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The Relationship Between Digital Leadership and Innovation with the Role of Organizational Learning

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العلاقة بين القيادة الرقمية والابتكار ودور التعلم التنظيمي

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Abstract:
The study investigates how digital leadership influences, in theory, the innovative work behaviors, with organizational learning acting as a learning mediator, in small and medium enterprises in Tripoli, Libya. In an age of technological transformation, businesses are increasingly dependent on digital capabilities and agile leadership styles to gain competitivity. The study was carried out on 435 employees, data collected via a structured questionnaire; and the SEM was used in the analysis. The findings confirmed a positive and significant relationship between digital leadership and innovative work behavior. Further, it was observed that organizational learning also mediates the relationship between digital leadership and innovative work behavior, thereby suggesting that it is strategically important for realizing innovation. Some of the phenomena observed pave a path to SMEs requiring investment along two major fronts: digital leadership development and the creation of learning-oriented organizational cultures. The research extends the digital transformation literature by contextualizing it within an emerging market economy. There are limitations due to time-bound data in the study applicable to the South Asian region; hence, it may interest future researchers to delve into cross-sectoral and cultural dynamics. The study gives some relevant insights to academicians, policy-makers, and organizational leaders interested in fostering innovation capacity through effective digital leadership and learning mechanisms.

Keywords: Digital Leadership, Innovative Work Behavior, Organizational Learning, SMEs, Libya.

الملخص
التعليم التنظيمي في المؤسسات الصغيرة والمتوسطة بمدينة طرابلس، ليبيا. في ظل التحول التكنولوجي المتسارع، أصبحت المؤسسات تعتمد بشكل متزايد على الكفاءات الرقمية ومرونة القيادة للحفاظ على قدرتها التنافسية. تم جمع البيانات من 435 موظفًا باستخدام استبيان منظم، وتم تحليلها من خلال نمذجة المعادلات الهيكلية (*SEM*). أظهرت النتائج وجود علاقة إيجابية ومعنوية بين القيادة الرقمية والسلوك الابتكاري في العمل. كما تبين أن التعلّم التنظيمي يتوسط هذه العلاقة، مما يبرز أهميته الاستراتيجية في تعزيز الابتكار. تؤكد النتائج ضرورة استثمار المؤسسات الصغيرة والمتوسطة في تطوير القيادات الرقمية وترسيخ ثقافة تنظيمية قائمة على التعلم. تساهم هذه الدراسة في إثراء الأدبيات المتعلقة بالتحول الرقمي من خلال تقديم رؤى من سياق اقتصاد ناشئ. وقد تم الإقرار ببعض القيود المرتبطة بالإطار الزمني والتركيز الجغرافي، وتُشجَّع الدراسات المستقبلية على فحص الديناميكيات في قطاعات وسياقات ثقافية متنوعة. تقدم الدراسة رؤى قيّمة للباحثين وصنّاع السياسات وقادة المؤسسات الراغبين في تعزيز قدرات الابتكار عبر القيادة الرقمية والتعلم المستمر.

الكلمات المفتاحية: القيادة الرقمية، سلوك العمل المبتكر، التعلم التنظيمي، الشركات الصغيرة والمتوسطة، ليبيا.

1. INTRODUCTION

In light of fast changes in the digital era, it is highly recommended that organizations, especially SMEs, take up new technologies and re-engineer their internal processes in order to remain competitive. Digital transformation is now the survival skill for strategy execution, especially in emerging markets such as Libya, where SMEs form the backbone of its private sector economy. It is a change that requires not only the technological infrastructure but a dynamic leadership that can drive an organization through complicated changes. Here, digital leadership is considered very crucial for the development of innovation, adaptability, and performance for SMEs that operate in volatile and resource-constrained environments (Samad et al., 2022; Zafar et al., 2023).

Digital leaders distinguish themselves by using technology tools to enhance collaboration, accelerate decision-making, and create value at all levels of the organization. In contrast to traditional styles of leadership, digital leadership includes strategic vision, openness to innovation, and ability to engage employees in continuous learning (Cortellazzo, Bruni, & Zampieri, 2019; Singh et al., 2020). The Libyan business environment has seen a surge in interest in digital solutions-trend during the second half of the last decade-with post-conflict reconstruction in Tripoli and increasing levels of international integration. Some severe empirical gaps still exist on how digital leadership impacts employee-level innovation within Libyan SMEs.

IWB is essential for organizational resilience and growth. It contains proactive actions by employees, which are generating ideas, promoting ideas, and realizing ideas (Messmann & Mulder, 2015; Dhar, 2016). Due to the presence of resource limitations, leadership has become the inhibitor of and enabler for all innovation behaviors of the staff in an SME (García-Morales, Martín-Rojas, & Lloréns-Montes, 2018). From the various studies, it is evident that digital leadership affects the IWB directly and indirectly, manipulating organizational culture for the enhancement of psychological safety and knowledge sharing mechanisms in the work environment (van der Voet & Vermeeren, 2017; Jiang & Chen, 2022).

