Linking e-leadership to innovative and proactive work behaviors in tourism higher education institutions: a moderated mediation model using SEM

Vinculando a e-liderança a comportamentos de trabalho inovadores e proativos em instituições de ensino superior de turismo: um modelo de mediação moderada utilizando SEM

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Abstract

E-leaders should encourage academics to manage their multi-dimensional work requirements and even to go beyond these requirements to innovate in their tasks and achieve sustainable development in educational institutions. This study aims to examine the relationship between e-leadership, innovative work behavior and proactive work behavior in the presence of work engagement as a mediator. Researchers implemented a quantitative methodology. This study used data from an online survey of 398 academics in Egyptian tourism higher education institutions. The results of structural equation modeling presented strong support for the proposed model. E-leadership has been proven to affect innovative and proactive work behavior among academic staff positively. Work engagement has shown an effective and significant mediating role between the examined variables. Further, the academic department was proven to moderate the relation between e-leadership and innovative work behavior, while age had no moderation effect in this relation. The study draws researchers' attention to the role of e-leadership in helping academics to cope with the dynamic nature of research and education.

Keywords: E-Leadership, innovative work behavior, proactive work behavior, work engagement, tourism higher educational institutions.

Resumo

Os e-líderes devem incentivar os académicos a gerir as suas diversas exigências de trabalho e até mesmo ir além dessas exigências para inovar e alcançar um desenvolvimento sustentável em instituições educacionais. Este estudo visa examinar a relação entre a e-liderança, o comportamento de trabalho inovador e o comportamento de trabalho proativo tendo o empenho no trabalho como mediador. Os pesquisadores implementaram uma metodologia quantitativa. Os dados foram recolhidos através de uma pesquisa online com 398 académicos de instituições de ensino superior de turismo no Egito. Os resultados da modelação de equações estruturais forneceram forte suporte para o modelo proposto. Foi comprovado que a e-liderança tem uma relação positiva tanto com o comportamento de trabalho inovador como com o comportamento de trabalho proativo. O empenho no trabalho mostrou ter um papel mediador eficaz e significativo entre as variáveis examinadas. Além disso, foi comprovado que o departamento académico modera a relação entre a e-liderança e o comportamento de trabalho inovador, enquanto a idade não teve efeito de moderação nessa relação. O estudo chama a atenção para o papel da e-liderança em ajudar os académicos a lidar com a natureza dinâmica da investigação e da educação.

Palavras-chave: E-liderança, comportamento de trabalho inovador, comportamento de trabalho proativo, empenho no trabalho, instituições de ensino superior de turismo.

1. Introduction

The emergence of new technologies and innovations and the conversion to decentralized management forced workplaces towards a more empowered environment. The development of quality human capital became critical for the survival and success of organizations. Leadership is a prominent element that influences and shapes employees' behavior and activities in the workplace. Thus, increased competition imposes constant pressure on leaders to engage their employees, keep them motivated, and encourage them to be innovative (Mubarak et.al., 2021; Nazir et.al., 2021). In higher education, leaders play an important role in developing education, stimulating innovation, and supporting academic and administrative staff while developing their competencies.

The spread of COVID-19 during 2021 forced the closure of higher education institutions in Egypt, propelling universities to shift from face-to-face to e-learning and e-management. Such a switch from working in a faculty to working and teaching from home demanded developing online educational materials, conducting scientific research, and doing other administrative responsibilities that were difficult for both leaders and subordinates. They were meant to use technology and inventive ideas to complete their large-scale work and track ground-breaking solutions to challenges in a short time (Newman & Ford, 2021). Basically, this situation required the application of new corresponding leadership skills and approaches to provide full support and training to faculty staff, which led to sustainable changes on the behavioral, cultural, and organizational levels.

To achieve sustainable development in an educational institution, e-leaders should direct their efforts towards encouraging new ways of thinking and diverse educational approaches. The leader's skills, her/his technological capacities, how she/he encourages innovation, and the use of technology could add value to the organization by combining leadership techniques with digital technologies. Digitally skilled leaders could provide quick responses to the changing multicultural world and help the institution adapt to constantly emerging technologies and educational techniques (Litvinenko, 2020).

Subsequently, the importance of the role of e-leaders emerged in motivating academics to find and take advantage of technological opportunities by applying creative solutions to the rising challenges (Iqbal, Latif & Ahmad, 2020). In addition, the move towards a more virtual setting made employees' work engagement crucial, as the commitment was no longer linked inside the walls of the workplace as it was. Innovative and proactive behavior became a major contributor to staff overall performance as universities expected them to be more active and take initiative to adapt to academic diversity, ensure academic quality, and promote positive change in their faculties to cope with the dynamic nature of research and education.

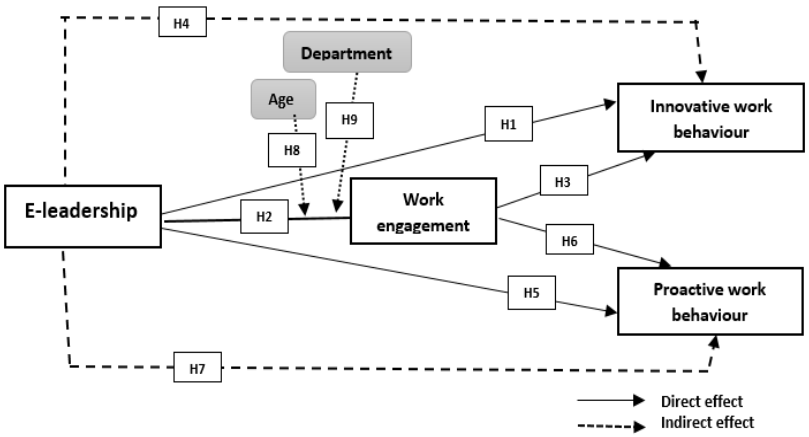
Even though there is an extensive amount of studies that investigated the effect of different leadership styles on innovative work behavior (Nazir et.al, 2021; Zhang et.al., 2021) and proactive work behavior (Gul et al., 2021` Wang & Yang, 2021), the generalization of their results on e-leadership might not be accurate as the leadership processes via e-channels transformed the relationship between leaders and employees dramatically. Moreover, e-leadership requires techniques not included in traditional leadership styles, making it plausible that its antecedents would be different.

