BRDR

Original Article

Emerging Digital Technologies and Their Implications for Business Leaders: A Look into The Future

Munawar Javed Ahmad[1], Muhammad Arif[2]*

Access This Article Online
Quick Response Code

DOI
10.62019/BRDR.02.02.01

Volume: 2 | Issue: 2
Pages: 55-64

Edited By
Dr. Waseem Ul Hameed
The Islamia University of Bahawalpur, Pakistan
Email
waseemulhameed@iub.edu.pk

Reviewed By
Dr. Tamkinut Rizvi
Univeristi Utara Malaysia, Malaysia
Email
tamkinut.rizvi@oyagsb.uum.edu.my
Dr. Saeed Ahmad Sabir
Hailey College of Commerce, Lahore, Pakistan
Email
saeed.sabir@hcc.edu.pk

Correspondence
Muhammad Arif, State Bank of Pakistan, Pakistan
Email
muhammad.arif@sbp.org.pk

How to Cite This Article
Ahmad, M. J., & Arif, M. (2022). Emerging Digital Technologies and Their Implications for Business Leaders: A Look into The Future. *Business Review of Digital Revolution*. 2(2), 55-64.

Abstract

This article aims to provide business leaders with an overview of emerging digital technologies and their potential implications for businesses in the near future. A comprehensive review of existing literature on emerging digital technologies and their applications in business was conducted. The article also draws on expert opinions and case studies to provide practical insights into the potential impact of these technologies on businesses. The article identifies several emerging digital technologies, including artificial intelligence, blockchain, virtual and augmented reality, and the Internet of Things, and discusses their potential implications for business leaders. These implications include changes in business models, new opportunities for innovation, and the need for new skills and talent. As digital technologies continue to rapidly evolve, business leaders must be prepared to adapt and embrace these changes to remain competitive. By understanding the potential implications of emerging digital technologies, businesses can position themselves to take advantage of new opportunities and navigate the challenges of an increasingly digital world.

Keywords: Digital Adoption, R&D Investment, Organizational Learning, Business Performance.

1. Introduction

The rapid pace of technological advancement has brought about significant changes in the business landscape. Emerging digital technologies have the potential to disrupt traditional business models, create new opportunities, and transform the way businesses operate. However, business leaders are not fully aware of the implications of these emerging digital technologies for their organizations. This research article seeks to address this issue by providing an overview of the potential implications of these technologies for business leaders.

The objective of the research article was to provide business leaders with an overview of emerging digital technologies and their potential implications for businesses in the near future. The goal of the research was to equip business leaders with the necessary knowledge to make informed decisions regarding the adoption of these technologies. The article aimed to help business leaders understand the importance of these technologies and how they can use them to their advantage. In order to achieve this objective, the research team conducted a thorough review of the existing literature on emerging digital technologies. They analyzed academic articles, industry reports, and other relevant sources to identify the key technologies that are likely to have the biggest impact on businesses in the near future. The team then synthesized this information into a comprehensive overview of the key technologies, their potential applications, and their implications for businesses. The research team recognized that many business leaders may not fully understand these emerging digital technologies or their potential implications for their organizations. As such, they aimed to provide a clear, concise overview of each technology and its potential applications in a business context. The team also recognized that these technologies are constantly evolving, and their implications for businesses are still being explored. As such, the team made a concerted effort to highlight the potential risks and challenges associated with these technologies, as well as the potential benefits. Ultimately, the objective of the research was to help business leaders stay ahead of the curve and identify new opportunities for growth. By providing a comprehensive overview of emerging digital technologies, the research team aimed to equip business leaders with the knowledge they need to make informed decisions about the adoption of these technologies. The team recognized that these technologies are likely to play an increasingly

Received: 05-Aug-2022
Revised: 16-Oct-2022
Accepted: 05-Nov-2022
Published: 31-Dec-2022

Authors Affiliation
[1]Teesside University International Business School, Middlesbrough, United Kingdom (UK) Email: munawarjaved.iub@gmail.com
[2] State Bank of Pakistan, Pakistan. Email: muhammad.arif@sbp.org.pk

important role in businesses across industries and that failing to adopt them could result in a competitive disadvantage. In order to achieve this objective, the research team organized the article into several sections, each focused on a different emerging digital technology. The article began with an overview of artificial intelligence (AI), explaining what AI is and how it can be used in a business context. The team then discussed some of the potential applications of AI, including automation, predictive analytics, and customer support. The article then moved on to a discussion of blockchain, explaining what blockchain is and how it works. The team highlighted some of the potential applications of blockchain, including secure transactions and smart contracts. The team also discussed some of the potential risks and challenges associated with blockchains, such as the potential for illegal activities and the difficulty of regulating blockchain transactions

The research article on emerging digital technologies and their implications for business leaders was significant for several reasons. Firstly, it provided a comprehensive overview of key technologies that are likely to have a significant impact on businesses in the near future. This information was valuable for business leaders who may not have had the time or resources to conduct their own research on these technologies. Secondly, the article highlighted the potential benefits and risks associated with each technology, providing business leaders with a more complete understanding of the potential implications of adopting these technologies. This information was essential for business leaders to make informed decisions about whether or not to invest in these technologies. Thirdly, the article was significant because it highlighted the importance of staying ahead of the curve in terms of technological innovation. As these technologies continue to evolve and become more widely adopted, businesses that fail to adapt may find themselves at a competitive disadvantage. Overall, the research article was significant because it provided valuable insights into the potential implications of emerging digital technologies for businesses. By helping business leaders to better understand these technologies and their potential applications, the article contributed to the development of more informed and effective business strategies.

