Navigating Digital Waves: Unveiling Entrepreneurial Leadership Towards Digital Innovation and Sustainable Performance in the Chinese IT Industry

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Abstract

Purpose – The rapid evolution of digital innovation has significantly revolutionized the business landscape for entrepreneurs. Embracing digital innovation is crucial for all stakeholders to achieve sustainable development goals (SDGs) and promote sustainability. However, there is little understanding of how entrepreneurial leadership in developing nations has proactively responded to the challenge of digital innovation. Based on Drucker's productivity theory, this study examines the relationship between entrepreneurial leadership (EL), digital orientation (DO), and digital capability (DC) as predictors of digital innovation (DI). The proposed model aims to establish the causal connections between variables and elucidate the complex interplay between digital innovation and the resulting outcome of sustainable performance (SP).

Design/methodology/approach – Two research studies were carried out in the Chinese IT industry to assess the efficacy of the theoretical framework among IT workers. Study 1 utilized a three-week, two-week time-lagged design (N = 299), while Study 2 used a two-week, four-week survey design (N = 341). The study used Smart-PLS 4.0 for data analysis.

Findings – The results showed that entrepreneurial leadership significantly impacts employee digital orientation and digital capabilities, fostering digital innovation. Moreover, digital innovation has a significant impact on sustainable performance.

Originality/value – The study's findings allow authors to contribute to the existing scholarship on employee digital orientation, digital capabilities, digital innovation, and sustainable performance in an emerging economy.

Keywords: Entrepreneurial leadership; Digital orientation; Digital capabilities; Digital innovation; Sustainable performance; Drucker's Productivity Theory

1. Introduction

Digital innovation is crucial to the United Nations' agenda, particularly for achieving the Sustainable Development Goals (SDGs) by 2030. The UN acknowledges the significant impact of digital technologies and highlights the importance of digital innovation in tackling global issues (Fatima & Masood, 2024). This mounting attention to achieving the UN's sustainable development goals (SDGs) has profoundly impacted the global business landscape (Janjua et al., 2024). It has garnered considerable interest in organizations' digital innovation and sustainable performance (Malik et al., 2024). Digital innovation (DI) has significant ramifications for businesses in terms of enhancing their capabilities (Al Issa & Omar, 2024; Ochinanwata et al., 2023; Opland et al., 2022) and, as a result, preparing for future challenges. DI is an essential factor for organizational growth. However, several digital innovation failures have highlighted the significant challenges it can present for many organizations. The challenges frequently arise due to the organization's ever-changing performance objectives and the absence of alignment between organizational practices and employees' capabilities (Reibenspiess et al., 2022). The situation requires a comprehensive approach in which the development of employee capabilities is a key focus of organizational leadership practices. Organizations must implement new leadership frameworks to develop employees' digital capabilities (DC) and promote a workforce oriented toward digital technologies (Nakpodia et al., 2023; Opland et al., 2022). This is amplified within the IT (X. Liu et al., 2023) sector, particularly during the era of digitization, as it is recognized as the key route to achieving sustainability (Broccardo et al., 2023). Research on digital innovation in the service sector has garnered increased attention recently (Aránega et al., 2023a; X. Liu et al., 2023; Xie et al., 2022).

The failure to prioritize digital innovation through employee digital orientation and capabilities and the neglect of its impact on organizations' sustainable performance goals have piqued the interest of scholars to guide organizations navigating complex pathways to sustainability (Nasiri, Saunila, & Ukko, 2022; Straub et al., 2023). Nevertheless, previous studies have largely overlooked the employee-driven factors that enhance digital innovation and sustainable performance in the IT sector (Benitez et al., 2022; Opland et al., 2022; Straub et al., 2023).

Recent research suggests that entrepreneurial leadership (EL) has the potential to foster growth and enhance sustainable performance in challenging and adverse conditions (Aparicio et al., 2023; Aránega et al., 2023b). Furthermore, it can be crucial to identify opportunities in demanding, volatile, and competitive environments (Aránega et al., 2023b). This is achieved by equipping employees with the necessary knowledge and skills to navigate new digital products and processes, enabling them to drive digital innovation within the IT industry (Aránega et al., 2023b; Faridian, 2023a; Khin & Ho, 2018). It has been demonstrated that businesses, specifically the IT sector, increasingly need entrepreneurial leaders, and research has to be given more attention in services (IT) industries (Ahmad et al., 2024; Aránega et al., 2023b; Latif et al., 2020; Shahzadi et al., 2021). The concerns expressed by scholars regarding the effectiveness of various leadership styles, such as transformational (Aslam & Sahibzada, 2024; Aslam et al., 2024) and transactional (Stenmark, 2024), in effectively guiding employees within the IT industry's intricate responsibilities have prompted the necessity to explore entrepreneurial leadership. This need arises from two significant factors: (a) different leadership styles are not intended to manage all types of employees behavior, and (b) there is a need to specify the leader's actual behavior and strategies for directing many complicated IT-related operations (Aránega et al., 2023b; Latif et al., 2020; Wu et al., 2021). To date, there has been limited consensus regarding the role of EL in the IT services sector (Wu et al., 2021). The existing body of knowledge on EL primarily stems from a limited number of primary empirical investigations conducted within the context of IT firms.

Moreover, it is noteworthy that there has been a lack of comprehensive research on the examination of the positive effects of EL on employees' digital orientation (DO) and digital capability (DC), leading to organizational digital innovation (DI) and sustainable performance (SP) in the IT industry (Aránega et al., 2023b; Kohli & Melville, 2019; Wu et al., 2021). Previous research has investigated the impact of digital orientation (DO) as a precursor to driving innovation performance within small and medium-sized enterprises (SMEs) in India (Ranjan, 2024; Sharma & Sharma, 2024). Additionally, there have been studies on the influence of digital orientation on organizational resilience within manufacturing firms in China (Liu et al., 2024). The role of digital capability (DC) in moderating the relationship between corporate environmental responsibility and commitment among Chinese publicly traded companies has been previously examined (Luo et al., 2024). However, the direct impact of EL on DO, DC, and DI has remained largely unanswered within the IT industry. This research gap is particularly evident when considering using time-lagged data. Thus, this study utilizes Drucker's productivity theory (Drucker, 1999) comprehending the correlation between EL, DO, and DC enhances DI and SP. Based on Drucker's productivity theory, employees are classified as digital workers or knowledge workers (Shehzadi et al., 2021).

Drucker's productivity theory underscores the importance of entrepreneurial leadership, employees' digital orientation, and digital capabilities. It posits that digital workers should prioritize enhancing their learning and competencies to collaborate, disseminate, and apply cutting-edge digital solutions effectively. The theory emphasizes the need for employees to proficiently manage and assimilate knowledge concerning the optimal integration of digital technology in the digital innovation process. The employee's proficiency and inclination toward learning are instrumental in expediting digital innovation by effectively leveraging the potential of both technological advancements and human capabilities and resources (Benitez et al., 2022; Cetindamar Kozanoglu & Abedin, 2021). The theory postulates that organizations, predominantly through effective leadership, should articulate the significance of fostering learning orientations and capabilities among their knowledge workers (Ahmad Amouei et al., 2023; Benitez et al., 2022; Opland et al., 2022). The study posits that digital workers are the primary drivers of digital innovation by engaging with diverse internal and external stakeholders, including customers, in actively pursuing digital innovation (Shehzadi et al., 2021). Consequently, this leads to a multitude of beneficial organizational practices, including heightened DO and DC within the realm of IT firms (Faridian, 2023b; Khin & Ho, 2018; Y. Liu et al., 2023) and enhanced sustainability performance (Pan & Nishant, 2023).

