Journal of Finance – Marketing; Vol. 14, Issue 6; 2023
ISSN: 1859-3690
DOI: https://doi.org/10.52932/jfm.vi6

Journal of Finance – Marketing
http://jfm.ufm.edu.vn

BENEFITS AND RISKS OF DIGITAL TRANSFORMATION AT THE FIRM LEVEL: A LITERATURE REVIEW

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ARTICLE INFO

DOI:
10.52932/jfm.vi6.426

Received:
August 11, 2023
Accepted:
September 19, 2023
Published:
December 25, 2023

Keywords:
Benefits;
Digital transformation;
Literature review;
Risks.

JEL Classification:
F23, M15

ABSTRACT

In recent years, digital transformation has gained prominence as a trending keyword in both academia and practice. Some firms have emerged as pioneers in utilizing disruptive digital technologies to enhance their performance, attracting the attention of many scholars. In this study, we aim to review and highlight the benefits and risks of digital transformation at the firm level based on existing publications. Our findings indicate three benefits: enhanced efficiency and productivity, improved customer experience, and data-driven decision-making. Additionally, we identify four risks associated with this transformation: security vulnerabilities, integration challenges, employee resistance and skill gaps, and regulatory compliance. We also provide ten recommendations for firms to select suitable digital transformation strategies based on these findings.

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1. Introduction

Digital transformation has emerged as a critical area of interest for firms across various industries in recent years (Appio et al., 2021). With rapid advancements in technology, companies have felt compelled to embrace digital transformation to maintain their competitiveness and relevance in the digital age (Yucel, 2018). The impact of digital transformation on firms has garnered significant attention from scholars. Guo and Xu (2021), Ren et al. (2023), and Ribeiro-Navarrete et al. (2021) indicated a positive impact on firm performance, whereas Guo et al. (2023) and Jardak and Ben Hamad (2022) found evidence of a negative effect. Leão and Silva (2021) highlighted that digital factors play a crucial role in motivating firm transformation and enhancing competitiveness. Ahmed et al. (2021) demonstrated that digital transformation facilitates high-appreciated decision-making, thereby elevating firm performance. Furthermore, Masoud and Basahel (2023) explored how digital transformation enhances customer experience and technological innovation. Numerous other publications have also underscored the significant link between digital transformation and firms from various perspectives. However, existing studies have yet to thoroughly explore and indicate the associated benefits and risks, which can significantly influence both the firm and the implementation of digital transformation strategies. Therefore, based on our current understanding, we contend that a literature review is necessary to investigate the benefits and risks linked to digital transformation at the firm level, drawing insights from existing publications. This study aims to contribute meaningful knowledge that can be valuable for stakeholders involved in implementing and planning digital transformation strategies.

This paper is organized as follows: Section 1 introduces the topic. In Section 2, we outline the procedure used for selecting articles for review. Sections 3 and 4 delve into the benefits and risks associated with digital transformation. Moving on to Section 5, we present recommendations for implementing effective digital transformation strategies. Finally, Section 6 comprises the conclusion, addressing limitations, and suggesting directions for future research.

2. Selected Articles

We employed a systematic literature review approach to elucidate the advantages and drawbacks of digital transformation at the organizational level. Our methodology encompassed the following steps:

Step 1: Utilizing the Google Scholar platform, we conducted searches using pertinent keywords. Specifically, we combined the term "digital transformation" with terms such as "business," "organization," "firm," "entrepreneurship," or "company" to identify relevant articles. Given the substantial volume of related publications, we prioritized titles containing the crucial keyword "digital transformation." We limited our selection to articles appearing on the first three pages of Google Scholar search results.

Step 2: As suggested by (Nambisan et al., 2019), a significant surge in publications on digital transformation has been observed since 2016. Consequently, we focused our review on publications from 2016 onwards. Combining the outcomes of the first and second steps, we curated a collection of 100 relevant publications.

Step 3: To ascertain the quality of the publications, we cross-referenced journal names with the Scopus and Web of Science databases. Journals included in these databases were regarded as indicators of high quality. This rigorous screening process led us to select 50 publications for further consideration.

Step 4: For the final stage of selection, we thoroughly assessed the titles, keywords, and abstracts of each publication. Based on this assessment, we determined whether a publication merited inclusion in our review. Ultimately, 38 publications were chosen as part of our study.