E-leadership has been studied to know its effect on some work outcomes such as team effectiveness (Sedrine et al., 2021) and team performance (ElYousfi et al., 2021) in business settings, which is different than higher education as academics are not just employees; they are instructors and researchers as well. They are at the same time managers of groups and members of the groups they manage. Unlike employees in traditional organizations, university staff have a high sense of entitlement and academic freedom. Consequently, the power distance among leaders in high education entities is less than in other organizations. Few studies have investigated the opportunities and challenges of e-leadership in the context of higher education (Razemba & Devi, 2022) and the required skills that deans must have to be able to deal with emerging e-leadership (Ngang et al., 2013).

Some studies have investigated the link between leadership and work engagement (He et.al., 2021), other studies have used work engagement as a mediator with different job resources and innovative work behavior. However, work engagement has scarcely been studied as a mediator between e-leadership and innovative work behavior. In fact, no generally accepted theory can be adapted in higher education, especially in tourism and hotel faculties. Therefore, answering the question: "To what extent could e-leadership shape innovative work behavior and proactive work behavior, among academics in tourism higher educational institutions (THEIs)?". The presence of work engagement will definitely help to add theoretical evidence to the e-leadership literature.

Hence, the present study proposes to fill the abovementioned gap by first addressing the relationship between e-leadership and work engagement, proactive behavior, and innovative work behavior among university academic staff. Second, examining the role of work engagement as a mediator in the relationship between e-leadership and each staff member's proactive behavior and their innovative work behavior. Third, assessing if the relationship between e-leadership and innovative work behavior may be moderated by factors such as age and specialization. Our research model is presented in Figure (1).

Figure 1 - Conceptual research model



2. Theoretical background

2.1 E-leadership (EL)

E-leadership (EL) is defined as the social influence process that implies changes in the employees' behavior, attitudes, thinking, and performance at any hierarchical level in an organization through an information technology-mediated environment (Kandil & Abdelmonem, 2021).

Although EL builds and enhances the relationship among organizational members through the established fundamentals, content, and styles of leadership defined by the organization's structure, the virtual environment changes not only the means of communication between leaders and employees but also affects the collection and dissemination of information required to support organizational tasks. Consequently, e-leaders might face some new challenges, like overcoming the

physical distance to communicate effectively with the employees, inspiring them, engaging them, and encouraging them to be innovative (Das Gupta, 2011).

E-leaders must have a perspective for a digital future; they have to develop different leadership skills and positive attitudes, as they need to be informal, convincing, and effective communicators to improve employees' engagement, performance, and creativity. Hence, Six leadership practices are effective in overcoming the challenges associated with leading virtual teams: (a) establishing and maintaining trust using communication technology; (b) ensuring that distributed diversity is understood and appreciated; (c) managing virtual work-life cycle meetings; (d) monitoring team progress using technology; and (e) enhancing the visibility of virtual members within the team and within the larger organization. (El Yousfi et.al., 2021).

As for academic leaders, Silvas (2016) proposed that they must be aware of the essentials of managing virtual teams, use the appropriate means of communication, and be conscious of the factors that assist in creating a culture of collaboration and trust. He emphasized that they should engage employees' interests to improve the organization.

When leaders encourage the implementation of new technologies, this helps in providing an environment that encourages innovative efforts by integrating information technologies with production processes, motivates employees to adjust their working methods to adapt to the changing environment and better complete work tasks, and stimulates their proactivity and work engagement (ElYousfi et al., 2021; He et al., 2021).

2.2 Innovative work behavior (IWB)

The rapid change in technology causes changes in the need for employees to show innovative behaviors. Innovative work behavior (IWB) is a cognitive and motivational process directed towards the proposal and application of novel or improved ideas, processes, practices, and policies to realize organizational effectiveness, business success, and long-term sustainability (Kwon& Kim, 2020). It's a complex behavior consisting of three activities: idea generation, idea promotion, and idea realization (Wu & Wu, 2019). These three activities are non-sequential and may be engaged in separately.

Employees with IWB generate new ideas, apply new things, develop new technologies, and change working methods to improve work efficiency (Wang et al.,2021; Wu et.al., 2021)

Many previous studies have noted that leadership is arguably the most important indicator of IWB, depending on leaders' interactions with followers as individuals and other situational and contextual factors (Masood & Afsar, 2017).

2.3 Work engagement (WE)

To define work engagement (WE), most studies have adopted the definition of Schaufeli et al. (2002), who defined engagement at work as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." Vigor refers to high energy and mental resilience while working, a willingness to invest effort in one's work, and persistence even in the face of difficulties. Dedication refers to a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption is characterized as fully concentrating in one's work, whereby time passes quickly, and one has difficulty detaching from work (Agarwal, 2014b).

Engagement is the opposite of burnout; engaged employees find work meaningful and devote all their energy to it to make a difference. Their work state is not focused on any particular object, event, individual, or behavior (Afsar et.al., 2021). WE is a way to connect employees with clear identification to their work, to perform tasks, and to enhance motivation, excitement, and dedication (Buila et al.,2018; Mubarak et.al., 2021). Further, the concept of WE includes everything about how to benefit from the employees performance of their jobs, including the use of behaviors and emotions in addition to awareness (Kandil & Abd-Elmonem, 2021).

Employees demonstrate high levels of work engagement when their social-psychological needs are fulfilled by the support of their immediate supervisors (Gruman & Saks, 2011). Hence, leadership has been discussed as one of the most important aspects that could influence engagement since leaders can inspire and motivate employees as they communicate together throughout the working day. This communication has come into question with the rise of e-leadership as the role of leaders has become even more important to engage employees. An e-leader must work much harder to make remote employees feel like they are part of the business culture. One of the most crucial factors in employee engagement is having the right virtual tools in place with a dispersed staff (Wang et al., 2021). The degree of employee engagement can have an important impact on work outcomes such as performance and innovation (Li et al., 2018).

