Journal of Social Sciences of Kahramanmaraş Sütçü İmam University
KSÜSBD
http://dergipark.gov.tr/ksusbd

ISSN 1304-8120 | **e-ISSN** 2149-2786

Araştırma Makalesi * Research Article

The Mediating Role of Firm Innovation Performance in The Impact of Digital Leadership on Employee Performance: Evidence From Startups

Dijital Liderliğin Çalışan Performansı Üzerindeki Etkisinde Firma İnovasyon Performansının Aracılık Rolü: Startup'lardan Kanıtlar

Metin IŞIK
Doç.Dr., Bitlis Eren University, Faculty of Economics and Administrative Sciences,
Department of Business Administration
beu.metin@gmail.com
Orcid ID: 0000-0003-4577-0095

Abstract: This study was conducted with employees of start-up companies established to operate in different technological fields such as IT, hardware, software, communication and cyber security. The research aims to examine the direct and indirect impacts of digital leadership and firm innovation performance on employee performance through empirical analysis. In this context, a cross-sectional study was conducted. A mediating analysis was conducted using empirical data. Within the framework of the research, digital leadership served as an independent variable, employee performance as a dependent variable and firm innovation performance as a mediating construct. The dataset utilized for analysis comprised responses from 184 employees selected from diverse start-up enterprises in Gaziantep, selected through purposive sampling techniques. Employing the Process Macro methodology for analysis, the study revealed that both digital leadership and firm innovation performance exert direct influence on employee performance. Furthermore, the analysis established a significant direct association between digital leadership and firm innovation performance. The outcomes underscored the substantial impact of both digital leadership and firm innovation performance on the enhanced effectiveness of employees within start-up' entities. Crucially, the investigation indicated that innovation performance of the firm holds the potential to bolster employee performance independently of digital leadership. As valuable long-term assets, employees significantly contribute to a firm's sustained viability, bringing forth their creative ideas, productivity acumen, and innovative capabilities. Hence, the possession of digital competencies by managers and the cultivation of the firm's innovation potential emerge as positive catalysts influencing employees within corporate settings. Especially in start-up's, the leader's digital skills and the firm's focus on developing innovative performance increase employee performance.

Keywords: Digital Leadership, firm innovation performance, employee performance.

Öz: Bu çalışma, bilişim, donanım, yazılım, iletişim ve siber güvenlik gibi farklı teknolojik alanlarda faaliyet gösteren start-up şirketlerin çalışanları ile gerçekleştirilmiştir. Araştırma, dijital liderlik ve firma inovasyon performansının çalışan performansı üzerindeki doğrudan ve dolaylı etkilerini ampirik analizlerle incelemeyi amaçlamaktadır. Bu bağlamda, kesitsel bir çalışma yürütülmüştür. Ampirik veriler kullanılarak aracılık analizi yapılmıştır. Araştırma çerçevesinde dijital liderlik bağımsız değişken, çalışan performansı bağımlı değişken ve firma inovasyon performansı aracı yapı olarak ele alınmıştır. Analiz için kullanılan veri seti, Gaziantep'teki çeşitli start-up işletmelerinden amaçlı örnekleme teknikleri ile seçilen 184 çalışanın yanıtlarından oluşmaktadır. Analiz için Prosess Makro'yu kullanan çalışma, hem dijital liderliğin hem de firma inovasyon

Arrival Date:19.03.2024 *Acceptance Date:04.09.2024* *Publication Date:31.12.2024*
Reference: Işık, M. (2024). Liderliğin karanlık tarafının örgütsel muhalefet ve psikolojik iyi oluşa etkisi: bir alan araştırması. *Kahramanmaraş Sütçü İmam University Social Sciences Journal, 21*(3), 1534–1549. Doi: 10.33437/ksusbd.41471006

performansının çalışan performansı üzerinde doğrudan etkisi olduğunu ortaya koymuştur. Ayrıca analiz, dijital liderlik ile firma inovasyon performansı arasında anlamlı bir doğrudan ilişki olduğunu ortaya koymuştur. Sonuçlar, hem dijital liderliğin hem de firma inovasyon performansının, yeni kurulan işletmelerdeki çalışanların artan etkinliği üzerindeki önemli etkisinin altını çizmiştir. En önemlisi, araştırma, firmanın inovasyon performansının, dijital liderlikten bağımsız olarak çalışan performansını destekleme potansiyeline sahip olduğunu göstermiştir.

Anahtar Kelimeler: Dijital Liderlik, firma inovasyon performansı, çalışan performansı

INTRODUCTION

In the contemporary landscape, swift technological advancements characterized by innovations such as artificial intelligence, augmented reality, 5G, and blockchain are progressing at an exponential pace. The significant advancements in technology are widely acknowledged as the primary catalyst for transformation within the realm of business administration subsequent to the industrial revolution (Camarinha-Matos et al., 2019). Notably, these technological strides are not only reshaping organizational structures but also permeating the fabric of societal interactions. In the wake of organizational digitization and the consequent paradigm shift, enterprises grapple with uncertainty while endeavoring to sustain enduring growth within the digital milieu (Shin et al., 2023). It is worth noting that the imperatives of digitization and technology's ascendancy continue to emerge as pivotal constituents of holistic business progress (Overby, 2019), consequently recalibrating the contours of leadership within this transformative context.

The confluence of these dynamics underscores the growing demand for a distinct category of leadership, commonly termed “digital leadership” (Zike et al., 2019). Such a leadership archetype is indispensable in view of the perpetual obligation to navigate the swiftly evolving technological landscape and consumer behaviors, constituting a dedicated pursuit. The discernible shift toward digital transformation is corroborated by an empirical study conducted by PwC, which assessed 2500 publicly traded companies. The findings demonstrated that companies spanning diverse sectors, including information production, insurance, media, entertainment, communication, banking, retail, and other consumer-oriented domains, have instituted the role of a digital transformation manager as a formalized managerial position (Pwc, 2017). This development substantiates the assertion that the advent of digital transformation has precipitated the need for leaders possessing adeptness in directing digitalization endeavors.

In tandem with this context, a novel leadership paradigm known as "digital leadership" has emerged. As articulated by Larjovuori et al. (2018: 1144), digital leadership entails the capacity of leaders to conceptualize a lucid and purposeful vision for the digitalization journey, coupled with the acumen to execute strategies that concretize this vision. This conceptualization necessitates the skillful utilization of an organization's digital assets to synergize with both collective and individual objectives (Thomson et al., 2016). In light of this, it is paramount to fortify the essential business resources, denoted by digital leadership competencies, amongst managerial cadres to effectively surmount the challenges inherent to the digital transformation endeavor (Zike et al., 2019).

