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# Does Technology Orientation Determine Innovation Performance through Digital Innovation? A Glimpse of the Electronic Industry in the Digital Economy

**Abdelmohsen A. Nassani [1], Adriana Grigorescu [2,3,*], Zahid Yousaf [4,*], Elena Condrea [5], Asad Javed [6] and Mohamed Haffar [7]**

[1] Department of Management, College of Business Administration, King Saud University, P.O. Box 71115, Riyadh 11587, Saudi Arabia
[2] Department of Public Management, Faculty of Public Administration, National University of Political Studies and Public Administration, Expozitiei Boulevard, 30A, 012104 Bucharest, Romania
[3] Academy of Romanian Scientists, Ilfov Street 3, 050094 Bucharest, Romania
[4] Higher Education Department, Government College of Management Sciences, Mansehra 21300, Pakistan
[5] Department of Economics, Faculty of Economic Science, Ovidius University of Constanța, Mamaia Boulevard, 124, 900527 Constanta, Romania; elena.condrea@univ-ovidius.ro
[6] Department of Management Sciences, Hazara University, Mansehra 21100, Pakistan; asadjaved@hu.edu.pk
[7] Department of Management, Birmingham Business School, University of Birmingham, Birmingham B15 2TY, UK; m.haffar@bham.ac.uk
* Correspondence: adriana.grigorescu@snspa.ro (A.G.); muhammadzahid.yusuf@gmail.com (Z.Y.); Tel.: +40-724-253-666 (A.G.); +92-321-980-4474 (Z.Y.)

**Abstract:** This study aims to explore the impact of technology orientation on innovation performance in the electronic industry operating in the digital economy. This study also investigates the mediating role of digital innovation (a special type of innovation that is based on digital technologies) in the relationship between technology orientation and innovation performance. Primary data, based on perception, was collected from operational managers of electronic firms. Correlation and regression analyses were used to test the direct relationship among digital innovation, innovation performance, and technology orientation. The stepwise regression model was used to check the indirect relationship (mediation analysis). Findings revealed that technology orientation is a major predictor of innovation performance in the electronic industry. Results show that digital innovation acts as a bridge between technology orientation and innovation performance. This study investigates the nexus of technology orientation, digital innovation, and innovation performance in electronic firms. This study contextualizes electronic firms for the achievement of innovation performance through digitalization and technology orientation, which is a dire need of the current decade.

**Keywords:** digital innovation; innovation performance; technology orientation; electronic sector



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## 1. Introduction

The technology orientation of electronic industry has gained significant attention from innovation researchers in recent years [1–4]. Despite differing opinions among researchers on the direct impact of technology orientation on firms' activities to achieve higher performance, the core idea is that firms that are familiar with research and development and the implementation of the latest technology are more likely to be technology-oriented [5]. Technology orientation is the firm's openness to new ideas and willingness to embrace new concepts [6]. Therefore, technology orientation is a critical element of innovation performance, particularly in the digital economy where technological advancements are more rapid [7].

Technology orientation provides new knowledge and creates new opportunities for innovation performance by generating new routes and renewed knowledge [8].Technology

plays a crucial role in driving innovation and generating new opportunities for businesses to improve their performance. With advancements in technology, companies can access new knowledge, tools, and resources to improve their products, services, and processes, or they can renew the systems in accordance to current digital transformation. There are various studies that have explored the direct relationship between technology orientation and innovation performance [9–11]. However, there is no study that has introduced digital innovation as a moderator in the aforesaid relationship. Thus, there is a literature gap that needed to be addressed. Furthermore, no such study has been conducted on electronic firms; this population gap will also be addressed in the current study. Furthermore, there is a need for further empirical research to better understand the role of digital innovation in moderating the relationship between technology orientation and innovation performance and the factors that influence this relationship. This empirical gap will also be addressed by the current research.

This study aims to explore the role of technology orientation in improving innovation performance in the electronic industry. The direct impact of technology orientation on innovation performance may be slight. Therefore, this study proposes digital innovation as a mediator in the link between technology orientation and innovation performance. To achieve sustained innovation performance, explicit research is required to investigate the influence of technology orientation on innovation performance through digital innovation.

This study fills the research gap by analyzing the nexus of technology orientation, digital innovation, and innovation performance. The findings of this study can help managers to implement theoretical knowledge into practice by gaining a deep understanding of both technology orientation and digital innovation. Electronic firms need innovative services and products to meet dynamic customer requirements through the latest knowledge [12]. Firms explore new information and create new technical solutions through digital innovation. Additionally, digital innovation becomes crucially important for firms to achieve their goals and compete, as seen since the 1990s with the first generation of IT, where firms have become more efficient in their internal operations while offering process innovation opportunities [13].