2.4 Proactive work behavior (PWB)

Proactive work behavior (PWB) is an initiative to adapt to the changes in the work environment and the motivation to change it, exhibited in the initiative to take decisions that aim to overcome obstacles, solve problems, and enhance productivity. A proactive employee considers complex situations personal challenges, aims for self-improvement, has high coping behaviors, makes extra efforts to improve work methods, and motivates her/his co-workers to develop a better social network (Yamak & Eyupoglu, 2021; Zahour, 2019).

Parker& Collins (2010) identified four dimensions of proactive work behavior: problem prevention, individual innovation, voicing ideas, and taking charges. Even though proactivity is a personal trait, proactive work behavior has become a widely researched area in management in recent years. Employees with a proactive personality have an intrinsic motivation to accept and utilize new technology, accept changes more

readily, and like the challenge of learning something new to expand their technology-based knowledge (Kwon & Kim, 2020).

Numerous researchers have suggested that the job resources that support capability and work engagement lead to a higher level of proactivity. Proactive work behavior has been related to leadership style, organizational support, work engagement, and satisfaction (Buila et al., 2018; Maden-Eyiusta, 2016).

2.5 Hypotheses development

Existing literature recognizes the role of leadership in shaping employees' attitudes and behaviors due to the ability of leaders to shape the work environment and control resource allocation (Lee et al., 2020). When an employee receives more information, feedback, support, and encouragement, she/he tends to show a high level of IWB as a payback to the e-leader's supportive behavior (Iqbal, Nazir & Ahmhead, 2020).

Thereupon, it was found that IWB is affected by various leadership styles, such as transformational Wang et al., 2021), servant (Wang et al., 2019), authentic (Yamak & Eyupoglu, 2021), inclusive (Qi et al., 2019), ethical (Zeng & Xu, 2020), paternalistic (Tian & Sanchez, 2017), relational (Akram et al., 2016), and empowering leadership (Arshad et al., 2021).

Regarding EL, it has been stated that to reinforce IWB, e-leaders must have the capability to know and use information and communication technologies and new applications in addition to business intelligence and the ability to comprehend business and strategic leadership skills (Yücebalkan, 2020).

The present study aims to investigate if EL has the same influence on IWB as conventional leadership, because communication is the main way through which leaders transfer their leading style to employees, capture their emotional information, and show support. Thus, the following hypothesis was formulated:

H1: EL has a positive effect on IWB among academics.

Prior human resources and organizational behavior studies have examined the different factors that affect work engagement (Agarwal, 2014a; 2014b). Positive leadership styles have been found to improve employees' work engagement, such as transformational leadership (Yasin Ghadi et al.,2013), charismatic leadership (Roberson& Strickland, 2010), inclusive leadership (Cenkci et al., 2020), positive leadership (Decuypere & Schaufeli, 2020), empowering leadership (Lee et al., 2020), and paternalistic leadership (He et al, 2021).

Further, the relationship between leadership and WE has been interpreted by the leader-member exchange (LMX) theory (Li et al., 2012), based on the notion that positive actions by a supervisor can lead employees to feel indebted, forming a favor exchange. Research has generally revealed that leaders who show high social support, meaningful feedback, guidance to help employees with any challenges, acknowledge effort, and ensure adequate resources stimulate a similar response from employees who entirely invest their potential and allocate more substantial cognitive, emotional, and material resources for the organization. (Kim & Koo, 2017; Wu et al., 2021).

The effect of virtual leadership practices on WE among faculty members and the assisting body in Egypt was investigated by Kandil & Abd-Elmonem (2021). They discovered a significant correlation between virtual management communication's quantity and perceived quality and employee engagement. This result agrees with Mitchell (2015) who indicated that the quantity of time a manager spent communicating with virtual employees positively affected employee engagement. While the results proved to be different from those of Barhite (2017), who found that communication channels did not significantly impact employee engagement. Thereupon, to further investigate this relationship among academics in THEIs, the present study proposed the following hypothesis:

H2: EL affects WE among academics.

Innovative behavior is an extra-role behavior that requires a complex, high-risk activity with some degree of uncertainty, requiring rich knowledge and excellent skills and employees to demonstrate a strong commitment to their work and organization (Park & Jo, 2018; Wu et al., 2021). Previous studies have reported that high WE plays a key role in enhancing IWB (Khan et al., 2021; Kim & Koo, 2017; Kwon& Kim, 2020; Wu et al., 2021). WE has even mediated the relationship between IWB and various organizational factors such as learning organization (Park et al., 2013), organizational identification (Zhang &Wang, 2021), and positive emotions (Wu & Wu, 2019).

Employees with high work engagement are more likely to devote themselves to work. They tend to associate their own development with organizational development, so they would invest more private resources and energy in their work and integrate more self-awareness. Thus, they will be more likely to find problems in their work and actively look for innovative ideas and ways to solve them (Agarwal, 2014; Garg & Dhar, 2017). On the contrary, employees with low work engagement tend to show occupational burnout, which would weaken their ability to innovate (Ghanizadeh & Jahedizadeh, 2016; Zhang &Wang, 2021).

WE is even associated with IWB based on the social exchange theory, as an employee's work engagement is an integral element in enhancing the performance of individuals that ascertains organizational sustainability (Mubarak et al., 2021). Further, Kwon and Kim (2020) used job demands-resources (JD-R) to examine the relationship between WE and innovative behavior, assuming that innovative behaviors stem not only from an individual's natural traits but also from an individual's job attitudes. Therefore, the present study hypothesized that:

H3: WE is correlated with IWB among university staff.

Leadership's impact on employees' will to create new ideas and novel solutions could vary depending on their predisposition to work hard and to involve themselves deeply in their tasks. Mubarak et al. (2021) stated that an employer must craft the

employees' WE to reach a satisfactory level in order to achieve innovative work behavior. Therefore, literature has commonly connected leadership and WE to IWB (Agarwal, 2014a; Garg & Dhar, 2017; Wu et.al., 2021). Literally, the present study aims to investigate the moderating effect of WE on the relationship between EL and IWB. Hence, we formulate the following hypothesis:

H4: WE plays a mediating role between EL and IWB among academics.