Organizational learning is another crucial variable and basically means an organization's ability to absorb knowledge from its environment and subsequently make appropriate adjustment in its status quo. Through organizational learning, another mechanism whereby digital leadership might foster innovation is by enabling employees to increase their capacity to absorb and apply new knowledge (Soto-Acosta, Popa, & Martinez-Conesa, 2018; Alzoubi et al., 2020). In SMEs, especially in transitional economies such as in Libya, where formal training systems are mostly underdeveloped, creating a culture of learning is both a challenge and an opportunity for sustaining innovation.

Despite their importance, there is relatively sparse empirical evidence on how digital leadership, organizational learning, and innovative work behavior relate in Libyan SMEs. This study attempts to fill in the gaps by exploring the mediating role of organizational learning on the link between digital leadership and IWB, surveying 435 employees from Tripoli-based SMEs. The findings hope to offer some models and practical insights for business leaders and policymakers to effectively enhance innovation capacities in post-conflict and developing environments.

2. THEORETICAL FRAMEWORK

2.1. Digital Leadership

Digital leadership became a strategic response to the multifaceted changes that are evolving rapidly in the digital economy. Unlike the traditionally dominant and bestowing routine leadership models, such leadership would adapt, remain agile, and use digital tools proactively to improve performance within organizations (Hoch & Dulebohn, 2017; Kane et al., 2019). SMEs in developing economies such as Libya cannot regard digital leadership as a technological instrument; rather, it must be considered a transformational instrument to maintain competitiveness and sustain resilience during unstable times.

Digital leaders integrate digital technologies into strategic visioning, managing cross-functional teams remotely, and cultivating a culture that fosters experimentation and continuous learning (Cortellazzo et al., 2019; Schiuma, Schettini, & Carlucci, 2021). This kind of leadership thrives on transparency, fast communication, dispersed authority, and the empowerment of employees. These are elements deemed very important for dynamic settings such as post-conflict Libya, where stiff hierarchies undermine innovation and responsiveness (Oseni et al., 2021; George et al., 2022).

Upper Echelons Theory is one of the founding theory bases for digital leadership, holding that top executives' characteristics and cognition affect particular organizational decisions. Hence, this theory suggests that digitally oriented leaders are likely to foster working environments that accept technological change and promote digital transformation (Hambrick & Mason, 1984; Li, Su, Zhang, & Mao, 2018). On-ground digital leaders in SMEs

often act as strategic navigators as well as operational enablers, utilizing real-time information and digital channels for decision-making and to bring teams together for innovation (Ebrahim & Singh, 2022; Rejeb et al., 2023).

Further, digital leadership is held directly responsible by Technology Acceptance Models (TAM) from the standpoint of how leaders create perceived usefulness and ease of use of technology among employees. With leaders expressing a positive competence in initiatives for digital vision, they will also eliminate resistance and mold their employees' attitudes to embrace digital systems. This will lead to the fluid implementation and subsequent assimilation of digital systems (Dwivedi et al., 2020; Talwar et al., 2021). The success of digital transformation in SMEs often hinges on the presence of an influential digital leader because of a near absence of formal frameworks.

With rapid changes, the digital leadership role continues spilling, moving beyond technology comparatively faster implementation, into culture-building work relations, and innovation-orchestrating domain. In the Libyan SME environment, further challenged by external uncertainties and weak infrastructural base, digital leaders act principally as strategic players countering structural inertia and building long-term innovation capabilities (Attar et al., 2021; Chen, Xu, & Liu, 2023).

2.2. Innovative Work Behavior

According to De Jong & Den Hartog (2010) and Messmann & Mulder (2015), IWB implies the deliberate efforts of employees for the initiation, promotion, and implementation of ideas for processes, products, and procedures inclined toward the organizational benefit. Being a multidimensional construct, it incorporates an inclination toward creativity and sometimes toward risk-taking, in addition to the proactive attitude for pursuing problem-solving and idea realization (De Jong & Den Hartog, 2010; Messmann & Mulder, 2015). In SME situations, particularly in developing economies such as Libya, IWB becomes the great asset for survival and means of competitive differentiation given limited capital, blocks to formal R&D, and institutional support (Yidong & Xinxin, 2013; Radaelli et al., 2014).

Generally, IWB is treated as a discretionary behavior that goes beyond the confines of employees' formal work descriptions and can be discerned in three phases: idea creation, idea championing, and idea realization (Scott & Bruce, 1994). The happening of such behaviors is mainly a concern of the psychological makeup of the individual with the major organizational contextual factors, including leadership style, autonomy, organizational learning, and encouragement for innovation (Ng & Feldman, 2013; Purc & Laguna, 2019). In a resource-poor setting like Libyan SMEs where bureaucracy and risk aversion inhibit the establishment of formal innovation systems, fostering and empowering individual creative behaviors becomes indispensable for nimbleness and responsiveness. Because IWB tends to be context-dependent and socially constructed, leadership styles hold great prominence. For example, transformational and digital leadership have been investigated and established as core antecedents of IWB. Leaders who develop a climate of trust among employees, inspire them intellectually, and promote their willingness to explore new avenues tend to generate greater levels of IWB from the workforce (Afsar & Masood, 2018; Shafique et al., 2020). Particularly, digital leadership supports IWB through leveraging technological solutions to aid ideation activities, support cross-functional collaboration, and promote knowledge diffusion across the organization (Li, Chen, & Cao, 2021; Chen et al., 2023). For SMEs situated inside fragile economies such as Libya, these leadership behaviors could counteract the effects of institutional voids and thus provide alternative pathways to innovation.