The electronic industry has been greatly influenced by the rapid advancements in technology, digital innovation, and innovation performance. In order to remain competitive in the market, firms are increasingly adopting digitalization and technological orientation strategies to improve their innovation performance [14–17]. These advancements have shortened product life cycles and increased the speed of innovation and product development rates, leading to changes in the nature of economic growth [18]. Businesses are now more focused on innovation approaches to maintain and attain competitiveness [19,20]. The implementation of technological orientation and digital innovation has become a central support for success in the electronic industry [21]. Consumers now prefer products and services that are based on the latest technology, which has motivated firms to acquire technical skills and implement the latest technology to offer novel and improved products [22,23]. Technological orientation supports firms in planning, production, and control by providing insights and adjustments in new technological development needs [24,25]. Without technology orientation, it is more difficult to achieve innovation performance, especially when firms are facing rapid changes in technology. Innovation performance refers to the application of a new productive method, the conquest of new sources, and the establishment and expansion of new firms in the industry [26].

Although several antecedents of innovation performance have been identified (e.g., [27–30]), the major determinant is technology orientation. Digital advancement knowledge is a prerequisite for the development of innovative products and implementation of the latest technology. To respond to the challenges of the latest technology, firms require different resources to assist them in their efforts to tackle advanced digital innovation.

This study investigates the impact of technology orientation on innovation performance through digital innovation in a competitive environment. It aims to offer an

innovation–performance paradigm to electronic firms for enhanced planning, invention, and management. The Figure 1 shows the innovation performance model.

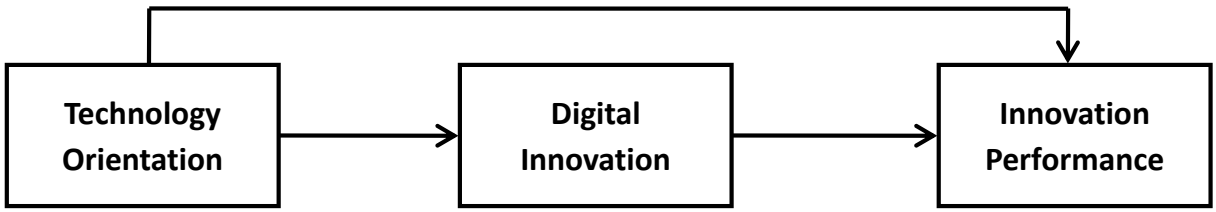


**Figure 1.** Theoretical framework.

## 2. Theoretical Foundation

For the current research, the resource-based view (RBV) theory provides the foundation, as this theory better explains the understanding of moderating the role of digital innovation in the relationship between technology orientation and innovation performance. According to RBV, a firm's resources and capabilities, including technology, are critical drivers of its performance and competitive advantage [31]. In this context, technology orientation can be considered as a firm's resource, which can be leveraged through digital innovation to enhance innovation performance [32].

Moreover, digital innovation can be viewed as a capability, which enables firms to better leverage their resources, including technology orientation, and gain a competitive advantage [33]. The RBV theory proposes that firms with strong resources and capabilities, such as technology orientation and digital innovation, are better positioned to achieve superior innovation performance [31].

Empirical studies have also supported the RBV theory in the context of digital innovation, technology orientation, and innovation performance. For instance, a study by Fang et al. [32] found that digital innovation has a positive impact on innovation performance, and that technology orientation can enhance this relationship. Similarly, a study by Meena and Sahu [34] found that digital innovation capabilities moderate the relationship between technology orientation and innovation performance, indicating the importance of digital innovation as a capability for enhancing innovation performance.

## 3. Literature Review

A detailed literature review is given below.

### *3.1. Technology Orientation (TO) and Innovation Performance*

TO is the adoption of the latest technology and its applications [35,36], and is also defined as the organization's responsiveness to new ideas or its capacity to accept new ideas through product development. Firms with an advanced level of technology orientation are capable of practicing new-fangled and sophisticated technologies to improve their innovation performance [37]. This is the age of digitalization, and businesses are depending on their familiarity with technologies [38]. This scenario will put those businesses that lack technological orientation in a disadvantageous position, i.e., they will not be able to leverage technologies for innovation performance [39]. Hence, digital concerns with high technological orientation can perform tasks better than those with diminutive levels of technology orientation [40]. A firm's innovating performance majorly depends on the level of its involvement in technology orientation-related activities [41]. TO helps in implementing the latest techniques as a combination of the potentials for attaining the targets of innovation performance. Thus, setting priorities and the right combination of competencies to the TO provides a competitive position that is sustainable and results in long-lasting innovation performance. TO is considered one of the important forms of strategic orientation that can rapidly build capabilities in an ever-changing technological climate that allows businesses to quickly adapt [42]. These skills of firms can be viewed as an indicator of innovation performance for achieving competitive advantages [43,44].