Previous studies have only provided incomplete explanations of the factors contributing to sustainability and have not taken an integrated approach to creating a clear roadmap for achieving digital innovation and sustainable performance. This gap restricts authors' understanding of the relationships between multiple complex features of entrepreneurship and organizational behavior. Studying the process through which EL, DO, and DC relate to DI can thus result in improved IT industry SP. Three primary research inquiries are proposed in this study: *RQ1.* How is EL linked with DO and DC? *RQ2.* How are employees' DO and DC linked with organizational DI? *RQ3.* How is DI associated with SP?

The innovative contribution of this study lies in its comprehensive exploration of previously unexamined linkages by employing an integrated model encompassing both employee and organizational factors. This approach enriches our comprehension of how firms can elevate employee DO and DC to achieve greater levels of DI and SP, particularly within the IT industry. The study examines the unique leadership and management challenges faced in the IT industry, maintaining an analytical viewpoint that differs from the manufacturing sector. It makes a valuable contribution by conducting an all-encompassing analysis of the critical association, utilizing an integrated model in two studies, and employing a research design with a time-lagged approach to produce more broadly applicable results.

2. Hypotheses Development

2.1. Entrepreneurial Leadership and Employee's Digital Orientation

Entrepreneurial leadership (EL) is a leadership style focused on innovation, taking risks, and promoting growth and development (Renko et al., 2015). It improves employees' digital orientation via organizational learning programs (Wu et al., 2021). Entrepreneurial leaders are often seen as innovators and change agents and can play a key role in driving digital transformation (Wu et al., 2021). Drucker's productivity theory demonstrates that entrepreneurial leadership and digital innovation are intricately linked. The theory emphasizes the crucial role of leadership support in driving digital innovation (Shujahat et al., 2021). According to Drucker's theory, a supportive work environment can empower digital workers to create, collaborate, share, and implement innovative digital solutions (Drucker, 1999). Research on entrepreneurial leadership (EL) and innovation along the lines of Drucker's theory in various sectors suggests that entrepreneurial leaders are ideally positioned to foster digital innovation in the IT industry (Al-Sharif et al., 2023; Hoang et al., 2023).

EL encourages innovation and increases staff receptivity to cutting-edge techniques and tools (Akbari et al., 2020). Employees are more likely to learn how to exploit cutting-edge technologies like the Internet of Things (IoT), big data, artificial intelligence (AI), and blockchain when they are more digitally oriented (Nasiri, Saunila, Rantala, et al., 2022; Nasiri, Saunila, & Ukko, 2022). An entrepreneurial leader might, for instance, establish cross-functional teams that include personnel from other departments and collaborate on digital projects (Wu et al., 2021). Existing trends in entrepreneurial leadership have led to the proliferation of studies that were either restricted to innovation performance (Al-Sharif et al., 2023; Hoang et al., 2023), adaptive innovation (Lin & Yi, 2023) or open innovation (Faridian, 2023b) or examined the link between EL and employee's innovative behavior (Abualoush et al., 2022; Malibari & Bajaba, 2022b). Past research primarily concentrated on examining the influence of EL in different industries by considering factors related to organizations (Djalil et al., 2023; Shiferaw et al., 2023). Nevertheless, this investigation considers a unique viewpoint and investigates the extent to which EL can influence employee digital orientation. Despite increasing focus on entrepreneurial leadership in fostering innovation, studies exploring its relationship with the digital orientation of employees, especially within the IT industry, remain scarce. Based on the above discussion, we hypothesize the following:

H1: EL has a significant impact on employees' digital orientation.

2.2. Entrepreneurial Leadership and Digital Capabilities

Entrepreneurial leaders possess the ability to identify the specific digital capabilities and knowledge that employees need to contribute towards the achievement of organizational strategic objectives effectively (Wu et al., 2021). An entrepreneurial leader encourages digital transformation within the company so that employees can gain knowledge of the most recent digital technologies and how to apply them to achieve company goals (Hoang et al., 2022; Wu et al., 2021). Based on Drucker's productivity theory, leaders may encourage digital workers' learning and communication by utilizing digital platforms like collaboration tools or artificial intelligence (Benitez et al., 2022; Wu et al., 2021). This can encourage digital skills among workers and foster a sense of community and shared purpose.

Drucker's productivity theory shows that an organization's innovation depends on its employees' digital literacy and comfort with technology (Nguyen et al., 2023; Shehzadi et al., 2021; Shujahat et al., 2021). Digital workers' capability particularly be successful in overcoming change resistance and inspiring digital workers to come up with creative solutions, including implementing new digital tools and technology (Bagheri et al., 2022). Previous studies have shown that entrepreneurial leaders can facilitate the advancement of their employees' digital skills by offering opportunities for learning and growth (Malibari & Bajaba, 2022b). According to Wu et al. (2021), entrepreneurial leaders can identify the specific digital capabilities and knowledge that employees need to contribute effectively to achieving organizational strategic objectives. Scholars have argued that entrepreneurial leadership can impact the structuring and utilization of resources and the development and application of employee's capabilities in various industries (Abualoush et al., 2022). Prior research has investigated the impact of employees' digital capabilities in many industries under different leadership styles (Aghazadeh et al., 2023; Permana et al., 2024; Shin et al., 2023). However, the influence of entrepreneurial leadership on employees' digital capabilities has been overlooked. The literature on leadership could benefit from an examination of the direct influence of EL on DC in the IT sector, given the fact that entrepreneurial leaders can enhance their teams' digital capabilities by developing a vision and strategy for digital technology, spotting and seizing new opportunities, and cultivating a culture that values experimentation, innovation, and continuous improvement. It is hypothesized that using EL in the service sector would increase employee's DC.

H2: EL has a significant impact on employees' DC.

2.3. Digital Orientation and Digital Innovation

Digital innovation strongly correlates with employees' digital orientation or technological literacy (Arias-Pérez & Vélez-Jaramillo, 2022; Razavi Hajiagha et al., 2023). Digitally oriented employees are more likely to use digital tools and technology in their regular jobs (Kokina & Blanchette, 2019), to increase the volume and quality of digital innovations (Khin & Ho, 2018). Moreover, these digital workers may better understand digital technologies' potential benefits and limitations, allowing them to make more informed decisions (Blut & Wang, 2020). Drucker's productivity theory highlights that the significance of an organization's innovation is closely linked to its employees' digital literacy and comfort with technology (Shahzadi et al., 2021; Shujahat et al., 2020). This underscores the importance of fostering a technologically adept workforce to drive innovation. Digitally focused knowledge workers may also be more inclined to suggest new digital innovation ideas, leading to more sustainable digital innovation within the firm (Nasiri, Saunila, Rantala, et al., 2022). According to Carvalho and Alves (2023), digitally oriented workers are more likely to develop new ideas and solutions using digital technologies to serve clients better.

Employee digital orientation can also create a favorable organizational culture that encourages learning and experimentation, which results in digital innovation (Arias-Pérez et al., 2021). Therefore, service industries are expected to be more operative in driving digital innovation when their employees possess a strong digital orientation. The impact of digital orientation on a range of innovation classifications has been the subject of prior research. For example, research has investigated the impact of digital orientation (DO) as a precursor to driving innovation performance within small and medium-sized enterprises (SMEs) in India (Ranjan, 2024). Additionally, there have been studies on the influence of digital orientation on organizational resilience within manufacturing firms in China (Liu et al., 2024). Similarly, Mishra et al. (2024) conducted a study on the impact of digital orientation on digital eco-innovation. However, the direct impact of DO on DI has remained largely unanswered within the IT industry. This research gap is particularly evident when considering using time-lagged data. Thus, we hypothesize the following:

H3: Digital orientation has a significant impact on digital innovation.

