Information Resources Management Journal
Volume 36 • Issue 1

Modelling Digital Transformation Within the Financial Sector:
A South African Perspective

Olusegun Ademolu Ajigini, The Independent Institute of Education, Sandton, South Africa*
Tendesai Jeanlynn Wilma Chinamasa, The Independent Institute of Education, Sandton, South Africa

ABSTRACT

Digital transformation is a socioeconomic change across organizations, individuals, societies, and ecosystems formed by the utilization and adoption of digital technologies. This study modeled the factors that drive the degree of digital transformation in the financial services sector in South Africa. Data from 350 participants was modeled in terms of seven factors: organizational IT application portfolios; organizational culture; organizational structure; organizational dynamic capabilities; leadership; employee roles and skills; and ethics. The analysis showed that organizational culture predicted 81.7% of the digital transformation.

KEYWORDS

Digital Disruption, Digital Innovation, Digital Transformation, Financial Services, Leadership

INTRODUCTION

Digital transformation is a tool for changing business cultures, processes, and organizational viewpoints to satisfy changing market requirements that digital technologies affect (Nasiri et al., 2020). It is also the adoption of digital technologies and the substitution of nondigital processes with digital ones, leading to changes in the organization and the advent of new business models (Radziwon et al., 2021; Verhoef et al., 2021) or the amendment of existing ones (Dabrowska et al., 2019). According to Dabrowska et al. (2022), digital transformation is a socioeconomic change across organizations, individuals, societies, and ecosystems formed by the use and adoption of digital technologies. Digital technologies surpass organizational boundaries (Nakarni & Prugl, 2020) because they outline organizational value propositions and business models and can infer new organizational identities (Wessel et al., 2020).

Digital transformation is regarded as a holistic notion that includes technologies, organizational changes, and strategic changes (Matt et al., 2015). It can be seen as a process undergone by an organization to revamp its outdated approach while embracing new ways of working and thinking by using social, digital, mobile, and new technologies (Terrar, 2015). The financial sector is going through intense transformation, and digital technologies are used for payments, insurance, lending and wealth management while this process has been exacerbated by the COVID-19 pandemic (Feyen, et al., 2021).

DOI: 10.4018/irmj.320642 *Corresponding Author

The digital transformation of financial service systems has been accelerated by the financial technology (FinTech) organizations because of the disruptive innovations by these new market entrants that oppose the position of the mainstream financial institutions (Breibach et al., 2020). Mandela (2018) also holds the view that the emergence of FinTech companies has further disrupted and challenged traditional banks, resulting in a competitive and intensified digital transformation. The retail banks have been at the vanguard of this technological revolution distinguished by rapid implementation of digital innovation services and innovative breakthroughs altering conventional banking practice (Krasonikolakis & Tsarbopoulos, 2020).

The South African banking sector has pursued and embedded digital mechanisms such as digital wallets, blockchain, cryptocurrency, online banking, and mobile banking (Jenkin and Naude, 2018). Louw and Nieuwenhuzen (2020) point out that the traditional South African banks have commenced implementing digitization across their business models and services by presenting Internet banking services to their customers as well as access to their websites. Digitization is acclaimed as a strategic focus area for the sector, and it is one of BankSETA's five strategic priorities (BankSETA, 2018).

The main problem in the financial sector is that not many traditional financial service providers have implemented comprehensive digitization (Groberg et al., 2016; Kelchevskaya & Shirinkina, 2019; Niemand et al., 2020). Consequently, they often offer an incomplete range of services and are thus faced with both operational and strategic barriers within the digital transformation process (Diener & Spacek, 2021). A report developed by Capgemini research institute (Capgemini, 2022), revealed that many financial services organizations are lagging in digital transformation compared with other industry sectors.

Financial services institutions are lagging their digital capabilities owing to a shortage of skills, leadership, and collective vision required to shape the digital future. There is a gap in the literature on this issue because no research on modeling digital transformation within the financial sector has been carried out. For this reason, this paper contributes to the issue of digital financial sector transformation and identifies the factors (variables) that enhance digital transformation within the financial sector from the South African perspective. In line with this research objective, this study identifies the factors contributing to digital transformation within the financial sector leading to the development of a model using a methodological approach based on surveys conducted using financial sector managers and employees and exploration of multiple best-practice approaches. Moreover, the research in this study focused on answering this question: How can we conceptualize a model for the digital transformation within the South African sector?

In this paper we review the literature, as well as the conceptual framework; present the research methodology; examine analytical results; and discuss the conclusions, limitations, and future work of the study.

LITERATURE REVIEW

Phases of Digital Transformation—Digitization, Digitalization, and Digital Transformation

Mikalef and Parmiggiani (2022) argue that the notions of digitization, digitalization, and digital transformation have different meanings and that they require a radical approach. They describe digitization as a process of moving from analog to digital, whereas digitalization is defined as "the way in which many domains of social life are restructured around digital communication and media infrastructures" (Brennen & Kreiss, 2016, p.1). Additionally, digital transformation is defined as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial, 2019, p 9.).

Digitization is the "encoding of analog information into a digital format (i.e., into zeros and ones) such that computers can store, process, and transmit such information" (Loebbecke & Picot, 2015, p.150 ; Dougherty & Dume, 2012, p.1468). Moreover, Verhoef et al. (2019, p 889.) defines digitization as "describing the action to convert analog information into digital information"; that is, digitization

does not change value creation activities but only digitizes internal and external documentation. Also, Kusters (2022) defines digitization as information conversion from analogue to digital. According to O'Leary (2022, p.2), digitization "is the process of changing from analog to digital form and it is often concerned with capturing information for a digital process."

Digitalization is about how IT or digital technologies can be used to change existing business processes (Li et al., 2016). Organizations use digital technologies to improve existing business processes and/or by generating additional customer value through improving user experiences (Pagani & Pardo, 2017). Digitalization refers "both to a transformation from 'analog' to digital (e.g., a shift from cash to electronic payments) and to the facilitation of new forms of value creation (e.g., accessibility, availability, and transparency" (Amit & Zott, 2001, p.493). Digitalization comprises process improvements that may enrich customer experiences (Verhoef et al., 2019). Kusters (2022) also refers to digitalization as the conversion of processes. Digitalization is defined by O'Leary (2022, p.3) as "the use of digital technologies to change a business model and provide new revenue and value-producing opportunities, that is a process of moving to a digital business."

Digital transformation describes a change affecting the whole organization that leads to new models and development (Pagani & Pardo, 2017; Kane et al., 2015). Digital transformation brings in a new business model by executing a new business logic to build and confine value (Pagano & Pardo, 2017; Zott & Amit, 2008). Digital transformation involves the whole organization and its way of performing business (Amit & Zott, 2001) and goes beyond digitalization, which is the transforming of simple organizational processes (Verhoef et al., 2019). Thus, digital transformation can assist organizations to achieve competitive advantage by changing the organization to leverage existing core competences or develop new ones (Liu et al., 2011). Digital transformation is a whole organization phenomenon that is combined to strategic changes in the business model owing to the implementation of digital technologies (Sebastian et al., 2017). Organizations thus look for and implement business model innovation in pursuit of digital transformation. Consequently, digital transformation can be referred to as the introduction of new business models like product-as-a-service, digital platforms, and pure data-driven business models (Verhoef et al., 2019).