Predicated on varying leadership styles, the demeanor and conduct of managers emerge as potent influencers of employee performance. This research endeavors to scrutinize the impact of digital leadership on employee performance. In a comprehensive sense, employee performance encapsulates the amalgamation of quantitative and qualitative advantages delivered by individuals or teams to realize individual or collective objectives (Stewart et al., 2012). Within the ambit of employee actions and inactions, encompassing output quality, quantity, work attendance, goal contribution, and temporal output valuation (Rich, 2010), the potency of leadership behavior surfaces as a catalyst for shaping employee performance outcomes. Evidentiary inquiry underscores the direct nexus between leadership style, behavior, and the motivation and performance levels of employees (Walumbwa & Hartnell, 2011). Pertinently, contemporary scholarship posits digital leadership as a salient variant, evincing affirmative influence upon employee performance (Sasmoko et al., 2019; Alfares & Banikhaled, 2022).

Within the purview of this study, another pivotal variable under examination is innovation performance. Scholarly inquiry accentuates that the orientation of leaders or managers toward innovation profoundly shapes the innovation trajectory within enterprises, spanning the spectrum from

ideation inception to commercialization fruition (Dargan & Shucksmith, 2008). Despite managerial endorsement of innovation, unswerving success might not invariably transpire. Consequently, scrutiny of firm innovation performance, serving as a barometer of organizational innovation acumen, assumes paramount significance. Firm innovation performance, connoting the successful incorporation of novel products, processes, and concepts aligned with corporate objectives, resonates deeply in organizational decisions encompassing strategy, investment, supply-demand dynamics, and more (Oke et al., 2012; Verhees et al., 2010). A qualitative yardstick evaluates innovation performance, encompassing inquiries about company participation in innovation activities, alongside quantitative metrics gauging outputs germane to innovation pursuits (Perkmann, et al., 2011). In this investigation, firm innovation performance is quantitatively assessed through the prism of employee perceptions.

Notably, perusal of existing literature reveals two extant studies (Benitez et al., 2022; Fatima & Masood, 2023) delving into the interplay between digital leadership and firm innovation performance. However, a lacuna emerges in terms of examining the mediating role of firm innovation performance within the digital leadership-employee performance relationship. This research endeavors to bridge this gap by scrutinizing the impact of firm innovation performance on employee performance. Thereby, it aspires to enrich the scholarly corpus while contributing to prospective research avenues.

LİTERATURE REVİEW AND HYPOTHESES

Digital Leadership and Employee Performance

The concept of digital transformation has emerged as a pivotal focal point for businesses in the current century, garnering significant attention due to its velocity, comprehensive reach, and profound ramifications (Matzler et al., 2018). At the organizational echelon, it is contended that enterprises should proactively cultivate strategies that embrace the repercussions of digital transformation, thus enhancing operational efficacy (Hess et al., 2016: 123). As organizations endeavor to transition from conventional methodologies divorced from information and communication technology to a vastly expansive digital landscape, a robustly innovative leadership strategy becomes imperative (Tidd & Bessant, 2020). This underscores the necessity of examining digital leadership benchmarks with substantive influence to ascertain the degree to which decisions made during digital transitions hold sway. A requisite digital leadership framework is paramount for enterprises to facilitate successful strategic shifts associated with digital transformation and to stabilize the ensuing changes (Matt et al., 2015: 339). This demand has fostered an intricate nexus between leadership and digital acumen.

Digital leadership epitomizes a leader's role in supporting an organization's digitalization journey, combining competencies with technological advancements by creating teams that enable people to stay connected and engaged, and deliver continuous digital transformation (Abbatiello et al., 2017). It demands the leader’s active participation and technical adeptness in the organizational transition to information and communication Technologies (Uçar & Tutgaç, 2022). This form of leadership draws upon a multiplicity of disciplines, necessitating competencies such as management, business administration, and strategic cogitation to harmonize with proficiencies in adeptly utilizing digital technologies (Saputra et al., 2021). Especially in this era of digitalization, emblematic of the Industry 4.0 revolution, leaders' capacity to inspire, guide, manage, and enact initiatives should be seamlessly integrated with the paradigm of digitalization (Rossato, & Castellani, 2020). Indeed, as posited by Oke & Fernandes (2020), the quintessential leadership requisite in the digital era encompasses the ability to not only comprehend but also to implement the transformative changes heralded by the Industry 4.0 revolution.

Digital leadership stands as a catalyst for enhancing a company's adaptability to novel developments and addressing challenges encountered during the process of digital transformation. The attainment of digital transformation's success hinges upon the possession of digital acumen, literacy, visionary insights, customer-centric orientation, agility, risk propensity, and adept collaboration skills by digital leaders (Tidd & Bessant, 2020). Wilson (2004) categorizes the theoretical contributions of digital leaders into four key dimensions: awareness augmentation, resource mobilization, operational leadership, and structural leadership. Successful digital leadership necessitates managers to embrace attitudes, competencies, and behaviors, such as digital literacy and robust leadership skills, which are pivotal in propelling digital transformation (Westerman & McAfee, 2012).

Effective leadership behavior holds a pivotal role in motivating and guiding employees towards realizing their utmost potential and enhancing performance outcomes (Uğurlu & Işık). Leaders who adopt proactive and inspiring approaches within the organizational context foster an environment that spurs employees to excel and transcend their limits (Iskamto, 2020: 471). Research underscores the pivotal role of an adept leader in seamlessly integrating employees and bolstering their morale, thus facilitating their work with maximal motivation. In this regard, In this context, digital leaders are expected to direct their followers' attention to information and communication technologies and be the initiators of organizational change such as operational improvements, new business models, customer relations, employee workload, motivation and financial conditions (Cortellazzo et al., 2020).

The realm of digital leadership occupies a critical juncture in shaping a company's vision and implementing initiatives that pave the way for its actualization, all while fostering employee enthusiasm and elevating operational efficiency (Cong & Thu, 2021). Furthermore, digital leadership is perceived as the cornerstone in the process of conceiving new products and services through the integration of technology into leadership, thereby steering employee efforts and incentivizing the proposal of innovative ideas in alignment with customer demands (Sasmoko et al., 2019. Empirical studies substantiate the affirmative influence of digital leadership on employee performance (ALfares & Banikhaled, 2022). This context underscores the formulation of the following hypothesis:

H1: Digital leadership positively affects employee performance.

Digital Leadership and Firm Innovation Performance

Although the concept of innovation has recently gained prominence, its historical origins trace back further. Robert Leonard, leading the linguistics program at Hofstra University, notes that the term "innovation," derived from the Latin “innovatus,” signifying renewal or alteration, emerged in written records during the early 15th century (Laal, 2012). Substantive research on innovation emerged in the early 1900s and garnered heightened attention in the 1980s, catalyzed by globalization and evolving business strategies. Within Turkey, innovation, which has surged in popularity since the 2000s, has solidified its presence within the corporate realm.