2.4. Digital Capability and Digital Innovation

Digital innovation requires employee's technological abilities and competence (Cetindamar Kozanoglu & Abedin, 2021; Khin & Ho, 2018; Renko et al., 2009). Service organizations with digitally capable employees signify their capacity to create new products and services by connecting their strategy with innovative procedures (Heredia et al., 2022). Digital capability could be characterized in digital products as employees' skill, experience, and knowledge in managing digital technology for new product creation, which helps an organization to digitize (Proksch et al., 2021).

Drucker's productivity theory places a strong emphasis on the importance of innovation to increase knowledge workers' productivity by making employees capable in the services sector, specifically in IT (Arkhipova & Bozzoli, 2018; Butt et al., 2019). Studies have examined the effect of digital capabilities as a percussor of innovation (Ferreira et al., 2024), digital product and processes (Proksch et al., 2024), firm performance (Heredia et al., 2022). While, Khin and Ho (2019), demonstrated a positive relationship between organizational digital capability and digital innovation in Malaysian SMEs. Nevertheless, the past literature has overlooked the significance of employee digital capabilities concerning digital innovation. To fill this gap in the literature, the current study assumes that service organizations will be better able to drive digital innovation if their employees have excellent digital capabilities, given that digitally capable employees can spot opportunities to use technology to enhance corporate procedures and produce value for the organization and its clients. Consequently, it is hypothesized:

H4: DC has a significant impact on DI.

2.5. Digital Innovation and Sustainable Performance

Digital innovation is a key strategic tool for businesses to improve sustainable performance and competitiveness (Ahmad Amouei et al., 2023; Khin & Ho, 2018). Nambisan et al. (2017) describe digital innovation as the invention of market offerings, business processes, or business models through digital technology. Digital technology and digitized processes enable new products, platforms, services, consumer experiences, and other value streams (Khin & Ho, 2018). New market products, company procedures, or business strategies that employ digital technology can come from digital innovation (Opland et al., 2022). In conjunction with Drucker's productivity theory, digital innovation plays a key role in fostering the generation of new ideas by capitalizing on entrepreneurial opportunities in the workplace and transforming them into innovative digital products to achieve organizational performance (Shahzadi et al., 2021; Shujahat et al., 2020).

The pursuit of innovation is related to what can and should be improved, and this affects acquiring and directing chances that promote sustainable performance (Sahibzada & Mumtaz, 2023i). Sustainable performance ensures the efficient use of natural resources without jeopardizing future economic prospects and harming society and the environment (Caiado et al., 2018). Integrating environmental integrity, social equality, and economic prosperity into the firm's functioning (Lee & Ha-Brookshire, 2018). Previous research has shown that innovation significantly impacts sustainable performance in Hi-tech industries (Kwon Choi et al., 2013). Coutinho et al. (2018) acknowledged that sustainable organizational performance depends on an organization's strategies and practices. Heredia et al. (2022) confirmed that organizations with above-average digital innovation values have greater profitability and revenue growth. Khin and Ho (2018) also assert that the relationship between a company's sustainable digital business performance and innovation may be impacted by innovation. A few studies, however, have suggested that new product innovations of SMEs can negatively affect organizational performance (Laforet, 2011). Therefore, research findings on links to digital innovation are contradictory and context-dependent. The conflicting findings have aroused experts' curiosity to comprehend this correlation within the Chinese IT business thoroughly. (See Table I)

H5: Digital innovation has a significant impact on SP.

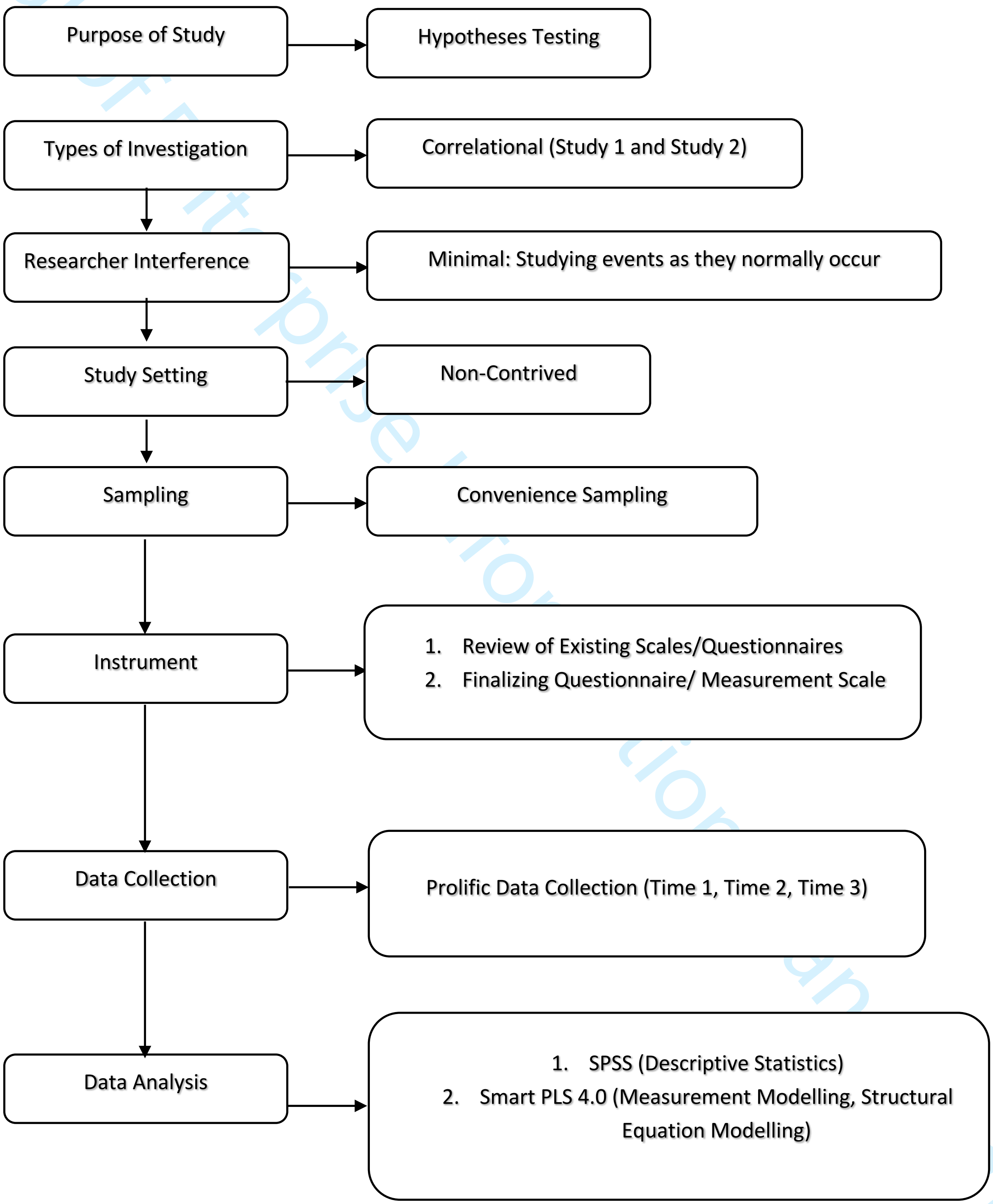
Table I: Previous studies on Leadership (Types) and Innovation (Types)