According to Kusters (2022), both digitization and digitalization refer to a process where organizations use digital technologies to perform efficiently and faster. Digital transformation goes a step further because it necessitates the whole organization to change where the implementation of digital technologies is just a small element. Corejova and Chinoracky (2021) state that digital transformation takes place not only across business but also across industries and society, thus contributing to the interconnection between businesses and economies as well as a more globalized world economy. Consequently, information is digitized, processes are digitalized, while businesses are digitally transformed (Kusters et al., 2022). O'Leary (2022, p.3) describes digital transformation as "the process of exploiting digital technologies and supporting capabilities to create a robust new digital business model and it would require building new processes or reengineering existing processes."

DIGITAL TRANSFORMATION

Changing customer demands, the integration of the Internet, blockchain, big data, artificial intelligence (AI), and related technologies, along with COVID-19, have created difficulties for business operations (AlNuaimi et al., 2022). Market boundaries are distorting, and agent roles continuously change because of rapid technological advancements (Verhoef et al., 2021). To attain sustainable competitive advantage and survive the disruptive market environment, organizations need to employ digital technologies to influence their existing core competencies or develop new ones (Verhoef et al., 2021). In addition, leaders need to ensure the development of digital mindsets and agility necessary to address the disruptions (Vial, 2019), a combination that establishes a distinctive ecosystem structure to deliver specific value propositions necessary (Adner, 2017; Dedehayir et al., 2017).

Digital transformation is often associated with the terms digitization and digitalization warranting a distinction of the three concepts and their relationship. Digitization represents a shift in tasks and information from analog into digital format, allowing computers to store, process, or transmit information without changing value-creating actions (Verhoef et al., 2021). Digitalization entails using digital technologies to change existing business processes (Reis & Melao, 2023). Digitization is considered the framework for digitalization (Rachinger et al., 2019) with the main difference showing through value creation and improved customer experience (Reis & Melao, 2023; Verhoef et al., 2021).

Digital transformation is considered the step beyond digitalization (Reis & Melao, 2023) representing a paradigm shift (Fernandez-Vidal, Perotti, Gonzalez, & Gasco, 2022) because it covers a wide range of activities, including the changing of business operations, products, and processes (Modiba & Kekwaletswe, 2020). Diener and Spacek (2021) have pointed out that in practice, a deeper understanding of the relationship between technological and organizational culture, as well as institutional change within certain rules and regulations, is required for digital transformation. Moreover, digital transformation is considered sophisticated, uncertain, and unpredictable. The approach is summarily innovative and requires the implementation of more than one technology. Consequently, for successful digital transformation, the approach is considered ongoing, and contextual considerations are required (Modiba, 2020).

OVERVIEW OF DIGITAL TRANSFORMATION IN THE FINANCIAL SECTOR

Digital transformation covers a wide range of activities, including the changing of business operations, products, and processes (Modiba & Kekwaletswe, 2020). Diener and Spacek (2021) have pointed out that in practice, a deeper understanding of the relationship between technological and organizational culture, as well as institutional change within certain rules and regulations, is required for digital transformation. Moreover, digital transformation is considered sophisticated, uncertain, and unpredictable. The approach is summarily innovative and requires the implementation of more than one technology. Consequently, for successful digital transformation, the approach is considered ongoing and contextual considerations are required (Modiba, 2021). Digital transformation improves financial inclusion by enabling social benefits that offer more personalized financial products and usable digital access channels (Mavlutora et al., 2023).

Financial service providers (FSPs) are pivotal to the country's economic growth and the financial industry is competitive, however, to stay relevant, FSPs need to innovate, digitally change, and reconsider their roles in adding to customers' value (Diener & Spacek, 2021). According to Kolodiziev et al. (2021), the use of attractive financial tools and methods, such as banking apps and improved digital payment options, is inevitable for FSPs. Recently, the COVID-19 pandemic in 2020, coupled with globalization and rapid development in technologies, has accelerated FSPs' speed in technological adoption and making decisions informed by data. With customers forced to digitally interact, the shift in behavior has necessitated FSPs' drive from a one-size-fits-all approach in financial services to more personalized experiences to ensure customer retention.

Digital transformation addresses this shift by leveraging information, computing, communication, and connectivity technologies with the aim to generate significant changes within an organization (Vial, 2019). Digital transformation is an ongoing journey and requires contextual considerations to be successful (Modiba, 2021). Digital transformation entails creating new and innovative business models and changes and/or improvements to existing business models with the help of digital technologies (Ivancic et al., 2020).

The exponential acceptance and growth of the Internet and online technologies over the past few decades have resulted in businesses digitizing and formulating new digital business models (Louw & Nieuwenhuizen 2019). Through digitalization, business models are becoming more consumer centric and open (Jenkin and Naude, 2018). FSPs are no exception, especially with the advent of the Fourth Industrial Revolution (4IR).

FSPs in South Africa include the economic services of credit facility, banking, insurance, accounting, consumer lending, securities brokerage, investment funds, corporate management, and government-funded enterprises. FSPs have widely adopted technology in financial services provision to parallel use of digital financial systems by consumers.

Impact of Digital Transformation on the Financial Sector

Digital transformation is considered a driving factor that offers a solution to the challenges faced by the banks with impacts broad and varied in the financial sector, and banks are confronted to change their methods and business models to adopt a customer-centric approach to remain competitive (Diener & Spacek, 2021). In the digital economy, both innovation and transformation are essential for generating value (Modiba & Kekwaletswe, 2020). Therefore, FSPs are constantly requiring overhauls of all company functions, including products, processes, and company structure to meet increased customer demands. Through technological advances, alternative business models have arisen in varied forms such as digital-only banks offering banking services entirely over smartphones or websites, thereby disrupting the traditional banking norm (Louw & Nieuwenhuizen, 2020). Digital transformation is not optional, but a survival process requirement given the impacts it has in the financial sector.

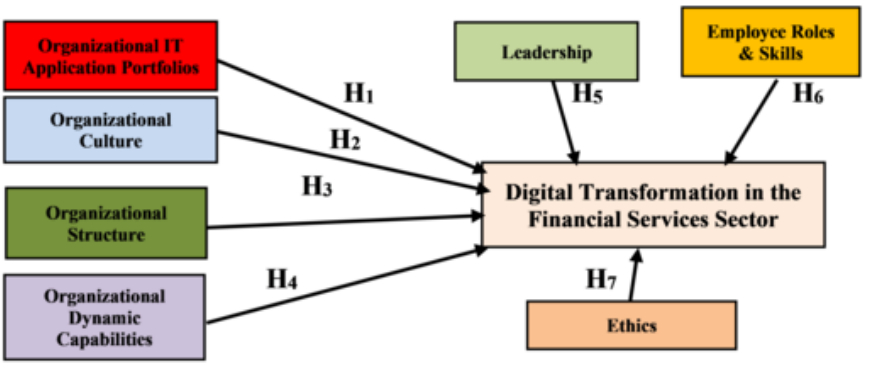
Digital-only business models satisfy a customer need that is not easily reached by traditional platforms, ushering in a fundamental change in the financial services. Digital-only banks are disruptive through offering affordable products and services by leveraging outsourcing opportunities to already existing systems and frameworks (Kulkarni & Dambe, 2019). Moreover, the convenience and economic efficiencies offered by digital-only services resonate positively with consumer intentions of adoption and continuance (Lee & Kim, 2020). Pallant et al. (2020) argue that traditional FSPs respond to the growth of digital-only FSPs by digitalization, thereby ensuring a perpetual cycle of innovation in offline, online, and mobile services. Louw and Nieuwenhuizen, (2020) conclude that web-based technologies and smartphone banking technologies endeavors are not only similar but also a priority for both digital-only FSPs and traditional FSPs in South Africa.