For companies aspiring to expand, flourish, and thrive in nascent markets, innovation stands as a pivotal driver (Rosenberg, 2010). At the core of the innovation process lies the conversion of ideas into novel products or services, innovative process technologies, reimagined organizational frameworks, or fresh management paradigms (Azar & Ciabuschi, 2016: 325). The commercial aspect encompassing the incorporation of freshly developed products, processes, and ideas into the business ecosystem encapsulates the firm's innovation performance (Verhees & Meulenberg, 2004). Innovation performance encapsulates the amalgamation of comprehensive or organizational accomplishments stemming from innovation initiatives and enhancements, incorporating diverse facets of firm innovation such as processes, products, and organizational structures. Consequently, innovation performance constitutes a multifaceted construct predicated on diverse performance metrics encompassing new patents, product launches, project introductions, process innovations, and organizational adjustments (Gunday et al., 2011). In essence, innovation performance embodies the influence of both product and process innovations on firm performance, gauging their successful integration into the market. This extends to outcomes, such as the expeditious introduction of novel products, process systems, or devices (Chang, 2003).

The evaluation of a firm’s innovation performance is intrinsically linked to the quantification of innovation endeavors that align with the predetermined organizational objectives. This assessment further involves appraising the extent of benefits and drawbacks incurred by these initiatives within the organizational context. Notably, innovation performance indicators serve as instrumental tools that afford companies the ability to discern and comprehend their positioning within the realm of innovation (Carrasco-Carvajal et al., 2023). Over the long-term trajectory, the potency of innovation performance is capable of engendering favorable ramifications across a firm's production, market presence, and overall financial standing. However, in the immediate term, the initiation of investments and internal sourcing may potentially engender preliminary setbacks (Lawless & Anderson, 1996).

Given the profound significance of innovation within the landscape of progressive endeavors, senior managers hold a cognizant appreciation for its pivotal role within innovative initiatives. As a testament to this acknowledgment, senior managers embrace innovation performance indicators as an essential precondition for fostering developmental progress (Chenhall & Langfield-Smith, 1998). Thus, it is conceivable that the influence of senior management extends directly to the innovation performance of the firm (Andries & Czarnitzki, 2014).

Kane et al. (2019) assert that firms proffer insights into the strategic orchestration of digital transformation. This encompasses the strategic recruitment of digital leaders, the augmentation of digital literacy among personnel, and the cultivation of a work environment and culture conducive to digitalization. In light of this, a comprehensive understanding of the role of digital leadership in propelling innovation is imperative.

An examination of the existing literature reveals a notable scarcity of studies that delve into the influence of leadership on the innovation performance of companies. This academic exploration encompasses diverse leadership modalities, including versatile leadership (Gerlach et al., 2020), transformational leadership (Sattayaraksa & Boon-itt, 2018; Tajasom et al., 2019), and wise leadership (Zacher et al., 2016). These investigations primarily probe the interrelationship between distinct innovation categories and their subsequent performance outcomes. In this context, a handful of researchers have tackled the subject of the impact of digital leadership on innovation performance, notably by Benitez et al. (2022) and Fatima & Masood (2023). Additionally, a study by Mihardjo et al. (2019) closely aligns with these themes, delving into the ramifications of digital leadership on dynamic, talent-driven innovation management. This study underscored robust associations between digital leadership and innovation. Further research underlines the effectiveness of digital leadership in elevating companies' innovation performance, particularly within the scope of sustainability considerations (Khaw et al., 2022). Notably, El Sawy et al. (2016) emphasized that digital leadership is capable of furnishing fundamental principles for enhancing a company's capabilities. Moreover, Heredia et al. (2022) established that digital capabilities exert a positive influence on firm performance.

The role of digital leadership extends beyond mere contribution to the generation of new products and services. It encompasses the cultivation of inventive management paradigms and operational methodologies, augmenting a firm's competitive prowess and strategic goal attainment (Mihardjo et al., 2019). Within this context, the following hypothesis has been formulated:

H2: Digital leadership positively affects firm innovation performance.

Firm Innovation Performance and Employee Performance

Employee performance denotes the extent to which an employee contributes towards the realization of a company’s objectives, processes, and aims. In essence, it encapsulates the level of goal achievement or potential success (Işık & Kızıltuğ, 2022). The extant literature signifies a positive correlation between innovation performance and employee performance. Scholarly investigations by Chenhall & Langfield-Smith (1998), Andries, P & Czarnitzki (2014) and Dedahanov, et al., (2017) have scrutinized the nexus between innovation and employee performance, collectively revealing a discernible relationship.

Coulson-Thomas (1991) contends that employees endowed with innovative competencies play an instrumental role in securing an enduring competitive advantage for firms. Within this context, the implementation of assorted policies and strategies aimed at enhancing employees' innovative proficiencies emerges as pivotal. These strategies encompass the promotion of employee engagement, support for collaborative teamwork, the cultivation of a risk-embracing organizational culture, and the provision of opportunities for divergent thought processes. Tiwana et al. (2013) accentuate the significance of investing in training and developmental initiatives to enhance employee performance, as elevating employees' competencies and knowledge levels stands as a critical stride towards enhancing their performance.

Hult et al. (2004) assert in their research that the innovation performance of a firm intertwines with the competencies and motivation of its employees. Similarly, Bessant (2013) underscores the

paramount role of employees' contribution and performance in unearthing novel ideas and innovative resolutions. Innovation performance remains intrinsically linked to employees' ability to employ their innovative cognitive abilities and to appraise situations from diverse vantage points. Sadikoglu & Zehir (2010) and Osman et al., (2016) found a correlation between innovation and employee performance. Consequently, a positive rapport between innovation performance and employee performance prevails. Firms can fortify this bond by enacting policies and strategies that nurture employees' innovation competencies. In so doing, the potential of employees can be optimally harnessed, affording the firm sustainable competitive advantages and adeptly managing innovation processes. In this vein, the ensuing hypothesis has been formulated:

H3: Firm innovation performance positively affects employee performance.

Mediating Role of Firm Innovation Performance

Within the purview of prior investigations, two notable studies have explored the mediating implications of firm innovation performance. Zhou et al. (2023) discerned that firm innovation performance serves as a comprehensive mediator in the link between environmental, social, and governance impacts and sustainability performance. Similarly, Upadhyay et al. (2023) identified that firm innovation mediates relationships, to varying extents, with adaptability, entrepreneurship, technology orientation, and intentions. In a distinct exploration, Al-Husban et al. (2021) probed the mediator role of innovation ability in the nexus between digital leadership and organizational performance.

Borah et al. (2022) underscored that innovation occupies an indispensable facet within firm performance, exerting indirect influence on various factors. Nonetheless, limited scholarship has undertaken comprehensive investigations into innovation's intermediary role. Notably, Pekdemir et al. (2014) uncovered that employees' inclination towards innovation partially mediates the influence of reward perception on employee performance, while it fully mediates the impact of autonomy perception on employee performance. These select studies underscore the nascent nature of research exploring the mediation aspect of firm innovation performance. Particularly, the study by Al-Husban et al. (2021) investigating digital leadership and the mediating role of innovation ability in relation to organizational performance lays the foundation for the formulation of the ensuing hypothesis.