Table 1. Information on Selected Articles

Criteria	2016	2017	2018	2019	2020	2021	2022	2023	Total
Scopus	1	3	4	2	6	14	4	4	**38**
Web of Science	1	2	2	1	5	12	2	4	**29**
Citation*	180	837	504	1.321	1.506	5.810	133	52	**10.343**

Note: *(*) accessed Google Scholar on August 10, 2023.*

The chosen articles are outlined in Table 1. All of these selected articles are present in the Scopus Database, and out of these, 29 articles are indexed in the Web of Science Database, including SSCI, SCEI, and ESCI. These selected articles collectively exhibit an impressive average of 10.343 citations, translating to more than 272 citations per article. This citation metric underscores the high quality of the selected articles. Notably, the majority of the articles, 14 in total, were published in 2021, amassing a total of 5.810 citations.

3. Benefits of Digital Transformation

By reviewing 38 selected publications, we have found that the benefits of digital transformation at the firm level are diverse and can vary depending on the specific industry, goals, and strategies of each firm. In this study, we will focus on discussing three common dimensions of these benefits as outlined below:

Enhanced Efficiency and Productivity

One of the primary advantages of digital transformation is its ability to enhance operational efficiency and productivity (Chen et al., 2016; Leão & Silva, 2021; Morakanyane et al., 2017). By embracing cutting-edge technologies and automation, companies can streamline processes, reduce manual tasks, and optimize resource allocation. Cloud computing and data analytics enable real-time access to critical information, facilitating faster and more informed decision-making (L. Guo & Xu, 2021; Zhang et al., 2022). Collaboration tools and communication platforms enhance teamwork and knowledge sharing, fostering a more agile work environment. Moreover, digital solutions enable employees to focus on higher-value tasks, boosting overall productivity (Sousa-Zomer et al., 2020). Additionally, the integration of artificial intelligence and machine learning further augments operational efficiency by predicting trends, optimizing workflows, and identifying potential areas for improvement (Hanelt et al., 2021; Leão & Silva, 2021; Morakanyane et al., 2017). As a result, firms embracing digital transformation witness improved operational performance and competitiveness in today's rapidly evolving business landscape (Hanelt et al., 2021; Ji et al., 2023).

Improved Customer Experience

Digital transformation empowers firms to deliver personalized and seamless customer experiences. Through data-driven insights, firms can understand customer preferences, behavior, and pain points, enabling them to offer tailored products and services, leading to higher customer satisfaction and loyalty (Kraus et al., 2021; Zaoui & Souissi, 2020). By leveraging innovative technologies, businesses can offer personalized and seamless interactions across various touchpoints. Customer relationship management systems enable a better understanding of individual preferences, leading to tailored products and services. Self-service portals and chatbots provide instant support, enhancing customer satisfaction. Social media and online platforms facilitate real-time engagement and feedback, allowing companies to respond promptly to customer needs (Moi & Cabiddu, 2021; Sestino et al., 2020). Moreover, data analytics and AI-driven insights help anticipate customer preferences and pain points, ensuring proactive service delivery. Embracing digital transformation empowers firms to create memorable and customer-centric experiences, building loyalty and long-term relationships (Fernández-Rovira et al., 2021; Gil-Gomez et al., 2020).

Data-Driven Decision-Making

Digital transformation provides firms with access to vast amounts of data from various sources. Advanced analytics tools can help them make data-driven decisions, identify trends, predict future outcomes, and uncover valuable insights to inform business strategies (Ahmed et al., 2021; Gölzer & Fritzsche, 2017; Osman et al., 2022). Through advanced analytics and data processing tools, businesses can now access vast amounts of information in real-time (Gomez-Trujillo & Gonzalez-Perez, 2022; Vial, 2019). This data-driven approach allows for a more accurate understanding of market trends, customer behavior, and operational performance. Companies can make informed decisions promptly, optimizing processes and resource allocation. Additionally, predictive analytics and machine learning models enable proactive planning and risk management. With comprehensive insights, firms gain a competitive edge, identifying new opportunities and potential challenges ahead of their competitors (Li, 2020b). Embracing digital transformation empowers organizations to harness the power of data, leading to more agile and strategic decision-making, ultimately driving success and growth in today's data-driven business landscape (Gil-Gomez et al., 2020; Moi & Cabiddu, 2021).

4. Risks of Digital Transformation

Similar to the benefits, our exploration reveals that existing publications have also highlighted various types of risks, which can be classified into different categories. However, in this study, we will focus on presenting some common risks related to the challenges firms face when implementing digital transformation.

Security Vulnerabilities

Digital transformation, while offering numerous benefits, has also brought about increased security vulnerabilities at the firm level. As firms digitize their operations and store sensitive data online, they become more vulnerable to cyber threats and data breaches (Stewart, 2023). Protecting valuable information and ensuring robust cybersecurity measures become paramount to safeguarding the firm's reputation and customer trust (Garcia-Perez et al., 2023; Maglaras et al., 2021). The adoption of interconnected technologies and online systems creates a larger attack surface for cybercriminals to exploit. With sensitive data stored in the cloud and shared across networks, the risk of data breaches and unauthorized access rises significantly. Moreover, employees may lack adequate cybersecurity training, leading to unintentional security lapses (Metawa et al., 2022). The integration of third-party applications and services could introduce additional vulnerabilities. Cyber attacks have become more sophisticated, posing serious threats to businesses (Maglaras et al., 2021). To mitigate these risks, firms must prioritize cybersecurity measures, implement robust encryption, regularly update software, and invest in comprehensive security protocols to safeguard their digital assets and maintain trust with customers.