Innovation performance (IP) is the product of the knowledge base of an enterprise or a synthesis of knowledge, i.e., the recombination of existing and new information [45,46]. Ref. [47] acknowledged that innovative firms make investments and implement the latest technologies with the help of the TO strategy in terms of both radical and incremental innovation to attain innovation performance. TO encourages firms to achieve IP through acquiring the latest technology and services [48]. To cope with the latest technology, TO follows the "technological-push" approach, i.e., organization preferences for high-tech products and services [49]. By following the TO strategy, firms maintain relations with reputed vendors who support them in innovation performance and achieving long-run goals [50].

In addition, firms need a broad range of capabilities for highlighting the role of TO on IP [51]. Innovation performance uses an idea/creativity to enhance the procedure/product resulting in increased usefulness, significance, and performance of an organization [52]. Businesses should adapt innovation capability and TO to align their practices with the external world [53]. Literature shows that TO affects new product creativity on export performance [54], customer orientation, and sales performance [55]. These outcomes of TO set foundations for innovation performance [40]. The authors of [56] proposed that those firms that focus on customer orientation along with TO can use the latest technologies and innovation and have an edge over others. TO increases the intelligence scope and mutual knowledge which ensures that firms can utilize such information for effective innovation performance [57–59]. TO is an essential strategy for all firms to compile the targets of innovation performance and create an enduring interest in innovations [38]. Innovation performance can be seen as a result of a firm's TO, and it is a force that pushes firms into digitalization, which ensures innovation performance.

**H1.** *Technology orientation is positively associated with innovation performance.*

### *3.2. Technology Orientation and Digital Innovation*

Digital innovation is defined as the application of digital technology into existing business operations to solve problems [60]. A digitized business seeks out new ways of solving problems [61]. Digital innovation requires rapid change and a comprehensive use of digital expertise to improve infrastructure, products, and processes. The authors of [35] defined digital innovation as the development of novel mixtures of numerical and physical mechanisms to create new services. By contrast, it is more broadly described in relation to both the design phases and outcomes. For instance, Ref. [62] described it as the creation of (and resulting variation in) marketplace contributions, commercial processes, and/or copies that result from the use of digital knowledge.

In today's world, large and small firms have initiated efforts to incorporate digital innovation as a pillar of generating value creation in their organizations [62]. Technology orientation introduced digital innovation by generating new possibilities for invention [63]. Firms improve digital innovation with the help of new techniques and skills learned through technology orientation. These advancements in digital innovation enable organizations to implement novel business prototypes and improve existing ones. Technology orientation offers a platform to establish digital innovation to face the changes in the market and firms' environments, according to [5]. Digital innovation is constantly used in generating value by conceptualizing the digital focus. As the world evolves with new technologies including AI, 5G networks, IoT, VR, etc., the idea of digital innovation cannot be overlooked at any cost [62]. Moreover, with the innovation of numerical technology, the usefulness of traditional product innovations has reduced [64]. Therefore, the successful implementation of digital innovation cannot be possible without employing the technological orientation strategy [63]. Firms are gradually adopting an open approach to technology, engaging staff with their practical skills to advance the complete procedure in digital innovation [65]. In the previous literature related to technology orientation, most studies examined its impact on firm performance (see, for example, [49,66,67] on product performance). However, the impact of technology orientation on digital innovation is neglected, which should be

taken into account because of the frequent and rapid changes occurring in technology. Organizations that acquire new and latest technology may be more innovative [67] and the next step ahead for expertise direction.

Digital innovation has quickly changed the way people live, work, and communicate. This shift of change is weightier in electronic firms, and those organizations which keep them informed about the latest technology can conveniently develop digital innovation. Contemporary investigations indicate that these digital innovations can generate distinguished gains in overall business improvements through technology orientation. Businesses are increasingly focused on launching and developing digital innovations due to their revolutionary impact on business success [67]. However, the implementation of these digital innovations does not occur automatically and depends on many factors [55]. One of the most important factors for the activation of digital innovation in firms' efforts is technology orientation [53]. The increased level of technology orientation will lead to higher digital innovations. This deliberation is more profound in local-level electronic firms, where technology orientation is actually required instead of theorizing. In this study, we build our argument that technology orientation is the first element that prospers digitalization. Digital innovation is rooted in technology orientation, and firms need to learn more about technology before launching digital innovation [43]. We propose that digital innovation is an outcome of technology orientation. The authors of [47] stated that digital innovation initiated through technology orientation is a procedure of joining digital and corporal workings to create new strategies, facilities, or corporate models, pushing them to create and empower fair contributions, and surrounding them in broader socio-practical situations to allow their distribution, action, and practice. As technology orientations are drivers of digital innovation in electronic firms, the researchers call for research on firms' acceptance of the newest technology.

