example, in the context of banking industry, Al-Awamleh and Al-Dmour (2005) found positive impact of transformational leadership of bank managers on employee job satisfaction and self-perceived performance. Likewise, Abu Tayeh and Al-Khawaldeh (2004) reported that transformational leadership in the Jordanian Petroleum Refinery Company improved the level of subordinates' work outcomes. Such findings were in harmony with the earlier study by Al-Dmour and Al-Awamleh (2002) who found a positive effect of transformational leadership style of sales managers on sales people's self-perceived satisfaction and performance in all manufacturing Jordanian Public Shareholding companies. Based on above discussion, therefore, it is posited that:

H1: TL will have a positive and significant relationship with IWB.

3. Methodology

3.1 Sample and Procedure

The population in this study consisted of telecommunication engineers working in telecommunication organizations in Jordan. A total of 400 of questionnaires were distributed among the three participated telecommunication organizations. A total of 277 questionnaires were received, yielded a response rate of 69.25%. 59 questionnaires were discarded due to incomplete data. Hence, only 218 questionnaires were pulled together for further analysis. This yielded a useable rate of 54.50%.

The descriptive analysis showed that about three quarters of the respondents were males (72.9%). The data reflects the actual scenario in the telecommunication industry in Jordan where the engineering field is male dominated (Jordan Engineers Association 2016). Majority of the respondents in the study were less than 34 years old. Specifically, out of the total 218 respondents, 11.5% of the respondents were under the age 25 years, while 34.9% were within the age category of 25-34 years, 31.7% were within the age category of 35-44 years, and 18.8% were in the age category of 45-54 years. Only 3.2% of the respondents were more than 55 years old. Over half of the respondents (65.1%) are married.

With regards to the academic qualification, more than half of the respondents were holding a Bachelor's degree (59.6%) and 32.6% of the respondents have a Master's degree. It shows that the respondents in the present study are highly educated (92.2%). In terms of the respondents' position, 53.2% were working as engineers while 46.8% were holding the position as senior engineers.

Respondents were also questioned about their job and organizational tenure. Specifically, 14.2% of the respondents had been working in their position from 7 months to 1 year, while 32.1% of the respondents indicated that they have been working in their current position for 1-3 years. Meanwhile, 33.9% of the respondents have worked 4 to 6 years in their current position. 18.8% of the respondents indicated that they have worked at their current position from 7 to 9 years while only a minority of the respondents (0.9 %) indicated that they have worked at their current position from 10 to 15 years. Regarding their organizational tenure, 14.7% of the respondents in this study have been working from 7 months to 1 year in the organization. Moreover, 17.4% of the respondents have 1 to 3 years of working experience, while the majority of the respondents (33.5%) have been working in the organization from 4 to 6 years. In addition, 23.9% of the respondents have 7 to 9 years of experience, while 7.8% of the respondents indicated that they have been working in the organization from 10 to 15 years. Only 2.8% of the respondents indicated that they have been working in the organization for more than 15 years.

3.2 Measures and Control Variables

The independent variable in this study comprised of 20 items measuring the extent of the transformational leadership behavior exhibited by their leaders (e.g. "my immediate manager/supervisor/leader instils pride in me for being associated with him/her). The measures were adopted from the Multifactor Leadership Questionnaire

(MLQ) Bass and Avolio (1994). The reliability reported as 0.90. Respondents respond to a five-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree).

Regarding Innovative Work Behavior, nine items were adopted from Janssen (2000) (e.g. As an engineer in this organization, I create new ideas for difficult issues). The reliability reported by Janssen (2000)was 0.95. The respondents give their agreement based on seven-point Likert scale ranging from "1" (never) to "7" (always).

3.3 Analytical Strategy

The research model were tested using Smart Partial Least Squares (SmartPLS) software developed by Ringle, Wende, and Will (2005). According to Henseler et al. (2009), PLS model can be evaluated and interpreted in two stages: (1) the measurement model, and (2) the structural model. The measurement model examines the relationships between the manifest variables (observed items) and latent variables. The measurement model is also examined in terms of its reliability (item reliability and internal consistency) and validity (convergent validity and discriminant validity).

The structural model specifies the relationships between the latent variables through "bootstrapping" procedure. The structural model is evaluated based on the significance of the path coefficients and R^2 measures.

