The Opportunities for Digitalization of Companies on Modern Technologies in a Post-Pandemic World

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Abstract. COVID-19 shook the global economy, companies, and people. Digitalization helps many companies withstand the pandemic. This study examines how digital transformation (DT) process affect modern technologies like Big Data Analytics (BDA) and blockchain technology (BCT). Using partial least squares structural equation modeling (PLS-SEM), 313 managers from SMEs in Mozambique were surveyed. The findings show that DT boosts BDA. However, DT does not impact BCT. The research suggests that new working patterns will boost talent demand irrespective of location. Incorporating BDA and BCT into manufacturing operations improves business processes and organizational management.

Keywords. Digital transformation, blockchain technologies, big data analytics, post-pandemic.

1. Introduction

Digital transformation (DT) is crucial for businesses. Digitalization transforms organizational management and business processes by incorporating digital technology into production activities such as BDA, the IoT, and cloud computing [1]. Corporations are now under pressure to make choices and implement strategies that include social and environmental issues. Despite the significant attention paid to digitalization in theory and practice [2], the exact impact of corporate digitalization on BDA and BCT remains uncertain. DT in Mozambican SMEs is challenging since managers adopt the essential technology for new business models [3].

DT is the act of combining several physical and digital systems. Innovative techniques for doing business, generating services, and manufacturing items based on learned information [4]. Although digitization is not a novel phenomenon, the opportunities and risks it presents are constantly evolving. Before COVID-19, DT problems concentrated on the fourth industrial revolution, including Web4.0, the IoT, and Industry 4.0. Two challenges that arose were the rapidity of DT and the perturbation caused by novel concepts and technologies. The COVID-19 pandemic has highlighted the problems, causing concerns among business members and stakeholders. Furthermore, this

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transformation transpired at an unparalleled velocity. Regardless of an organization's level of expertise with DT methods, this must be accomplished [5]

Organizations will inevitably endure a digital revolution. Nonetheless, whether they are ready for the move is an important question. Chen *et al.* [6] found that firms, regardless of their DT status, are not equipped to handle its challenges. Digitization requires rearranging activities, making the company more agile, investing in organic structures, increasing standards, and automating as much as possible to increase customer responsiveness. This research explores the potential that digitalization will provide enterprises using modern technologies: (i) BDA; and (ii) and BCT. We focused on these areas because Ahmad and Mustafa [7] anticipate that COVID-19 would have a significant effect on business operations in these areas.

This research aims to add to the literature in many ways. First, the research investigates the relationship between DT and modern technologies such as BDA and BCT. Second, this research attempts to investigate the relationship between DT and modern technologies using resource-based theory. Third, this research would be undertaken in Mozambique.

2. Theory and hypothesis development

2.1 Resource-based theory

The resource-based theory (RBT) posits that organizations possess a variety of assets, some of which confer a short-term competitive advantage and others of which contribute to long-term performance enhancement [8]. To ascertain the means by which organizations attain and maintain a competitive advantage, the RBT examines and interprets their resources [9]. Our study used the RBT hypothesis to acquire a better understanding of how BDA and BCT work.

2.2 The Effect of DT on BDA

DT depends primarily on resource and person availability. Technology is crucial throughout the digital shift. Due to the profusion of new technology, many sectors and enterprises have gone digital, but after COVID-19, those advancements will grow [10]. BDA requires specialized software for storage, retrieval, organisation, and data translation into conveniently consumable information. The ability to capture and analyse massive volumes of data has changed in recent years due to developments in algorithms, computer power, and computational storage. Due to predicted Internet data increase post-COVID-19, companies will require BDA knowledge and strategies to succeed [11]. Therefore, we hypothesis the following:

H1: DT is positively correlated to BDA.

2.3 The effect of DT on BCT

Digital technology's vulnerabilities increase as companies and society use it. Stranieri *et al.* [12] asserts that BCT has the ability to remove intermediaries in financial transactions and information sharing. After the pandemic, supply chains may manage

information sustainably using this technology, as all supply chain players may use the supply chain infrastructure for information technology. Lotfi *et al.* [13] found that fast technical breakthroughs and fierce industry rivalry have forced SMEs to become more environmentally sensitive, efficient, and swift. Thus, we hypothesis the following:

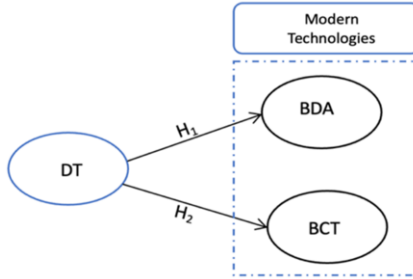**H2**: DT is positively correlated to *BCT*.

Figure 1. The relationship between digital transformation and modern technologies.

3. Data and Methods

3.1 Demographics, sampling, and methods

We gathered data from Mozambican manufacturing SMEs. The respondents in the study have diverse professional backgrounds, including finance, human resource management, R&D, sales, and marketing. We sent managers-employees of various levels the survey to complete. Questions regarding DT and modern technology (BDA and BCT) were completed by all respondents. In response to questionnaires distributed to 500 managers, 345 responded; 313 pairs were chosen for data analysis. Despite the complexity of the proposed research model, this sample size is sufficient to SEM-evaluate Kline's route model [14]. This study uses Nanjundeswaraswamy and Divakar [15] modified Cochran formula. Equation (1) displays the formula.

$$n = \frac{n_0}{\left[1 + \left\{\frac{(n_0 - 1)}{N}\right\}\right]} \qquad (1)$$

Population: N, sample: n. Nanjundeswaraswamy [15] recommends 278 surveys for a 5% margin of error, 95% confidence, and 1.96 t-value. Our data is adequate. The data collection period was January–March 2023.