**H2.** *Technology orientation is directly linked with digital innovation.*

### *3.3. Digital Innovation and Innovation Performance*

Digital innovation helps us to find new methods to solve business problems, hence causing innovation performance to transform its product according to the market competitive environment [37]. Digital innovation is an imperative factor used for improving innovation performance in a competitive environment. Innovation performance majorly depends on firms' ability to grow to achieve its overall strategic goals through digital technologies [9]. The authors of [44] emphasized that companies that possess digital innovation are better equipped to achieve innovation performance with greater ease. Furthermore, Ref. [9] acknowledged that innovation performance is the implementation of a new production process through technological orientation and the acquisition of new sources through digital innovation processes. In addition, [62] acknowledged that the innovation performance of a firm depends on its capabilities of acquiring digitalization and technological skills.

Researchers show frameworks for improving and diagnostic procedures of digital products by using a digital innovation strategy to set the basis for innovation performance. The authors of [42] highlighted that, in terms of utilizing digital innovation, advanced firms can attain additional gains and grow earlier. These gains and the digitalization process are very helpful for achieving innovation performance. Digital innovation became a competitive resource in the innovation process as it offers an intensive use of knowledge [60]. Such knowledge of innovative digitalization appeared as a major antecedent of innovation performance. Through simplifying collective activities and promoting the exchange of internal and external information, digital innovation leads to enhancing the innovativeness of businesses [27]. In a nutshell, digital innovation is considered the perfect tool for bringing a boost in innovation performance [11] as well as a supporting technology that can be used strategically [21]. Practical management has to face a number of difficulties while facing the real challenges of technological advancement and rapid innovations [8]. The digitalized world has changed the pace of work for local-level firms, and the only survival of these

firms is to stabilize in business through improved innovation performance [36], and this innovation performance is largely dependent on digital innovation.

**H3.** *The relationship between digital innovation and innovation performance is positive.*

### 3.4. Digital Innovation as Mediator

Digital innovation mediates the relationship between TO and innovation performance. Technology orientation helps local firms adapt to the latest technology and understand its consequences [41]. The actual role is played by digital innovation initiated through TO in achieving innovation performance [15]. TO expands a firm's skills to use technology-based resources and improve technical means by accessing reliable information sources and partner knowledge [52]. This information enables firms to stay uptodate and learn about digital innovation. TO is used to achieve long-term business goals by introducing new technology, products, and services. The authors of [47] also highlighted the importance of TO, which has been the most executable and important option available to companies in recent decades. Therefore, many companies have achieved significant success following TO [5]. The value of TO has been extensively recognized in terms of organizational performance. However, how TO can affect any organization's innovation performance has received very minimal attention, because we cannot predict innovation performance directly from TO over a longer period. This implies that TO cannot affect innovation performance directly; there must be some driving factor through which TO can affect innovation performance. Through that mechanism, an organization can improve its products/services and bring innovativeness to the organization. The best possible factor which has not previously been considered is digital innovation. Organizations having a higher level of technological orientation perform well because they can easily mold themselves to rapid changes in technology [51]. To the best of our knowledge, this revision is the primary result that explains the mediating part of digital innovation that shows how digital innovation bridges the gap between TO and innovation performance.

Technologically oriented firms are more enthusiastic in developing digital innovation to achieve the targets of innovation performance [60]. Dynamic changing technologies have changed the operational mechanisms of local firms. These firms need to orient their management about the latest technology for launching digital innovations. Digital innovation provides novel ideas to solve existing and potential problems and achieve innovation performance [67]. Firms at the local level prefer to develop digital innovation using a TO strategy and ultimately achieve innovative performance. Hence, technologically oriented firms dedicate their resources to the acquisition of innovative technology/products and provide a basis for digital innovation [58]. This digital innovation is very helpful for sustaining innovation performance. Technologically oriented organizations are more likely to enjoy sustainable revenue and effectiveness for improved digital innovation, and perform innovatively.

**H4.** *Digital Innovation mediates between technology orientation and innovation performance links.*

## 4. Methodology

This study is cross-sectional in nature; the philosophical stance of the current empirical study is positive. The data were collected through questionnaires. Detail is given as follows.

### 4.1. Data Collection

Electronic firms play a vital role in the economy and provide valuable services. In this study, data was collected from electronic firms. The aim was to obtain a representative sample size, and a list of 3218 electronic firms was acquired through various means. With the population of several countries on the rise, there is increasing demand for employment opportunities, better living standards, revenue generation, and economic growth. In the current decade, developed nations have begun to focus on the important role of electronic firms in their development.

The data was collected from electronic firms that fulfilled three criteria: first, the firms had to have been operating for the past five years; second, the number of employees had to be greater than 50; and third, the firms were required to have a complete office setup, including addresses and postal and email details, as well as contact information.