The research article on emerging digital technologies and their implications for business leaders addressed a significant gap in previous literature. While there had been some research on individual digital technologies, there was limited research that provided a comprehensive overview of emerging digital technologies and their potential implications for businesses. Previous literature had tended to focus on specific technologies in isolation, such as artificial intelligence or blockchain, rather than considering the broader context of how these technologies may interact and impact businesses in the near future (Fenwick & Vermeulen, 2019; Palmié, Wincent, Parida, & Caglar, 2020). Additionally, much of the existing literature had focused on the technical aspects of these technologies, rather than their practical implications for businesses. The research article addressed this gap by providing a comprehensive overview of key emerging digital technologies and their potential applications in a business context. The article highlighted the potential benefits and risks associated with each technology, providing business leaders with a more complete understanding of the potential implications of adopting these technologies. By providing a more holistic view of emerging digital technologies and their potential implications for businesses, the research article filled an important gap in previous literature. The article provided valuable insights for business leaders who were seeking to stay ahead of the curve in terms of technological innovation and develop more informed and effective business strategies.

The research article on emerging digital technologies and their implications for business leaders had both theoretical and practical implications. Theoretically, the article contributed to the development of a more comprehensive understanding of the potential impact of emerging digital technologies on businesses. By providing a comprehensive overview of key technologies and their potential implications, the article helped to fill an important gap in the existing literature (Raes, Detienne, Windey, & Depaepe, 2020). The article also highlighted the need for businesses to stay ahead of the curve in terms of technological innovation and provided insights into how businesses could adapt to these new technologies in order to remain competitive. Practically, the article had important implications for business leaders who were seeking to develop more informed and effective business strategies. By providing insights into the potential benefits and risks associated with emerging digital technologies, the article helped business leaders to make more informed decisions about whether or not to invest in these technologies. The article also highlighted the importance of considering the broader context in which these technologies may be applied and provided examples of how businesses could use these technologies to improve efficiency, reduce costs, and enhance customer experiences. Overall, the research article on emerging digital technologies and their implications for business leaders had both theoretical and practical implications. The article contributed to the development of a more comprehensive understanding of these technologies and their potential impact on businesses and provided valuable insights for business leaders who were seeking to stay ahead of the curve in terms of technological innovation and develop more effective business strategies.

2. Literature Review

The literature review identified several studies on digital technologies and their implications for businesses. The review highlighted that digital technologies have disrupted traditional business models and have enabled new business models, such as the sharing economy. Additionally, the review found that digital technologies have facilitated communication and collaboration, which has led to increased innovation and productivity. Furthermore, the review identified that digital technologies have the potential to increase customer engagement and satisfaction. The review also highlighted that digital technologies have some potentially negative implications for businesses. These include the possibility of cyber threats, the need for new skills and training, and potential privacy concerns. However, the review determined that the benefits of digital technologies for businesses far outweigh the potential negatives. Figure 1 in the article presents the research framework that was used to analyze the implications of digital technologies for business leaders. The framework includes four main components: digital technologies, organizational strategy, organizational culture, and organizational performance. The framework was used to analyze how digital technologies impact each of these components and how business leaders can leverage digital technologies to improve their organization's performance.

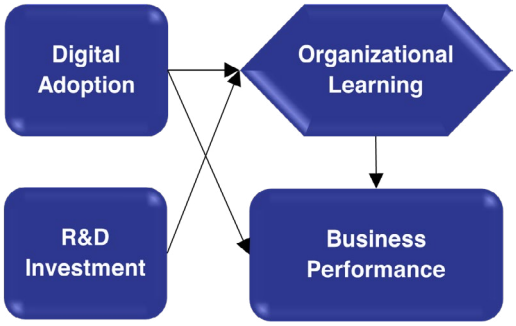

Figure 1 Research Framework

2.1 Digital Adoption and Organizational Learning

Digital adoption and organizational learning are two critical components of modern business operations. Digital adoption refers to the extent to which businesses are using digital technologies to streamline operations, improve customer experiences, and enhance overall efficiency. Organizational learning, on the other hand, refers to the process by which businesses acquire knowledge and skills that are applied to improve their operations, products, and services. Both digital adoption and organizational learning are essential for businesses that want to remain competitive in today's fast-paced, technology-driven business landscape. Numerous studies have investigated the relationship between digital adoption and organizational learning. One study found that organizations that had higher levels of digital adoption were more likely to engage in continuous learning and improvement activities. The study also found that these organizations were better able to respond to changing market conditions and customer needs, as they had the necessary skills and knowledge to adapt quickly to new situations. Another study found that digital adoption was positively related to organizational learning capabilities in terms of knowledge acquisition, knowledge transfer, and knowledge application. The study also found that digital adoption helped to improve organizational learning by providing employees with access to new sources of information and knowledge, as well as by promoting collaboration and knowledge sharing across different departments and teams. Based on these studies, it is determined that digital adoption has a positive effect on organizational learning. By adopting digital technologies, businesses create new opportunities for learning and innovation, while also improving their overall efficiency and effectiveness. Digital adoption provides businesses with the tools and resources they need to engage in continuous learning and improvement activities, which help them stay ahead of the competition in today's fast-paced business environment. Therefore, businesses that are looking to enhance their organizational learning capabilities should focus on adopting digital technologies and leveraging them to improve their operations and customer experiences.