Intermediate mechanisms, such as psychological safety and perceived organizational support, deepen the link between leadership and IWB. When employees feel supported by their environment and observe tolerant attitudes towards failure, they are more inclined to engage in risk-taking and try new and novel approaches (Kessel, Kratzer, & Schultz, 2012; Newman et al., 2020). Cultivating such an environment is paramount but could confront several obstacles in Libya given the country's ongoing political turmoil and economic instability, which greatly augment environment uncertainty. Therefore, the role of leadership in building such trust and openness cannot be understated, as the leaders will be responsible for established willingness of the employees to deviate from established norms, present alternative solutions, and embrace potential risk by taking initiatives.

IWB has thus been linked with positive organizational results including customer satisfaction, process efficiency, and market flexibility. In various industries, it is confirmed that employees who perpetually show innovative behavior contribute largely to the endurance and long-time prosperity of the organization (Hughes et al., 2018; Wu & Wu, 2019). Hence, highlighting IWB support among SMEs in Tripoli can represent much more than a desirable trademark: it becomes the strategic fulcrum that enables firms to respond to the changes List of customer needs with implementing digital tools to secure a competitive advantage in an utmost dynamical environment.

2.3. Organizational Learning

Organizational learning involves any array of processes by means of which organizations acquire, disseminate, interpret, and store knowledge in order for them to improve decision-making and adapt to environmental changes. It is considered a core competencie enabling firms to react to market volatility, technological disruptions, and organizational inefficiencies (Argote & Miron-Spektor, 2011; Wang & Wang, 2012). For Libyan SMEs in developing countries, organizational learning is not only a competitive advantage but more so a matter of survival in unstable economic and institutional environments.

The process of organizational learning is based on individual and collective mechanisms. On the individual side, learning may take place through experimentation, reflection, and feedback; on the organizational side, it requires systems and structures that facilitate the sharing of knowledge, codification of experiences, and absorption of lessons learned into standard routines (Crossan, Maurer, & White, 2011; Liu, Ke, & Wei, 2022). In SMEs, which rarely have formal knowledge management systems, it is primarily up to the leadership to nurture a culture of learning and embed it in everyday practices (Kim, Kumar, & Kumar, 2012; Hussinki et al., 2017).

A critical distinction made in the literature is the differentiation between single-loop and double-loop learning. In contrast to single-loop learning-or which appropriate the application actions are based on existing assumptions and routines-the double-loop learning (ideally) critiques the norms that render transformation and innovation possible (Argyris, 2002; Ramesh & Dennis, 2018). This is a crucial distinction in the instance of Libyan SMEs, wherein the formalized practical attitudes and conventional hierarchy restrain organizational agility. In such circumstances, double-loop learning enables organizations to question existing processes, in a manner aligned to modern digital and market demands.

There is an empirical link between organizational learning and multiple performance outcomes, including employee performance, innovation capabilities, strategic flexibility, and readiness for digital transformation (Shao, Feng, & Hu, 2021; Soluk, Kammerlander, & Sigurdsson, 2021). Learning organizations have the capability to identify emerging opportunities, adjust customer choices, and integrate technologies for alternative deliveries. Libyan SMEs under severe environmental conditions require such capabilities to traverse uncertainty, minimize salient operational risks, and seize on technologies.

Extant literature further highlights a close-profound association between organizational learning and leadership behavior, specifically regarding modeling learning-oriented attitudes, the creation of an environment of psychological safety, and allowing resource allocation for employee learning and development. Digital leaders, in contrast, provide an environment that nurtures experimentation, reward success, and regards failure as a process towards improvement (Popova-Nowak & Cseh, 2015; Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2017). With Tripoli's SME sector fast-paced digitized but without institutional support, organizational learning is the vehicle for translating digital leadership into operational resilience and continued innovation.

Also, organizational learning facilitates knowledge integration and cross-functional collaboration—key requirements for small and lean structures with divided roles. An atmosphere in which top-down communication, cross-training, and reflective practices are encouraged can be useful for SMEs to dismantle silos, sanction collective problem-solving, and ensure success in contexts like Libya that are prone to crises (Ferreira, Coelho, & Moutinho, 2020; Bulińska-Stangrecka & Bagieńska, 2021).

2.4. The Relationship between Digital Leadership and Innovative Work Behavior

Recently, there has been increasing interest in exploring the association between digital leadership and innovative work behavior as organizations evolve with ever-changing dynamics in their digital environment. Digital leadership, which signifies vision, digital competence, and the capacity to drive change through technology, is the backbone of an environment adequate with employee empowerment to harbor the generation, nurture, and implementation of ideas (Cortellazzo, Bruni, & Zampieri, 2019; Elia, Margherita, & Passiante, 2020). Innovation is an issue in SMEs in Libya, where formal structures for innovation are often highly underdeveloped, and digital leadership is thus highly important for the activation of bottom-up innovation processes.