4. Results

4.1 Measurement Model Results

To test the reliability of the measurement model, the loadings for each item and the composite reliabilities were examined. Item reliability specifies the correlations of the items with their respective construct which is indicated by the item's loading (Chin 1998). Chin (1998) suggests a minimum loading of 0.7. Table 1 showed the items loading ranging from 0.737 to 0.976. As shown in Table 1 below, all the study constructs have satisfied the criterion of internal consistency with composite reliability (CR) higher than 0.7 as suggested by Fornell and Larcker (1981).

Table 1 *Summary of Composite Reliability and the Average Variance Extract for the Measurement Model*

Construct	Items	Loading	AVE	CR
Individualized Consideration	IC1	0.904	0.823	0.949
	IC2	0.925		
	IC3	0.914		
	IC4	0.884		
Idealized Influence	II1	0.869	0.689	0.939
	II2	0.868		
	II3	0.858		
	II4	0.858		
	II5	0.789		
	II6	0.823		
	II7	0.737		
Inspirational Motivation	IM1	0.888	0.784	0.948
	IM2	0.891		
	IM3	0.871		
	IM4	0.873		
	IM5	0.903		
Intellectual Stimulation	IS1	0.915	0.822	0.949
	IS2	0.888		
	IS3	0.902		
	IS4	0.922		
Innovative Work Behavior	IWB1	0.945	0.906	0.989
	IWB2	0.947		
	IWB3	0.976		
	IWB4	0.966		
	IWB5	0.975		
	IWB6	0.956		
	IWB7	0.970		
	IWB8	0.953		
	IWB9	0.873		

After ascertained the reliability, subsequently the validity of the measurement model was examined based on its convergent validity and discriminant validity. Convergent validity reflects whether a particular items measures of a latent variable which it is supposed to measure (Urbach and Ahlemann 2010). Fornell and Larcker (1981) proposed that the average variance extracted (AVE) can be used as the criterion to measure convergent

validity of a measurement model. According to Fornell and Larcker (1981), an AVE value greater than 0.50 indicates that, on average, a latent variable is able to explain more than half of the variance of its indicators. As shown in Table 1, the AVE values (ranging from 0.689 to 0.906) surpassed the 0.50 cut-off proposed by Fornell and Larcker's (1981). Hence, it can be assumed that the measurement model possesses convergent validity.

Meanwhile, discriminant validity focuses on the degree in which the item of a latent variable differs from one another. Henseler et al. (2009) suggested the use of both Fornell and Larcker's (1981) criterion and Chin's (1998) cross-loading criterion in determining discriminant validity. From Table 2, it can be seen that the square root of the average variance extracted (AVE) of the latent variable exceeded the correlations of other constructs which fulfil Fornell and Larcker's (1981) criterion. According to Chin (1998), items indicated sufficient convergent and discriminant validity if the loading of each indicator is greater than all of its cross-loadings. The loadings of each indicator were inspected and found that all the respected loading values were greater than all of its cross-loadings. This indicates the presence of discriminant and convergent validity of the measurement model. Based on the estimated parameters, it can be concluded that the measurement model is reliable and valid.

Table 2 *Discriminant Validity of Constructs*

Item	IC	II	IM	IS	IWB
IC	**0.907**				
II	0.766	**0.830**			
IM	0.845	0.828	**0.885**		
IS	0.856	0.790	0.869	**0.907**	
IWB	0.715	0.700	0.72	0.735	**0.952**

Notes: The value in the diagonal is the square root of AVE while the others entries represent the squared correlations

IC – Individualized Consideration
II – Idealized Influence
IM – Inspirational Motivation
IS – Intellectual Stimulation
IWB – Innovative Work Behavior

4.2 Transformational Leadership as a Second Order Construct

Prior to the assessment of the structural model, this study conceptualized TL as a second-order formative construct which is consistent with previous studies Bass (1985), Bass and Riggio (2006), Arshad, Goh et al. (2014) and MacKenzie, Podsakoff et al. (2005), who viewed TL as multifaceted construct which consists of four dimensions namely (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration).