The impact of digital transformation is equally appreciated in its role toward United Nations sustainable development goals. Bican and Brem (2020) point out that to sustainably solve both economic and environmental issues in the future, transformation of existing businesses is imperative. The shift toward sustainable solutions through digital transformation is apparent by the growth of financial technology companies (FinTechs). FinTechs are considered a new concept, shaking up the financial sector. They consist of a wide array of businesses offering financial services coupled with innovative technology to FSPs (Moro-Visconti et al., 2020). There are several advantages gained from FinTechs, including microfinancing and crowdfunding as solutions for sustainable finance (Diener & Spacek, 2021). In South Africa, the central bank, South African Reserve Bank, has recognized advances made in FinTech by establishing a FinTech unit with the goal to "respond to the rapidly changing environment with agility, flexibility and speed by assessing how financial services innovation driven by technological developments impact on policies and regulations" (South African Reserve Bank, 2020).

THE CONCEPTUAL FRAMEWORK

The conceptual framework is displayed in Figure 1. The conceptual framework was adapted from Tahirkheli and Ajigini (2022). In this paper we used all the independent and dependent variables from the adapted conceptual framework because these variables will enhance the understanding of digitalization within the financial sector. The independent variables are organizational IT application portfolios, organizational culture, organizational structure, organizational dynamic capabilities, leadership, employee roles, and skills and ethics. The dependent variable is digital transformation in the financial sector. Based on the existing literature, there are preexisting relationships between the independent and dependent variables and in which seven hypotheses were postulated (Tahirkheli & Ajigini, 2022).

Figure 1 The Conceptual Framework (Source: Adapted from Tahirkheli & Ajigini, 2022).



Seven hypotheses were postulated from the conceptual framework, and we used them to develop the model:

H1: Organizational IT application portfolios positively influence the digital transformation in the financial sector.
H2: Organizational culture positively influences the digital transformation in the financial sector.
H3: Organizational structure positively influences the digital transformation in the financial sector.
H4: Organizational dynamic capabilities positively influence the digital transformation in the financial sector.
H5: Leadership positively influences the digital transformation in the financial sector.
H6: Employee roles and skills positively influence the digital transformation in the financial sector.
H7: Ethics positively influences the digital transformation in the financial sector.

RESEARCH METHODOLOGY

Sample Size and Data Collection

We chose South Africa to perform this study because South Africa is one of the few African countries that have embraced digital transformation within the financial sector. A random sampling strategy was employed to choose respondents in the chosen financial institutions. Moreover, digital transformation of the financial sector is one of the most expeditiously researched topics in many academic publications during the last decade (Barro & Laborda, 2022; Natrins et al., 2019). Based on this contextual framing of digitalization, we conducted surveys in the financial institutions to enhance our understanding of digitalization within the financial sector in South Africa. Moreover, South Africa might be seen as a digital laggard compared with its international counterparts, and digitalization is still recognized as a strategic focus area for the financial sector (Jenkin & Naude, 2018). The unit of analysis is the employees of the identified financial institutions in South Africa, and this is the population that the research was intended to analyze. We contacted the respondents by using gatekeepers in the identified financial institutions. Based on the random strategy used, the sample is representative of the population.

We conducted surveys and distributed questionnaires via a web-based platform to test the seven hypotheses. We developed a measuring instrument based on a five-point Likert scale (see Appendix 1). We first piloted the measuring instrument (questionnaire) by using 50 participants to perform item analysis and validity testing (Brace, 2013). The questions were on a five-point Likert scale format as follows: 1—strongly disagree; 2—disagree; 3—neutral; 4—agree; 5—strongly agree. The questionnaire

consisted of the following variables: organizational IT application portfolios, organizational culture, organizational structure, organizational capabilities, leadership, employee roles and skills, ethics, and digital transformation. After the pilot test, we modified the questionnaire according to the results of the test. At the end of the questionnaire deadline, 350 participants had completed the questionnaire, and these responses were captured in an Excel spreadsheet for data analysis.

Data Analysis

Afer compiling the data, we used regression analysis to analyze and present the data. We used SPSS 25.0 software to perform the data analysis with the Excel data input. First, we performed item analysis using the Cronbach alpha to measure the reliability of the constructs. We then carried out composite and discriminant validity tests to measure the validity of the constructs. We also conducted factor and regression analyses on the constructs.

RESULTS AND DISCUSSION OF FINDINGS

Profile of the Participants

A total of 350 respondents participated in the study. The vast majority (37.1% [N = 130]) were middle managers, 30.9% (N = 108) were lower managers, and 32.0% (N = 112) were employees. The mean age of the respondents was 35 years (SD = 1.167), and the majority were males (82.6% [N = 289]). Most of the respondents were permanently employed (80% [N = 280]), 13.4% (N = 47) were temporary employed, and 5.7% (N = 20) were on contract. Most of the respondents (33.4% [N = 117]) have worked in their organizations for more than two years, and 12.6% (N = 44) have worked for more than 10 years in their organizations. The majority of the respondents (60.0% [N = 210) have adequate experience in digital technologies, whereas 40.0% (N = 140) do not have adequate experience in digital technologies.

Validity and Reliability

We performed construct validity and discriminant validity using exploratory factor analysis (EFA) (Wang et al., 2010). We used Cronbach alpha (σ) to measure the reliability of the constructs. The details are presented in Table 1. The construct with the highest Cronbach alpha ($\sigma = 0.805$) is Organizational IT application portfolios, whereas Organizational structure with has the lowest Cronbach value ($\sigma = 0.660$). According to Hair et al. (2010), the lowest acceptable value for Cronbach's alpha for a construct is 0.60. Therefore, because the Cronbach alpha values of all the constructs—organizational IT application portfolios, organizational culture, organizational structure, organizational capabilities, leadership, employee roles and skills, ethics, and digital transformation—are all above 0.6, they are all reliable and consistent.

To assess the validity and reliability of the constructs, we estimated the average variance extracted (AVE), the composite reliability (CR), and the maximum shared variance (MSV) of each construct. The results are shown in Table 2. The lowest permissible value of AVE is 0.5 (Fornell & Larker, 1981). The lowest permissible value of CR is 0.5 (Hair et al., 2011). The value of the MSV should be less than its corresponding value of AVE. Therefore, in Table 2, the estimated values of AVE, CR, and MSV are within the acceptable range. Thus, the constructs are valid and reliable.