Because digital leaders foster an excuse for innovations, agrarian-style forward risk taking, experimentation, and collaboration should be welcomed. Thus, barriers of hierarchy and bureaucracy are put aside, and employees may behave on their own behalf without that fear of retribution (Tian, Zhang, & Zou, 2021; Akram et al., 2020). This becomes an indispensable approach in the Libyan domain where crystallized organizational cultures and top-down authorities discourage innovation behaviors. Digital leaders can promote lateral thinking by using digital tools to share knowledge among employees and facilitate team learning.

Moreover, an equally important function of digital leadership is promoting engagement with emerging technologies and new workflow routines—the very critical enablers of IWB. For example, using newly emerging

web technologies such as social systems for sharing ideas, collaborative platforms for virtual brainstorming, and synchronous environments for real-time feedback loops may enable firms to build capacity toward becoming more interactive and responsive (Dirani et al., 2020; Singh, Del Giudice, & Chierici, 2021). Thus, the use of these tools makes sure innovative thinking has a prominent position in the organization while also reinforcing behaviors that lead to innovation by giving names and recognition to innovative contributions.

Inter alia, digital leadership is leaning toward realization whereby digital leadership somewhat improved innovation outcomes through aligning digital tools with strategic goals and capabilities of the employees (Karampela et al., 2023). An observation made by Karampela, Lacka, and McLean (2023) supports the stance, stating that digital leaders being perceived as individuals with both interpersonal skills and technological prowess are more likely to promote a culture of innovation. Echoing this is the observation by Zafar et al. (2023) that digital leadership in technology-intensive firms was an important factor behind employee-level innovation through the mechanisms of enhanced digital interaction, shared vision, and participatory practices.

ithin the Libyan SME context, digital leadership also serves to fill institutional voids, such as the absence of formal innovation policy, limited access to capital, and lack of structured R&D. Hence, digital leaders assist employees to innovate within their jobs and thus counteract these external constraints with empowerment from within the organization (Nambisan et al., 2019; Margherita & Heikkilä, 2021). This is very important in post-conflict settings such as Tripoli, where traditional leadership approaches often fail to address the complex issues of digital and organizational transformation.

The relationship between digital leadership and IWB, in essence, is a dynamic and complementary one in which, while digital leadership sets the stages for the innovation process, employee reaction and experimentation serve to inform them in how to evolve digital strategy further. This reciprocal interaction becomes a continuously repeated learning loop that strengthens both leadership impact and organizational capability, which are instrumental to SMEs operating within the turmoil (Chen, Xu, & Liu, 2023; Kane et al., 2019).

2.5. The Relationship between Digital Leadership and Organizational Learning

Increasingly, digital leadership and organizational learning are understood as partnering agencies through which sustainable competitive advantage is generated in-day enterprises (Yusuf et al., 2004). Digital leadership cultivates a learning culture by opening channels for communication and activities to share knowledge and further skills development-all vital to organizational learning (Li et al., 2021; Schiuma et al., 2021).Within the milieu of Libyan SMEs, where formal education routes and institutional supports are few and far between, digital leaders serve a paramount role in fostering an environment where the learning mechanism gets implemented into day-to-day organizational functions.

According to digital leaders who behave according to the principles of organizational learning by challenging outdated assumptions, encouraging trial, and institutionalizing new knowledge, from knowledge management systems to collaboration technologies, their proactive use of digital tools and platforms facilitates the fast dispersal and absorption of knowledge across the organization(Zheng, Yang, & McLean, 2010; Frank et al., 2019). For Libyan SMEs, the road to successful digital transition relies largely on the ability to transform the digital interaction into a learning experience.

Further organizational learning comes from leadership communication, which fosters curiosity, transparency, and adaptability. Leaders who espouse openness in discussing strategy while delivering digital training and rewarding learning behaviors create an environment that encourages the organizational members to do likewise (Bondarouk, Harms, & Lepak, 2017; Cegarra-Navarro et al., 2021). In the Tripoli SME cluster, such openness is not often seen due to the countervailing force of traditional hierarchical practices that stifle dialogue and deter experimentation.Digital leadership, then, actively secures psychological safety for both individuals and teams, allowing them to openly express ideas, admit errors, and learn mistakes.

Within empirical research, the positive relation between digital leadership and organizational learning was corroborated. For instance, García-Sánchez et al. (2021) found that organizations with digitally competent leaders demonstrated a tendency, largely significant, toward reflecting on and practicing organizational learning, collaborative learning, and integration of knowledge. In the same way, the study by Khin and Ho (2019) confirmed that digital leadership positively affects the learning orientation of SMEs, which, basically, contributes to an acceleration in their change and innovation in fast-moving markets.