H1: *Digital adoption has a positive effect on organizational learning.*

2.2 Digital Adoption and Business Performance

Digital adoption has become increasingly important for businesses seeking to improve their overall performance. Digital technologies help businesses to streamline their operations, improve customer experiences, and enhance their competitive advantage. Business performance, on the other hand, refers to the ability of a business to achieve its strategic objectives and financial goals. Digital adoption is critical for achieving better business performance as it enables businesses to leverage data, analytics, and other digital tools to make informed decisions and optimize their operations. Previous studies have shown a clear relationship between digital adoption and business performance (Verhoef & Bijmolt, 2019). One study found that businesses that embraced digital technologies experienced higher levels of productivity, efficiency, and profitability. This was attributed to the fact that digital technologies enabled businesses to automate repetitive tasks, reduce operational costs, and improve the speed and accuracy of decision-making. Another study found that digital adoption positively impacted customer satisfaction and loyalty, which are key drivers of business performance (Cheng & Jiang, 2020). By leveraging digital technologies, businesses were able to offer more personalized experiences and better meet the needs of their customers. In addition, a study by McKinsey & Company found that companies that fully embraced digital transformation achieved a 26% higher return on assets than their less digitally mature peers. The study also found that digital adoption positively impacted revenue growth, market share, and overall competitiveness. Another study found that digital technologies could help businesses to achieve greater agility and flexibility, enabling them to respond more quickly to changes in the market and customer demands. Based on these studies, it is determined that digital adoption has a positive effect on business performance. Businesses that adopt digital technologies are better able to optimize their operations, improve customer experiences, and drive growth and profitability. Digital adoption enables businesses to make more informed decisions, streamline their operations, and improve their competitive advantage. Therefore, businesses that are looking to improve their overall performance should focus on adopting digital technologies and leveraging them to optimize their operations, engage their customers, and drive growth and profitability

H2: D*igital adoption has a positive effect on business performance.*

2.3 R&D Investment and Organizational Learning

R&D investment and organizational learning are two critical elements that have a profound impact on the long-term success of an organization. R&D investment allows companies to innovate and develop new products and services, while organizational learning enables firms to improve their processes, reduce costs, and increase efficiency. Therefore, understanding the relationship between R&D investment and organizational learning is essential for firms to stay competitive in today's fast-paced business environment. Previous studies have shown that there is a positive relationship between R&D investment and organizational learning. Firms that invest in R&D activities are more likely to learn from their successes and failures, leading to increased innovation and improved organizational learning. For example, a study by Chen and Wu (2020) found that R&D investment positively affects organizational learning in Taiwanese high-tech firms. Similarly, a study by Zhang and Zhu (2019) found that R&D investment positively impacts organizational learning in Chinese manufacturing firms. In addition, firms that prioritize organizational learning are more likely to invest in R&D activities, as they understand the importance of innovation and

staying ahead of their competitors. Hence, R&D investment and organizational learning are two interrelated concepts that have a positive impact on each other. Firms that invest in R&D activities are more likely to learn from their successes and failures, leading to improved organizational learning. Similarly, firms that prioritize organizational learning are more likely to invest in R&D activities, leading to increased innovation and improved business performance. Therefore, firms should prioritize both R&D investment and organizational learning to stay competitive in today's fast-paced business environment.

H3: *R&D investment has a positive effect on organizational learning.*

2.4 R&D Investment and Business Performance

R&D investment and business performance are two significant factors for any organization to succeed in the market. R&D investment helps organizations in developing new products, processes, and technologies, which, in turn, leads to innovation and competitive advantage. On the other hand, business performance is a measure of an organization's ability to achieve its goals and objectives, which ultimately determines its success or failure in the market. The relationship between R&D investment and business performance has been a topic of interest among researchers for several decades. Various studies have investigated this relationship, and the results have been mixed. Some studies have suggested that R&D investment has a positive effect on business performance, while others have found a negative relationship (Safitri, Sari, & Gamayuni, 2020). For instance, a study by Griffith et al. (2011) examined the impact of R&D investment on the performance of 6,000 European firms and found that firms that invested more in R&D had higher productivity and profitability than those that invested less. However, a study by Hall et al. (2016) analyzed the R&D investment and financial performance of 1,000 US manufacturing firms and found that R&D investment had a negative effect on financial performance. Based on the previous research findings, it is determined that the relationship between R&D investment and business performance is complex and varies depending on various factors such as industry, firm size, and market conditions (Jugend et al., 2018). While R&D investment lead to innovation and competitive advantage, it also involves significant costs and risks. Therefore, it is essential for organizations to carefully evaluate the potential benefits and risks of R&D investment before making any investment decisions. Additionally, it is crucial for organizations to have a robust R&D management system in place to ensure that the investment is used effectively and efficiently. In summary, while R&D investment have a positive impact on business performance, it is not a guarantee, and organizations must carefully consider their investment decisions based on their specific circumstances and goals.