Studies have shown that leadership plays an important role in encouraging PWB (Gul et al., 2021; Li et al., 2017; Yamak & Eypoglu, 2021), as employees should have the perception that they are capable of conducting proactive behaviors before they actually engage in such behaviors (Ajzen,1991). Employees with proactive personalities might not engage in PWB if their leader pressures them to perform in a pre-determined way; they will be reluctant to try new things despite their personalities because they are compelled to obey their leader (Jia et al.,2020). On the contrary, a highly empowering leader conveys to followers that she/he is confident in the followers' capabilities to deal with challenging tasks by encouraging followers to be involved in decision-making (Jia et al., 2020).

Maciel et al. (2017) indicated that efficient e-leadership boosts telework productivity, which, to be accomplished, requires e-leaders to build trust in their connections, allowing a freer flow of ideas; they must promote the free sharing of information and offer new solutions that empower employees to take the initiative in their job (Avolio et al.,2014). The following hypothesis was proposed for this investigation:

H5: EL influences PWB among academics.

The relationship between WE and proactive behavior has been investigated in numerous studies. Some studies found that employees with high levels of proactive personality would expect to engage in taking charge behaviors and demonstrate high work engagement (Chong et al., 2021; Marica, 2018; Zahoor, 2019). On the other hand, engaged employees are more likely to show proactive behavior because they are better able to see possibilities and are more determined to overcome challenges and adapt to their work environment (Bakker et al., 2012). For this reason, the present study hypothesizes the following:

H6: WE influences PWB among academics.

A positive form of leader behavior engenders positive feelings, which can lead to a change in an employee's personality and a positive psychological aptitude. In the context of EL, managers are not always available for their employees, so it is crucial that employees mobilize their job demands and resources through PWB. This proactivity could vary according to the level of WE. Therefore, the present study hypothesizes the following:

H7: WE mediates the relationship between EL and PWB among academics.

Previous studies found a significant difference between generation Y and generation X regarding innovative behavior. The study aims to investigate the role of age in moderating the relationship between EL and IWB as a response to the call of Thomas & Feldman, 2013 who suggested that the construct of age warrants much more attention both as an independent and moderator variable in organizational research. As a result, the present study formulates the following hypothesis:

H8: Age moderates the relationship between EL and IWB among academics.

On the other hand, Birdi et al. (2016) found a positive association between department support and all the metrics for assessing the quality and quantity of employee idea generation as a construct of IWB. Moreover, identification with the department has been found to be an important explanatory mechanism for the relationship between benevolent leadership and innovative behavior (Gumusluoglu et al., 2017). Hence, the present study aims to test this hypothesis:

H9: Academics' department moderates the relationship between EL and IWB.

3. Methodology

3.1 Participants and procedures

Researchers implemented a quantitative methodology by designing a survey to collect and statistically analyze the research data. The targeted population was academics in tourism higher educational institutions (THEIs), which consists of 980 academics affiliated with Egyptian THEIs. The present study focused mainly on academics in tourism and hotels faculties (THFs), as they have the same organizational chart, so 'department' can be easily examined as a moderator variable in the research model. A random sampling approach was conducted (CAPMAS, 2018). An anonymous online questionnaire was directed to academics in THFs, who were kindly invited to participate in the present study after briefly explaining the purpose of the research. A total of 398 Egyptian academics from THFs answered the questionnaire. The final overall sample size was acceptable according to Hair et al., (2010) and valid for a Structural Equation Model with less than seven factors, where a minimum of 300 participants should be targeted. Relevant data was collected in April 2021. Moreover, the sample size was satisfactory by adopting the equation suggested by Steven (2012) with an error percentage of 5% and a confidence level of 95%.

3.2 Construct measurement

The questionnaire was comprised of three main parts**:** Part one included demographic variables such as gender, age, specialization, position, and type of institution. The second part contained two questions to examine the technological tools that are frequently used by academics in THEIs in the form of Check-all-that-apply question (CATA), as well as the frequency of use of technology tools to organize work online. Part three

was divided into four constructs. All items for these constructs were adapted from previous literature, as shown in Table 1. With a 5-point Likert scale, items ranged from 1 (strongly disagree) to 5 (strongly agree) to let participants define their level of agreement.

Table 1 - Constructs development

Construct	Item code	Source	No. of items	Sample items included
E-leadership	EL	Iriqat, & Khalaf, 2017; Uzunbacak & Aydin, 2021	6	E-leaders educate staff about technology that can enhance organizational processes.
Innovative work behavior	IWB	Malik& Wilson (1995); Uzunbacak & Aydin (2021)	6	I often suggest new working methods and techniques to accomplish tasks and achieve organizational goals.
Proactive work behavior	PWB	Schmitt *et al*. (2016)	7	Whenever something goes wrong, I search for a solution immediately.
Work engagement	WE	Brien et al., 2021	6	I feel very involved with this organization.
The overall no. of item			25 items	

3.3 Data Analysis Method

Researchers conducted a three-stage data analysis technique. Firstly, a descriptive analysis using SPSS was conducted to calculate frequencies and percentages. Secondly, a confirmatory factor analysis (CFA) via Amos was adopted to verify the reliability and validity of the research constructs. Third, structural equation modeling SEM was used to test the hypothesized inter-variable relationships among research constructs. Additionally, a Bootstrapping and Sobel tests based on Baron and Kenny (1984)'s and Sobel (1981)'s approaches were calculated to verify the mediating effect of WB. At the end, a multi-group analysis (MGA) was performed to test the effect of EL on academics' IWB according to their specialization and age.