Author (s)/ Year	Leadership (Types)	Mediator	Moderator	Innovation (Types)	Control Variable	Industry	Country	Findings
(Fatima & Masood, 2024)	Digital leadership	knowledge sharing and innovation capability	Top management knowledge value	Open innovation	N/A	Telecom and IT companies	Pakistan	Results indicated substantial backing regarding the serial mediation framework. TMKV has been identified as a crucial factor in enhancing employee knowledge sharing.
(Malik et al., 2024)	Digital leadership	Digital transformation and leadership skills	N/A	Innovative business models	N/A	Textile industry	Pakistan	Research indicates that technological expertise, adaptability, leadership, integrity, vision, communication, and teamwork are key to effective digital change in textile-related organizations. Digital leaders may improve innovation in business models, create value, develop new products, and establish ecosystem alliances.
(Al Issa & Omar, 2024)	Digital leadership and innovative culture	Techno-work engagement	technostress inhibitors	Digital innovation	N/A	Banking sector	Libya	The findings indicated that digital leadership and innovative culture positively impact digital innovation. Techno-work engagement mediated the link between leadership, culture, and innovation. Technostress inhibitors have a substantial moderating impact on the linkages between leadership, culture, and engagement.
(Janjua et al., 2024)	Green transformational leadership	Green dynamic capability and green environmental orientation	N/A	Green innovation	N/A	Hospitality sector	Italy	The research findings highlight that improving a hotel's green dynamic capability and green environmental orientation can be assisted by offering GTL. Consequently, this may result in the improvement of green innovation that enhances the competitive advantage and green performance of a hotel.
(Ahmad et al., 2024)	Green transformational leadership	green dynamic capabilities	environmental dynamism	green product and process innovation	N/A	Manufacturing SMEs	Pakistan	The findings also indicate a favorable impact of transformational leadership on green dynamic capability, which stimulates green innovation. Moreover, our results suggest that environmental dynamism moderates the association between green transformational leadership and green dynamic capabilities.
(Nguyen et al., 2023)	Transformational leadership and transactional leadership	employee creativity	N/A	organizational innovation	N/A	Public Enterprises	Vietnam	Transformational leadership and transactional leadership were strong indicators of employee creativity and organisational innovation. Transformational leadership had a crucial role in

								fostering employee creativity and organizational innovation, but transactional leadership had a negative impact on these two factors. Furthermore, the influence of the two leadership styles on organizational innovation was somewhat mediated by employee creativity.
(Sharma & Sharma, 2024)	Ethical leadership	human capital and social capital	N/A	innovative performance	N/A	Information Technology	India	The findings show that ethical leadership boosts employee innovation. Ethical leadership directly and indirectly benefits employee innovation, with intellectual capital mediating the indirect effect.
(Şengüllendi et al., 2024)	Ethical leadership	green organizational culture	N/A	green innovation	N/A	SMEs	Turkey	The findings showed that ethical leadership could help SMEs build a green organizational culture. Moreover, green organizational culture mediates ethical leadership and green product and process innovations.

Source (s): *Authors Work*

3. Methodology



Source (s): *Authors Work*

3.1. Overview of Research Method

The sequential model was subjected to empirical testing in two studies utilizing a time-lagged research design, with samples of managers and employees from the IT industry in China. The first study examined a dual-path linear model using three-wave time-lagged data, with a two-week interval between each wave. At T1, we conducted measurements on EL, while at T2, we assessed DO and DC. Finally, at T3, we evaluated DI. The complete model was tested in Study 2. The study utilized a two-wave time-lagged design with a four-week interval between each wave to collect data. At T1, we conducted measurements of EL, DO, and DC. At T2, we assessed DI and SP.

3.2. Methodology for Study 1

Study 1 was conducted to test the model empirically, utilizing a time-lagged research design. An online survey was conducted using the Prolific data collection service to procure data from IT workers in three progressive China IT Cities (Shenzhen, Xi'an and Beijing). The present study was executed in three distinct phases, with a time interval of two weeks separating each phase. Prior research in the domain of leadership has suggested a two-week break among successive rounds of data gathering e.g. (Quade et al., 2020; Rasheed et al., 2023). At time point 1 (T1), data was gathered from 327 participants concerning their supervisor's EL approach. At the second time point (T2), the 327 participants were asked to populate their DO and DC information. At T2, data was collected from 317 participants who were requested to provide their ratings on DI. Two weeks after the T2 wave, 317 participants were asked to rate DI again. At T3, a total of 317 participants were involved in the study. Following the identification of multivariate outliers, 18 responses were eliminated, leaving 299 valid responses for subsequent analyses.

3.3. Respondents Profile for Study 1

The Prolific IDs of the respondents were employed as exclusive codes to correspond and integrate the data they had furnished in the three waves. Out of the total sample size of 299 participants, 62.4% were males and 37.6% of them identified as female. Additionally, it was found that 35.6% of the sample population fell within the age range of 30 to 39 years, while 24.8% were between the ages of 20 and 29 years. Furthermore, 48.2% of the participants held a master's degree, while 40.9% possessed between 11 to 15 years of work experience in the IT sector.

3.4. Methodology for Study 2

The entire model was examined using a time-lagged method and analysis. Using the Prolific data collection service, we again gathered the information for Study 2 from Chinese IT industry employees. The second study was executed in two phases, separated by a one-month interval. Prior research on leadership has suggested a temporal gap of one month between successive data collection waves (Khan et al., 2021; Rasheed et al., 2020). During the initial phase of data collection (T1), data were obtained from 378 participants regarding metrics about EL, DO, and DC during the T1 survey, demographic information such as city, age, level of education, gender, and total experience in the IT industry was gathered from the respondents. At the T2 stage, four weeks after the initial phase, we requested that the 378 participants who had taken part in the T1 wave furnish information about DI and SP. The T2 survey was participated in by a total of 359 respondents. Out of the total number of participants, 341 individuals provided usable responses for analysis. Eighteen responses were excluded as multivariate outliers, leaving 341 responses for the final analyses.

3.5. Respondents Profile for Study 2

The Prolific IDs of the respondents were employed as distinct codes to correspond to and consolidate the data they had furnished in the two waves. 63.3% were males, and 36.7 % of the 349 survey participants were female. Additionally, 35.2% of respondents were between 30 and 39, and 25.8 % were between 20 and 29. In addition, 38.4% had 11 to 15 years of experience in the IT industry, and 47.6% had master's graduates.

3.6. Measures/Instrumentation

This study employed 28 measuring items derived from the current literature. However, a few minor changes have been made to the phrasing of the parts to conform with the IT format (Latif et al., 2020). The questionnaire utilized a 5-point Likert scale, with 1 representing strongly disagreed and 5 representing strongly agreed. We adapted a Renko et al. (2015) scale to measure EL. The four-item DO measure was derived from Zhou et al. (2005) and Gatignon and Xuereb (1997). The five-item DC measure was adopted by Zhou and Wu (2010). The six-item DI scale was adapted from Paladino (2007). Finally, five SP items were adapted from Gelhard and Von Delft (2016).

4. Data Analysis and Results

Several methods were employed to analyze the data and verify the hypotheses. We utilized missing values analysis, multivariate outlier, data normality, descriptive statistics, and correlation analyses for the data screening. Specifically, we screened for IT professionals with at least one year of full-time experience. In both studies, the data screening procedure utilized the same criteria.