H4: Firm innovation performance mediates the relationship between digital leadership and employee performance.

METHOD

This quantitative study endeavors to meticulously examine the direct and indirect ramifications of the postulated hypotheses within the research framework. The model under consideration encompasses employee performance as the dependent variable, digital leadership as the independent variable, and firm innovation performance as the intermediary variable. Moving on to the hypothesis testing phase, the process commenced with the determination of the coefficient of determination (R-squared), approximating an absolute value of 100%. This R-squared value encapsulates the extent of the simultaneous impact exerted by independent and mediator variables on the dependent variable. The subsequent step encompassed the empirical testing of the stipulated hypotheses, with a p-value threshold of < 0.05 signifying statistical significance.

Data Analysis

For analysis purposes, SPSS version 25 in conjunction with the Process Macro (v4.0) plugin developed by Andrew F. Hayes (2012) were employed. In assessing direct and indirect effects, the main research model was evaluated through mediation testing using model 4, while resampling was undertaken with a sample size of 5000. The Bootstrap method was leveraged to ascertain the mediation effect, favored for its efficacy in determining indirect effects and minimizing Type I errors.

Figure 1 illustrates the research model, positing that digital leadership wields a positive influence on both employee performance and firm innovation performance (H_1 and H_2). Moreover, the model posits that firm innovation performance, in turn, positively impacts employee performance (H_3).

Additionally, firm innovation performance serves as the mediating variable that underpins the indirect effect of digital leadership on employee performance (H_4).

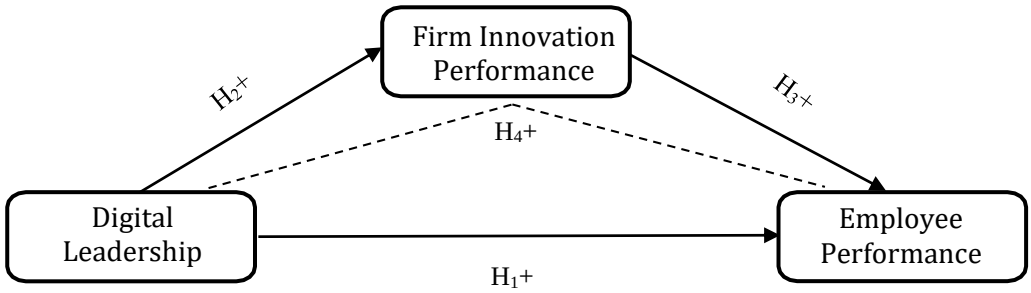


Figure 1. *Research Model*

The research methodology here in has embraced a rigorous approach, utilizing a combination of statistical techniques to validate and analyze the proposed hypotheses within the model.

Measurement Tools

Data collection involved the utilization of three distinct scales. The construct of **digital leadership**, as conceptualized by Buyukbese et al. (2022), was measured using a scale consisting of two dimensions: innovative (comprising six statements) and supportive (comprising three statements). The construct of **firm innovation performance** was assessed using a five-item scale developed by Oke et al. (2012). Additionally, the construct of **employee performance** was gauged through a four-statement scale as previously employed in the research conducted by Sigler & Pearson (2000).

Data Collection

The research data were collected through face-to-face interactions with employees of companies operating in the domain of informatics and technology, registered within Gaziantep University Technopark. A 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was employed for the statements within the measurement tools in the questionnaire. A purposive sampling technique was adopted for the sample selection process, resulting in the participation of 184 individuals employed in fields encompassing informatics, software, and hardware. Considering that the research population is approximately 240 people, the sample size of 184 participants was sufficient, with a 95% reliability level for studies using quantitative methods in social sciences (Gürbüz & Şahin, 2016, p. 132).

Participants

The study's sample comprises 184 participants, consisting of 127 males and 57 females. Among the participants, 101 are married, while 83 are single. Age distribution reveals that 36 participants fall within the age bracket of 18-25, 80 fall within 26-35, 53 within 36-45, 14 within 46-55, and one individual is aged 56 and above. In terms of educational background, 14 participants have attained primary education, 39 have completed high school, 37 hold an associate degree, 77 possess an undergraduate degree, and 17 have achieved a graduate level of education. Regarding employment duration, 52 participants have less than 1 year of experience, 75 have 1-5 years, 31 have 6-10 years, 10 have 11-15 years, 10 have 16-20 years, and 6 participants boast 21 or more years of work experience.

FINDINGS

Findings on Scale Reliability and Exploratory Factor Analysis

In the initial phase of the analyses, exploratory factor analysis was applied to the measurement instruments. The outcomes of the exploratory factor analysis for the measurement tools are displayed in Table 1. Notably, the structure and factor loads yielded by the exploratory factor analysis indicate that both the employee performance and innovation performance scales retain their original structures. Conversely, the digital leadership scale demonstrates a unidimensional structure, diverging from the original structure. Subsequent analyses, consequently, evaluated digital leadership as a singular dimension. To evaluate the reliability of the measurement tools, Cronbach's Alpha values were

scrutinized. As illustrated in Table 1, the Cronbach's Alpha values assigned to the variables meet the requisite criteria for reliability.

Table 1. *Exploratory factor analysis and reliability analysis*

Scales	Factors	λ	α	KMO and Bartlett	Explained Variance
Digital Leadership	DL1	.828	0.95	0.93	71.78%
	DL2	.847			
	DL3	.822			
	DL4	.842			
	DL5	.856			
	DL6	.845			
	DL7	.838			
	DL8	.901			
	DL9	.843			
Employee Performance	EP1	.850	0.85	0.81	69.55%
	EP2	.854			
	EP3	.817			
	EP4	.815			
Firm Innovation Performance	IP1	.827	0.88	0.83	67.41%
	IP2	.705			
	IP3	.905			
	IP4	.852			
	IP5	.803			

λ: Factor loadings

Measurement Model

In the second phase, reliability analysis was conducted. Subsequently, the analytical procedures proposed by Anderson & Gerbing (1988) were employed. In this context, an initial measurement model was constructed using the structural equation modeling approach in the AMOS software. As advocated by Fornell & Larcker (1981), the adequacy of the values for validity and reliability of the measurement model was assessed. To ascertain whether the observed variables considered in the study represent the underlying latent constructs, convergent and discriminant validity were computed (Fornell & Larcker, 1981). Discriminant validity is used to ensure that the observed variables used in the measurement model actually measure the latent variable. Convergent validity, on the other hand, indicates the degree of relationship between the observed variables measuring the latent variable (Hair et al., 2019). To achieve convergent validity, CR values should be greater than 0.70, AVE values should be greater than 0.50, and all CR values should exceed AVE values (Verma et al., 2021). For discriminant validity, the Maximum Shared Variance (MSV) and Average Shared Variance (ASV) values should be less than AVE, and the square root of AVE should be greater than the inter-variable correlation value (Malhotra & Dash, 2011).