Wernerfelt (1984) postulated that organizational resources that intermingle with incorporative leadership shape the organizational capabilities of learning; here digital leadership acts as a strategic enabler converting those intangibles (such as employee knowledge, shared norms, digital culture) into concrete organizational measures in terms of learning (Yunis et al., 2017; Chatterjee et al., 2021). The design of intangible learning capacity if directed

through digital leadership becomes an utmost necessity for Libyan SMEs that may lose out on grabbing their share of tangible and financial capital.

Even beyond, digital leadership supports learning agility in being able to unlearn outdated practices and acquire new competencies quickly—the agility being instrumental in post-conflict economic recovery and equipping SMEs for growth in the digital ecosystem (Jarrahi et al., 2017; Kane et al., 2019). The emphasis is that digital leadership does not merely nurture organizational learning but acts as the structural and behavioral precondition for organizing such learning effectively in precarious and resource-scarce environments such as Libya.

2.6. The Relationship between Organizational Learning and Innovative Work Behavior

Organizational learning and IWB are intertwined concepts that essentially pertain to the power of SMEs to sustain themselves through innovation and adaptability. Organizational learning offers a basis of innovation, granting the employees new ways to acquire, share, and apply knowledge to solving new problems and generating ideas (Soto-Acosta et al., 2018; Alegre & Chiva, 2008). Thus, given that Libyan SMEs face an environment with limited access to formal training, capital, and policy support, organizational learning becomes a strategic enabler for stimulating innovation from the bottom-up.

Through several means, organizational learning promotes the IWB (Jiménez-Jiménez & Sanz-Valle, 2011; López-Cabarcos, Vázquez-Rodríguez, & Mendez-Picazo, 2015). First of all, it increases employees' cognitive flexibility by enabling them to undergo different experiences from which they learn new tools and perspectives. As a result, they are more prone to spotting interesting opportunities and creatively solving operational problems. Secondly, organizational learning constitutes an environment open to collaboration and consensus, which is necessary to sustain the generation and implementation of novel ideas (Fang, Jiang, Makino, & Beamish, 2010; Imran, Ilyas, & Aslam, 2017).

Furthermore, organizations that promote structured learning interventions (such as after-action reviews, feedback loops, and cross-functional conversations) will most probably enhance psychological safety, which fosters innovative behaviors (Newman et al., 2020; Naranjo-Valencia et al., 2016). This scenario allows citizens to trial, take risks, and challenge existing theories even in the hostile environment of Libya, such as where SMEs are concerned. This is especially important for SMEs, where there are no committees to formalize innovation; hence, this has to be done informally by incumbents at the individual and team levels.

On the empirical front, researchers have found time and again that organizational learning is a very significant predictor of the degree of innovative behavior among employees. For example, Darroch (2005) found learning-oriented firms were in a better position to implement new ideas and secure improvements in innovation-based performance. In the same way, the study by Jerez-Gómez, Céspedes-Lorente, and Valle-Cabrera (2005) revealed that organizational learning capability relates to both product and process innovation. Then, later on, for instance, Ogbeibu, Senadjki, and Gaskin (2018) backed the fact that organizational learning mediates between leadership and innovation, highlighting its mediation role in converting strategic intent into creative employee behavior.

From a theoretical stance, another theory that explains the relationship between organizational learning and IWB is absorptive capacity. Absorptive capacity refers to the capacity of a firm to recognize, assimilate, and apply external knowledge, and this capacity is basically based on processes of learning (Zahra & George, 2002). Firms that develop their absorptive capacity through learning processes are more likely to support innovation at the individual level and sustain these dynamic capabilities (Cohen & Levinthal, 1990; Flatten et al., 2011). For SMEs in Tripoli, it is especially significant that they work on establishing this internal capability given how limited the external innovation infrastructure is.

In brief, organizational learning supports and facilitates innovative work behavior. It generates a body of knowledge, culture, and a psychological atmosphere that allows employees to behave innovatively. Strengthening organizational learning processes in Libyan SMEs through leadership, digital tools, and reflective mechanisms can make a difference to employees'> innovation and the overall resilience of organizations.

3. RESEARCH METHOD

3.1. Research Model, Hypotheses, and Data Collection

This research examines the mediating role of organizational learning on the relationship between digital leadership and innovative work behavior in SME settings in Tripoli, Libya. The underlying premise of the research model is that digital leadership promotes innovative work behavior directly and indirectly through encouraging processes of organizational learning. As technological adoption and innovation take root in Libya's SMEs, understanding the nature of these relationships is critical for building organizational resilience and long-term growth capacity in uncertain and resource-constrained environments.

The research adopts an explanatory research design in which cross-sectional survey data are collected for testing the proposed model. This particular design is suitable in mediator analyses for testing the magnitude and statistical significance of the effects between latent constructs (Hair et al., 2019; Kline, 2015). The theoretical model was tested through Hayes's (2018) PROCESS macro (Model 4), which allows estimation in a mediation context of both direct and indirect effects. Path estimates for all relationships were bootstrapped (N = 5,000) with 95% confidence intervals, which permits inference about the mediation effect even when distributions are not normal.
The conceptual framework is described in Figure 1. It describes digital leadership as the independent variable, innovative work behavior as the dependent variable, and organizational learning as a mediating variable. All constructs are operationalized as multi-item latent variables, whereas the hypothesized paths represent causal relationships well-established in leadership and organizational behavior literature.