The data collection process was conducted in two steps. During the first step, five trained research assistants were hired to assist in approaching owners, CEOs, and managing directors. However, despite their efforts, most respondents were not interested in participating in the research. Consequently, a final list of 589 respondents who agreed to participate was compiled. In the second step, questionnaires were sent via email and mail to these 589 respondents, along with a cover letter. Of the total questionnaires sent, 459 were returned, and 428 of those were considered usable. The details of the final sample and the total number of firms are presented in Table 1.

**Table 1.** Electronic firms.

| Details | Population | Sample | % |
|---|---|---|---|
| Computer accessories andother IT equipment | 474 | 47 | 9.92 |
| Services equipments | 321 | 58 | 18.07 |
| Optical instruments | 435 | 89 | 17.00 |
| Office machinery and computers | 311 | 91 | 29.26 |
| Machinery and equipments | 456 | 49 | 10.75 |
| Electrical machinery, TV, and communication | 426 | 33 | 7.75 |
| Transportation material | 795 | 61 | 7.67 |
| Total | 3218 | 428 | 100 |

The questionnaire was divided into two sections; section one asked three questions regarding respondent education, experience, and age. The details of the demographics are presented in Table 2. Section two contained questions about digital innovation, technology orientation, and innovation performance. Each item was evaluated using five-point Likert scale from "*Strongly Disagree = 1*" to "*Strongly Agree = 5*".

**Table 2.** Respondent experience, education, and age.

| **Experience Details** | **Frequency** | **%** | **Cum. %** |
|---|---|---|---|
| Below 10 Years | 55 | 12.791 | 12.791 |
| 10–15 Years | 112 | 26.047 | 38.837 |
| 15–20 Years | 124 | 28.837 | 67.674 |
| Above 20 Years | 139 | 32.326 | 100 |
| Total | 430 | 100 | 100 |
| **Education** | | | |
| **Education Details** | **Frequency** | **%** | **Cum. %** |
| Intermediate | 35 | 8.178 | 8.178 |
| Graduation | 232 | 54.206 | 62.383 |
| Master's | 148 | 34.579 | 96.963 |
| PhD | 13 | 3.037 | 100 |
| Total | 428 | 100 | 100 |
| **Age** | | | |
| **Age Details** | **Frequency** | **%** | **Cum. %** |
| 25 to 30 years | 55 | 12.850 | 12.850 |
| 31 to 35 years | 98 | 22.897 | 35.748 |
| 36 to 40 years | 148 | 34.579 | 70.327 |
| Above 40 years | 127 | 29.673 | 100 |
| Total | 428 | 100 | 100 |

### *4.2. Measures*

To ensure the reliability and validity of the scales employed in current study we used pre-checked constructs of the prior research. The measures have been adapted by following the guidelines of Anderson and Gerbing.

#### 4.2.1. Independent Variable

For the measurement of technology orientation, a four-item scale was adapted from the study of [68].

#### 4.2.2. Mediating Variable

The digital innovation was determined through a six-itemscale, which was adapted from the prior research of [69].

#### 4.2.3. Dependent Variable

To measure innovation performance, an eleven-item scale was used, which was adapted from the work of [70]. Detailed measures are presented in Appendix A.

Due to the fact that all measurement scales employed in the study were self-reported, extra care was required to determine how common-method bias would have an impact. A Harman test for common-method bias was used to achieve this. According to this approach, if there is a sizable amount of common-method variance (CMV), either a single factor will show up in the factor analysis or a single, general factor will account for the majority of the covariance between the variables. We conducted an exploratory factor analysis with all the items from each of the constructs to ascertain the number of factors needed to explain the variance in the variables. The variables were restricted from rotating. Instead of a single factor, the factor analysis revealed the presence of 19 different factors, each with an eigenvalue larger than 1.0. The greatest factor only explained 14% of the variance, whereas the remaining 18 factors accounted for 51% of the total variance. Thus, it can be said that common-method bias was not a major issue in this study.

## 5. Analysis

To test the hypotheses of the study, we used descriptive methods, regression analysis, and correlation. To examine the mediation of digital innovation, this study utilized the Baron and Kenney approach. Additionally, we used an additional analysis called "Process", designed by [71,72], to test mediation. Discriminant validity was tested following the guidelines of [73]. All construct reliabilities were checked using the value of Cronbach's $\alpha$. CFA outcomes showed that this model fits the data (please refer to Table 3). We checked the distinctiveness of the variables, i.e., technology orientation, digital innovation, and innovation performance. A baseline three-factor hypothesized model and two alternative models were designed to determine which model was better [74]. Findings presented in Table 3 demonstrate that the three-factor model is a good fit.