As suggested by Becker, Klein et al. (2012), two-stage approaches were adopted to model higher-order constructs. In the first step, estimation of the first order constructs for TL was conducted and followed by saving the latent variable scores. In the second step, the obtained latent variable scores were used as formative indicators. In order to assess formative measures, few statistical criteria were assessed as below:

1. The significance of their weights and the items
2. Multicollinearity, indicator variance inflation factor (VIF) value should be less than 10 (Kleinbaum, Kupper et al. 1998)
3. Correlation between the items to the construct.

As showed in Table 3, the results of TL weights and VIF after transforming into a second order construct. As presented, all weights for TL measures were significant. In addition, the results showed that VIF values were below the commonly used threshold of 10 (Kleinbaum, Kupper et al. 1998, Diamantopoulos 2011). This further confirmed that multicollinearity is relatively low and does not pose any issue in this study. With regarding to the third criterion, the correlation between the items to a latent variable score reveals that all items for both constructs are significantly correlated.

Table 3 *Weights and VIF values for TL and EI as Second Order Construct*

Construct	Scale	Items	Weights	VIF
Transformational Leadership (TL)	Formative	IC	0.260	4.299
		II	0.292	3.442
		IM	0.155	5.642
		IS	0.365	4.964

Notes:

IC – Individualized Consideration
II – Idealized Influence
IM – Inspirational Motivation
IS – Intellectual Stimulation

4.3 Structural Model Results

Prior to performing the path analysis, the effect of the control variables on exogenous variables was estimated. As showed in Table 4, academic qualification variable was found to have significant effects on the endogenous

variable. Nevertheless, according to Cohen (1988), R^2 change value of 0.004 was considered as trivial, hence, it would not affect the estimation of the variance explained by the exogenous variable.

Table 4 *Assessment of Control Variable Effect on Endogenous Variables*

Control Variables	**Endogenous Variable IWB**		
	Beta	***t-values***	**R^2 Change**
Gender	-0.008	0.207	0.000
Age	0.004	0.117	0.000
Academic Qualification	-0.033	1.035	0.004
Job Tenure	0.022	0.643	0.000
Org Tenure	0.027	0.778	0.000

Note: **significant at p<0.01, *significant at p<0.05, bootstrapping (n=5000)

After estimating the effects of the control variables, algorithms were executed to examine the relationships between the exogenous variables and the endogenous variable. Figure 1 presents the beta coefficients between exogenous variables and endogenous variable.

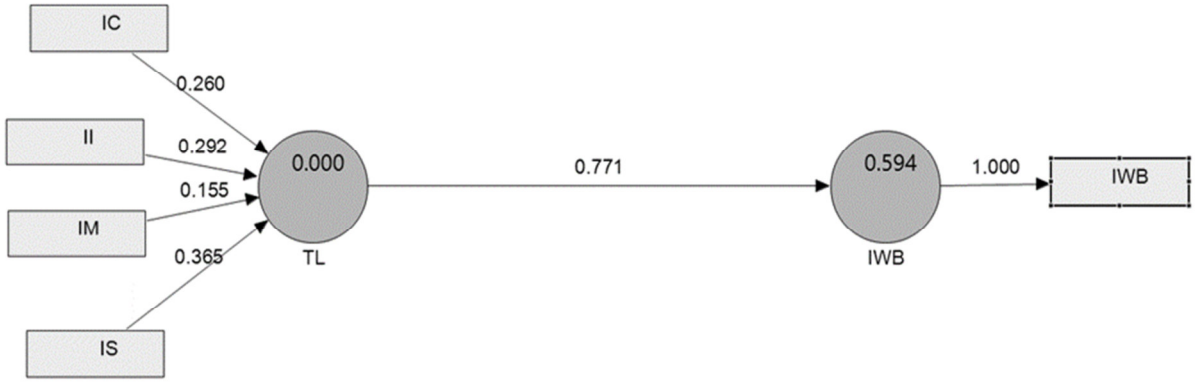

Figure 1 Path Coefficient and R^2 in the Research Model

Table 5, presents the details of the path coefficients, standard errors, *t*-values and decisions for hypotheses that relates to the relationship between TL and IWB. As shown in Table 5, TL has a positive and significant relationship with IWB ($\beta = 0.771$, $p < 0.01$) thereby, H1 is supported.