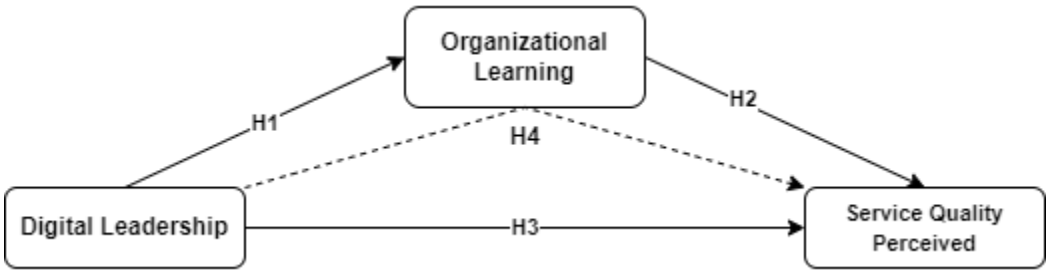

Figure 1. Conceptual Research Model.

Data collection went through an online questionnaire, distributed via emails, LinkedIn, and WhatsApp, spanning over four weeks. The questionnaire was bilingual in English and Arabic to maximize accessibility. Participation was voluntary and anonymous. Ethical clearance was sought from a recognized academic institution before data collection commenced. Beforehand, all participants gave their informed consent.
The questionnaire consisted of four sections:

1. **Demographic Variables**: Including gender, age, education level, job title, work experience, and sector type.
2. **Digital Leadership Scale**: Adapted from AlNuaimi et al. (2022) and validated in prior studies. It includes 5 items related to digital vision, innovation enablement, and technological empowerment.
3. **Organizational Learning Scale**: Based on Goh and Richards (1997) and Jerez-Gómez et al. (2005), measuring learning orientation, knowledge integration, and openness to change with 7 itmes.
4. **Innovative Work Behavior Scale**: Adapted from De Jong and Den Hartog (2010), measuring idea generation, idea promotion, and idea realization.

All items were measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

3.2. Research Universe and Sample

The universe of the present study consists of employees working in small and medium enterprises (SMEs) that operate in Tripoli, which is the capital and the largest economic hub of Libya. SMEs in Libya account for much of employment and economic activity, especially in services, construction, trade, and ICT. However, due to the prevailing conditions like lack of basic infrastructure, inadequate access to finance, and slow pace of digital transformation, these enterprises have a lot of challenges in breathing and, hence, make it really fitting to study the impact of digital leadership and organizational learning on innovation.
The study adopted a non-probability convenience sampling technique to ensure a representative and analyzable dataset. This was seen to be appropriate because of practical constraints relating to the absence of any registry for SMEs in Libya, the uneven distribution of internet access among firms, and some political instability marking some regions. Efforts, however, were made to ensure sample heterogeneity from the viewpoint of industry type, firm size, and role of the employee.
A total of 435 valid responses were collected from employees working in SMEs operating in Tripoli. These responses were obtained through an online survey held in both Arabic and English using Google Forms.
A sample size of 435 is more than the minimum number required for structural equation modeling and PROCESS mediation analyses, with the literature stating this to be at least 200 observations for relatively complex mediation models involving multiple latent variables and multiple mediation effects (Kline, 2015; Hair et al., 2019). This, will hence, permit more stable estimates of coefficients and high statistical power in testing the direct and indirect effects.

4. FINDINGS

4.1. Descriptive Statistics of Demographic Variables

The demographic profile of the participants is summarized in Table 1. A total of **435 employees** from small and medium-sized enterprises (SMEs) in Tripoli, Libya, took part in the survey.

Table 1. Descriptive Statistics for Demographic Variables.

Characteristics	Groups	Frequency (n)	Percentage (%)
Gender	Male	233	53.3
	Female	202	46.4
Education Level	Primary School	1	0.2
	High School or Equivalent	13	3.0
	Vocational School	18	4.1
	Bachelor's Degree	291	66.9
	Master's Degree	80	18.4
	Doctorate	15	3.4
Employment Type	Contractual	129	29.7
	Full-time	267	61.4
	Part-time	39	9.0
Operational Scope	Regional	84	19.3
	National	168	38.6
	Regional-National	5	1.1
	Regional-International	2	0.5
	National-International	13	3.0
	International	148	34.0
	Regional-National-International	4	0.9
Industry	Information Technology	167	38.4
	Project Management	16	3.7
	Education	51	11.7
	Finance and Banking	45	10.3
	Sales and Marketing	40	9.2
	Tourism	35	8.0
	E-commerce	14	3.2
	Human Resources	42	9.7
	Media, Communication & Publishing	2	0.5

In terms of educational attainment, the majority of respondents held a bachelor's degree (66.9%), followed by master's degree holders (18.4%) and doctoral degree holders (3.4%). Only a small portion reported completing high school (3.0%) or vocational education (4.1%). The employment type distribution revealed that most respondents were full-time employees (61.4%), while 29.7% were employed on a contractual basis and 9.0% were part-time workers.