**Table 3.** CFA Results.

| Model | χ2 | Df | χ2/df | RMESA | GFI | CFI |
|---|---|---|---|---|---|---|
| Hypothesized three-factor model | 923.65 | 324 | 2.85077 | 0.04 | 0.95 | 0.94 |
| Two-factor model | 986.27 | 298 | 3.30963 | 0.12 | 0.88 | 0.87 |
| Single-factor model | 997.52 | 274 | 3.64058 | 0.27 | 0.74 | 0.73 |

*Operational Measurement, Reliability, and Validity*

The values of factor loadings were more than 0.80 and AVE ranged from 0.71 to 0.86, which proves convergent validity. Discriminant validity was proven through a constrained CFA model for all potential pairs of latent constructs and connection fixing between paired variables at 1.0. When compared with the unconstrained model with freely anticipated associations among variables, the $\chi^2$ differences were significant with $p < 0.001$,

thus proving discriminant validity. The values of factor loading, alpha, CR, and average variance extracted are shown in Table 4.

**Table 4.** Alpha, CR, and AVE results.

| Variables Details | FL | Alpha | CR | AVE |
|---|---|---|---|---|
| ***Technology Orientation*** | | 0.85 | 0.92 | 0.76 |
| TechOri1 | 0.79 | | | |
| TechOri2 | 0.81 | | | |
| TechOri3 | 0.82 | | | |
| TechOri4 | 0.84 | | | |
| **Digital Innovation** | | 0.86 | 0.93 | 0.75 |
| Dig-Inno1 | 0.83 | | | |
| Dig-Inno2 | 0.81 | | | |
| Dig-Inno3 | 0.82 | | | |
| Dig-Inno4 | 0.79 | | | |
| Dig-Inno5 | 0.84 | | | |
| Dig-Inno6 | 0.83 | | | |
| **Innovation Performance** | | **0.87** | **0.95** | **0.78** |
| Innov-Perfor1 | 0.82 | | | |
| Innov-Perfor2 | 0.81 | | | |
| Innov-Perfor3 | 0.83 | | | |
| Innov-Perfor4 | 0.78 | | | |
| Innov-Perfor5 | 0.79 | | | |
| Innov-Perfor6 | 0.84 | | | |
| Innov-Perfor7 | 0.81 | | | |
| Innov-Perfor8 | 0.83 | | | |
| Innov-Perfor9 | 0.78 | | | |
| Innov-Perfor10 | 0.79 | | | |
| Innov-Perfor11 | 0.81 | | | |

Outcomes of mean, standard deviation, and correlation are illustrated in Table 5. Outcomes proved our theory, and all variable of study shows significant results. Technology orientation and digital innovation have a significant association ($r$ = 30). Technology orientation and innovation performance have a significant relationship ($r$ = 30). Digital innovation and innovation performance have a significant correlation ($r$ = 36).

**Table 5.** Mean, SD and Correlations.

| Variable | | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Age | 2.25 | 0.65 | 1.00 | | | | | |
| 2 | Experience | 2.37 | 0.68 | 0.11 | 1.00 | | | | |
| 3 | Education | 2.41 | 0.69 | 0.12 | 0.11 | 1.00 | | | |
| 4 | Technology orientation | 3.27 | 0.71 | 0.09 | 0.02 | 0.03 | 1.00 | | |
| 5 | Digital innovation | 3.31 | 0.75 | 0.06 | 0.04 | 0.05 | 0.34 ** | 1.00 | |
| 6 | Innovation performance | 3.48 | 0.73 | 0.08 | 0.07 | 0.11 | 0.30 ** | 0.36 ** | 1.00 |

** = significant.

Table 6 explains the outcomes of the hypotheses testing. H1 was accepted because the results confirmed that technology orientation is significantly linked with innovation performance (beta = 0.29, $p$-value = significant). Results of H2 showed that technology orientation is directly and significantly connected with the digital innovation (beta = 0.32, $p$-value = significant). H3 was also accepted as digital innovation is optimistically correlated with IP (beta = 0.43, $p$-value = Significant). To analyze the mediation of digital innovation, we followed the guidelines of Baron and Kenney (1981). This approach tests mediation through four steps. Step 1 showed a significant relationship between the IV (independent variable) and DV, i.e., confirmed in H1. Step 2 shows a significant association between the IV and mediator, which is proved in H2. Step 2 presents a significant relationship between

the mediator and DV, which is proved in H3. Finally, step 4 presents that the impact of the IV on DV must be decreased or insignificant when mediator is controlled. Results in Table 4 explain that the influence of technology orientation on IP has been reduced from (beta = 0.29, *p*-value = significant) to (beta = 0.10, *p*-value = insignificant), hence proving our H4: that digital innovation fully mediated the link between TO and IP.