Upon subjecting the measurement model, devised to explore the interrelations between variables, to confirmatory factor analysis (CFA), it was discerned that satisfactory fit indices were not initially attained. However, subsequent adjustments in accordance with the model's predictions yielded consistent outcomes, resulting in the following fit indices: (CMIN/DF) $\chi 2/df = 2.156$, RMSEA = 0.079, AGFI = 0.818, CFI = 0.941, GFI = 0.864, NFI = 0.896, TLI = 0.930. Notably, these values fall within the range acknowledged in the literature as acceptable in terms of both the construct validity and the reliability of the scales implemented in the research. Table 2, providing insights into the reliability and convergent validity metrics of the scales, accentuates the robust convergent validity exhibited by the scales integrated into the measurement model.

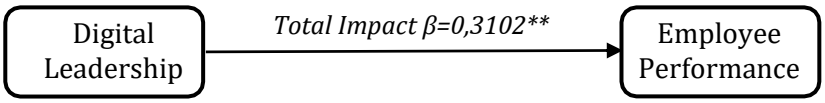
Table 2. *Findings on internal consistency reliability and convergent validity*

	Mean	SD	CR	AVE	MSV	ASV	D L	FP	I P
D L	3.37	3.37	0.950	0.678	0.531	0.367	*0.823* [a]		
EP	4.01	4.05	0.855	0.596	0.318	0.260	0.449 8**	*0.772* [a]	
I P	3.64	3.64	0.887	0.615	0.531	0.425	0.729 8**	0.564 8**	*0.784* [a]

Notes: **Significant at the 0.01 level N= 184, DL: Digital Leadership, EP: Employee Performance, IP: Innovation Performance, CR = Composite Reliability, AVE = Average Variance Extracted, MSV: Maximum Shared Variance, ASV: Average Shared Variance, a is the square root of the AVE values

Testing The Hypotheses

Figure 2 illustrates that digital leadership significantly predicts employee performance at the 0.05 significance level (β=0.3102; t=6.106; P<0.05). This finding signifies that a one-unit escalation in digital leadership is linked to a 0.3102-unit upsurge in employee performance. Consequently, the supported nature of the H_1 hypothesis "Digital leadership positively affects employee performance" is evident within this context.



** Statistically significant at the 0.05 level.

Figure 2. *The total impact of digital leadership on employee performance*

Examining the findings depicted in Figure 3, it becomes apparent that digital leadership exerts a statistically significant and positive influence on firm innovation performance, the mediating variable (β=0.5820; t=12.6021; P<0.05). Consequently, the established H_2 hypothesis, asserting that "Digital leadership positively affects firm innovation performance", garners support from the empirical evidence. Moreover, the analysis results signify that firm innovation performance possesses a statistically significant and positive impact on employee performance (β=0.3938; t=5.1589; P<0.05). As a result, the H_3 hypothesis, postulating that "Firm innovation performance positively affects employee performance", is also validated.

Upon multiplying the effect coefficients mentioned above, the magnitude of the indirect effect emerges. The calculated indirect effect (0.5820 × 0.3938) within the model is measured at 0.2292 [point estimate=0.2292; BootSE=0.0703; 99% BootCI (0.1438; 0.4624)]. Furthermore, analyzing Figure 3 reveals that the direct effect stands at 0.0810 (β=0.0810; t=1.2443; P>0.05). When aggregating the indirect and direct effects, a total effect size of 0.3102 is attained.

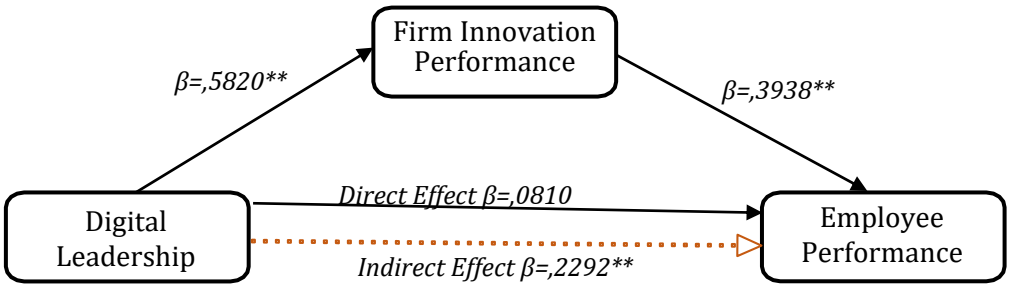


Figure 3. *Findings on the direct and indirect (mediation) effects*

The significance of the indirect effect of digital leadership on employee performance via firm innovation performance is evident by the absence of zero within the specified confidence intervals [BootCI (0.1438; 0.4624)]. Importantly, in line with Hayes's (2012) framework, a positive indirect effect in Model 4 that excludes zero signifies a mediating effect. Consequently, the H_4 hypothesis, postulating that "Firm innovation performance mediates the relationship between digital leadership and employee performance.", also garners empirical support.

Moreover, with the integration of firm innovation performance, the mediating variable, into the model, the previously significant association between digital leadership and employee performance loses significance. This indicates that firm innovation performance serves as a full mediator in this relationship. As a result of the examined mediation model, it is established that the variables elucidate around 28% of the variance in employee performance (R^2=0.28). Furthermore, the established model emerges as statistically significant (F=34.574; P<0.05).

DISCUSSIONS

The study's foremost discovery underscores the direct impact of digital leadership on employee performance. This observation confirms a substantial enhancement of employee performance by 31% through the influence of digital leadership. This outcome finds support in previous research that similarly demonstrated the positive correlation between digital leadership and employee performance (idd & Bessant, 2020; ALfares & Banikhaled, 2022). Notably, the visionary and innovative qualities of leaders, coupled with their adeptness at integrating employees into digital transformation processes, contribute to fostering a stronger sense of affiliation among employees. As a result, employees exhibit an increased willingness to actively engage in digital transformation endeavors. Particularly noteworthy is the role of skill development among employees in the realm of information and internet technologies, which in turn positively affects employee motivation and performance. Within this framework, managers who possess adept digital leadership skills are well-positioned to foster the dynamic involvement of employees in organizational processes, thereby engendering a favorable impact on their overall performance.