Integration Challenges

Introducing digital technologies may require integration with existing systems. Poor integration can lead to disruptions in operations, data inconsistencies, and additional costs (Jedynak et al., 2021; Shahi & Sinha, 2021). Ensuring seamless integration is crucial for a smooth digital transformation process. As businesses adopt various new technologies and software solutions, ensuring seamless compatibility and data flow between different systems becomes complex (Nambisan et al., 2019). Legacy systems may struggle to integrate with modern platforms, leading to data silos and fragmented processes (Jedynak et al., 2021). Migrating data and operations to the cloud can encounter resistance due to technical constraints and security concerns. Additionally, different departments may adopt individual solutions, making cross-functional collaboration difficult (Gray & Rumpe, 2017). These integration hurdles can impede information sharing, hinder real-time insights, and slow down decision-making processes (Stewart, 2023). Overcoming these challenges

requires careful planning, investment in robust integration tools, and fostering a culture of collaboration and openness to embrace digital transformation effectively.

Employee Resistance and Skill Gaps

Resistance to change is a common challenge during digital transformation. Some employees may be resistant to adopting new technologies, and firms may face skill gaps within their workforce (Mazurchenko & Maršíková, 2019; Schlegel & Kraus, 2023). Proper training and change management are essential to overcome these hurdles. Introducing new technologies and processes may disrupt familiar routines, leading to fear and reluctance among staff. Some employees may resist change, perceiving it as a threat to job security or feeling overwhelmed by the learning curve associated with novel tools (Mazurchenko & Maršíková, 2019; Tijan et al., 2021). Moreover, skill gaps can emerge as traditional roles evolve and demand for digital skills increases. Upskilling and reskilling employees to adapt to the changing landscape becomes essential but can be time-consuming and costly (Shahi & Sinha, 2021). Failure to address these issues can lead to decreased productivity, decreased morale, and hinder the full potential of digital transformation (Trenerry et al., 2021). Firms must prioritize change management, offer comprehensive training programs, and foster a supportive culture to empower employees to embrace and capitalize on the opportunities digital transformation brings.

Regulatory Compliance

Digital transformation often involves handling sensitive customer data, which may be subject to stringent data protection regulations (Al-Ruithe et al., 2018; Li, 2020a). Non-compliance can result in legal consequences and damage to the firm's reputation. With the adoption of new technologies and data-driven processes, companies must navigate a complex web of evolving laws and regulations governing data privacy, cybersecurity, and digital transactions (Kotarba, 2018; Troshani et al., 2018). Non-compliance can result in hefty fines, legal liabilities, and reputational damage. Ensuring that digital systems meet regulatory requirements becomes crucial, but it requires ongoing monitoring and updates as regulations change (Jedynak et al., 2021). Additionally, data breaches and cyber-attacks can expose sensitive information, leading to potential compliance violations. Balancing innovation and compliance can be daunting, as some cutting-edge technologies may lack well-defined regulatory frameworks (Nambisan et al., 2019; Stewart, 2023). To address these concerns, firms must prioritize compliance from the outset of their digital transformation journey, invest in robust security measures, and establish a proactive approach to staying abreast of regulatory changes.

5. Recommendations for Selecting Digital Transformation Strategies

Selecting suitable digital transformation strategies is crucial for firms to maximize the benefits while mitigating the risks associated with this transformative process. Drawing from the systematic literature review studies conducted by Feliciano-Cestero et al. (2023), Plekhanov et al. (2022), and Teng et al. (2022), we employ transaction cost, the knowledge-based view, and the resource-based view theories as foundational lenses for selecting the digital transformation strategy at the firm level. The transaction cost theory posits that by comparing the costs of internalizing and outsourcing specific operations, firms strive to optimize their operational costs. Additionally, through cost analysis, firms aim to determine the optimization of operational boundaries and spheres of influence, ultimately working towards improving efficiency. The knowledge-based view theory encompasses knowledge management capabilities, which serve as the foundational source influencing crucial decisions within firms, including competitiveness, resource allocation, executive decisions, and management practices. Possessing superior capabilities in knowledge management forms the basis for a firm to adopt a suitable development strategy and achieve higher effectiveness and efficiency. The resource-based view theory provides the

managerial framework for identifying strategic resources. According to this theory, firms should internally prioritize their strengths and focus on effective firm management to attain their business goals, ultimately aiming for sustainable development.