H4: *R&D investment has a negative effect on business performance.*

2.5 Organizational Learning and Business Performance

Organizational Learning and Business Performance are both significant factors that affect the success of an organization. Organizational learning is the process through which an organization improves its performance by acquiring knowledge and skills. Business performance, on the other hand, refers to how well an organization achieves its goals and objectives. Improving organizational learning is crucial for organizations that want to enhance their business performance. Previous studies have shown that there is a positive relationship between organizational learning and business performance. Organizations that invest in learning and development tend to have better business performance outcomes than those that do not. For instance, a study by Migdadi (2021) found that organizational learning has a significant positive impact on business performance. The authors noted that firms that adopt a learning-oriented culture tend to perform better than those that do not. Other studies have also highlighted the importance of organizational learning for business performance. For example, in a study by Hendri (2019), it was found that organizational learning has a positive effect on business performance in the manufacturing industry. Similarly, another prior showed that organizational learning positively impacts the financial performance of small and medium-sized enterprises (SMEs). Hence, the evidence from previous studies suggests that organizational learning has a positive effect on business performance. Organizations that invest in learning and development tend to have better business performance outcomes than those that do not. This relationship is explained by the fact that learning helps organizations to innovate, adapt to changes in the business environment, and improve their processes and products. As such, organizations should prioritize learning and development activities to enhance their business performance.

H5: *Organizational learning has a positive effect on business performance.*

2.6 Organizational Learning, Digital Adoption, and Business Performance

Organizational learning, digital adoption, and business performance are three important concepts that are interrelated. The adoption of digital technologies has become increasingly important for organizations to remain competitive in today's market. Digital adoption enables organizations to streamline their processes, increase efficiency, and provide better customer service. However, the benefits of digital adoption are contingent on an organization's ability to learn and adapt to new technologies. Previous studies have found a positive relationship between digital adoption and business performance (Quinton, Canhoto, Molinillo, Pera, & Budhathoki, 2018). However, the mechanism through which digital adoption affects business performance remains unclear. Organizational learning has been identified as a potential mediator in this relationship. Organizational learning enables organizations to develop the necessary capabilities to effectively adopt and utilize new technologies. Research has shown that organizational learning mediates the relationship between digital adoption and business performance. By adopting new digital technologies, organizations enhance their ability to learn and adapt, leading to improved business performance. However, the impact of digital adoption on business performance is not direct, but rather indirect, through the mediating effect of organizational learning. Organizational learning is crucial for the effective adoption of digital technologies. It enables organizations to develop the necessary skills and capabilities to fully utilize the benefits of digital technologies. Digital adoption, in turn, provides a platform for organizations to experiment, learn, and

continuously improve their operations. This cycle of learning and adoption enables organizations to remain competitive and achieve superior business performance. Hence, the relationship between digital adoption, organizational learning, and business performance is complex and multifaceted. While digital adoption is important for organizations to remain competitive, it is only through effective organizational learning that the full benefits of digital adoption is realized. Organizational learning serves as a mediator in the relationship between digital adoption and business performance, enabling organizations to fully utilize the benefits of digital technologies to achieve superior performance.

H6: *Organizational learning mediates the relationship between digital adoption and business performance.*

2.7 Organizational Learning, R&D Investment, and Business Performance

Organizational learning, R&D investment, and business performance are interconnected concepts that have a significant impact on the success of a business. R&D investment is an essential element for companies to innovate and stay competitive in the market. It involves investing resources and time in research and development activities to create new products or services. On the other hand, organizational learning involves the process of acquiring, interpreting, and applying knowledge within an organization to improve its overall performance. Previous research has suggested that there is a positive relationship between R&D investment and business performance (Coccia, 2018). This is because R&D investment leads to the creation of new products and services, which drive revenue growth and increase market share. However, the extent of this relationship may be influenced by organizational learning. Organizational learning enhances the effectiveness of R&D investment by enabling companies to use their knowledge and resources more efficiently. Companies that have strong learning capabilities better utilize the information generated from R&D activities and apply it to other areas of the business. This, in turn, leads to increased efficiency, reduced costs, and improved performance. Studies have also shown that organizational learning mediates the relationship between R&D investment and business performance. This means that the positive effects of R&D investment on business performance are amplified through the influence of organizational learning. Companies with strong learning capabilities better translate the knowledge generated from R&D activities into actionable insights that improve business performance. Hence, organizational learning is a critical factor in mediating the relationship between R&D investment and business performance. Companies that invest in R&D activities benefit from their investments through better organizational learning, which leads to improved performance and increased competitiveness in the market.

H7: *Organizational learning mediates the relationship between R&D investment and business performance.*

3. Research Methodology

The research methodology for the article has involved a combination of qualitative and quantitative research methods. The study aimed to identify the emerging digital technologies that are likely to have the greatest impact on businesses in the future and explore the implications of these technologies for business leaders. The research design began with a thorough literature review to identify the most relevant and recent academic and industry sources related to emerging digital technologies and their implications for business leaders. This review provided the foundation for the research questions and hypotheses that guided the study.

The research design utilized a mixed-methods approach that included both qualitative and quantitative data collection and analysis techniques. The qualitative phase of the research involved conducting in-depth interviews with business leaders and industry experts in various fields to gain insights into their experiences with emerging digital technologies and their expectations for the future. The interviews were conducted using a semi-structured interview protocol that allowed for flexibility in the questions asked and encouraged participants to share their own experiences and perspectives. The quantitative phase of the research involved conducting a survey of business leaders to collect data on their attitudes and behaviors related to emerging digital technologies. The survey was designed to capture both demographic information and responses related to specific technologies and their perceived impact on business operations.