4.1. Common Method Bias and Multi Collinearity

To reduce the potential for bias, this study implemented the procedural precautions outlined by (Podsakoff et al., 2003). First, the survey was pre-tested throughout the questionnaire development phase to identify areas for improvement in the survey design and items to alleviate the respondents' workload. Furthermore, the questionnaire deliberately separated the independent and dependent variables. The items were also randomized to eliminate any bias toward specific responses. Therefore, any phrasing or layout of variables that could have resulted in a priming effect was deliberately avoided. Second, a single factor test by Harman was administered. The test yielded no immediate issues as a singular component accounted for 41.19 % of the variation in the sample, which was significantly lower than the 50% criterion. Thus, there was no cause for concern regarding common method bias (Volberda et al., 2012). Furthermore, an examination was conducted on the bivariate correlations among the constructs, which revealed comparatively weak correlations (r > 0.90) (Lowry & Gaskin, 2014). Lastly, we assessed the vertical and lateral collinearity between each construct by evaluating the variance inflation factors (VIFs) (Kock, 2015). Kock (2015, p. 7) states that a thorough collinearity test can be used to evaluate the bias of common methods in studies employing structural equation modeling. By examining the VIFs, we can determine whether the model is unaffected by common method bias. The model appears to be impartial if the VIFs are 3.30 or lower. Given that the maximum VIF from the full collinearity test was below 3.30 (ranging from 1.57 to 2.607), it can be concluded that there were no issues regarding common method bias in the sample of this study.

4.2. Measurement Model Assessment for Study 1

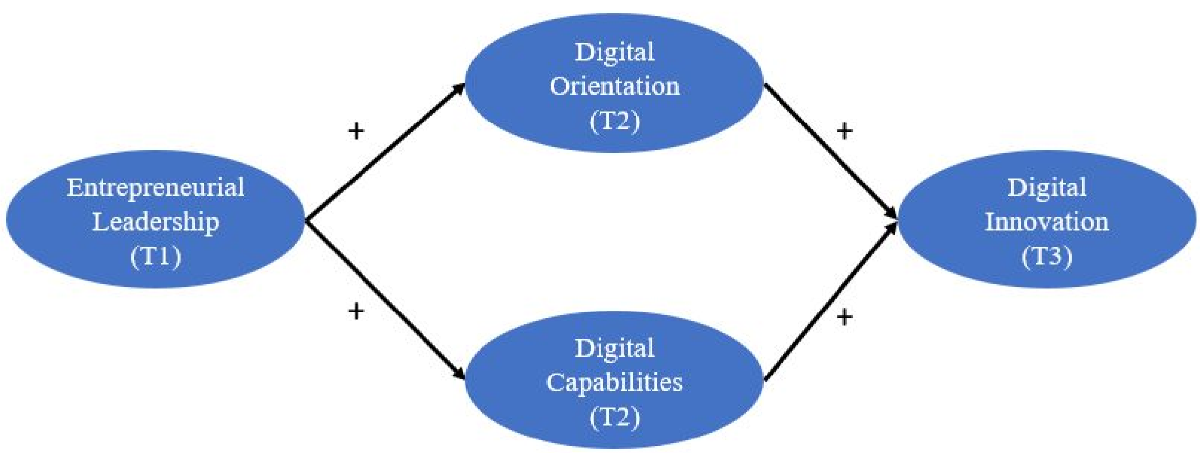


Figure 1: *Conceptual Framework for Study 1*

Source(s): *Authors Work*

Study 1 analyzed skewness, kurtosis, and the variance inflation factor to explore potential collinearity issues. The skewness of all variables was found to be below 3, and the kurtosis was below the 10th threshold, indicating that the data was approximately normally distributed according to (Kline, 2011). The variance inflation factor values ranged from 1.05 to 3.67 (< 5), indicating that there are no significant issues with multicollinearity, as all values are less than 5 (Hair et al., 2017). Anderson and Gerbing (1988) proposed the standards for assessing convergent validity. Ringle et al. (2018) recommended the model fit index should be employed to assess the quality of data. The measurement model for study 1 exhibited an adequate level of fit: $\chi 2$=592.503, df=308, $\chi 2$/df=3.447, goodness-of-fit index (GFI)=0.890, adjusted goodness-of-fit index (AGFI)=0.863, non-normed fit index (NFI)=0.871, comparative fit index (CFI)=0.971, incremental fit index (IFI)=0.901, root mean square residual (RMSR)=0.039 and root mean square error of approximation (RMSEA)=0.071. Hu and Bentler (1999) proposed that the model would be deemed acceptable if the GFI and AGFI values were greater than 0.8. Overall, the measurement model used in this study was deemed satisfactory (Baumgartner & Homburg, 1996).

The research investigated the study 1 model by initially evaluating its internal consistency by applying Cronbach's alpha and composite reliability (CR) metrics. Additionally, the study assessed the model's convergent and discriminant validity by analyzing outer loadings, average variance extracted (AVE), and Fornell-Larcker, as outlined by (Hair et al., 2017). To ascertain the internal consistency of the study, the values of Cronbach's alpha and CR must exceed the minimum threshold level of 0.6, as stipulated by (Nunnally Jr, 1994). Table II displays findings that indicate internal consistency. The AVE scores were analyzed to evaluate the convergent validity. The results indicate that all the AVE values surpass the threshold of 0.5, which is considered the minimum acceptable value according to (Hair et al., 2017). The study also evaluated outer loadings to assess the reliability of the indicators. Only values exceeding 0.6 were deemed suitable for subsequent data analysis, as per the methodology outlined by (Hair et al., 2017). During this stage, it was observed that four items were eliminated since their factor loadings were below the recommended threshold of 0.6.

Study 1 confirmed the convergent and discriminant validity by ensuring that the intra-construct correlations were stronger than the inter-construct correlations (Hair et al., 2017). We evaluated the discriminant validity by examining the heterotrait-monotrait ratios (HTMT) and found that all values were below 0.85, as suggested by (Hair et al., 2017). Study 1 passed discriminant validity testing. (See Tables II & III)

Table II: *Item Loadings, Reliability, and Convergent Validity*

	Λ	**α**	**CR**	**AVE**
Entrepreneurial Leadership		0.906	0.928	0.682
EL1	0.858			
EL2	0.872			
EL3	0.828			
EL4	0.831			
EL5	0.796			
EL6	0.767			
Digital Capability		0.768	0.853	0.593
DC1	0.778			
DC2	0.835			
DC3	0.803			
DC4	0.653			
Digital Orientation		0.833	0.889	0.667
DO1	0.784			
DO2	0.780			
DO3	0.861			
DO4	0.837			
Digital Innovation		0.827	0.878	0.589
DI1	0.760			
DI2	0.764			
DI4	0.730			
DI5	0.782			
DI6	0.801			

Source(s): *Authors Work*

Table III: *Discriminant Validity (HTMT)*

	T1-EL	T2- DC	T2- DO	T3- DI
T1-EL				
T2- DC	0.706			
T2- DO	0.646	0.842		
T3- DI	0.447	0.806	0.762	

Note: *The Data on the diagonal (in bold) is the square root of the AVE of the construct, while the other values are the correlations with other constructs. *P<0.001 ~ ** DC, Digital Capability; DI, Digital Innovation; DO, Digital Orientation; EL, Entrepreneurial Leadership*

Source(s): *Authors Work*

4.3. Structural Model Assessment for Study 1

Following Hair et al. (2017) we examined R^2 values and Stone Geisser's Q^2 values to gauge the explanatory and predictive capability of the proposed model. The R^2 values of 0.25, 0.50, and 0.75 indicate weak, moderate, and substantial explanatory power, respectively. Furthermore, Q^2 values greater than zero indicate that the model has satisfactory predictive power (Hair et al., 2017). This study demonstrated sufficient explanatory and predictive capabilities, as evidenced by the results for digital orientation ($R^2 = 0.71$, $Q^2 = 0.53$), digital capability ($R^2 = 0.66$, $Q^2 = 0.47$), and digital innovation ($R^2 = 0.64$, $Q^2 = 0.59$).