Drawing from these theories and combining insights from existing studies with our own experiences, we propose several key recommendations for selecting appropriate digital transformation strategies for firms amidst the ongoing digitalization in this new era of technology. Here are the key recommendations:

(1) Comprehensive Assessment: Before embarking on a digital transformation journey, firms should conduct a thorough assessment of their existing infrastructure, processes, and workforce capabilities. This evaluation will help identify areas where digital technologies can enhance efficiency and productivity, improve customer experience, and enable data-driven decision-making.

(2) Security-first Approach: Given the rising cybersecurity threats, firms must prioritize security throughout their digital transformation initiatives. Implementing robust encryption, multi-factor authentication, and regular security audits will safeguard sensitive data and protect against security vulnerabilities.

(3) Integration Strategy: To address integration challenges, firms should develop a clear integration strategy that aligns with their business goals. This involves selecting technology solutions that seamlessly integrate with existing systems and allow smooth data exchange across departments. Prioritizing interoperability will prevent data silos and improve collaboration.

(4) Change Management and Employee Engagement: To tackle employee resistance and skill gaps, a strong change management program is essential. Communicate the benefits of digital transformation to employees, involve them in the decision-making process, and offer comprehensive training programs to enhance their digital skills. Encouraging a culture of continuous learning will foster employee engagement and ease the transition to new digital tools.

(5) Compliance by Design: Regulatory compliance must be considered from the outset of any digital transformation initiative. Firms should ensure that their chosen technologies adhere to relevant data protection and privacy regulations. Regular audits and compliance checks will help avoid potential legal issues.

(6) Customer-Centric Approach: When improving customer experience, firms should adopt a customer-centric approach. Leverage data analytics to gain insights into customer preferences and behavior, enabling the delivery of personalized products and services. Implement user-friendly interfaces and seamless omnichannel experiences to enhance customer satisfaction.

(7) Data-driven Decision-making: To harness the full potential of data-driven decision-making, invest in advanced analytics and machine learning capabilities. These tools can provide valuable insights into market trends, customer needs, and operational performance, guiding strategic planning and proactive decision-making.

(8) Scalability and Flexibility: When selecting digital transformation strategies, consider scalability and flexibility. Choose technologies that can adapt to future business needs and accommodate growth. Scalable solutions allow firms to stay agile and responsive to market changes.

(9) Pilot Projects and Iterative Implementation: Instead of attempting a massive transformation all at once, consider starting with pilot projects. These smaller-scale initiatives can help identify potential challenges and areas for improvement before full-scale implementation. Adopt an iterative approach, continuously refining and expanding digital initiatives based on feedback and outcomes.

(10) Partner with Experts: Digital transformation can be complex, and firms may benefit from partnering with external experts or consultants with experience in similar projects. These experts can provide valuable insights, best practices, and guidance throughout the transformation journey.

By carefully considering these recommendations, firms can navigate the complexities of digital transformation and leverage its benefits to drive growth, innovation, and long-term success in an increasingly digital world.

6. Conclusion

In light of the emerging topic of digital transformation in academia and practice, we conducted a comprehensive literature review to explore the benefits and risks of digital transformation at the firm level. The study involved analyzing 32 high-quality publications from 2015 to 2023, sourced from Scopus and Web of Science databases via Google Scholar. Through this review, we identified three key benefits: enhanced efficiency and productivity, improved customer experience, and data-driven decision-making. Additionally, we recognized four risks associated with digital transformation: security vulnerabilities, integration challenges, employee resistance and skill gaps, and regulatory compliance. Based on our findings, we proposed ten recommendations for firms seeking to select suitable digital transformation strategies: comprehensive assessment, security-first approach, integration strategy, change management and employee engagement, compliance by design, customer-centric approach, data-driven decision-making, scalability and flexibility, pilot projects and iterative implementation, and partnering with experts.

The study has some limitations that point toward directions for further research. Firstly, the selected publications were reviewed manually, relying on the authors' experience, which may lead to the possibility of missing key information and resulting in incomplete findings. To address this, we recommend future research to employ word cloud and sentiment analysis approaches to depict the relationships between components. This would likely provide more comprehensive and significant insights. Secondly, the recommendations were derived from the findings and the authors' experiences, which introduce subjective elements. To enhance the credibility of these recommendations, we suggest conducting qualitative studies that involve gathering feedback and perspectives from relevant stakeholders. This approach will offer a more robust and appreciated foundation for the suggested recommendations. By addressing these limitations and conducting further research using more advanced methodologies, the study's findings can be strengthened, leading to more impactful and applicable insights for the field of digital transformation.

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