Table 5 *Path Coefficient and Hypothesis Testing for Direct Effects*

Hypotheses	**Relationship**	**Beta**	**Std. Error**	***t*-value**	**Decision**
1	TL → IWB	0.771**	0.037	19.925	Supported

*Notes: ** $p < 0.01$ (2.333), * $p < 0.05$ (1.645)*

TL – Transformational Leadership IWB – Innovative Work Behavior

The variance explained by the exogenous latent variables in the measurement model was also estimated. According to Chin (1998), R^2 value ranges from zero to one. Cohen (1988) suggests that R^2 value of 0.26, 0.13, and 0.02 for endogenous latent variables are considered as substantial, moderate, and weak respectively. Table 6 presents the R^2 values in the present study. As shown in Table 6, TL explained 59.4% of the variance IWB. Accordingly, it can be concluded that TL were able to substantially (59.4%) explained the variance in IWB.

Table 6 R^2 *Values in the Model*

Endogenous Variable	***R^2***
Innovative Work Behavior (IWB)	0.594

5. Discussion

This study aims to investigate the relationship between TL and IWB among tele-communication engineers in Jordan. The statistical results showed that TL has a positive and significant relationship with IWB. This finding implies that transformational leaders impact on their employee's (telecommunications engineers) beneficial work behaviors, in this case it is IWB.

The findings is in line with the tenet explained by Social Exchange Theory (Blau 1964). Specifically, when employees' needs and expectations are being thought of, they tend to reciprocate by exploring new opportunities with a better focus on important organizational issues and processes. Transformational leaders help to balance short-term goals with opportunity exploitation and motivate employees to take risks associated with trying out new processes (Whittington, Goodwin et al. 2004). When the leader/supervisor exhibited TL behavior, telecommunication engineers' motivation increased, confidence in their own ability in problem-solving and thinking out of the box, and striving to achieve organization's objectives more consistently. This finding is in

line with past scholars (Al-Nasani 2008, Jung, Wu et al. 2008, Reuvers, van Engen et al. 2008, Gumusluoglu and Ilsev 2009, Nusair, Ababneh et al. 2012, Afsar, Badir et al. 2014), who opined that transformational leaders encourage the employees or their followers to go beyond the job description to improve their performance by engaging them in their personal value system. When employee's personal value system has been fulfilled they are likely to exhibit innovative behavior in the work which will ultimately improve organization performance.

6. Implications and Recommendations For Managerial Practice

Several implications have emerged from our study's findings. T findings of this study elucidate that TL has a direct effect on IWB. The result implies that practicing TL behavior among managers can motivate IWB among telecommunication engineers in the organization. Hence, manager/supervisor in telecommunication organization should display a sense of power and confidence when dealing with engineers, specifies for the them the importance of having a strong sense of purpose, communicates with engineers in an optimistic way about what needs to be accomplished, talks passionately about what needs to be accomplished, guide them in seeking differing perspectives when solving problems, get them to look at problems from a different point of view, and spends more with them in terms of teaching and coaching. By practicing TL behavior, managers/leaders increase employees' willingness to perform beyond expectations, and challenge them to adopt innovative approaches in their work.

7. Limitations and Suggestion For Future Research

Findings in present study demonstrated the significant relationship between TL and IWB. Thus, future researchers may want to replicate the study in other different organizations to confirm the results. In addition, this study only examines Transformational Leadership as an IWB determinant. Future studies might want to expand on the current study to include other leadership related variables, such as Leader-Member Exchange (Agarwal, Datta et al. 2012).

As with all research, several limitations have been identified in this study. First, our study was cross-sectional in nature, which limits the causal inferences. One suggestion to address this problem would be to carry out a longitudinal study. Second, our data was gathered via self-reports which may be subjected to common method variance issues. Future researchers may opt to collect data from multiple sources (such as from the supervisors as well as peers) to address this shortcoming. This study was conducted among telecommunications engineers working in Jordanian telecommunication organizations. The cultural differences among countries prevent the study findings from being generalized to other countries (Hofstede 2005). Therefore, it is worthwhile to replicate this study in other developing Asian countries to cross-validate the findings from this study. Additionally, the data in this study was collected from telecommunication engineers, hence; it is beneficial for future studies to expand the study to research and development (R&D) employees. R&D employees are considered an important strength for organizations as they help organizations to own a high technological capability and to absorb the knowledge developed outside the organizations (Fontana, Geuna et al. 2006). These efforts may greatly improve the generalizability of the findings.

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