Moreover, an additional significant discovery stems from the study, demonstrating that digital leadership exerts a 58% increase in firm innovation performance. This finding aligns harmoniously with prior research that has illuminated the constructive influence of digital leadership on innovation performance (Benitez et al., 2022; Fatima & Masood, 2023). A company's capacity to heighten product quality and generate substantial revenues hinges on its ability to engender novel products and operational strategies. The optimization of operational processes within companies necessitates the concurrent advancement of innovative technologies. In this context, the innovative outlook that digital leaders bring to the table serves as a catalyst for the formulation of creative processes within organizations. Additionally, leaders who are well-versed in digital leadership concepts are poised to bolster their company's adaptability to technological advancements. Consequently, the substantiation of these findings underscores their compatibility with theoretical underpinnings and empirical investigations. In essence, this research underscores that digital leadership, which coalesces innovation and technological progress, distinctly enhances innovative activities within the workplace. Hence, a favorable surge in the perception of digital leadership augments innovation performance.

The present study unveils a noteworthy discovery, illustrating that firm innovation performance possesses a constructive influence on employee performance, elevating it by 39%. This outcome aligns harmoniously with prior research that substantiates the affirmative impact of innovative initiatives within companies and their resultant innovation performance on the individual and collective performance of employees (Sadikoglu & Zehir, 2010; Osman et al., 2016). It is established that employees equipped with advanced qualifications stand as a pivotal factor in enabling a company to attain a sustainable competitive advantage. Consequently, companies must be resolutely committed to fostering an environment that fosters the provision of facilities, technological resources, adaptable work policies, and a conducive work environment. Such an environment is instrumental in nurturing employees' comfort and creative ideation, thus enabling innovation to flourish within a supportive framework. Recognizing the significance of this, the implementation of diverse strategies and policies intended to enhance employees' innovation skills is imperative. These strategies encompass the encouragement of active employee participation, the promotion of collaborative teamwork, the cultivation of a risk-tolerant culture, and the provision of avenues for diverse thinking processes (Coulson-Thomas, 1991). In light of these observations, the adoption of novel approaches that nurture and bolster employee development is paramount for sustaining and augmenting their performance.

Furthermore, the study underscores the mediating role of firm innovation performance in the relationship between digital leadership and employee performance. With the introduction of firm

innovation performance as a mediating variable, the previously significant direct effect of digital leadership on employee performance becomes non-significant. This finding underscores the pivotal role of firm innovation performance as a mediator, indicating that digital leadership's influence on employee performance is channeled through its impact on firm innovation performance. Notably, the calculated indirect effect of firm innovation performance (β=0.2292) has been established as statistically significant within the effect of digital leadership on employee performance. This outcome unequivocally underscores that digital leadership contributes to an enhancement in firm innovation performance, which subsequently engenders a positive impact on employee performance. In essence, the study substantiates the pivotal role played by firm innovation performance in mediating and amplifying the positive impact of digital leadership on employee performance.

CONCLUSIONS

This study establishes that both digital leadership and firm innovation performance wield a direct influence on employee performance. Furthermore, the research reveals that the effect of digital leadership on employee performance is mediated by the intermediary role of firm innovation performance. Specifically, firm innovation performance serves as a significant mediator that explains the impact of digital leadership on employee performance. This research model augments the field of management and organizational studies by shedding light on the pivotal role of firm innovation performance in driving employee performance. Particularly, for companies, especially start-ups in the informatics sector, embracing innovative practices becomes imperative for enhancing employee performance. As the digital landscape evolves, companies must empower their employees to adapt to technological advancements, emphasizing learning and application of new technologies.

Future investigations could consider extending this study by incorporating variables such as firm technological adaptability and technology literacy. Such an extension would allow for an exploration of the technological adaptation capabilities of employees in the IT sector, as well as the factors influencing their technological literacy.

However, it is essential to acknowledge certain limitations while interpreting the study's outcomes. The study employs a cross-sectional questionnaire with closed-ended questions, potentially missing out on observing behavioral changes over time. Closed-ended questions may restrict respondents' freedom to fully articulate their opinions. Thus, a mixed methods design could offer a more comprehensive understanding in future inquiries. Additionally, data collection was limited to a specific region and industry. Consequently, the findings might exhibit a degree of bias. Increasing the sample size and diversifying the geographical and industrial scope could enhance the robustness of future studies. Exploring similar hypotheses across various sectors in Turkey or internationally might also offer valuable insights. Lastly, the study's findings, being rooted in a developing country context, may not be universally applicable. Therefore, future investigations could aim to conduct cross-country or cross-regional analyses for a broader perspective.

REFERENCES

Abbatiello, A., Knight, M., Philpot, S. & Roy, I. (2017). *Rewriting the rules for the digital age: Deloitte global human capital trends*. UK, Deloitte University Press.

ALfares, M., & Banikhaled, M. (2022). The effect of digital leadership on Kuwaiti hospitals' employee performance. *Management Science Letters, 12*(4), 223-228. https://doi:10.5267/j.msl.2022.6.002

Al-Husban, D. A. A. O., Almarshad, M. N. D., & Altahrawi, M. H. A. (2021). Digital leadership and organization's performance: The mediating role of innovation capability. *Int. J. Entrep, 25*, 1-16.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-423.

Andries, P., & Czarnitzki, D. (2014). Small firm innovation performance and employee involvement. *Small Business Economics, 43*, 21-38. https://doi.org/10.1007/s11187-014-9577-1

Azar, G., & Ciabuschi, F. (2016). Organizational innovation, technological innovation, and export performance: The effects of innovation radicalness and extensiveness. *International Business Review. 26*, 324-336. http://dx.doi.org/10.1016/j.ibusrev.2016.09.002

Benitez, J., Arenas, A., Castillo, A., & Esteves, J. (2022). Impact of digital leadership capability on innovation performance: the role of platform digitization capability. *Information & Management, 59*(2), 103590. https://doi.org/10.1016/j.im.2022.103590

Bessant, J. (2013). Innovation in the twenty-first century. *Responsible innovation: Managing The Responsible Emergence of Science and Innovation in Society*, 1-25. https://doi.org/10.1002/9781118551424.ch1

Borah, P. S., Iqbal, S., & Akhtar, S. (2022). Linking social media usage and SME's sustainable performance: The role of digital leadership and innovation capabilities. *Technology in Society*, 68, 101900. https://doi.org/10.1016/j.techsoc.2022.101900

Büyükbeşe, T., Dikbaş, T., Klein, M., & Batuk Ünlü, S. (2022). A study on digital leadership scale (DLS) development. *Kahramanmaraş Sütçü İmam Universitesi Sosyal Bilimler Dergisi 19*(2), 740–760. https://doi.org/10.33437/ksusbd.1135540

Camarinha-Matos, L. M., Fornasiero, R., Ramezani, J., & Ferrada, F. (2019). Collaborative networks: A pillar of digital transformation. *Applied Sciences, 9*(24), 5431. https://doi.org/10.3390/app9245431

Carrasco-Carvajal, O., Castillo-Vergara, M., & García-Pérez-de-Lema, D. (2023). Measuring open innovation in SMEs: an overview of current research. *Review of Managerial Science, 17*(2), 397-442. https://doi.org/10.1007/s11846-022-00533-9

Chang, Y. (2003). Benefits of co-operation on innovative performance: evidence from integrated circuits and biotechnology firms in the UK and Taiwan'. *R&D Management, 33*(4), 425–437.