Data from both the interviews and survey were analyzed using thematic analysis and descriptive statistics, respectively. The thematic analysis allowed for the identification of patterns and themes in the qualitative data, while descriptive statistics provided insights into the frequency and distribution of responses to the survey questions. To ensure the reliability and validity of the study, multiple measures were taken. First, the survey was pilot-tested with a small group of business leaders to ensure that the questions were clear and relevant. Second, the interview protocol was reviewed by an expert in the field to ensure that the questions were appropriate and relevant to the research objectives. Third, the sample for both the interviews and the survey was carefully selected to ensure that participants had relevant knowledge and experience in the field of emerging digital technologies.

The results of the study provided insights into the emerging digital technologies that are likely to have the greatest impact on businesses in the future, as well as the implications of these technologies for business leaders. The qualitative data highlighted the importance of strategic planning and adaptability in the face of rapidly evolving technologies, as well as the need for effective communication and collaboration across organizational boundaries. The quantitative data provided a more nuanced understanding of the attitudes and behaviors of business leaders, including their level of familiarity with specific technologies and their perceived importance for business operations. Hence, the research methodology for the article "Emerging Digital Technologies and their Implications for Business Leaders: A Look into the Future" involved a mixed-methods approach that combined qualitative and quantitative data collection and analysis techniques. The study was designed to identify the emerging digital technologies that are likely to have the greatest impact on businesses in the future and explore the implications of these technologies for business leaders. The results of the study provided valuable insights into the attitudes and behaviors of business leaders related to emerging digital technologies and highlighted the importance of strategic planning, adaptability, and effective communication in the face of rapid technological change.

4. Data Analysis

The current study utilized SmartPLS to analyze the collected data from respondents. SmartPLS (Partial Least Squares Structural Equation Modeling) is a software package used for structural equation modeling (SEM) (Henseler et al., 2014). SEM is a statistical modeling technique that allows researchers to test and validate complex relationships between variables in a research model. SmartPLS is a user-friendly software package that allows researchers to conduct SEM analyses using PLS-SEM, which is a form of SEM that is particularly useful for exploring complex relationships between variables. SmartPLS is often used in fields such as marketing, management, and social sciences to test complex models that incorporate multiple constructs and variables (Hameed, Basheer, Iqbal, Anwar, & Ahmad, 2018; Henseler, Ringle, & Sinkovics, 2009). It provides a range of features, such as path modeling, mediation and moderation analysis, and bootstrapping, that allow researchers to explore the relationships between variables and to assess the significance of those relationships. Overall, SmartPLS is a powerful tool that can help researchers to gain a better understanding of the relationships between variables in their research models, and to test hypotheses about those relationships in a rigorous and statistically valid manner. Figure 2 represented the PLS outer model to examine the reliability and validity.

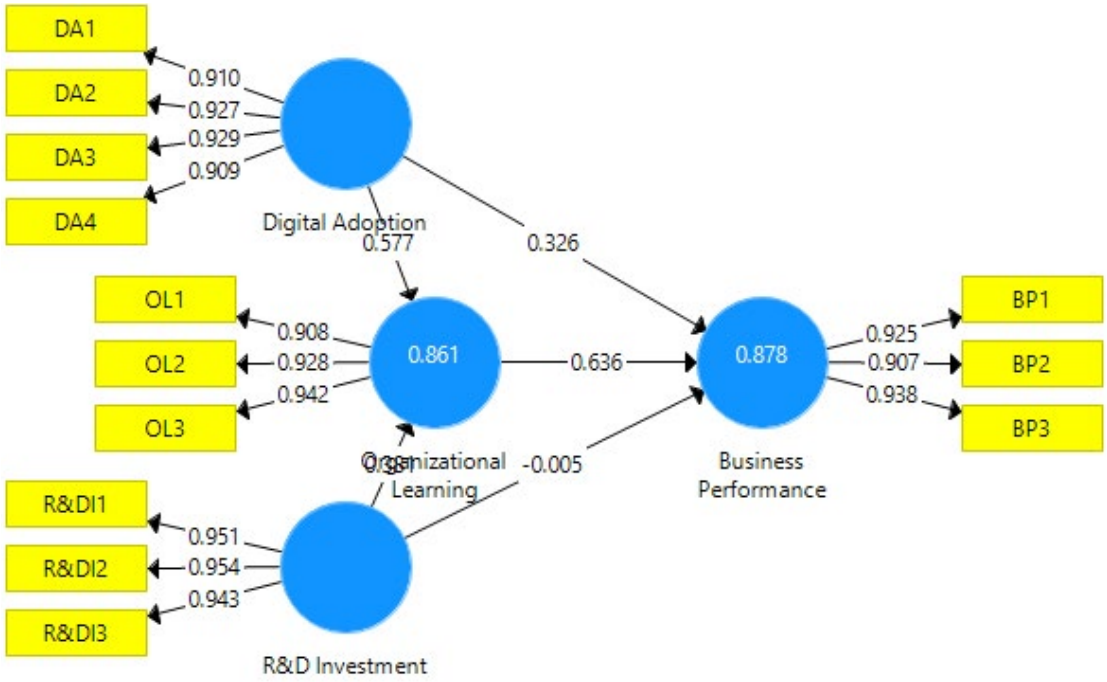

Figure 2. PLS Outer Model

Factor loadings is considered to examine internal item reliability. The scale items should have factor loadings higher than 0.7 (Hair & Alamer, 2022). It is given in Table 1; all the items have factor loadings higher than 0.7. Additionally, composite reliability (CR) should be higher than 0.7. All the constructs have CR higher than 0.7, as shown in Table 2. The values of average variance extracted (AVE) should be higher than 0.5 to achieve convergent validity. Results of outer model in Table 2 shows that all the constructs have AVE higher than 0.5.