In terms of operational scope, 38.6% of firms operated at the national level, 34.0% internationally, and 19.3% regionally. Only a small number of organizations operated across multiple boundaries (regional, national, and international simultaneously).

Industrially, the largest group of respondents (38.4%) came from the information technology sector. This was followed by education (11.7%), finance and banking (10.3%), human resources (9.7%), and sales and marketing (9.2%). Other sectors included tourism (8.0%), consulting (3.7%), and e-commerce (3.2%).

4.2. Confirmatory Factor Analysis and Reliability Results

In this section of the study, both exploratory and confirmatory factor analyses were conducted to assess the construct validity of the measurement instruments, including the two-dimensional **Digital Leadership** scale and the one-dimensional **Innovative Work Behavior** and **Organizational Learning** scales. Additionally, internal consistency was evaluated using Cronbach's alpha coefficients.

The Confirmatory Factor Analysis (CFA) was performed using the **Jamovi module within IBM SPSS** to assess whether the scale structures were consistent with the collected data from the Libyan SME sample. Fit indices were used to evaluate the validity of the factor structure. In line with established benchmarks, a chi-square to degrees of freedom ratio (χ^2/df) below 2 is preferred, although values up to 5 may be acceptable in social sciences. Furthermore, a Root Mean Square Error of Approximation (RMSEA) value below 0.10 is considered acceptable. Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values above 0.90 also indicate satisfactory model fit.

The initial CFA results for the original structure of the **Digital Leadership** and **Organizational Learning** scales, consisting of 6 and 11 items respectively, indicated poor fit with the data. The obtained fit indices were as follows: χ^2/df = **9.875**, RMSEA = **.142**, CFI = **.748**, and TLI = **.721**. Furthermore, some items—specifically items 1 and 5 from the Digital Leadership scale, items 2 and 6 from the Innovative Work Behavior scale, and items 2, 4, 6, 8, and 10 from the Organizational Learning scale—showed negative correlations with the remaining items in their

respective scales. These anomalies adversely affected both the construct validity and the reliability of the instruments.

After removing the problematic items, the model was re-tested by incorporating the modification suggestions offered by Jamovi. The revised model demonstrated a substantially improved fit, indicating stronger support for construct validity.

As displayed in **Table 2**, all retained items exhibited factor loadings ranging from 0.50 to 0.90, which are considered acceptable thresholds in social sciences. According to Scherer, Wiebe, Luther, and Adams (1988), explained variance levels between 40% and 60% are generally adequate for constructs in behavioral research. The revised scales were subjected to reliability analysis, and Cronbach's alpha values confirmed strong internal consistency.

Table 2. Final Scale Statistics.

Variable	Mean	Standard Deviation	Cronbach's α
Digital Leadership (DL)	4.08	0.62	0.901
Organizational Learning (OL)	3.92	0.59	0.882
Innovative Work Behavior (IWB)	4.18	0.61	0.919

These results validate the psychometric adequacy of the measurement instruments used in the study and provide a solid foundation for further hypothesis testing.

4.3. Correlation Analysis

The results of the correlation analysis reveal significant and positive relationships among the study's core constructs: **Digital Leadership**, **Innovative Work Behavior**, and **Organizational Learning**. As presented in Table 3, digital leadership was found to be positively correlated with innovative work behavior (**r = .618, p < .01**) and organizational learning (**r = .715, p < .01**). Moreover, a significant positive relationship exists between organizational learning and innovative work behavior (**r = .673, p < .01**). These findings suggest that stronger digital leadership is associated with enhanced learning capacity and greater inclination toward innovation among employees.

Such patterns align with recent studies that emphasize the transformational role of digital leadership in enabling continuous learning and fostering innovative thinking within dynamic organizational contexts (Li et al., 2020).

Table 3. Correlation Analysis Results.

	Digital Leadership	Innovative Work Behavior	Organizational Learning
Digital Leadership	1	.618**	.715**
Innovative Work Behavior	.618**	1	.673**
Organizational Learning	.715**	.673**	1

*Note: *. *Correlation is significant at the 0.01 level (2-tailed).*

Reliability was assessed using Cronbach's alpha coefficients. The results showed high internal consistency across all three scales: **Digital Leadership (α = .912)**, **Innovative Work Behavior (α = .832)**, and **Organizational Learning (α = .936)**. These values confirm the measurement reliability and support the robustness of the constructs for subsequent analysis (Hair et al., 2019).

4.4. Model Fit Indices and Regression Analysis

The model fit indices for the confirmatory factor analysis are summarized in **Table 4**. The obtained fit statistics—χ^2/df = **4.65**, RMSEA = **0.072**, SRMR = **0.042**, TLI = **0.948**, and CFI = **0.953**—indicate an acceptable model fit based on standard criteria. In particular, a χ^2/df ratio below 5 reflects an acceptable level of fit, while RMSEA values below 0.08 and SRMR values below 0.05 signify good approximation and residual fit (Browne & Cudeck, 1993; Kline, 2011). CFI and TLI values exceeding 0.90 further validate the adequacy of the model fit (Tabachnick & Fidell, 2007).