In the second phase, the structural model test was examined. The hypotheses were examined in sequence. First, the direct influence of T1-EL on the T2-DO and T1-EL on T2-DC was analyzed. In the second phase, the direct influence of T2-DO and T2-DC on T3-DI was analyzed. A bootstrap resampling technique with 5,000 resamples (Ringle et al., 2005) was utilized to establish the significance of direct paths. Table IV lists the test outcomes of hypotheses intended for direct associations.

The results reveal a substantial positive influence of T1-EL on T2-DO and T2-DC (β= 0.568, t= 12.41, p<0.001) (β= 0.599, t= 13.07, p<0.001), respectively. Therefore, H1 and H2 were supported. Similarly, there is a significant direct positive influence of T2-DO and T2-DC on T3-DI (β= 0.280, t= 4.67, p<0.001) (β= 0.528, t= 9.12, p<0.001), respectively. Therefore, H3 and H4 were accepted.

Table IV: *Results from SEM*

Hypotheses	Relationships	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
H1	T1-EL -> T2- DO	0.568	0.046	12.415	0.000
H2	T1-EL -> T2- DC	0.599	0.046	13.074	0.000
H3	T2- DO -> T3- DI	0.280	0.060	4.676	0.000
H4	T2- DC -> T3- DI	0.528	0.058	9.125	0.000

Source(s): *Authors Work*

4.4. Measurement Model Assessment for Study 2

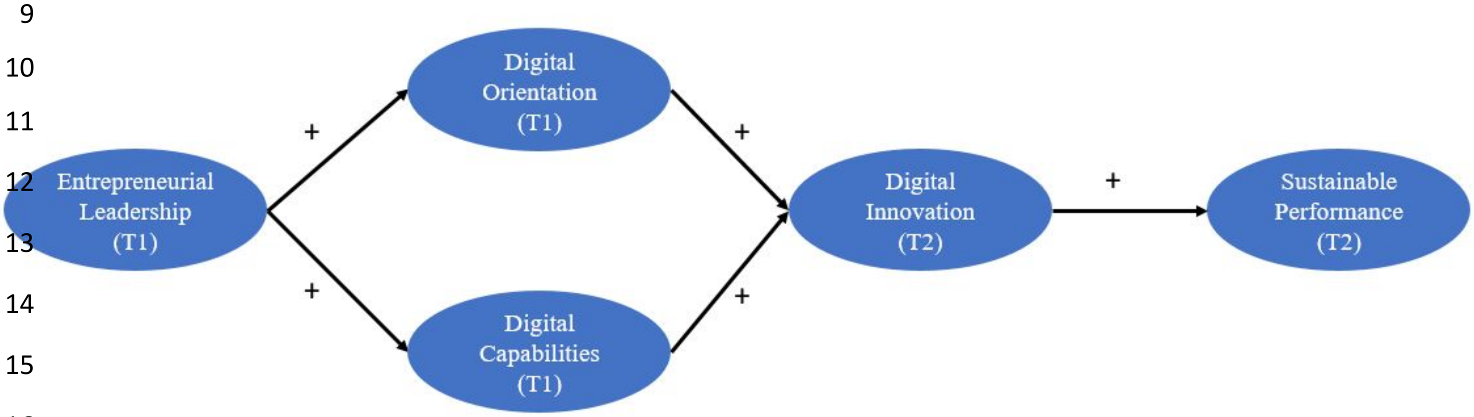


Figure 2: *Conceptual Framework for Study 2*

Source(s): *Authors Work*

Study 2 evaluated skewness, kurtosis, and the variance inflation factor to explore any potential issues with collinearity. The multivariate normality of all variables was supported by their skewness and kurtosis, both of which were below the 3 and 10 thresholds, respectively (Kline, 2011). The variance inflation factor values ranged from 1.00 to 4.33, with all values being less than 5, suggesting that there are no significant issues with multicollinearity (Hair et al., 2017). The measurement model for study 2 demonstrated sufficient fit, as indicated by the results χ2=860.907, df=351, χ2/df=3.980, GFI=0.940, AGFI=0.891, NFI=0.908, CFI=0.981, IFI=0.931, RMSR=0.040 and RMSEA=0.079. According to Hu and Bentler (1999), the model would be considered acceptable if the GFI and AGFI values were greater than 0.8. The measurement model employed in this study was found to be acceptable (Baumgartner & Homburg, 1996).

The research investigated the Study 2 model by initially evaluating its internal consistency through the application of Cronbach's alpha and composite reliability (CR) metrics. Additionally, the study assessed the model's convergent and discriminant validity by analyzing outer loadings, average variance extracted (AVE), and Fornell-Larcker, as outlined by (Hair et al., 2017). To ascertain the internal consistency of the study, the values of Cronbach's alpha and CR must exceed the minimum threshold level of 0.6, as stipulated by (Nunnally Jr, 1994). Table V displays findings that indicate internal consistency. The AVE scores were analyzed to evaluate the convergent validity. The results indicate that all the AVE values surpass the threshold of 0.5, which is considered the minimum acceptable value (Hair et al., 2017). The study also evaluated outer loadings to assess the reliability of the indicators. Only values exceeding 0.6 were deemed suitable for subsequent data analysis, as per the methodology outlined by (Hair et al., 2017). During this stage, it was observed that no items were eliminated since their factor loadings exceeded the recommended threshold of 0.6.

After confirming the convergent validity, Study 2 moved on to assess the discriminant validity by ensuring that the intra-construct correlation was higher than the inter-construct correlations, as specified by (Hair et al., 2017). To evaluate discriminant validity, we examined the heterotrait-monotrait ratios (HTMT), which all fell below 0.85 (Hair et al., 2017). Study 2 passed discriminant validity testing. (See Tables V & VI)

Table V: *Item Loadings, Reliability, and Convergent Validity*

	Λ	α	CR	AVE
Entrepreneurial Leadership		0.932	0.944	0.677
EL1	0.811			
EL2	0.806			
EL3	0.846			
EL4	0.815			
EL5	0.840			
EL6	0.810			
EL7	0.823			
EL8	0.827			
Digital Capability		0.905	0.930	0.727
DC1	0.840			
DC2	0.760			
DC3	0.909			
DC4	0.888			
DC5	0.858			
Digital Orientation		0.894	0.927	0.760
DO1	0.847			
DO2	0.889			
DO3	0.888			
DO4	0.861			
Digital Innovation		0.930	0.945	0.741
DI1	0.834			
DI2	0.879			
DI3	0.898			
DI4	0.850			
DI5	0.865			
DI6	0.836			
Sustainable Performance		0.902	0.928	0.719
SP1	0.828			
SP2	0.814			
SP3	0.867			
SP4	0.862			
SP5	0.867			