4. Results

4.1 Demographic characteristics

Female participants (n=258, 64.8%) were more than males (n=140, 36.2%), reflecting a high participation of women in tourism higher educational institutions (THEIs) in Egypt (CAPMS, 2018). Classification by occupation were as follows: n=31, 7.8% demonstrator; 39, 9.8% assistant lecturer, n=106, 26.6% lecturer, n=147, 36.9% associate professor, and n=75, 18.8% professor. Regarding age, the highest proportion of participants was between 25 –44 (n=267, 67.1%), while others were in the age range between 45 and more (n=131, 43.6%).

4.2 Innovative technological tools used by academics

Academics were asked to determine the technological tools that they highly employ in their work. Findings in Figure 2 revealed that virtual platforms were the most often used by academics (n= 376, 94%), followed by social networks (n=366, 92%), then e-mail and telephone at a convergent rate of 85% and 83%), respectively. Moreover, many academics use online learning games 65% and live meetings (62%). As for the usage frequency of these innovative tools, results in Figure 3 showed that most academics use these tools daily (n=279,70%).

Figure 2 - The Technological tools that are frequently used by academics in THEIs

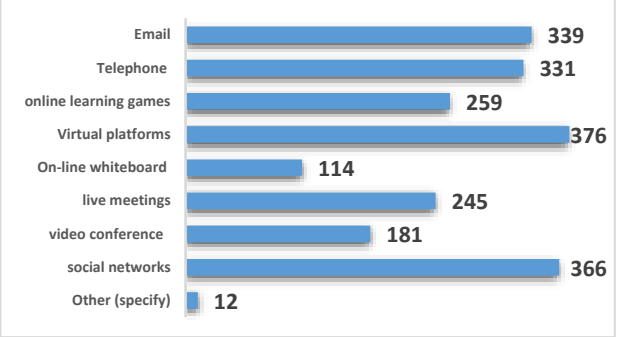
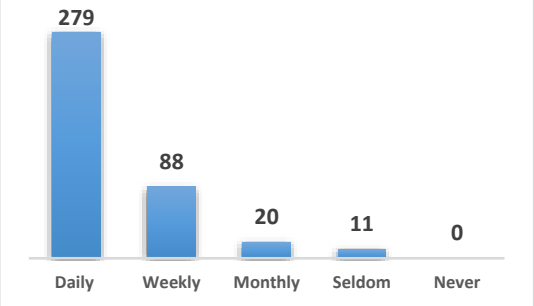


Figure 3 - How often academics use technological tools



4.3 Measurement model

Convergent validity refers to the extent to which the components of a variable measure the same linked construct. Hair et al. (2014) recommended testing three indicators to examine convergent validity: FL, CR, and AVE. Table 2 illustrates the standardized values of these indicators. To improve CR and AVE outcomes, all items with factor loadings less than 0.50 should be removed, as Afthanorhan et al. (2014) suggested. Consequently, few items were removed in the present study due to low factor loadings (<0.5), such as PWB6, PWB7, and IWB6. Table(2) shows that all FLs, $\bar{x}$, Std.dev, α, AVE, and CR values of the constructs used exceed the accepted.

Table 2 - Validity and reliability statistics

Construct	Items	FLs	$\bar{x}$	Std.dev	Cronbach's (α)	AVE (≥0.5)	CR (≥0.7)
EL	EL1	.781***	4.36	0.645	0.901	0.605	0.902
	EL2	.810***					
	EL3	.728***					
	EL4	.748***					
	EL5	.836***					
	EL6	.758***					
IWB	IWB1	.791***	4.28	0.811	0.934	0.729	0.930
	IWB2	.902***					
	IWB3	.888***					
	IWB4	.849***					
	IWB5	.833***					
	IWB6	*dropped*					
PWB	PWB1	0.717***	4.31	0.680	0.877	0.590	0.878
	PWB2	0.790***					
	PWB3	0.809***					
	PWB4	0.793***					
	PWB5	0.727***					
	PWB6	*dropped*					
	PWB7	*dropped*					
WE	WE1	0.757***	4.42	0.702	.927	0.674	0.925
	WE2	0.841***					
	WE3	0.813***					
	WE4	0.818***					
	WE5	0.829***					
	WE6	0.865***					
Literature					Pallant (2013)	Fornell & Larcker (1981)	

Note: FLs=Factor Loadings, $\bar{x}$ =Mean, Std.dev =Standard Deviation, AVE=Average Variance Extracted, and CR=Composite Reliability.

4.4 Structural model

4.4.1 Model fit indices

The overall fit of the study model is estimated to ensure that the measurement factors are unidimensional. Table 3 results confirm acceptable fitting indices for the hypothesized model.

Table 3 - Goodness of fit test

Indices	X^2/df	P-value	CFI	IFI	TLI	RMSEA
Value	4.044	.000	.914	.914	.901	.084
Cut-off threshold	**< 5.0**	**>0.05.**	**> 0.90**	**> 0.90**	**> 0.90**	**< 0.08**
Literature	Awang, 2015					

4.4.2 Hypotheses Testing

To test the hypothesized main effects and mediation effects, we followed Baron & Kenny (1988)'s approach. Data show that IWB is positively affected by EL in THFs (β=.270,Sig.(2-tailed)=.000,95% CI= [.133,.379], SE=0.076). Findings in Table 4 reveal that academics' IWB in THFs is affected by EL.