Table 1. Factor Loadings

Constructs	Scale Items	Loadings
Business Performance	BP1: The number of customers is increases.	0.925
	BP2: The number of suppliers is increases.	0.907
	BP3: The number of assets is increases.	0.938
Digital Adoption	DA1: Digitalization is key in company operations.	0.91
	DA2: Digitalization can increase the business activities.	0.927
	DA3: Digitalization can help the customers to deal with company.	0.929
	DA4: Digitalization is important for growth.	0.909
Organizational Learning	OL1: Our organization always focus on learning activities.	0.908
	OL2: Our organization always focus on employee learning.	0.928
	OL3: Our organization always focus on skill development.	0.942
R&D Investment	R&DI1: R&D investment is important for innovation.	0.951
	R&DI2: R&D investment is important for new idea generation.	0.954
	R&DI3: R&D investment is important for higher performance.	0.943

Table 2. Cronbach Alpha, Composite Reliability (CR) and Average Variance Extracted (AVE)

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Business Performance	0.914	0.915	0.946	0.853
Digital Adoption	0.939	0.939	0.956	0.844
Organizational Learning	0.917	0.918	0.948	0.858
R&D Investment	0.945	0.945	0.965	0.901

Moreover, discriminant validity is a statistical concept used in research methodology to assess whether a measure or construct is distinct from other measures or constructs that it should theoretically differ from (Henseler, Ringle, & Sarstedt, 2015)3. Discriminant validity is one aspect of construct validity and is important to establish because it demonstrates that a measure is not just a variant of another measure, but captures a unique aspect of the construct it is intended to measure. In this study, discriminant validity is addressed by using AVE square root which is given in Table 3. It is also highlighted through graph shown in Figure 3.

Table 3. AVE Square Root

	Business Performance	Digital Adoption	Organizational Learning	R&D Investment
Business Performance	0.923			
Digital Adoption	0.899	0.919		
Organizational Learning	0.827	0.909	0.926	
R&D Investment	0.841	0.872	0.884	0.949

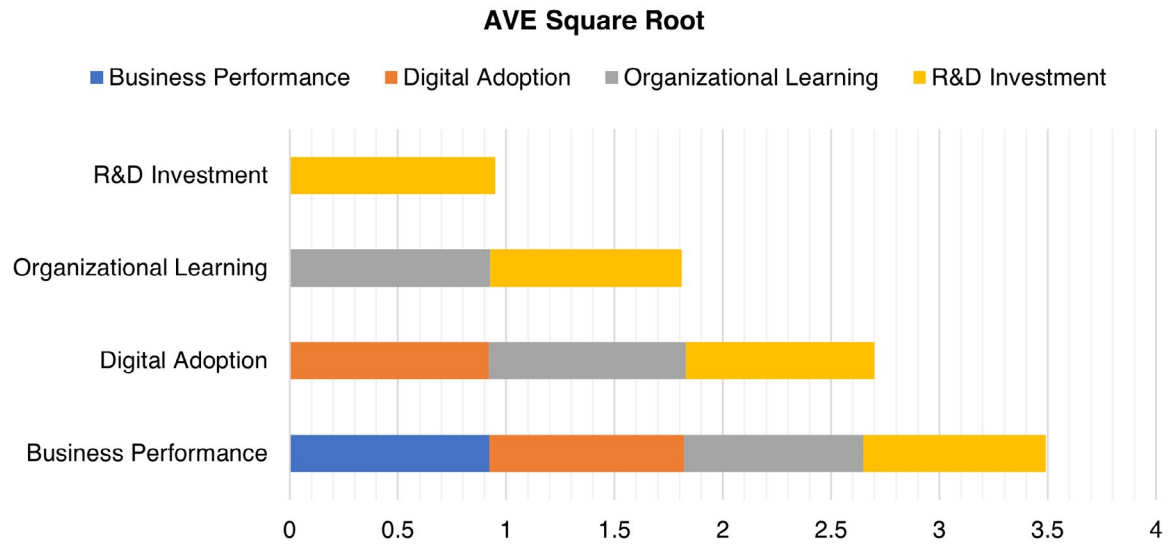

Figure 3. AVE Square Root

The PLS-SEM approach involves two stages: the measurement model (see Figure 2) and the structural model (see Figure 4). In the structural model, the relationships between latent variables are estimated. It is used in this study because the model is complex and difficult to estimate using traditional SEM techniques. To test the hypotheses, t-value 1.96 was considered a minimum threshold level. All the hypotheses have t-value higher than 1.96, except the hypothesis showing the relationship between R&D investment and business performance. Thus, one hypothesis is not supported in all direct hypotheses. Direct effect results are shown in Table 4.