The estimations of the Cronbach alpha (σ), variance inflation factor (VIF), and AV are shown in Table 3. Multicollinearity defect results when the inner meanings of the constructs become very close to each other. Consequently, the VIF of each construct needs to be estimated (James et al., 2017). The maximum acceptable value of VIF is 5.000 (Ringle et al., 2015). We tested discriminant validity by computing the AV of each construct, which is the square root of AVE of each construct. We then established the discriminant if the AV of each construct is more than the correlation coefficient of that construct with other constructs (Gefen & Straub, 2005). From Table 3, the values of all the AVs of the constructs in the ninth column are greater than the corresponding correlation coefficients shown in off-diagonal places. The values of VIF for all the constructs lie between 1.272 and 2.561, thus confirming that the data is free from multicollinearity defects.

Table 1. Alpha Values

Cronbach Alpha Values of the Constructs

Construct	Construct Name	Cronbach Alpha (σ)
B	Organizational IT application portfolios	0.805
C	Organizational culture	0.738
D	Organizational structure	0.660
E	Organizational capabilities	0.673
F	Leadership	0.746
G	Employee roles and skills	0.758
H	Ethics	0.682
I	Digital transformation	0.770

Table 2. Estimation of LF, AVE, CR, and MSV

Constructs/ Items	AVE	CR	MSV
Organizational IT application portfolio (B)	0.473	0.782	0.38
Organizational culture (C)	0.377	0.706	0.06
Organizational structure (D)	0.344	0.674	0.22
Organizational dynamic capabilities (E)	0.358	0.686	0.21
Leadership (F)	0.256	0.575	0.10
Employee roles and skills (G)	0.244	0.557	0.06
Ethics (H)	0.345	0.677	0.21
Digital transformation (I)	0.365	0.695	0.06

Table 3. Estimation of Cronbach's Alpha, VIF, and AV (Discriminant validity test)

	TransB	TransC	TransD	TransE	TransF	TransG	TransH	AV	σ	VIF
Trans B	**0.017**							0.688	0.805	1.347
TransC	0.230	**0.342**						0.614	0.738	2.561
TransD	0.070	0.681	**0.383**					0.587	0.660	1.272
Trans E	-0.019	0.535	0.192	**0.476**				0.598	0.673	2.037
Trans F	0.00	0.653	0.303	0.505	**0.307**			0.506	0.746	1.541
TransG	0.480	0.075	0.186	0.109	0.001	**0.063**		0.493	0.758	1.886
TransH	-0.039	0.897	0.255	0.636	0.553	0.616	**0.075**	0.587	0.682	1.318

FACTOR ANALYSIS

We conducted the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to assess the suitability of the respondent data for factor analysis. The KMO value of 0.5 is suitable for factor analysis (Hair et al., 1995; Tabachnick & Fidell, 2007). Additionally, the Bartlett's test of sphericity should be significant ($p < 0.05$) for factor analysis to be suitable (Hair et al., 1995; Tabachnick & Fidell, 2007). Table 4 lists the KMO and Bartlett's test of sphericity values for this study. From Table 4, the KMO value is 0.754 (i.e., KMO > 0.50), thus indicating the data suitability for factor analysis. Additionally, the Bartlett's test of sphericity $\chi 2\ (55) = 2025.274$, $\rho < 0.05$ [$\rho = 0.000$] shows that there are patterned relationships between the items.

Table 4 KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.754**
Bartlett's test of sphericity	Approx. Chi-Square	**2025.274**
	df	**55**
	Sig.	.000

MULTIPLE LINEAR REGRESSION

The details of the summary of the regression model are shown in Table 5. The adjusted R square is 0.816. This result means that the variables organizational IT application portfolio, organizational culture, organizational structure, and leadership collectively predict 81.6% for digital transformation in the financial sector.

Table 5 Summary of the Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.905[a]	.820	.816	.12402	.820	222.230	7	342	.000

a. Predictors: (Constant), Organizational IT application portfolio, organizational culture, organizational structure, organizational dynamic capabilities, leadership, employee roles and skills, ethics
b. Dependent variable: digital transformation

The contribution of individual constructs in the regression model is shown in Table 6. The *P* value (or the calculated probability) is the probability of the event occurring by chance if the null hypothesis is true (Anaesth, 2016) and have values between 0 and 1. According to Anaesth (2016), if the *P* value < 0.01, then the result is highly significant, and the null hypothesis should be rejected. If the *P* value < 0.01, but *P* value < 0.05, then the result is significant, and the null hypothesis should be rejected. If *P* value > 0.05, then the result is not significant and null hypothesis should not be rejected.

In Table 6, the variables having their *P* values less than 0.05 are as follows:

- Organizational IT application portfolio (0.018)
- Organizational culture (0.000)

- Organizational structure (0.016)
- Organizational dynamic capabilities (0.009)
- Leadership (0.002)
- Employee roles and skills (0.009)
- Ethics (0.002)

These results indicate that all of the seven variables meaningfully contribute to the prediction of digital transformation in the financial sector. From the standardized coefficients of the individual constructs, the beta value of organizational culture is 81.7%, which contributes to the highest prediction of digital transformation in the financial sector. Thus, the variable with the highest contribution toward the prediction of digital transformation is organizational culture. Moreover, the beta values of organizational IT portfolio (-0.032) and organizational structure (-0.035) are both negative because for every 1-unit increase in the predictor variable, the outcome variable will decrease by the beta coefficient value.

Table 6 Contribution of Individual Constructs in the Regression Model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.310	.138		2.258	.025
	Organizational IT application portfolio	-.032	.013	-.064	-2.385	.018
	Organizational culture	.827	.037	.817	22.248	.000
	Organizational structure	-.035	.015	-.063	-2.414	.016
	Organizational dynamic capabilities	.032	.024	.044	1.345	.009
	Leadership	.083	.026	.090	3.150	.002
	Employee roles and skills	.031	.032	.031	.978	.009
	Ethics	.028	.015	.049	1.876	.002

THE RESULTING MODEL

Table 7 shows the hypothesis testing outline from the regression model.

OIPP: organizational IT application portfolio; OC: organizational culture; OS: organizational structure; ODC: organizational dynamic capabilities; LE: leadership; ERS: employee roles and skills; ET: ethics; DT: digital transformation

The resulting model is shown in Figure 2, and it is based on the seven hypotheses (H_1, H_2, H_3, H_4, H_5, H_6, and H_7).