Table 4 - Hypothesis testing results

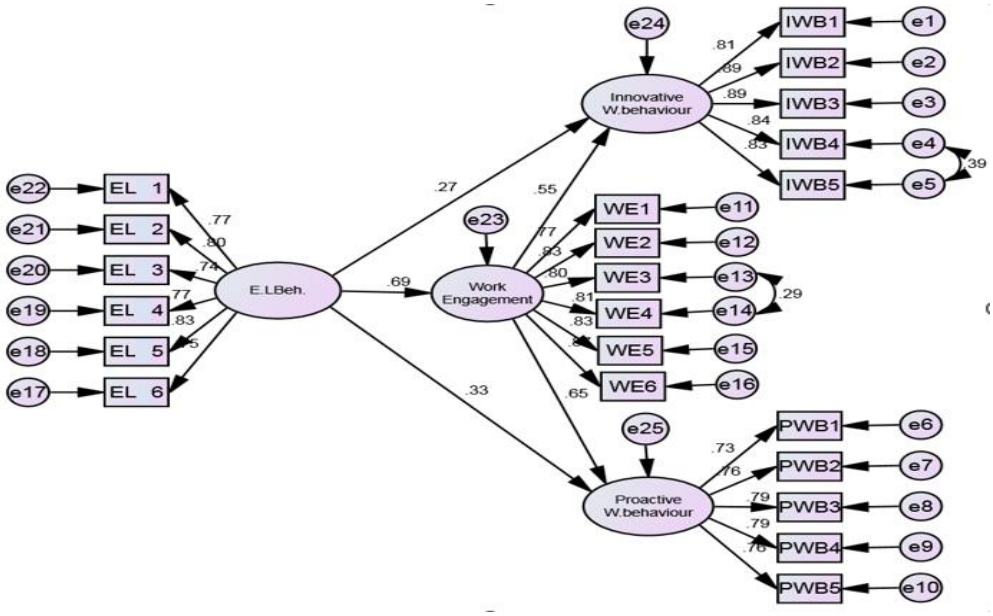
Hypothesis	Hypothesized Paths	Std-Estimate	S.E.	t-value	p-Value	95% CI	Support
H1	EL --> IWB	.270	.076	4.643	***	[.133,.379]	Yes
H2	EL --> WE	.687	.058	11.588	***	[.621,.749]	Yes
H3	WE--> IWB	.553	.081	8.961	***	[.446,.680]	Yes
H5	EL --> PWB	.330	.051	6.428	***	[.243,.427]	Yes
H6	WE--> PWB	.649	.063	10.615	***	[.559,.734]	Yes

As for academics' PWB, it was shown that e-leadership significantly affects academics' PWB (β=.330,Sig.(2-tailed) =.000,95% CI=[.243,.427], SE=0.051), reflecting that leaders' encouraging e-behavior is highly correlated with academics' PWB. The previous findings emphasize that the more e-leadership practices leaders exhibit, the more academics' IWB and PWB could be developed.

On the other hand, WE has a direct and positive impact on both IWB (β=.553,Sig.(2-tailed)=.000,95% CI=[.446,.680], SE=0.081) and PWB (β=.649,Sig.(2-tailed)=.000,95% CI=[.559,.734], SE=0.063). Accordingly, the higher the level of work engagement in the workplace, the higher the level of academics' IWB and PWB could be achieved.

Moreover, the hypothesized impact of EL on WE is also supported by results in Table 4, referring to the fact that WE can be stimulated by EL (β=.687,Sig.(2-tailed)=.000,95% CI= [.621,.749],SE=0.058). So, the higher the level of EL in the workplace, the greater the level of WE academics will have. At the end, the suggested model using standardized path estimates is shown in Figure 4.

Figure 4 - Results of SEM



4.4.3 Testing mediation:

To examine the mediation effect of work engagement, the Sobel test (Sobel, 1982) and Bias-corrected bootstrapping test (Memon et al., 2018), including 95 percent bootstrap confidence intervals with a 5,000-bootstrap sample, were used as shown in Table 5.

Table 5 - Mediation testing of work engagement

Structural link	*Hypothesis*	*Estimate effects*		*Sobel Test*			*Bootstrapping*		*Type of mediation*	*Support*
							Percentile 95% CI			
				Test statistic	Std.Error	P-value	LL	UL		
EL--> WE--> IWB	**H4**	Indirect effect	.380***	5.915	.0643	0.000	.289	.489	Partial	Yes
		Total effect	.650***				.505	.725		
EL-->WE--> PWB	**H7**	Indirect effect	.446***	7.773	.0644	0.000	.354	.550	Partial	Yes
		Total effect	.776***				.664	.854		

As illustrated in Table 5, the results proved that EL could significantly influence academics' IWB and PWB through WE, respectively (β=.650**,SE=0.0643,p<0.01;95%CI =[0.505, 0.725]) and (β=.776**,SE=0.0644,p<0.01; 95%CI =[0.664, 0.854]). Bootstrapping and Sobel testing outcomes predict that work engagement partially mediates the effect of e- leadership on academics' IWB and PWB, verifying H4 and H7. This confirms that encouraging their WE could enhance academics' IWB and PWB.

4.4.4 MGA analysis

In order to assess the moderation effect of academics age and department on the relationship between **EL** and academics' **IWBs,** a multi-group analysis (MGA) using Amos 25 was conducted to determine and evaluate whether academics' specialization (based on their department) and age bear a statistically important influence on the various connections between groups. An analysis of the relationships between two or more variables and the groupings is carried out based on Memon et al.'s (2019) approach. Table 6 provides a tabulation of the findings that were collected for the MGA analysis.

Table 6 - MGA analysis

Hypothesis	Variable	Group 1			Group 2			Group 3			Critical ratio for differences between parameters	Support
		Est.	P	CR (t-value)	Est.	P	CR (t-value)	Est.	P	CR		
H8	Department	.532	***	8.248	.730	***	12.620	.334	.001	3.219	Groups 1&2 (***Z* = 2.316**) Groups 2&3 **(*Z* = -2.996)** Groups 1&3 **(*Z* = -1.359)**	Yes (Partially)
H9	Age	.604	***	12.864	.552	***	6.865	--------			Groups 1&2 (***Z* = 0.650)**	No

Notes: As for specialization: (Group 1:Tourism Studies department, Group 2:Hotel management department, Group 3:Tourist Guiding department). As for age:(Group 1 aged between 25-45, Group 2 aged 46 years and higher)