**Table 6.** Results of testing H1, H2, H2, and H4.

| H | Details | F-Value | T-Value | Beta | Sig (Less than) | Remarks |
|---|---|---|---|---|---|---|
| 1 | Tech Ori → Innovation Performance | 27.245 | 8.956 | 0.291 | 0.001 | Accepted |
| 2 | Tech Ori → Digital Innovation | 35.824 | 9.235 | 0.326 | 0.001 | Accepted |
| 3 | Digital Innovation → Innovation Performance | 125.88 | 14.247 | 0.431 | 0.001 | Accepted |
| 4 | Tech Ori → Digital Innovation → Innovation Performance | 65.321 | 11.264 | 0.107 | 0.053 | Accepted |
| | | | | 0.384 | 0.001 | |

The mediating role of digital innovation between technology orientation and innovation performance is shown in Figure 2.

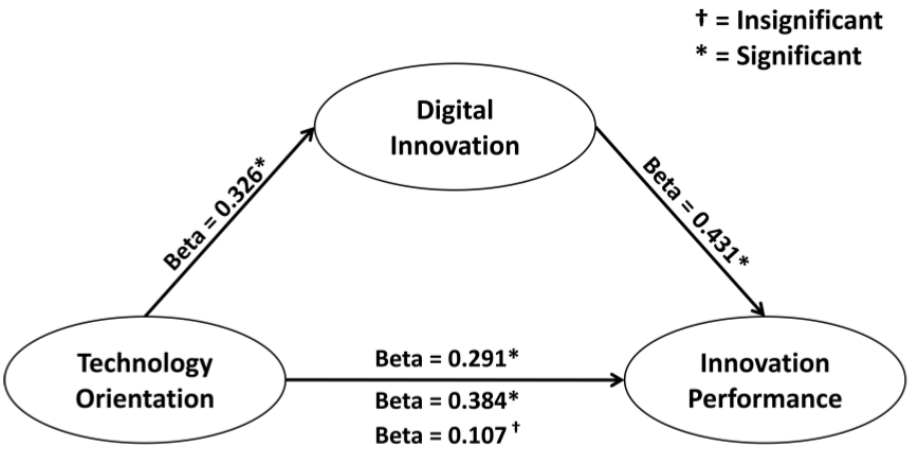


**Figure 2.** Mediation by Digital Innovation.

The Baron and Kenney approach shows the mediation test through the evaluating regression model; however, these techniques do not show the indirect effect. Hence, we used Preacher and Hayes' [75,76] approaches to find out the indirect effect of digital innovation. The results are presented in Table 7. The results of the indirect effect shows are significant, proving that digital innovation acts as mediator between technology orientation and innovation performance (beta = 0.1927, *p*-value = 0.000. LLCI = 0.3251, ULCI = 0.3874). An additional Sobel test using the normal theory test was conducted to evaluate the mediating role of digital innovation. The results proved that digital innovation fully mediates the link between technology orientation–innovation performance (Z = 9.472. *p*-value = 0.001).

**Table 7.** Testing direct and indirect effects of digital innovation mediator).

| Independent | Innovation Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total-Effect (c) | | | | Direct-Effect (c′) | | | | Indirect-Effect(c-c′) Normal Theory Test | | | | | |
| | *B* | *SE* | *T* | *Sig* | *β* | *SE* | *t* | *Sig* | *B* | *SE* | *Z* | *Sig* | *LLCI* | *ULCI* |
| **Network Capability** | 0.2859 | 0.343 | 15.86 | 0.000 | 0.0942 | 0.0721 | 0.6231 | 0.512 | 0.1927 | 0.715 | 9.472 | 0.000 | 0.3251 | 0.3874 |

## 6. Discussion

This study proposed four hypotheses. According to our hypothesis 1, the results show that technology orientation brings innovation performance in organizations. This study conceded that every business organization faces difficult situations due to dynamic changes in customer need and technology development. Our hypothesis has been accepted because the relevant practical management shows that technology orientation is necessary to achieve innovation performance. Our finding shows that every modern organization should focus on technology orientation to reach innovation performance as well as to grow effectively with respect to competitiveness. Similar results are also reported by [77,78]. The second hypothesis proposed that technology orientation predicts digital innovation. Results proved that digitalization is based on firms learning about the latest technological advancements. Similar results are reported by other studies [79–82]. Regarding hypothesis three, our results proved that digital innovating positively and significantly predicts innovation performance. Studies of [82,83] also support this result. Hypothesis four of this research portrays the mediating role of digital innovation among technology orientation and innovation performance. Digital innovation was considered as a mediator between technology orientation and innovation performance, and it acts as a bridge amongst these two variables. The results of our second hypothesis lived up to the expectations and have been accepted.