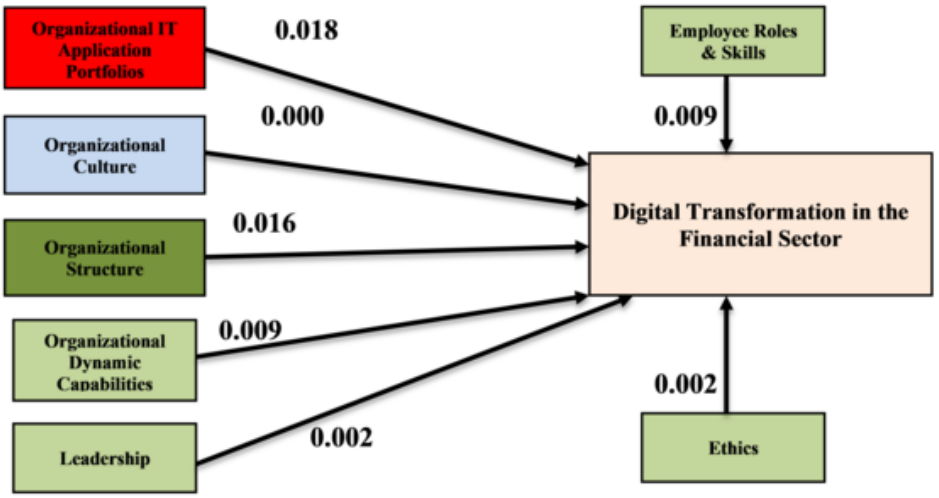
RELATED WORK

Kitsios et al. (2021) investigated the acceptance rate of digital transformation in the Greek banking sector by using data from 161 survey respondents. Their conceptual framework was based on the technology acceptance model (TAM), while data analysis was based on multivariate regression analysis. They concluded that perceived usefulness has a positive and significant impact on intension to use. These researchers also found that perceived ease of use and perceived self-efficacy also all have

Table 7 Hypothesis Testing Outline

Hypothesis Symbols	Hypothesis	Beta(β)	P -Values	Is P < 0.05?	Remarks
H_1	OIPP → DT	-.064	.018	Yes	Supported
H_2	OC →DT	.817	.000	Yes	Supported
H_3	OS →DT	-.063	.016	Yes	Supported
H_4	ODC →DT	.044	.009	Yes	Supported
H_5	LE →DT	.090	.002	Yes	Supported
H_6	ERS →DT	.031	.009	Yes	Supported
H_7	ET →DT	.049	.002	Yes	Supported

Figure 2 The Resulting Model



positive and significant impacts on intension to use digital transformation. Lastly, they found out that perceived intention to use digital transformation has a positive and significant effect on use behavior.

Mikalef and Parmiggiani (2022) developed a conceptual framework for digital transformation by using terms such as data availability, organizational structure, culture, employee skills and knowledge, top management support, competitor actions, and legal and regulatory conditions as antecedents. Vaska et al. (2021) argued that the field of digital transformation is still maturing, with more researchers showing growing interest since 2014. There is still a need for research in digital transformation to be performed in developing countries and for more collaboration between researchers and practitioners. Based on this assertion, this research was conducted in a developing country to stimulate more collaboration between researchers and practitioners.

In another dimension, Amudhan et al. (2022) investigated the impact of digital banking services on rural customers in India, and they argued in the favor of banks adopting digital transformation to remain competitive. Moreover, Cziesla (2014) also investigated how digital technologies shape the landscape

of the financial service industry and found that digital technologies have an impact on customer service performance. That is, there is a trend from "physical to digital" in the financial service industry.

Mavlutova et al. (2023) also explored digital transformation leads to the financial sector sustainable development through financial inclusion and operational efficiency. By using a systematic literature analysis on text analysis, they identified the research gaps on the digital transformation in the financial sector. They used statistical methods, including correlation and regression analysis, and found that with increased intensity of digital payments, the total and staff costs to bank assets decrease.

Verhoef et al. (2021) identified three stages of digital transformation from the literature: digitization, digitalization, and digital transformation. They posited that digital transformation needs specific organizational structures and bears consequences for the metrics used to regulate performance. Additionally, Skylar et al. (2019) also argued that digital transformation has implications for organizational structure, by favoring a flexible structure composed of separate business units, agile organizational forms, and digital functional areas.

By using institutional theory, AlNuaimi et al. (2022) developed and tested a model on how digital transformational leadership and organizational agility influence digital transformation with digital strategy as a moderator. They found that digital transformational leadership influences organizational agility. They also found that organizational agility facilitates the relationship between digital transformational leadership and digital transformation.

CONCLUSION AND THEORETICAL CONTRIBUTIONS

We developed a model that can be used to develop digital transformation in the financial services sector in this study. Digital transformation is a socioeconomic change across organizations, individuals, societies, and ecosystems formed by the use and adoption of digital technologies (Dabrowska et al., 2022). Three-hundred and fifty (350) participants completed the questionnaire, and most of them were middle managers (30.9% [N = 108]). We used Cronbach alpha (σ) to measure the reliability of the constructs. The construct with the highest Cronbach alpha is organizational IT application portfolios ($\sigma = 0.805$), while organizational structure has the lowest Cronbach value ($\sigma = 0.660$). The discriminant and construct validity were both satisfied by the constructs as well as the reliability of the constructs. We conducted the KMO measure of sampling adequacy and Bartlett's test of sphericity to assess the suitability of the respondent data for factor analysis. Additionally, the Bartlett's test of sphericity should be significant ($p < 0.05$) for factor analysis to be suitable (Hair et al., 1995; Tabachnick & Fidell, 2007). The KMO value is 0.754 (i.e., KMO > 0.50), thus indicating the data suitability for factor analysis. Additionally, the Bartlett's test of sphericity $\chi 2\ (55) = 2025.274$, $\rho < 0.05$ [$\rho = 0.000$] showed that there were patterned relationships between the items.

The results show that organizational IT application portfolios, organizational culture, organizational structure, organizational dynamic capabilities, leadership, employee roles and skills and ethics were the predictors of digital transformation in the financial services sector. This paper is helpful to academic and practitioners because it enhances the digital transformation within the financial sector by investigating the factors contributing to digital transformation. Consequently, top and executive management need to take into consideration these variables when implementing digital transformation within the financial sector.

To the best of our knowledge, this will be the first time that a model on digital transformation is being carried out. Thus, making this paper original and worthy of publication. Therefore, the academic interest in modeling of digital transformation per se justifies publication. The paper promotes the theory because there is clear guidance on research paths. The main contribution is therefore the conceptualization of the model on digital transformation within the financial sector.

LIMITATIONS, PRACTICAL IMPLICATIONS, AND FUTURE WORK

The study was conducted in South Africa; thus, respondents were chosen randomly from some financial institutions. The paper was limited by variables that could influence digital transformation. Some variables might have been left out that might also contribute to the resulting model, because the determinants were obtained from the literature (e.g., organizational culture, organizational size, etc.). More research can still be done by looking for more variables that can be included in the model. The research might not be generalizable as could be expected because the respondents were randomly selected. Another limitation was that the data collected for this study were done only in one country. Future research could develop this study by collecting data from countries with digital transformation maturity levels as well as considering other cultural factors.

The study used a cross-sectional research design owing to COVID-19 problems; however, future research can be performed by using a longitudinal research strategy. The study is a groundwork for exploring the actual process of adoption of digital transformation in the financial services sector. For future research, more determinants could be identified from the literature and included in the model to enrich the data and findings of the research. The findings of this study could be used by financial services directors, chief executive officers, and senior executives as well as academia.

COMPETING INTERESTS

The authors of this publication declare there is no competing interests and conflict of interest.