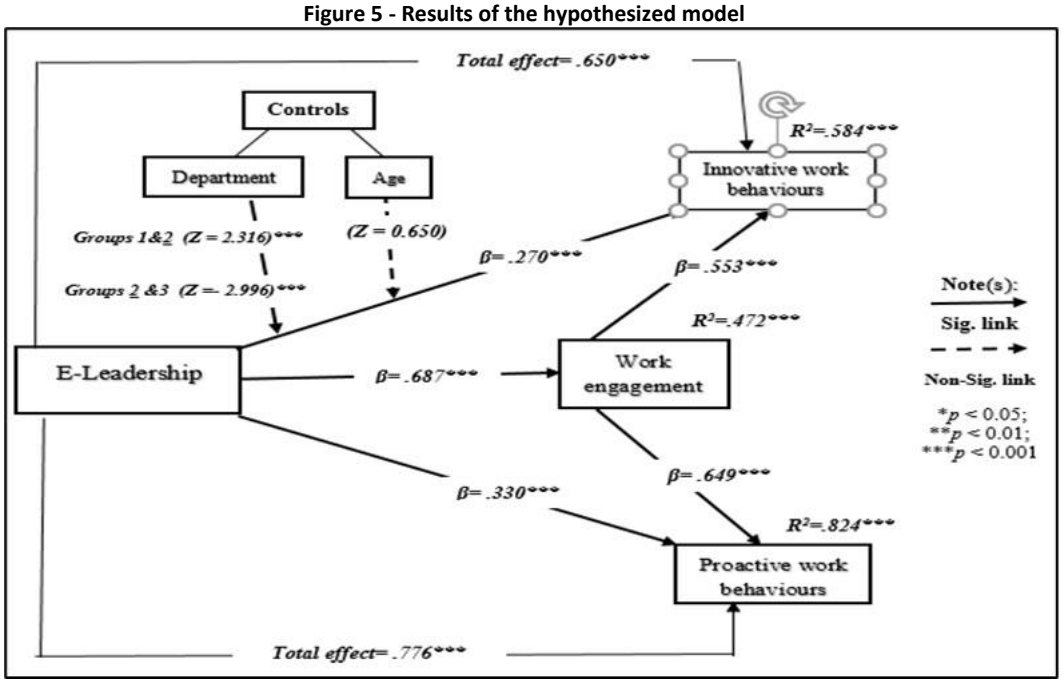
It is worth noting that the MGA examination was carried out following Byrne (2010)'s approach by employing the Critical Ratio for the differences among parametric techniques, also known as pairwise test results of path coefficients, results of these tests were then compared. According to this approach, for the regression weight to be statistically significant at p<0.01, it is necessary to get a z-score value of more than ±1.65.

As seen in Table 6, results of the Z-score exceed +1.65 for "***Department***" among groups 1&2, and 2&3, respectively, as follows: *Z*=**2.316,** p 0.01; and *Z*=**-2.996**, p0.01. More, the effect of EL on IWB was found to be stronger among academics in Group 2 (hotels management department) compared to the other two groups.

The difference between **Groups 1 and 3 reveals a non-significant** influence on the relationship between EL and IWBs, as the value of the Z score was lower than the recommended value ±1.65 **(*Z*=-1.359)**. Hence, it can be implied that the path coefficients of the tourism studies and hotel management departments are statistically significantly different from the path of the Guiding department in relation to e-leadership practices and academics IWBs. This confirms that a greater level of IWB was found to be higher among academics in tourism studies and hotel management departments in Tourism and Hotel faculties (THFs) compared to others in the tourism guiding department. Thus, H8 is partially supported.

However, contrary to what was expected, the path coefficients of academics (aged 25–45 years) are not statistically significantly different from the path of academics (aged 46 years and higher) in regard to EL and IWBs ($Z_{group1\text{-}group2}$ =0.650), which is lower than the cutoff value of ±1.65 suggested by Byrne (2020). Consequently, H9 is not verified. Based on the previous literature (Rony, 2019), researchers expected that academics who belong to generation Y would exhibit more innovative work behavior compared to the other group. However, findings reflect that there is no difference among groups in the context of age on the influence of EL and IWBs. Based on the preceding results, Figure 5 provides a graphical description of the suggested model with standardized path values.

Figure 5 - Results of the hypothesized model



5. Discussion and conclusion

Even though EL has become a recent topic in human resources literature, to the present researchers' knowledge, no study exists within the scope of tourism at higher educational institutions, especially in Egypt. The present study is distinguished from other studies that addressed the antecedents of leadership as it does not focus on a specific leadership style but rather investigates the consequences of e-leaders' work practices on academics' behavior in the context of THEIs, especially in a digitalized educational environment. The present study proposes a model of the effects of e-leadership on academic staff, namely, innovative work behavior and proactive work behavior. Work engagement was theorized to serve as a mediating variable among the aforementioned relationships. Eventually, the moderating roles of age and department were investigated using data collected from academic staff working in the THEIs in Egypt.

Results indicated that e-leadership showed a positive relationship with both IWB and PWB among academic staff. WE has shown an effective and significant mediating role between the examined variables. Further, the department where the academic work was proven to moderate the relation between EL and IWB, has no moderation effect in this relation.

Results of the present study found a correlation between EL and IWB, which is in line with previous studies that found a positive relationship with innovative behavior (Nazir et al., 2021; Zhang & Wang, 2021). Such findings prove that leaders who heavily rely on technological mediation can inspire their subordinates to take on more creative approaches to their work through their e-behaviors, which could enhance processes and improve work effectiveness. This result also agrees with Gumusluoglu and Ilsev (2009), who stated that when leaders support adopting technology at work, realize its advantages, and champion creativity, employees feel energized to seek new ways to fulfill their tasks. Similarly, Scott & Bruce (2004) and Janssen (2004) noted that employees become more innovative and sense a more supportive climate when a leader is masterful and accepts difficulties.

As concluded from previous studies, leaders need to motivate and inspire staff, taking advantage of their ability and skills to continuously develop new ideas (Park & Jo, 2018). Thus Tech-supportive behaviors practiced by managers and leaders in THFs could then encourage academic staff to generate new ideas and contribute to their faculties' progress, which became a must in a technology-aided learning environment, as suggested by Mihardjo et al. (2019).

The present study also concluded that the relationship between EL and IWBs could be mediated through WE, which is consistent with the study of Garg & Dhar (2017). Likewise, De Spiegelaere (2014) demonstrated in his study that WE provokes IWB among employees. This result is congruent with Maden-Eyiusta (2016)'s outcomes; that WE may inspire people to be more creative and imaginative in their roles and enhance their creativity skills and awareness. On the contrary, employees with poor WE contribute less to innovation, according to Ali et al. (2022).