Table 4. Model Fit Indices of the Variables.

Fit Indices	Acceptable Threshold	Results
χ^2 / df	< 5	4.65
RMSEA	≤ 0.10	0.072
SRMR	≤ 0.08	0.042
TLI	≥ 0.90	0.948
CFI	≥ 0.90	0.953
Factor Loadings	0.30–0.85	0.065–0.801

4.5. Regression Analysis

Table 5 presents the results of the regression analysis exploring the relationships among the core variables. The results confirm the following hypotheses:

- **Hypothesis 1**: Digital leadership significantly and positively affects organizational learning (**β = .679, R^2 = .522, p < .001**).
- **Hypothesis 2**: Organizational learning significantly and positively influences innovative work behavior (**β = .553, R^2 = .463, p < .001**).
- **Hypothesis 3**: Digital leadership significantly and positively influences innovative work behavior (**β = .472, R^2 = .358, p < .001**).

Table 5. Regression Analysis Results.

Independent Variable	Dependent Variable	B	Std. Error	Beta	t	p	R^2
Digital Leadership	Innovative Work Behavior	.472	.030	.614	15.738	.000	.358
Digital Leadership	Organizational Learning	.679	.031	.727	20.962	.000	.522
Organizational Learning	Innovative Work Behavior	.553	.029	.682	18.975	.000	.463

*Note: p < .05; **p < .01; ***p < .001*

4.6. Mediation Analysis

The indirect (mediating) effect of **Organizational Learning** in the relationship between **Digital Leadership** and **Innovative Work Behavior** was examined using **Hayes' PROCESS Macro** (Model 4), integrated into SPSS. According to Hayes (2017), the significance of a mediation effect is determined by evaluating the 95% bootstrap confidence intervals. If the interval does not include zero, the mediation effect is considered statistically significant.

As shown in **Table 6**, the total effect of digital leadership on innovative work behavior is **0.460**, while the direct effect is **0.157** and the indirect effect via organizational learning is **0.213**. The bootstrap confidence interval (CI: 0.273–0.532) does not contain zero, confirming the **full mediation** of organizational learning.

Table 6. Total, Direct, and Indirect Effects

Relationship	Total Effect	Direct Effect	Indirect Effect	Bootstrap CI
Digital Leadership → Org. Learning → IWB	0.460	0.157	0.213	[0.273, 0.532]

Therefore, **Hypothesis 4**—"Organizational learning mediates the relationship between digital leadership and innovative work behavior"—is **supported**.

5. CONCLUSION

Digital transformation has become a reality in the current phase of rapid evolution in the business environment. The technology of the internet, AI, and big data is being leveraged to offer new opportunities as well as challenges to businesses. These technological changes brought about a fundamental change in the nature of crisis management in organizations. With the acceleration of transformation, different sets of leadership came into being, coining the new term digital leadership. Digital leadership becomes crucial for leading organizations through change, especially in an environment of uncertainty and dynamism.

Digital leadership is the prerequisite for organizational sustainability and growth. Digitally savvy leaders promote the culture for continuous learning, nurture the creation of new ideas, and nurture their implementation. In that way, organizations adopt a new culture to maintain competitive advantage and ensure sustainability. Digital leaders promote sharing of knowledge, embracing errors, and considering all chances for improvement. All these elements enable organizations to better serve emerging opportunities and market shifts.

The study captured the relationship of digital leadership with innovative work behavior as well as the mediation of organizational learning therebetween. The study revealed the stronger positive influence of digital leadership on innovation, to the effect that organizations under the leadership of digital-minded leaders are more open to newer ideas, promote employee creativity, and accelerate the delivery of innovative solutions. Furthermore, digital leadership has also positively influenced organizational learning, which in turn positively influenced innovation.

Results show that organizational learning acts as a key mechanism through which digital leadership accelerates innovation. This implies that institutions may support their innovative capacity through a strong learning culture alongside digital leadership. When digital leadership is fitted in with organizational learning, there is a huge potential for innovation.

However, it should be noted that digital transformation is subject to rapid changes. The findings of this study are limited in time and may not remain consistent as the technologies and leadership paradigms toward which they

evolve change. Differences in cultural and economic contexts may also influence the applicability of these results. Digital transformation practices and leadership expectations vary across regions and sectors, which may limit the generalizability of the study.

Leaders today must look at technology not just as a tool, but as a strategic asset that has the potential to reinvent entire business models. These leaders must continue to upgrade their digital know-how, and galvanize others through transformation. In fact, more and more leaders are required who have a clear vision, who know technology, and who know how to galvanize people to steer through complex transformation.

Future studies should build on the present findings by investigating the industry-specific impacts of digital leadership and how digital training programs support the development of leadership and employee capabilities. Furthermore, as artificial intelligence and automation progress further, an investigation of their influence on leadership for the future also holds much promise. These studies will pave the way for a better strategizing of digital transformation and innovation sustenance in an increasingly competitive global market.

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