FUNDING AGENCY

The researchers received no specific grant from any funding agency in the public, commercial, or not-for-profit sector. Funding for this research was covered by the authors.

REFERENCES

Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, *43*(1), 39–58. doi:10.1177/0149206316678451

AlNuaimi, B. K., Singh, S. K., Ren, S., Budhwar, P., & Vorobyev, D. (2022). Mastering digital transformation: The nexus between leadership, agility, and digital strategy. *Journal of Business Research*, *145*(C), 636–648. doi:10.1016/j.jbusres.2022.03.038

Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, *22*(6–7), 493–520. doi:10.1002/smj.187

Amudhan, S., Banerjee, S., & Poornima, J. (2022). Impact of digital transformation of banking sector in rural areas. *Journal of Positive School Psychology*, *6*(2), 763–771.

Anaesth, I. J. (2016). Basic statistical tools in research and data analysis. *Indian Journal of Anaesthesia*, *60*(9), 662–669. doi:10.4103/0019-5049.190623 PMID:27729694

BankSETA. (2018). *Banking sector skills plan 2017/18.* Banking Sector Education and Training Authority (BANKSETA). https://www.bankseta.org.za/wp-content/uploads/2017/12/BST1016_Banking_Sector_Skills_Plan.pdf

Barroso, M., & Laborda, J. (2022). Digital transformation and the emergence of the Fintech sector: Systematic literature review. *Digital Business*, *2*(2), 100028. doi:10.1016/j.digbus.2022.100028

Bican, P. M., & Brem, A. (2020). Digital business model, digital transformation, digital entrepreneurship: Is there a sustainable "digital"? *Sustainability*, *12*(13), 5239. doi:10.3390/su12135239

Brace, I. (2013). *Questionnaire design: How to plan, structure and write survey material for effective market research* (3rd ed.). Kogan Page Limited.

Braun, A. (2018). *Deutsche Bank voll "Digital"*. https://www.db.com/news/detail/20190322-deutsche-bank-publishes-2018-financial-reports-human-resources-report-and-non-financial-report?language_id=1

Breidbach, C. F., Keating, B. W., & Lim, C. (2020). Fintech: Research directions to explore the digital transformation of financial service systems. *Journal of Service Theory and Practice*, *30*(1), 79–102. doi:10.1108/JSTP-08-2018-0185

Brennen, J. S., & Kreiss, D. (2016). Digitalization. In The International Encyclopedia of Communication Theory and Philosophy (pp. 1–11). doi:<ALIGNMENT.qj></ALIGNMENT>10.1002/9781118766804.wbiect111

Burgess, M. (2019). *What is GDPR? The Summary Guide to GDPR Compliance in the UK*. https://www.wired.co.uk/article/what-is-gdpr-uk-eu-legislation-compliance-summary-fines-2018

Business Wire. (2019, March 5). *Banks and insurers underestimated the magnitude of the digital transformation challenge*. https://www.businesswire.com/news/home/20190304006003/en/

Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, *1*(2), 245–276. doi:10.1207/s15327906mbr0102_10 PMID:26828106

Coleman, D., & Khanna, R. (Eds.). (1995). *Groupware technology and applications*. Prentice Hall.

Corejova, T., & Chinoracky, R. (n.d.). Assessing the potential for digital transformation. *Sustainability*, *13*(19), 11040. doi:10.3390/su131911040

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, *10*(7), 1–9. doi:10.7275/jyj1-4868

Cziesla, T. (2014). A literature review on digital transformation in the financial service industry. In *Proceedings of BLED 2014*. Association for Information Systems. https://aisel.aisnet.org/bled2014/18

Dąbrowska, J., Lopez-Vega, H., & Ritala, P. (2019). Walking the sleeping beauty: Swarovski's open innovation journey. *R & D Management*, *49*(5), 775–788. doi:10.1111/radm.12374

Dabrowska, J. H., Almpanopoulou, A., Brem, A., Chesbrough, H., Cucino, V., Di Minin, A., Giones, F., Hakala, H., Marullo, C., Mention, A.-L., Mortara, L., Nørskov, S., Nylund, P. A., Oddo, C. M., Radziwon, A., & Ritala, P. (2022). Digital transformation, for better or worse: A critical multi-level research agenda. *R & D Management*, *52*(5), 930–954. doi:10.1111/radm.12531

Dedehayir, O., Ortt, R., & Seppänen, M. (2017). Disruptive change and the reconfiguration of innovation ecosystems. *Journal of Technology Management & Innovation*, *12*(3), 9–21. doi:10.4067/S0718-27242017000300002

Diener, F., & Spacek, M. (2021). Digital transformation in banking: A managerial perspective on barriers to change. *Sustainability*, *13*(4), 2032. doi:10.3390/su13042032

Dougherty, D., & Dunne, D. (2012). Digital science and knowledge boundaries in complex innovation. *Organization Science*, *23*(5), 1467–1484. doi:10.1287/orsc.1110.0700

Fernandez-Vidal, J., Perotti, F. A., Gonzalez, R., & Gasco, J. (2022). Managing digital transformation: The view from the top. *Journal of Business Research*, *152*, 29–41. doi:10.1016/j.jbusres.2022.07.020

Feyen, E., Frost, J., Gambacorta, L., Natarajan, H., & Saal, M. (2021). Fintech and the digital transformation of financial services: Implications for market structure and public policy. *BIS Papers*, 117.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, *16*, 91–109. doi:10.17705/1CAIS.01605

Groberg, M., Vetter, H.-M., & Flatten, T. C. (2016). A measurement instrument for digitization: Scale development and impact on new product performance. *Academy of Management Proceedings*, *2016*(1), 13027. Advance online publication. doi:10.5465/ambpp.2016.13027abstract

Hair, J., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). *Multivariate data analysis* (4th ed.). Prentice Hall Inc.

Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.). Pearson: Prentice Hall.

Hair, J. F. Jr, Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (7th ed.). Pearson Education International.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed, a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. doi:10.2753/MTP1069-6679190202

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. *MIS Quarterly Executive*, *15*, 123–139.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*(2), 179–185. doi:10.1007/BF02289447 PMID:14306381

Jenkin, N., & Naude, R. (2018). *Developing competencies for a just transition of the South African banking sector: Digitalisation*. Working paper, University of Witwatersrand, Johannesburg.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, *20*(1), 141–151. doi:10.1177/001316446002000116

Kane, G. C., Palmer, D., Philips, A. N., Kiron, D., & Buckley, N. (2015). *Strategy, not technology, drives digital transformation.* MIT Sloan Management Review and Deloitte University Press. https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/strategy/dup_strategy-not-technology-drives-digital-transformation.pdf

Kelchevskaya, N. R., Shirinkina, E. V., & Strih, N. I. (2019). Estimation of interrelation of components of human capital and level of digitalization of industrial enterprises by method of modeling of structural equations. In *Proceedings of the 1st International Scientific Conference "Modern Management Trends and the Digital Economy: From Regional Development to Global Economic Growth" (MTDE 2019)*. Atlantis Press. doi:10.2991/mtde-19.2019.25

Kitsios, F., Giatsidis, I., & Kamariotou, M. (2021). Digital transformation and strategy in the banking sector: Evaluating the acceptance rate of e-services. *Journal of Open Innovation*, *7*(3), 204. doi:10.3390/joitmc7030204

Krasonikolakis, I., Tsarbopoulos, M., & Eng, T.-Y. (2020). Are incumbent banks bygones in the face of digital transformation. *Journal of General Management*, *46*(1), 60–69. doi:10.1177/0306307020937883

Kulkarni, A., & Dambe, S. (2019). Innovating digital consumer services in wealth management ecosystem: An anthropomorphic approach. In M. Tuba, S. Akashe, & A. Joshi (Eds.), *Information and Communication Technology for Sustainable Development. Advances in Intelligent Systems and Computing* (pp. 268–277). Springer Nature. doi:10.1007/978-981-13-7166-0_24

Kusters, A. (2022). *Relating digitization, digitalization and digital transformation: A maturity model and roadmap for Dutch logistics companies* [Paper presentation]. 36th Twente Student Conference on IT, Enschele, The Netherlands.