Source(s): *Authors Work*

Table VI: *Discriminant Validity (HTMT)*

	T1- DC	T1- DO	T1- EL	T2- DI	T2- SP
T1- DC					
T1- DO	0.813				

T1- EL	0.781	0.793		
T2- DI	0.586	0.684	0.673	
T2- SP	0.497	0.668	0.614	0.889

Note: *The Data on the diagonal (in bold) is the square root of the AVE of the construct, while the other values are the correlations with other constructs. *P<0.001 ~ ** DC, Digital Capability; DI, Digital Innovation; DO, Digital Orientation; EL, Entrepreneurial Leadership; SP, Sustainable Performance*
Source(s): *Authors Work*

4.5. Structural Model Assessment for Study 2

Based on the study conducted by Hair et al. (2017) we conducted an evaluation of the R^2 values and Stone Geisser's Q^2 values to determine the effectiveness of the proposed model in terms of explanation and prediction. The R^2 values of 0.25, 0.50, and 0.75 indicate weak, moderate, and strong explanatory power, respectively. When Q^2 values are greater than zero, it suggests that the proposed model has acceptable predictive capability (Hair et al., 2017). The results of this study demonstrate sufficient explanatory and predictive capabilities concerning digital orientation (R^2 = 0.77, Q^2 = 0.64), digital capability (R^2 = 0.70, Q^2 = 0.57), digital innovation (R^2 = 0.69, Q^2 = 0.49) sustainable performance (R^2 = 0.81, Q^2 = 0.69).

The structural model test was examined for study 2. The hypotheses were examined in sequence. First, the direct influence of T1-EL on the T2-DO and T1-EL on T2-DC was analyzed. In the second phase, the direct influence of T2-DO and T2-DC on T3-DI was analyzed. Lastly, the direct influence of T2-DI on T2-SP was analyzed. A bootstrap resampling technique with 5,000 resamples (Ringle *et al.*, 2005) was utilized to establish the significance of direct paths. Table VII lists the test outcomes of hypotheses intended for direct associations.

The results reveal a substantial positive influence of T1-EL on T1-DO and T1-DC (β= 0.905, t= 51.99, $p<0.001$) (β= 0.914, t= 52.13, $p<0.001$), respectively. Therefore, H1 and H2 were supported. Similarly, there is a significant direct positive influence of T1-DO and T1-DC on T2-

DI (β= 0.268, t= 5.15, p<0.001) (β= 0.689, t= 13.64, p<0.001), respectively. Therefore, H3 and H4 were accepted. Lastly, T2-DI reveals a substantial positive effect on T2-SP (β= 0.814, t= 18.41, p<0.001). Thus, H5 is substantiated in Study 2.

Table VII: *Results from SEM*

Hypotheses	Relationships	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
H1	T1- EL -> T1- DO	0.905	0.017	51.990	0.000
H2	T1- EL -> T1- DC	0.914	0.018	52.135	0.000
H3	T1- DO -> T2- DI	0.268	0.052	5.159	0.000
H4	T1- DC -> T2- DI	0.689	0.051	13.647	0.000
H5	T2- DI -> T2- SP	0.814	0.044	18.410	0.000

Source(s): *Authors Work*

4.6. Assessing the predictive relevance using PLS Predict

The R^2 statistics mentioned earlier indicate the model's explanatory power within the sample. We have utilized PLS Predict to assess the out-of-sample predictive relevance of our model for SP (Shmueli et al., 2016). This is based on the principles of using training samples, which are a subset of the data set used to estimate the model, and holdout samples, which are the remaining portion of the data set not used for parameter estimation (Hair et al., 2019; Shmueli et al., 2016). PLS Predict is a procedure that utilizes holdout samples to generate predictions at the case or item level. This indicates that PLS Predict can evaluate the precision of a model while simultaneously predicting the result value of new cases (Shmueli et al., 2016). Following the recommendations provided by Shmueli et al. (2019) and Hair et al. (2019) on the assessment of our model's predictive significance, we commenced the PLS Predict procedure with 10 folds (k = 10). The training sample in each fold was carefully verified to ensure that it still satisfied the minimal sample size criteria, as determined by (Kock & Hadaya, 2018) and calculated using G* Power software. Firstly, the study analyzed the $Q^2_{Predict}$ values of the PLS-SEM model. The positive $Q^2_{Predict}$ value, shown for SP, suggests that the PLS-SEM analysis for indicators of our main target construct performs better than the simplest benchmark linear regression model (LM) (i.e. the average values of the indicators from the training sample). Subsequently, the study analyzed our model's dispersion of estimate errors and observed an asymmetrical distribution. Therefore, we utilized the mean absolute error (MAE) data acquired for partial least squares structural equation modeling (PLS-SEM) in conjunction with the LM benchmark. Table VIII clearly shows that the MAE values for most of the indicators in the PLS-SEM analysis had reduced prediction errors compared to the LM. This indicates that our model has a moderate level of predictive capacity (Shmueli et al., 2019).

Table VIII: Assessment of predictive relevance for sustainable performance

	PLS-SEM		LM	PLS-SEM – LM
Items of the dependent variable	MAE	Q^2 Predict	MAE	MAE
SP1	0.859	0.271	0.921	–0.062
SP2	0.958	0.224	0.958	–0.032
SP3	0.756	0.355	0.778	–0.019
SP4	0.801	0.307	0.834	–0.009
SP5	0.771	0.281	0.719	–0.003

Source(s): *Authors Work*

5. Discussion, Conclusion, and Implications

5.1. Discussion

First, the statistical analysis supported a positive association between EL and DO. EL has previously been documented as having a positive impact on employees' digital orientation through the implementation of learning programs within different organizational contexts (Bagheri et al., 2022; Malibari & Bajaba, 2022a; Wu et al., 2021). Hence, the results obtained from Study 1 and Study 2 align with the existing body of research. Moreover, the evidence supporting a positive correlation between entrepreneurial leadership (EL) and digital orientation (DO) is consistent with Drucker's theory on knowledge worker productivity. According to Drucker, digital workers rely on organizational support to assist entrepreneurial leadership and cultivate digital orientation. The implications of the findings suggest that entrepreneurial leaders who prioritize innovation and the identification of opportunities, particularly in complex, turbulent, and uncertain environments (Aparicio et al., 2023) not only generate creative ideas to address business challenges but also guide the innovation and opportunity recognition process within their organization. This is achieved by fostering a culture that encourages employees to enhance their digital skills and knowledge while promoting collective ownership and accountability.

Second, the study supported the favorable connection between EL and DC. The study introduces the concept of employee's DC, which has not been previously examined in the management literature. However, the outcomes of studies 1 and 2 are aligned with the assertions made by (Bagheri et al., 2022; Malibari & Bajaba, 2022b), who suggests that entrepreneurial leaders offer their employees increased opportunities and resources to enhance their digital skills and knowledge in various industries. Therefore, this study's findings are consistent with those of previous studies. The endorsement of H2 was consistent with Drucker's theory on knowledge worker productivity, which posits that digital workers require leadership backing to enhance their digital capabilities. The findings indicate that with the continuous support and guidance provided by EL, along with their ability to recognize opportunities in a VUCA environment (Ochinanwata et al., 2023), they can enhance their employees' digital skills to effectively navigate the challenges of the contemporary digital landscape. As a result, digital workers exhibit an enhanced understanding of digital technologies' potential benefits and limitations. This heightened comprehension enables individuals to make decisions that are better informed and prudent.