Furthermore, the present study found that the relationship between EL and IWB will vary depending on the academic department. Findings concluded that the effect of e-leadership behavior on academics' innovative work behavior is stronger in the tourism and hotel departments than in the guiding department in the tourism and hotels faculties. As Rogers (2003) found, several elements contribute to whether or not a technology gets adopted, including how well it fits with the user's experiences and current requirements. In this regard, it is worth mentioning that academics in the tourism guiding department outlined three recurring responses when they were questioned at the end for any suggestions concerning the study theme. They noted that developing direct communication skills is a fundamental learning objective in the guiding department as tourist guides generally interact personally with tourists, so teachers need to assess the students' skills in this area constantly. From their point of view, this might hinder the application of technology in teaching and examination; they prefer to interact with their students on a face-to-face basis. This point of view affects their relative importance to e-communication even through their managerial tasks. However, this approach should be revised especially with the increase in virtual tours and e-museum, which dictates the need to develop e-communication skills among tourist guides.

Nevertheless, the abovementioned correlation will not vary depending on age. Researchers were expecting a greater level of innovative work behavior among academics in the 25–45 age range who belong to generation Y based on the perspective of earlier literature (Coombes, 2009). Contrary to the researchers' expectations, innovative work behavior was found to be significant among all groups of academics without any differences. This may be attributed to the fact that technological advancements compel all leaders and scholars to use digital technologies to face the current non-stop increasing technological changes in the work environment, especially in the case of unanticipated events such as the COVID-19 pandemic (Antonopoulou, 2020). This result is consistent with what was concluded by Olson (2011), who mentioned that it's a prevalent misconception that older folks (e.g., generation X) are less inclined to use emerging technologies for daily work.

By the same token, the present study results indicate that EL is positively related to PWB. Gul et al. (2021) found that participative leadership is correlated with PWB among faculty members of public and private universities in Quetta City. Wang and Yang (2021) found that empowering leadership promotes PWB among hotel employees. Erhan et al., (2021) reported that e-leadership practices displayed by leaders in higher educational institutions motivate academics to be upbeat, risk-takers, and able to sense opportunities, take on new challenges, and gain positive resources that help them grow, cope well, and succeed in a tech-work environment. Bilal (2021) too found that

academics who perceive high levels of e-leadership behavior are more likely to behave in a proactive manner.

Furthermore, the present study provides strong evidence that WE mediates the relationship between EL and PWB. This result is aligned with Salanova & Schaufeli (2008), who confirmed that WE fully mediates the impact of job resources on proactive behavior, reflecting that WE acts as a motivator for PWB. This perspective is different than the commonly studied approach that has always looked at WE as an antecedent of proactive behavior (Christian et al, 2011). Researchers such as Bakker et al. (2012) and Chonget al. (2021) highlighted proactive personalities as a significant driver of WE.

5.1 Implications

As one of the few studies within higher education aiming at investigating the impact of e-leadership, the present study enriches the existing literature on the mediating and moderating effects that influence this impact on both IWB and PWB.

Fundamentally, the present study draws researchers' attention to the importance of EL and its effects on work outcomes in higher education settings in general and the Egyptian academic sector in particular. Virtual environments amplify the e-leaders' responsibility in creating opportunities for academics to engage in their multi-task work in a participatory manner, helping them to cope with the increasing and multi-dimensional work requirements and encouraging them to go beyond these requirements to innovate in their tasks, which is crucial for the sustainability and development of higher education.

Nowadays, as organizations are moving towards a more empowered workplace, universities striving for innovation need to capitalize on the abilities and willingness of their employees to innovate. Consequently, e-leaders in universities must encourage academics to participate more actively in global innovation, which requires them to go above and beyond their standardized job responsibilities. Accordingly, leaders in higher education institutions must keep in mind enhancing work engagement among academics to promote IWB and PWB among their employees. So, leaders should consider academics' needs and feelings, motivating them to put forward their inventive thoughts, providing positive feedback, and encouraging them to propose innovative solutions for new challenges and develop their skills.

Top managers in THEISs should constantly support proactive, inventive, and organizational citizenship behaviors at work by adapting, encouraging, and utilizing the chances afforded by technological advancements in the work and educational environments to increase performance and achieve organizational goals.

Since academics' IWBs and PWBs could be reached through EL, enhancing the latter is highly required from top management in THEIs. Successful leaders need technical capabilities, a series of interconnected tools for collaboration, participatory management, and entrepreneurial and innovation capabilities to increase employee creativity, and enhance the quality of virtual learning. Higher educational institutions need leaders with competencies that exceed basic behavioral and organizational management skills, especially in a rapidly expanding digital environment and rising globalization.

Undoubtedly, academics are vital assets of higher educational institutions, so managers in THEIs must consider offering training programs that help them recognize the value of innovative and proactive behavior to improve work performance. Eventually, it can be said that innovative, proactive academic staff is a useful strategy for human resource managers seeking to enhance the higher education sector in Egypt.

5.2 Limitations and future research

The present study contains certain limitations that pave the way for further research in this area. To fully comprehend the relationship between ELBs, IWBs, and PWBs, other mediating variables, such as organizational support, organizational innovation atmosphere, work characteristics, employees' competencies, job autonomy, affective commitment, creative self-efficacy, organizational learning, and technology acceptance, could be investigated in future research. Barriers to e-leadership and Innovation in Egypt's THFs are a topic for future study. A more comprehensive survey would certainly include academic staff from other Egyptian higher education institutions to obtain broader results. The impact of e-leadership practices on academics' career advancement is also required. Furthermore, there has to be a comparison between traditional leadership and e-leadership to understand better the impact each has on employees' IWB and PWB. Future studies would also benefit from incorporating additional personality traits, such as years of experience and gender, as moderators.

Credit author statement

All authors have contributed equally. All authors have read and agreed to the published version of the manuscript.

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