Chenhall, R., & Langfield-Smith, K. (1998). Factors influencing the role of management accounting in the development of performance measures within organizational change programs. *Management Accounting Research, 9*(4), 361-386.

Cong, L.C., & Thu, D.A. (2021). The competitiveness of Small and Medium Enterprises (SMEs) in the tourism sector: The role of leadership competencies. *Journal of Economics and Developmen, 23*(3), 299-316. https://doi.org/10.1108/JED-06-2020-0080

Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. *Frontiers in Psychology, 10*, 1938. https://doi.org/10.3389/fpsyg.2019.01938

Coulson-Thomas, C. (1991). IT and new forms of organisation for knowledge workers: opportunity and implementation. *Employee Relations, 13*(4), 22-32.

Dargan, L., & Shucksmith, M. (2008). Leader and innovation. *Sociologia Ruralis, 48*(3), 274-291. https://doi.org/10.1111/j.1467-9523.2008.00463.x

Dedahanov, A. T., Rhee, C., & Yoon, J. (2017). Organizational structure and innovation performance: is employee innovative behavior a missing link?. *Career Development International, 22*(4), 334-350. https://doi.org/10.1108/CDI-12-2016-0234

El Sawy, O., Kræmmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO built the foundations and enterprise capabilities for digital leadership. *MIS Quarterly Executive, 15*(2), 141-166.

Fatima, T., & Masood, A. (2023). Impact of digital leadership on open innovation: a moderating serial mediation model. *Journal of Knowledge Management*. https://doi:10.1108/JKM-11-2022-0872

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.2307/3151312

George, D., & Mallery, P. (2014). *IBM SPSS Statistics 21 step: A Simple Guide and Reference*, 13th Edn. Boston: Pearson.

Gerlach, F., Hundeling, M., & Rosing, K. (2020). Ambidextrous leadership and innovation performance: a longitudinal study. *Leadership & Organization Development Journal, 41*(3), 383-398. https://doi.org/10.1108/LODJ-07-2019-0321

Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of production economics, 133*(2), 662-676. https://doi.org/10.1016/j.ijpe.2011.05.014

Gürbüz, S. & Şahin, F. (2016). *Sosyal bilimlerde araştırma yöntemleri*. Seçkin Publishing.

Hair, J. F., Ringle, C. M., Gudergan, S. P., Fischer, A., Nitzl, C., & Menictas, C. (2019). Partial least squares structural equation modelingbased discrete choice modeling: An illustration in modeling retailer choice. *Business Research, 12*(1), 115–142. https://doi.org/10.1007/s40685- 018-0072-4

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* [White paper]. Retrieved from http://www.afhayes.com/public/process2012.pdf

Heredia, J., Castillo-Vergara, M., Geldes, C., Gamarra, F. M. C., Flores, A., & Heredia, W. (2022). How do digital capabilities affect firm performance? The mediating role of technological capabilities in the "new normal". *Journal of Innovation & Knowledge, 7*(2), 100171. https://doi.org/10.1016/j.jik.2022.100171

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. *MIS Quarterly Executive, 15*(2), 12-139.

Hult, G. T. M., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management, 33*(5), 429-438. https://doi.org/10.1016/j.indmarman.2003.08.015

Iskamto, D. (2020). The role of leadership and influence on employee performance in digital era. *Jurnal Manajemen Bisnis, 17*(4), 470-484. https://doi.org/10.38043/jmb.v17i4.2730

Işık, M., & Kızıltuğ, S. (2022). Karanlık liderlik algısının işgören performansı ve iş tatminine etkisi. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi, 21*(43), 307-326. https://doi.org/10.46928/iticusbe.1062866

Kane, G. C., Phillips, A. N., Copulsky, J., & Andrus, G. (2019). How digital leadership is (n't) different. *MIT Sloan Management Review, 60*(3), 34-39.

Khaw, T. Y., Teoh, A. P., Abdul Khalid, S. N., & Letchmunan, S. (2022). The impact of digital leadership on sustainable performance: a systematic literature review. *Journal of Management Development, 41*(9/10), 514-534. http://dx.doi.org/10.1108/jmd-03-2022-0070

Laal, M. (2012). Innovation and medicine. *Procedia Technology, 1*, 469-473. https://doi: 10.1016/j.protcy.2012.02.103

Larjovuori, R. L., Bordi, L., Mäkiniemi, J. P., & Heikkilä-Tammi, K. (2018). *The role of leadership and employee well-being in organizational digitalization*. Proceedings of the 22nd International Academic Mindtrek Conference, 212-221. New York. http://dx.doi.org/10.1145/3275116.3275122

Lawless, M. W., & Anderson, P. C. (1996). Generational technological change: Effects of innovation and local rivalry on performance. *Academy of Management Journal, 39*(5), 1185-1217.

Malhotra, N. K., & Dash, S. (2011). *Marketing research an applied orientation*. London: Pearson Publishing.

Matt, C., Hess, T., Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering, 57*(5), 339–343. https://doi.org:10.1007/s12599-015-0401-5

Matzler, K., von den Eichen S. F., Anschober M., & Kohler T. (2018). The crusade of digital disruption. *Journal of Business Strategy*, *39*(6), 13-20. https://doi.org/10.1108/JBS-12-2017-0187

Mihardjo, L., Sasmoko, S., Alamsyah, F., & Elidjen, E. J. M. S. L. (2019). The influence of digital leadership on innovation management based on dynamic capability: market orientation as a moderator. *Management Science Letters, 9*(7), 1059-1070. https://doi.org:10.5267/j.msl.2019.3.018

Oke, A., & Fernandes, F. A. P. (2020). Innovations in teaching and learning: Exploring the perceptions of the education sector on the 4th industrial revolution (4IR). *Journal of Open Innovation: Technology, Market, and Complexity, 6*(2), 1-22. https://doi.org/10.3390/joitmc6020031

Oke, A., Walumbwa, F. O., & Myers, A. (2012). Innovation strategy, human resource policy, and firms' revenue growth: The roles of environmental uncertainty and innovation performance. *Decision Sciences, 43*(2), 273-302. https://doi.org/10.1111/j.1540-5915.2011.00350.x

Osman, S., Shariff, S. H., & Lajin, M. N. A. (2016). Does innovation contribute to employee performance?. *Procedia-Social and Behavioral Sciences, 219*, 571-579. https://doi: 10.1016/j.sbspro.2016.05.036

Pekdemir, I., Koçoglu, M., & Gürkan, G. Ç. (2014). An investigation on the mediating role of employee innovation behavior on the relationship between autonomy and reward. *Istanbul Business Research, 43*(2), 332.