Li, F., Nucciarelli, A., Roden, S., & Graham, G. (2016). How smart cities transform operations models: A new research agenda for operations management in the digital economy. *Production Planning and Control*, *27*(6), 514–528. doi:10.1080/09537287.2016.1147096

Liu, D.-Y., Chen, S.-W., & Chou, T.-C. (2011). Resource fit in digital transformation: Lessons learned from the CBC bank global e-banking project. *Management Decision*, *49*(10), 1728–1742. doi:10.1108/00251741111183852

Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, *24*(3), 149–157. doi:10.1016/j.jsis.2015.08.002

Louw, C., & Niewenhuizen, C. (2020). Digitalisation strategies in a South African banking context: A consumer services analysis. *South African Journal of Information Management*, *22*(1), 1–8. doi:10.4102/sajim.v22i1.1153

Mandela, E. (2018). Finnovation – South Africa 2018 accelerates digital innovations. *AESP*. https://www.itnewsafrica.com/2018/06/finnovation-south-africa-2018-accelerates-digital-innovations/

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. doi:10.1007/s12599-015-0401-5

Mavlutova, I., Spilbergs, A., Verdenhofs, A., Natrins, A., Arefjevs, I., & Volkova, T. (2023). Digital transformation as a driver of the financial sector sustainable development: An impact on financial inclusion and operational efficiency. *Sustainability*, *15*(1), 207. doi:10.3390/su15010207

McNurlin, B., & Sprague, R. (1998). *Information Systems Management in Practice* (6th ed.). Prentice Hall.

Mikalef, P., & Parmiggiani. (Eds.). (2022). An introduction to digital transformation. In *Digital transformation in Norwegian enterprises*. Springer. <ALIGNMENT.qj></ALIGNMENT>10.1007/978-3-031-05276-7

Modiba, M. M. (2020). *A digital transformation framework for South African financial service providers*. http://hdl.handle.net/10394/36415

Modiba, M. M., & Kekwaletswe, R. M. (2020). Technological, organizational and environmental framework for digital transformation in South African financial service providers. *International Journal of Innovative Science and Research Technology*, *5*(5), 180–196. doi:10.38124/IJISRT20MAY223

Mohan, D. (2015). How banks and FinTech startups are partnering for faster innovation. *Journal of Digital Banking*, *1*(1), 13–21.

Moro-Visconti, R., Cruz Rambaud, S., & Lopez Pascual, J. (2020). Sustainability in fintechs: An explanation through business model scalability and market valuation. *Sustainability*, *12*(24), 10316. doi:10.3390/su122410316

Nadkarni, S., & Prügl, R. (2020). Digital transformation: A review, synthesis and opportunities for future research. *Management Review Quarterly*, *71*(2), 233–341. doi:10.1007/s11301-020-00185-7

Nasiri, M., Ukko, J., Saunila, M., & Rantala, T. (2020). Managing the digital supply chain: The role of smart technologies. *Technovation*, *96–97*, 102121. doi:10.1016/j.technovation.2020.102121

Niemand, T., Rigtering, J. P. C., Kallmüzer, A., Kraus, S., & Maalaoui, A. (2020). Digitalization in the financial industry: A contingency approach of entrepreneurial orientation and strategic vision on digitalization. *European Management Journal*, *39*(3), 317–326. doi:10.1016/j.emj.2020.04.008

Nunamaker, J. F., Briggs, R. O., & Mittleman, D. D. (1995). Electronic Meeting Systems: Ten Years of Lessons Learned. In D. Coleman & R. Kanna (Eds.), *Groupware Technology and Applications* (pp. 149–193). Prentice Hall.

O'Leary, D. E. (2022). *Digitization, digitalization and digital transformation in accounting, electronic commerce and supply chains*. Paper presented at the 2022 American Accounting Association National Meeting, San Diego, CA. doi:<ALIGNMENT.qj></ALIGNMENT>10.1002/isaf.1524

Pagani, M., & Pardo, C. (2017). The impact of digital technology on relationships in a business network. *Industrial Marketing Management*, *67*, 185–192. doi:10.1016/j.indmarman.2017.08.009

Pallant, J., Sands, S., & Karpen, I. (2020). Product customization: A profile of consumer demand. *Journal of Retailing and Consumer Services*, *54*, 1020–1030. doi:10.1016/j.jretconser.2019.102030

Rachinger, M., Rauter, R., Muller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, *30*(8), 1143–1160. doi:10.1108/JMTM-01-2018-0020

Radziwon, A., Bogers, M., Chesbrough, H., & Minssen, T. (2021). Ecosystem effectuation: Creating new value through open innovation during a pandemic. *R & D Management*, *52*(2), 376–390. doi:10.1111/radm.12512

Reis, J., & Melao, N. (2022). Digital Transformation: A meta-review and guidelines for future research. *Heliyon*, *9*(1), e12834. doi:10.1016/j.heliyon.2023.e12834 PMID:36691547

Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3*. Bönningstedt: SmartPLS GmbH. http:// www.smartpls.com

Schepinin, V., & Bataev, A. (2019). Digitalization of financial sphere: Challenger banks efficiency estimation. *IOP Conference Series. Materials Science and Engineering*, *497*, 21–22. doi:10.1088/1757-899X/497/1/012051

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2017). How big old companies navigate digital transformation. *MIS Quarterly Executive*, *16*(3), 197–213.

Singh, A., & Hess, T. (2017). How chief digital officers promote the digital transformation of their companies. *MIS Quarterly Executive*, *16*(1), 1–17.

Singh, S., & Chana, I. (2016). A survey on resource scheduling in cloud computing: Issues and challenges. *Journal of Grid Computing*, *14*(2), 217–264. doi:10.1007/s10723-015-9359-2

Sklyar, A., Kowalkowski, C., Tronvoll, B., & Sörhammar, D. (2019). Organizing for digital servitization: A service ecosystem perspective. *Journal of Business Research*, *104*, 450–460. doi:10.1016/j.jbusres.2019.02.012

South African Reserve Bank. (2020). *Fintech.* https://www.resbank.co.za/en/home/quick-links/fintech

Stjepic, A.-M., Ivancic, L., & Vugec, D. S. (2020). Mastering digital transformation through business process management: Investigating alignments, goals, orchestration, and roles. *Journal of Entrepreneurship Management and Innovation*, *16*(1), 41–74. doi:10.7341/20201612

Sundt, C. (2006). Information security and the law. *Information Security Technical Report*, *11*(1), 2–9. doi:10.1016/j.istr.2005.11.003

Svantesson, D., & Clarke, R. (2010). Privacy and consumer risks in cloud computing. *Computer Law & Security Review*, *26*(4), 391–397. doi:10.1016/j.clsr.2010.05.005

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Pearson Education Inc.