Third, the study confirmed the positive relationship between DO and DI. The findings from studies 1 and 2 align with the existing literature. For instance, Arias-Pérez and Vélez-Jaramillo (2022) and Carvalho and Alves (2023) posit that a significant relationship exists between digital innovation and employees' digital orientation or technological literacy. Furthermore, the result aligns with the assertions of the Drucker productivity theory, which posits that an organization's ability to innovate is contingent upon the digital literacy and technological proficiency of its employees (Cetindamar Kozanoglu & Abedin, 2021; Shahzadi et al., 2021). The study suggests that adopting a digital orientation prompts IT firms to prioritize integrating digital technologies to effectively meet the evolving digital requirements of businesses and consumers. This enables them to provide digital solutions that have the potential to revolutionize business models and enhance consumers' experiences.

Fourth, as observed in both studies, the assertion that the DC of employees in the IT sector is positively correlated with DI and is consistent with previous research conducted in settings other than IT. The unique construct of employee DC distinguishes the study's findings from previous research endeavors, which demonstrates that the digital capabilities of the organizations play a pivotal role in enabling companies to revolutionize customer experience, operational processes, and innovative business models (Aghazadeh et al., 2023; Khin & Ho, 2018). Additionally, this research contributes to the existing body of literature on digital innovation by examining the impact of employee digital competence on organizational digital innovation. The successful execution of DI necessitates acquiring digital technology and developing novel digital solutions, both of which require the proficient expertise of skilled professionals.

Fifth, in study 2, we included an additional sustainable performance (SP) variable to determine the impact of DI on SP. The findings confirmed the existence of a positive correlation between DI and SP. The findings were consistent with previous research conducted in non-IT settings. Prior studies have demonstrated that innovation has a substantial influence on sustainable performance Benitez et al. (2022) and Opland et al. (2022). This finding implies that organizations that demonstrate a solid commitment to adopting digital technologies (Xie et al., 2022) and enhance their employees' ability to navigate these technologies effectively, which are more likely to generate innovative digital solutions, ultimately leading to improved sustainable performance of IT firms.

5.2 Theoretical contribution:

Moreover, this research provides four significant theoretical contributions. First, the study incorporates organizational and employee factors, employing EL, DO, DC, DI, and SP within a unified model. This model aims to clarify how IT firms can improve employee DO and DC, thus promoting DI and attaining SP.

Second, this study introduces a new construct called DC of employees to provide a more comprehensive understanding of the factors influencing DI within the Chinese IT industry. This study contributes to the existing body of literature on leadership and organizational behavior by examining the direct effect of EL on employees' digital competencies and digital orientation. Prior studies have exclusively focused on investigating the digital capabilities and digital orientation within organizational contexts across different settings (Chaudhuri et al., 2022; Heredia et al., 2022; Nasiri, Saunila, Rantala, et al., 2022).

Third, the findings of this research indicate that EL is an important antecedent of employees' DO and DC, which is an expression of digital innovation at a deeper level. Thus, the authors contribute to the entrepreneurship literature, which has largely focused on affirming the link between EL and DI while leaving unexamined the relationship among IT firm policies and their effect on employee digital orientation and capability. Even in instances where researchers investigated the factors that influence DI and SP, they measured DO and DC solely from an organizational perspective, according to (Heredia et al., 2022; Nasiri, Saunila, Rantala, et al., 2022). Given the growing importance of sustainable development and digital behaviors in the IT industry, this study makes a significant contribution by showing that EL practices can significantly improve DO and DC. This shows how digital learning behaviors can be encouraged among employees through EL support.

Finally, this study extends the knowledge worker productivity theory (Drucker, 1999) to address the essential question of how and when EL improves digital workers' digital orientation and capability. This study is the first to use knowledge worker productivity theory (Drucker, 1999) to analyze the relationship of EL with IT employees' digital orientation and capabilities, which leads to DI for IT firms. This study theoretically improves understanding of employee behavior and learning motivation. As a result, this study provides further evidence for the adaptability of the theory of knowledge worker productivity, which has previously been used to account for employees' actions in a variety of settings (Sahibzada et al., 2023j; Sahibzada et al., 2021e; Sahibzada & Mumtaz, 2023i). Previous studies have utilized theories such as the digital capability theory (Khin & Ho, 2018) and the resource-based view (Shan et al., 2019).

5.3.Managerial Implications for Policy and Practice

First, the study emphasizes the importance of internal reorganization within the firm to foster digital innovation and ensure sustainable performance. This entails the need to develop and apply novel digital competencies (AlNuaimi et al., 2022), initiate cultural shifts that seek to establish entrepreneurial leadership models and implement appropriate human resource management strategies to ensure digital innovation and sustainable performance. The empirical results show that EL is crucial to employees' digital orientation and capabilities to enhance IT innovation in SP's IT organizations. Moreover, IT firms that rely on digital innovation should embrace entrepreneurial leadership methods to foster innovation among their employees. EL may motivate employees to recognize and seize entrepreneurial opportunities at work and act entrepreneurially (Bagheri et al., 2022).

Second, this study provides practical contributions to IT firms and strategy/policymakers by emphasizing the essentiality of cultivating a digital-oriented culture and enhancing digital capabilities to effectively manage digital technologies and provide innovative digital solutions to meet the challenges posed by the digital economy. Gaining insight into the underlying factors that drive digital innovation can motivate firms to leverage technological opportunities to enhance their innovation and sustainable performance. Since individuals with a high degree of digital orientation can better comprehend the inherent advantages and possibilities presented by new technologies, a high level of digital orientation correlates with employee innovative performance (Jafari & Van Looy, 2022).

Lastly, firms must be aware of the direct impact of digital innovation on sustainable performance. This is because many firms may not be fully committed to digital innovation, possibly due to uncertainty regarding the performance outcomes of innovative digital solutions. As firms increasingly recognize the potential advantages of digital innovation and its driving mechanisms (Nakpodia et al., 2023), their likelihood of achieving strategic performance (SP) is correspondingly enhanced. Additionally, the outcomes of this study serve as a valuable reminder for IT firms to analyze their technological requirements to maintain sustainable performance. Simultaneously, these firms must establish a corporate culture and entrepreneurial mindset that fosters openness towards emerging digital economies.

5.4.Conclusion:

This research endeavors to adopt an integrated approach to tackle the imperative requirement for enhancing sustainable performance in the IT sector to align with the Sustainable

Development Goals (SDGs). It provides insights into the pathways from entrepreneurial leadership toward enhanced digital innovation and sustainable performance through focusing on employee-centered factors. Using longitudinal data for studies 1 and 2, a linear conceptual framework has been constructed to elucidate the positive interplay between EL, DO, DC, DI, and SP. The study's findings support Drucker's theory on knowledge worker productivity, which holds that EL affects an employee's DO and DC and encourages DI. Consequently, the SP of IT firms increases. The findings of this study are a valuable reminder for IT firms to carefully assess their technological needs in alignment with SDGs to sustain their performance. At the same time, these companies need to create a corporate culture and mindset that encourages embracing new digital economies.

5.5.Limitations and Future Opportunities for Scholars:

The research has certain limitations and suggests several avenues for future research. First, the sample was limited to Chinese IT firms, so future research must determine if the findings can be replicated in different organizational sectors or geographical settings. Second, this research focused on EL as an antecedent of DO and DI. Future research should consider other leadership styles, such as digital leadership, and team-level variables, such as organizational culture, to accept the digital transformation. Furthermore, future studies should explore methodological approaches beyond regression analysis, such as hierarchical linear modeling for a multilevel model and fsQCA for finding asymmetric associations. In addition, this study chose to focus on quantitative research methods. However, future studies may consider exploring qualitative research methods instead.

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