Perkmann, M., Neely, A., & Walsh, K. (2011). How should firms evaluate success in university–industry alliances? A performance measurement system. *R&D Management, 41*(2), 202-216. 1 https:// doi.org/10.1111/j.1467-9310.2011.00637.x

Pwc, (2017). The 2016 chief digital officerstudy. https://www.strategyand.pwc.com/gx/en/media/cdo-2017-company-demographics.pdf (05.02.2023).

Rich, B. L., Lepine, J. A., & Crawford, E. R. (2010). Job engagement: Antecedents and effects on job performance. *Academy of management journal, 53*(3), 617-635.

Rosenberg, N. (2010). S*tudies on science and the innovation process: selected works by Nathan Rosenberg*. World Scientific. Singapore, 173–203

Rossato, C., & Castellani, P. (2020). The contribution of digitalisation to business longevity from a competitiveness perspective. *The TQM Journal, 32*(4), 617-645. https://doi:10.1108/TQM-02-2020-0032

Sadikoglu, E., & Zehir, C. (2010). Investigating the effects of innovation and employee performance on the relationship between total quality management practices and firm performance: An empirical study of Turkish firms. *International Journal of Production Economics, 127*(1), 13-26. https://doi.org/doi:10.1016/j.ijpe.2010.02.013

Saputra, N., Nugroho, R., Aisyah, H., & Karneli, O. (2021). Digital skill during Covid-19: effects of digital leadership and digital collaboration. *Jurnal Aplikasi Manajemen, 19*(2), 272-281. http://dx.doi.org/10. 21776/ub.jam.2021.019.02.04

Sasmoko, S., Mihardjo, L., Alamsjah, F., & Elidjen, E. (2019). Dynamic capability: the effect of digital leadership onfostering innovation capability based on market orientation. *Management Science Letters*, 1633–1644. http://dx.doi:10.5267/j.msl.2019.5.024

Sattayaraksa, T., & Boon-itt, S. (2018). The roles of CEO transformational leadership and organizational factors on product innovation performance. *European Journal of Innovation Management, 21*(2), 227-249. http://dx.doi:10.1108/EJIM-06-2017-0077

Shin, J., Mollah, M. A., & Choi, J. (2023). Sustainability and organizational performance in South Korea: The effect of digital leadership on digital culture and employees' digital capabilities. *Sustainability, 15*(3), 2027. https://doi.org/10.3390/su15032027

Sigler, T. H., & Pearson, C. M. (2000). Creating an empowering culture: examining the relationship between organizational culture and perceptions of empowerment. *Journal of Quality Management, 5*(1), 27-52. https://doi.org/10.1016/S1084-8568(00)00011-0

Stewart, G. L., Courtright, S. H., & Barrick, M. R. (2012). Peer-based control in self-managing teams: Linking rational and normative influence with individual and group performance. *Journal of Applied Psychology, 97*(2), 435. https://doi.org/10.1037/a0025303

Thomson, N. B., Rawson, J. V., Slade, C. P., & Bledsoe, M. (2016). Transformation and transformational leadership: a review of the current and relevant literature for academic radiologists. *Academic Radiology, 23*(5), 592-599. https://doi.org/10.1016/j.acra.2016.01.010

Tidd, J., & Bessant, J. R. (2020). *Managing innovation: integrating technological, market and organizational change*. John Wiley & Sons.

Tiwana, A., Konsynski, B., & Venkatraman, N. (2013). Information technology and organizational governance: The IT governance cube. *Journal of Management Information Systems, 30*(3), 7-12. https://doi.org/10.2753/MIS0742-1222300301

Uğurlu, F., & Işık, M. (2023). Etik iklimin örgütsel sinizm üzerindeki etkisinde lider üye etkileşiminin aracı etkisi. *Bingöl Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 7*(2), 31-46. https://doi.org/10.33399/biibfad.1263034

Uçar, Z. & Tutgaç, C. (2022). İşgörenlerin dijital okuryazarlık algısı ve dijital teknolojilere erişim motivasyonu ilişkisi üzerinde dijital liderliğin düzenleyicilik rolü. *İzmir Yönetim Dergisi, 3*(1), 8-22. https://doi.org/10.56203/iyd.1095042

Upadhyay, N., Upadhyay, S., Al-Debei, M.M., Baabdullah, A.M., & Dwivedi, Y.K. (2023). The influence of digital entrepreneurship and entrepreneurial orientation on intention of family businesses to adopt artificial intelligence: examining the mediating role of business innovativeness, *International Journal of Entrepreneurial Behavior and Research, 29*(1), 80-115. https://doi.org:1108/IJEBR-02-2022-0154

Verhees, F. J. H. M., & Meulenberg, M. T. G. (2004). Market orientation, innovativeness, product innovation, and performance in small firms. *Journal of Small Business Management, 42*(2), 134–154.

Verhees, F. J. H. M., Meulenberg, M. T. G., & Pennings, J. M. E. (2010). Performance expectations of small firms considering radical product innovation, *Journal of Business Research, 63*, 772–777. https://doi.org/10.1016/j.jbusres.2009.06.006

Verma, V., Tandon, A., & Aggarwal, A. G. (2022). The moderating effect of management review in enhancing software reliability: A partial least square approach. *Information Systems Frontiers, 24*, 1845–1863 https://doi.org/10.1007/s10796-021-10209-6

Walumbwa, F. O., &Hartnell, C. A. (2011). Understanding transformational leadership–employee performance links: The role of relational identification and self-efficacy. *Journal of Occupational and Organizational Psychology, 84*(1), 153-172. https://doi.org/10.1348/096317910X485818

Westerman, G., & McAfee, A. (2012). *The digital advantage: how digital leaders outperform their peers in every industry*. MITSloan Manage. Capgemini Consult, 2, 2–23.

Wilson III, E. J., Goethals, G. R., Sorenson, G., & Burns, J. M. (2004). Leadership in the Digital age. *Encyclopedia of Leadership, 4*, 858-861.

Zacher, H., Robinson, A. J., & Rosing, K. (2016). Ambidextrous leadership and employees' self-reported innovative performance: The role of exploration and exploitation behaviors. *The Journal of Creative Behavior, 50*(1), 24-46. https://doi.org/10.1002/jocb.66

Zeike, S., Bradbury, K., Lindert, L., & Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. *International Journal of Environmental Research and Public Health, 16*(14), 1-12. https://doi.org/10.3390/ijerph16142628

Zhou, S., Rashid, M. H. U., Mohd. Zobair, S. A., Sobhani, F. A., & Siddik, A. B. (2023). Does ESG impact firms' sustainability performance? The mediating effect of innovation performance. *Sustainability, 15*(6), 5586. https://doi.org/10.3390/su15065586