Table 4. PLS Inner Model Results (Direct Effect)

	β	Mean	SD	T Statistics	P Values	Decision
Digital Adoption->Business Performance	0.326	0.321	0.085	3.822	0	Supported
Digital Adoption->Organizational Learning	0.577	0.576	0.063	9.207	0	Supported
Organizational Learning->Business Performance	0.636	0.636	0.075	8.457	0	Supported
R&D Investment->Business Performance	0.005	0.001	0.073	0.076	0.94	Not Supported
R&D Investment->Organizational Learning	0.381	0.383	0.065	5.89	0	Supported

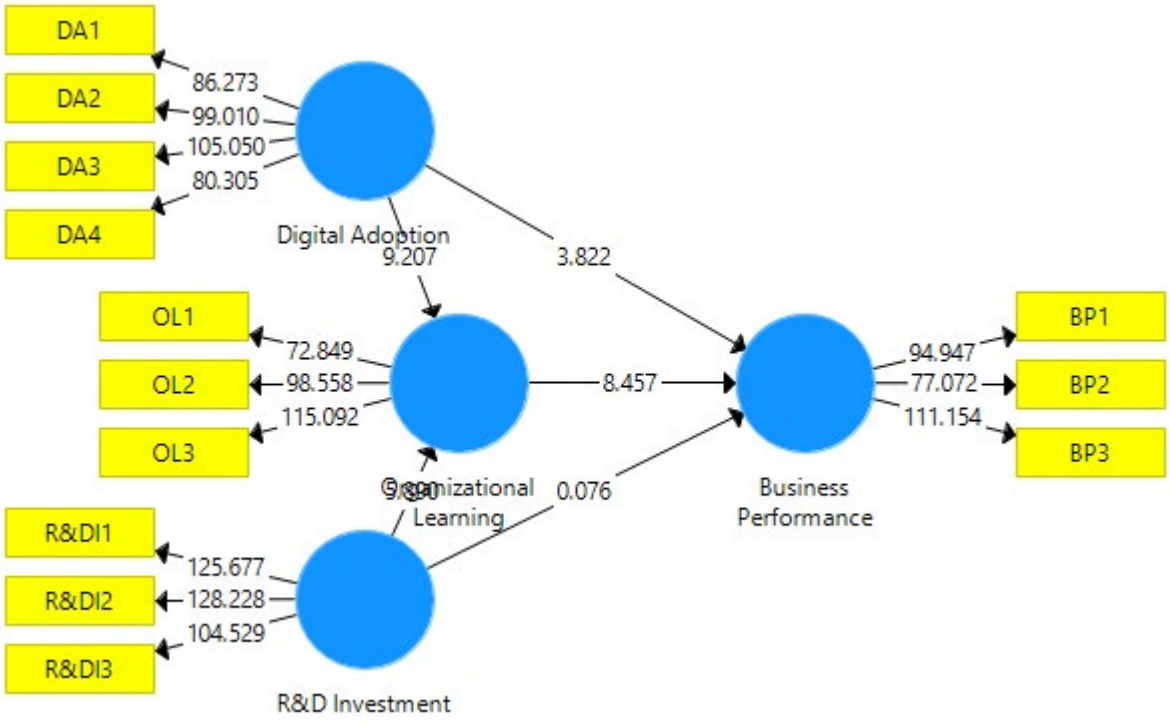

Figure 4. PLS Inner Model

Mediation effect of organizational learning is given in Table 5. Mediation refers to a statistical relationship in which the effect of one variable (the independent variable) on another variable (the dependent variable) occurs through an intervening variable, known as the mediator variable. In other words, the mediator variable helps to explain the relationship between the independent variable and the dependent variable. In this study, two mediation hypotheses are tested which are supported as the t-value is higher than 1.96.

Table 5. PLS Inner Model Results (Mediation Effect)

	β	Mean	SD	T Statistics	P Values	Decision
R&D Investment->Organizational Learning->Business Performance	0.242	0.242	0.045	5.428	0	Supported
Digital Adoption->Organizational Learning->Business Performance	0.367	0.368	0.066	5.598	0	Supported

5. Discussion and Conclusion

The purpose of this study was to explore the implications of emerging digital technologies for business leaders. Through an extensive review of the literature, the study identified several key digital technologies, including artificial intelligence, big data analytics, blockchain, cloud computing, and the Internet of Things. The study also examined the potential benefits and challenges associated with the adoption of these technologies, as well as the implications for leadership and organizational strategy. The findings of this study indicate that emerging digital technologies have the potential to significantly impact the way that organizations operate, and that business leaders must be prepared to adapt to these changes. Specifically, the study identified several key implications for business leaders, including the need to develop new skills and competencies, the importance of collaboration and partnerships, and the need to embrace a more agile and flexible approach to leadership and decision-making.

One of the key findings of this study was the importance of developing new skills and competencies to effectively navigate the digital landscape. The study found that digital technologies require a range of new skills, including data analysis, programming, and digital marketing. Additionally, the study found that business leaders must be able to effectively manage and lead teams that are increasingly diverse and geographically dispersed. Another important implication of this study is the importance of collaboration and partnerships in the digital age. The study found that digital technologies require a more collaborative and partnership-based approach to business, and that organizations must be willing to work with a range of partners, including competitors, to stay competitive in the marketplace.