The survey was pre-tested by 7 academics and 5 data analysts. First, they checked the survey for unambiguous measurement scales. The poll was emailed and shared on social media after changes. BDA-savvy top and medium managers replied. A five-point Likert scale was utilized, with 1 meaning "strongly disagree" and 5 meaning "strongly agree." To eliminate method bias, researchers collected data from many sources. The male target respondents (59.70%) outnumbered female respondents (40.30%). Table 1 lists the additional descriptions.

Table 1. Sample demographics.

Items	Description	Values	%
Total received responses	Small business	199	65.46%
	Medium business	105	34.54%
Gender	Male	138	59.70%
	Female	93	40.30%
Education	Secondary	55	43.30%
	Technical	35	27.60%
	University	17	13.40%
Industry type	Manufacturing	79	61.20%
Job position	Top management	111	48%
	Medium management	78	33.80%

Source: Computed by Authors

3.2 Measures of constructs

The analysis employs validated scales ranging from 1 to 5 to evaluate DT. This study has three variables; the independent variable DT consists of five items adapted from Yu [16] measuring the extend which the firm adjust, prioritize, and execute digital transformation activities. The dependent variable, modern technologies is made up of two components. First, BDA consists of six items from Elisha [17]. Second, BCT adoption consists of three items adjusted from Anshari and Hamdan [18]. The research questionnaire is in Appendix A.

3.3 Analysis techniques

This study employs PLS-SEM to identify causal relationships. The bootstrap method is utilized to calculate the shape, bias, and distribution of a population sampling distribution [19]. Firstly, to remove common method bias (CMB), the inner VIFs test was applied. Secondly, the average extracted variance, factor loading, and composite reliability were assessed using a composite reliability test. Thirdly, the discriminate validity test was employed to assess the intercorrelation coefficients among the constructs. Fourthly, SEM was employed to determine the paths connecting all acquired variable in the study.

4. Results

Table 2 showed H1, which examined if DT affects BDA. A significant impact of DT on BDA was found (β=0.407, p=0.001). The T-statistic surpasses 1.96 at 4.208, showing a statistically significant positive connection. Therefore, H1 stood. H2 examines if DT significantly affects BCT. The results shows no significant impact of DT on BCT (β=-0.031). The T-statistic is below the crucial threshold at 0.667. H2 was unsupported.

Table 2   Direct relationships of structural model assessment

Hypothesis	Relationship	β	97.5% CI LL	97.5% CIUL	Std. Error	|*t*-value|^	Decision
H1	DT→BDA	0.407	0.212	0.594	0.096	4.208***	Supported
H2	DT→BCT	-0.031	-0.192	0.093	0.029	0.667	Not Supported

Note: ***$p < 0.001$.

Source: Computed by Authors

5. Discussion

The primary aim of this study was to examine the direct impact of DT on modern technologies such as BDA and BCT. The results show that DT positively affects BDA. This result is in line with Liana [20], who suggests that BDA plays a key role for SMEs in improving their digitalization capabilities and business development knowledge to meet customer needs and improve performance for the future. Results further revealed that DT has an insignificant effect on BCT. Contrary to Alahmadi [21]. There are three factors that account for this insignificant effect. SME implementation of new technologies is frequently hampered by inadequate information systems, innovation strategies, and resource constraints caused by the pandemic. These concerns emerge at every stage of technology implementation, encompassing planning, and assessment. Furthermore, Surya *et al.* [22] demonstrated that SMEs revenue and profit do not increase directly as a result of BCT adoption, as it incurs expenses for system setup and preparation. SMEs encounter difficulty deploying BCT amidst the pandemic. Lastly, Massaro [23] argued that the discrepancy between what employees do and what they accomplish is due to their ignorance of BCT requirements. Thus, SMEs employees were incapable of fully implementing BCT adoption, which resulted in negative associations.

5.1 Practical implications

This research adds to DT literature by showing how DT affects BDA and BCT to help managers innovate. The study's findings support the RBT [24] that explains how current technology improves corporate operations.

This research has many managerial implications. The data imply that DT improves BDA, which is crucial for the company's innovation and competitiveness in global markets. This study suggests that firms should prioritize manager-employee training and new technology adoption to increase managers' creative abilities and benefit the company. Managers should invest in these technologies to understand their supplier networks and find growth prospects. Managers must also ensure that all employees have equal opportunity and that no workplace discrimination occurs. Blockchain technology may also provide stakeholders with transparent and verifiable supply chain information, including sustainability practices.

6. Limitations and future research

This study has some limitations that may propose additional investigation. This paper initially focused on the possibilities for digitization in Mozambican SMEs during the

pandemic, however it ignored stakeholder perspectives. Further studies may focus on varied stakeholders including customers. Second, other researchers may examine CSR practices in organizational performance and their effects on rich countries following the epidemic. Third, Further research may examine how DT rules effect different industries' labor forces.

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