### *6.1. Theoretical Implication*

This research contributes to the theory in many ways. *First*, this research adds valuable information about technology orientation for achieving innovation performance. Our findings support the general notion about the learning mechanism that innovation performance is an ever-changing phenomenon and that learning through technology orientation can help digital concerns. *Second*, this study contributed to expanding the literature on digital innovation. Our findings contribute to literature by adding the interplay between technology orientation and innovation performance. *Third*, a major addition of this study to theory is the explanation of link between digital innovating and innovation performance. *Fourth*, using the RBV lens, the study proved the importance of technology orientation and digital innovation for improving innovation performance. The *last* major contribution and theoretical implication of this research is exploring the mediating role of digital innovation. There is hardly any evidence in the literature about the intervening role of digital innovation in the relationship between technology orientation and innovation performance.

### *6.2. Practical Implication*

This research focused on a practical issue faced by electronic firms, i.e., the dynamics of technologies and digitalization. The findings are very helpful for management and research practitioners. *First*, this research highlighted that in this dynamic world, businesses need to focus on the latest knowledge and technologies. As the world is fast paced and technologies are changing every day, acquiring relevant information is necessary. This study proved that technology orientation is a key success factor for initiating advancement and innovation, as well as other influencing factors [84,85]. It is very helpful for electronic firms to plan and control technological advancement by focusing on the bright harmony of technology orientation. Management can control the production mechanisms involved in innovation performance through technology orientation.

*Second*, businesses have a common motive of earning profit, and this profitability is majorly dependent on a large number of customers. Digitalization has changed the way of doing business from the traditional to the modern way. Our research has highlighted that advanced technology reforms enable businesses to flourish in digital innovation. Management, in practice, cannot stop the ever-changing market demands in this digitalization arena, so businesses must orient themselves with the latest technology to cope with the requirements of digital innovation. Firms with strong orientations about the latest tech-

nology can yield digital innovation. Hence, our study suggests that managers should pay proper attention to digital innovation through learning about technological advancement.

*Third*, the success of electronic firms is reliant on the newest methods and processes to achieve innovation performance. Our study provided two major antecedents of innovation performance in terms of technology orientation and digital innovation. Our research suggests that digitalization is pertinent to establish innovation performance. Hence, managers and practitioners must consider digital innovation and launch the newest (computerized) machineries for controlling the production mechanism. The latest technology has replaced labor with robots, and most of the work is done through electronic machines. This advancement is ever-changing, and now only those electronic firms which are equipped with the latest technologies can perform better. Finally, this study helps operational management by providing a comprehensive model to attain innovation performance.

### *6.3. Limitations and Future Directions*

This is a quantitative research based on a cross-sectional research design. It is suggested that future research should be conducted using longitudinal research designs. For example, cross-functional studies could be developed for companies to improve their management framework [86]. This research has been conducted in the electronic industry only. The same research model should be analyzed in other manufacturing sector as well as in the service sector to generalize the findings and test the model's validity in different contexts. Similarly, cross-cultural studies can also be conducted to genialize the model of the study. The study used primary data collected from employees, based on their perceptions. Studies with qualitative stance can be utilized for improving the validity of the model. Lastly, the study used single independent, dependent, and moderating variables. Adding variables such as innovation training, innovation orientation, etc., could help capture more information.

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## Appendix A

Scale used.

### *Appendix A.1. Technology Orientation*

- I feel comfortable using new technologies.
- I like to try out new technological devices and software.
- Our organization invests in and maintains up-to-date technological infrastructure.
- Our organization values and rewards technological innovation and creativity.

*Appendix A.2. Digital Innovation*

- Our organization has a clear and compelling vision for digital innovation.
- Our organization provides the necessary resources and support for digital innovation.
- Our organization has formal and informal channels for sharing digital innovation ideas.
- Our organization is willing to experiment with new digital innovation ideas.
- Our employees are rewarded for taking risks in digital innovation.
- Our organization's digital innovation efforts are focused on meeting customer needs and preferences.

*Appendix A.3. Innovation Performance*

- Our organization has a clear innovation strategy.
- Our organization encourages and rewards employees for innovative ideas.
- Our organization has a structured process for idea generation and selection.
- Our organization has a culture that supports experimentation and risk-taking.
- Our organization invests in R&D activities to stay ahead of the competition.
- Our organization has a dedicated innovation team or department.
- Our organization collaborates with external partners (e.g., startups, universities) to foster innovation.
- Our organization has a mechanism for tracking and measuring the success of innovation projects.
- Our organization provides training and development opportunities for employees to enhance their innovation skills.
- Our organization has a system for capturing and managing intellectual property generated from innovation projects.
- Our organization has a budget allocated specifically for innovation activities.
- Our organization has a process for scaling successful innovation projects across the organization.

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