Tahirkheli, S. K., & Ajigini, O. A. (2022). Factors influencing digital innovation strategy in organizations: An empirical analysis. *Information Resources Management Journal*, *35*(1), 1–22. doi:10.4018/IRMJ.287900

Terrar, D. (2015). *What is digital transformation*? https://www.theagileelephant.com/what-is-digitaltransformation/

Vaska, S., Massaro, M., Bagarotto, E. M., & Mas, F. D. (2021). The digital transformation of business model innovation: A strategic literature review. *Frontiers in Psychology*, *11*, 11539363. doi:10.3389/fpsyg.2020.539363 PMID:33584396

Verhoef, P. C., Broekhuizen, T. L., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N. E., & Haenlein, M. (2019). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*, 889–901. doi:10.1016/j.jbusres.2019.09.022

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Wang, Y.-M., Wang, Y., & Yang, Y. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change*, *77*(5), 803–815. doi:10.1016/j.techfore.2010.03.006

Wei, L., Zhu, H., Cao, Z., Dong, X., Jia, W., Chen, Y., & Vasilakos, A. V. (2014). Security and privacy for storage and computation in cloud computing. *Information Sciences*, *258*, 371–386. doi:10.1016/j.ins.2013.04.028

Wessel, L. K., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind Jensen, T. (2020). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1), 102–129. doi:10.17705/1jais.00655

Zott, C., & Amit, R. (2008). The fit between product market strategy and business model: Implications for firm performance. *Strategic Management Journal*, *29*(1), 1–26. doi:10.1002/smj.642

Olusegun Ademolu Ajigini is with the Independent Institute of Education. His research interests include digitalisation, digital transformation, computers in education, data science, big data analytics and data governance. He received his PhD in Information Systems from University of South Africa. He received his Master of Information Technology (MIT) degree from University of Pretoria. He also received BSc (Hons) Engineering Physics and MSc Engineering degrees from Obafemi Awolowo University. He had worked in the IT Industry for more than ten years in IT executive management and professional IT roles. He had taught and conducted research in many universities.

Tendesai Jeanlynn Wilma Chinamasa is currently with the Independent Institute of Education, Sandton, Johannesburg. She holds a Master of Science degree in Leadership and Information Technology at Duquesne University, Pittsburgh, an honors degree in Business Management and Information Technology from Catholic University, Zimbabwe. Her research interests include implementation and impact of educational technologies, digital transformation in business and IT Ethics. She had worked in various academic institutions for the past ten years and also has nine years' experience in banking and retail industries as a database management system specialist and system analyst.

APPENDIX 1: QUESTIONNAIRE

Appendix Table 1

Factors/Authors	Question Identifiers	Questions
Organizational IT application portfolio (Bygstad [2017]; Wiesbock and Hess [2020])	**B1**	Do you think that there is a need for organizations to set up IT infrastructures that present adequate levels of centralization?
	B2	Will digital technologies produce IS infrastructures that bring about data replication and processes in organizations?
	B3	Will the changes initiated by digital transformation be adapted by the organizational IT application portfolio and its IT system?
	B4	Do you think that IT application portfolios facilitate digital transformation in organizations?
Organizational culture (Hartl and Hess [2017]; Wiesbick and Hess [2020])	**C1**	Do you think that organizations should amend their organizational culture to adapt to digital innovations?
	C2	Should the organizational culture govern how employees agree with the many changes caused by digital transformation?
	C3	Is culture accountable to the general attitude of the organization toward digital technologies?
	C4	Do you think that organizational culture facilitates digital transformation in organizations?
Organizational structure (Wiesbock and Hess [2020]; Alt and Zimmermann [2018]; Alt [2018])	**D1**	Do you think that organizations should set up organizational structures that facilitate digital transformation?
	D2	Will integrating digital technologies into organizational structures steer a change from decentralized resources toward more networked and centralized platforms?
	D3	Will the use of human capital resources assist organizations to improve the quality of large-scale system implementation?
	D4	Do you think that organizational agility is crucial for organizations to effectively use the benefits of digital technologies?
Organizational dynamic capabilities (Li et al. [2018]; Wiesbock [2018]; Stoeckli et al. [2018])	**E1**	Do you think that organizations should develop their organizational capabilities to achieve and entrench digital transformation?
	E2	Should organizations require reserved digital capabilities after possessing the necessary IT capabilities that allow them to manage digital technologies?
	E3	Should organizations use different ways to develop capabilities either by building the necessary capabilities organically or inorganically?
	E4	Do you think that organizational capabilities facilitate digital transformation in organizations?
Leadership (Vial [2019]; Benlian and Haffke [2016]; Hansen et al. [2011])	**F1**	Do you believe that organizational leaders should ensure that their organizations cultivate a digital mentality?
	F2	Should organizational leaders facilitate digital transformation in their organizations?
	F3	Do you believe that the position of chief digital officer be established in organizations to signify the strategic disposition of digital transformation?
	F4	Do you think that leadership facilitates digital transformation in organizations?
Employee roles and skills (Vial [2019]; Yeow et al. [2017]; Watson [2017])	**G1**	Do you believe that employees are steered to assume roles that were traditional outside their functions owing to changes to the structure and culture of the organization?
	G2	Do digital technologies nurture situations where employees from other departments except IT department lead in the management of technology-intensive projects in organizations?
	G3	Can digital transformation compel employees to depend more deeply on their analytical skills so that they can resolve difficult business problems?
	G4	Do you think that employee roles and skills facilitate digital transformation in organizations?

Table continued on next page

Table continued

Factors/Authors	Question Identifiers	Questions
Ethics (Galliers et al. [2012]; Ganju et al. [2016]; Majchrzak et al. [2016])	**H1**	Should ethical consequences of digital transformation remain outside the level of an organization's strategy?
	H2	Do you believe that ethical consequences of digital transformation can cause harm to the society itself?
	H3	Should traditional theories that entrench ethical contemplation be reexamined on the development of the digital transformation process?
	H4	Do you think that ethics facilitate digital transformation in organizations?
Digital transformation (Vial [2019]; Abedin et al. [2014]; Warner and Wager [2019]; Galati and Bigliardi [2019]; Yoo et al. [2012])	**I1**	Do you think that digital transformation is achieved through IT application portfolios/ organizational culture in organizations?
	I2	Do you think that digital transformation is achieved through organizational dynamic capabilities/ leadership in organizations?
	I3	Do you think that digital transformation is achieved through employee roles and skills/ ethics in organizations?
	I4	Do you think that digital transformation is achieved through organizational structure in organizations?