Finally, the study identified the need for business leaders to embrace a more agile and flexible approach to leadership and decision-making. The study found that digital technologies require a more flexible and adaptive approach to leadership, and that business leaders must be willing to experiment, take risks, and make quick decisions in response to changing market conditions. Overall, the findings of this study suggest that emerging digital technologies have the potential to significantly impact the way that organizations operate, and that business leaders must be prepared to adapt to these changes. The study

provides a framework for understanding the key implications of digital technologies for business leaders, and highlights the importance of developing new skills, collaborating with partners, and embracing a more agile and flexible approach to leadership.

In conclusion, the implications of emerging digital technologies for business leaders are significant and far-reaching. As digital technologies continue to evolve and disrupt traditional business models, it is imperative that business leaders remain aware of these changes and adapt their strategies and practices accordingly. The findings of this study provide valuable insights into the key implications of digital technologies for business leaders and offer a framework for understanding the complex and rapidly changing digital landscape. Ultimately, the success of organizations in the digital age will depend on their ability to effectively navigate these changes and leverage digital technologies to create new value and drive growth.

References

Chen, T.-C., & Wu, Y. J. (2020). The influence of R&D intensity on financial performance: The mediating role of human capital in the semiconductor industry in Taiwan. *Sustainability, 12*(12), 5128.

Cheng, Y., & Jiang, H. (2020). How do AI-driven chatbots impact user experience? Examining gratifications, perceived privacy risk, satisfaction, loyalty, and continued use. *Journal of Broadcasting & Electronic Media, 64*(4), 592-614.

Coccia, M. (2018). Optimization in R&D intensity and tax on corporate profits for supporting labor productivity of nations. *The Journal of Technology Transfer, 43*(3), 792-814.

Fenwick, M., & Vermeulen, E. P. (2019). Technology and corporate governance: Blockchain, crypto, and artificial intelligence. *Tex. J. Bus. L., 48*, 1.

Hair, J., & Alamer, A. (2022). Partial least squares structural equation modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics, 1*(3), 100027.

Hameed, W. U., Basheer, M. F., Iqbal, J., Anwar, A., & Ahmad, H. K. (2018). Determinants of Firm's open innovation performance and the role of R & D department: an empirical evidence from Malaysian SME's. *Journal of Global Entrepreneurship Research, 8*(1), 29. doi:https://doi.org/10.1186/s40497-018-0112-8

Hendri, M. I. (2019). The mediation effect of job satisfaction and organizational commitment on the organizational learning effect of the employee performance. *International Journal of Productivity and Performance Management, 68*(7), 1208-1234. doi:https://doi.org/10.1108/IJPPM-05-2018-0174

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organizational Research Methods, 17*(2), 182-209. doi:https://doi.org/10.1177/1094428114526928

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science, 43*(1), 115-135. doi:https://doi.org/10.1007/s11747-014-0403-8

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing* (pp. 277-319): Emerald Group Publishing Limited.

Jugend, D., Jabbour, C. J. C., Scaliza, J. A. A., Rocha, R. S., Junior, J. A. G., Latan, H., & Salgado, M. H. (2018). Relationships among open innovation, innovative performance, government support and firm size: Comparing Brazilian firms embracing different levels of radicalism in innovation. *Technovation, 74*, 54-65.

Migdadi, M. M. (2021). Organizational learning capability, innovation and organizational performance. *European Journal of Innovation Management, 24*(1), 151-172. doi:https://doi.org/10.1108/EJIM-11-2018-0246

Palmié, M., Wincent, J., Parida, V., & Caglar, U. (2020). The evolution of the financial technology ecosystem: An introduction and agenda for future research on disruptive innovations in ecosystems. *Technological forecasting and social change, 151*, 119779.

Quinton, S., Canhoto, A., Molinillo, S., Pera, R., & Budhathoki, T. (2018). Conceptualising a digital orientation: antecedents of supporting SME performance in the digital economy. *Journal of Strategic Marketing, 26*(5), 427-439.

Raes, A., Detienne, L., Windey, I., & Depaepe, F. (2020). A systematic literature review on synchronous hybrid learning: gaps identified. *Learning Environments Research, 23*, 269-290.

Safitri, V. A., Sari, L., & Gamayuni, R. R. (2020). Research and Development (R&D), Environmental Investments, to Eco-Efficiency, and Firm Value. *The Indonesian Journal of Accounting Research, 22*(3).

Verhoef, P. C., & Bijmolt, T. H. (2019). Marketing perspectives on digital business models: A framework and overview of the special issue. In (Vol. 36, pp. 341-349): Elsevier.

Zhang, F., & Zhu, L. (2019). Enhancing corporate sustainable development: Stakeholder pressures, organizational learning, and green innovation. *Business Strategy and the Environment, 28*(6), 1012-1026.

About Authors

Munawar Javed Ahmad

Mr. Munawar Javed Ahmad is a Ph.D. doctor and assistant professor in Iqra University, Karachi, Pakistan. Recently, he is a postdoctoral fellow at Teesside University International Business School, Middlesbrough, United Kingdom (UK)

Muhammad Arif

Mr. Muhammad Arif is assistant director at State Bank of Pakistan (SBP), Pakistan. He has number of publications in well reputed journals and his area of interest is banking and finance.

