

The Impact of Technology and Change Management on Value Proposition Innovation: An Iranian Study

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The Impact of Technology and Change Management on Value Proposition Innovation: An Iranian Study

Reihaneh Hajishirzi, Carlos J. Costa, and Manuela Aparicio

Abstract— Digital transformation is inevitable in today’s business world. Applying digital technologies in business processes creates innovative value propositions but causes substantial changes to the organization. The main objective of our research is to understand how technology and change management affect value proposition innovation of organizations. This study introduced a model that explains value proposition innovation in Iranian companies considering three essential factors of technology, change management, and environment (industry pressure and government regulation). We evaluated our model based on the data gathered by 220 organizational leaders from different Iranian organizations, and statistically validated our model. The results showed that technology and change management significantly impact value proposition innovation. Additionally, environment has a substantial effect on change management and technology.

Index Terms—Change Management, Digital Transformation, Environmental Pressure, Technology Adoption, Value Proposition Innovation

I. INTRODUCTION

DIGITAL transformation applies digital technologies in every aspect of organizational processes to change business models [1], [2] and value proposition [3]–[5] – which is about creating and delivering value to customers [6]. For example, using new technologies in the aviation industry directly impacts on value proposition [7]; Blockchain technology disrupts supply chain finance to solve the fraud and non-trust issues in this market [8]; The Uber company as a mobility service provider creates an innovative value proposition by digital delivery [9]. However, technology is not the only factor affecting the value proposition. Digital technologies cause fundamental changes in culture, markets, industries, and processes [10], [11]. Therefore, the leaders have an essential role [12] to adapt the company to changes. They should facilitate change management processes in companies and remove obstacles [13] which needs clear communication with employees [14]. However, to enhance business values, changes in strategy and structure must be controlled [15].

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Importantly, all these are affected by the environmental factors [16]–[19] including political, social, industrial, and governmental pressures [20]. Environmental regulation influences technology [21], green innovation [22] and reliable infrastructure [23]. Furthermore, environmental pressure has impact on management decisions on budgets, costs, investments, and technologies [24].

In this study, we identify essential factors – including technology, change management, and environment – that affect value proposition innovation. Previous studies [1], [4], [5], [7] have shown the correlations between some of these factors (Table1), but a comprehensive study on how all these factors are jointly correlated is required. This research focuses on the Iranian market, which is located in a strategic geographic location, but digital transformation is not mature enough [25], and have not been studied much in the previous literature [26].

We propose a new theoretical model, and we conduct an empirical study at the organizational level and analyze the collected data from 220 actual organizations to validate this model. Accordingly, our research question is “what are the determinants of value proposition innovation in Iranian companies?” Our specific objectives are to understand:

1. What is the impact of technological dimension and change management on value proposition innovation?
2. What is the impact of environmental dimension on technological dimension and change management?

We empirically validate our model through a quantitative Partial Least Squares/Structural Equation Modelling (PLS/SEM) technique. Our findings reveal that environmental dimension affects technological dimension and the change management process in the organization. Moreover, technological dimension and change management impact value proposition innovation.

This study makes three main contributions: 1) It proposes a theoretical model for digital transformation, change management, environmental factor, and value proposition innovation and validates the model by conducting an empirical

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study; 2) It contributes to the existing literature on showing the impact of technology and change management on bringing innovative values for the customers; 3) It enriches the scholars on showing the impact of environment on change management and the process of enabling technology in organizations.

This paper is organized as follows. The literature review is presented in section 2. The conceptual model and hypotheses are proposed in section 3, followed by how the empirical study was conducted in section 4. Section 5 outlines the results and discussion. Finally, the conclusion is provided in the last section (6).

II. THE CURRENT STATE OF ART

2.1. Value proposition

The value proposition is expressed in a company's business model and is about creating and delivering value to customers [6]. Traditional companies rarely change their value proposition even if their products get updated [27]. According to the theory of disruptive innovation [28], the new players in the market disrupt the traditional companies by offering convenience, accessibility, and cost-efficient products or services. Therefore, successful companies need to create value for their customers and differentiate their core competencies by applying innovation opportunities [29]. Successful companies use the business model canvas to clarify their value proposition, key resources, activities, partners, customer relationships, segments and channels, cost structures, and revenue streams [30]. The companies should contribute technology to their business models and improve the impact of value proposition innovation on their performance [31], [32]. Furthermore, increasing product life cycle and changing market demands affect value proposition innovation [7]. Moreover, companies gain distinct value propositions by providing business transactions with external stakeholders, and by strengthening the company to scale [5].

2.2. Change management

New technologies in organizations extend to structural changes in products, services, processes, skills, and value creation [33]. The successful implementation of digital transformation in firms needs change management and focus on individuals [15], [34], [35]. Hence, we summarize change management theories to understand this concept better. McKinsey's 7-S Framework analyzes companies' strategy, structure, systems, shared values, styles, staff, and skills [36]. Kotter's theory emphasizes the role of leadership in change management by combining the situation with a sense of urgency, putting together a core alliance, defining a strategic

plan, getting everyone on the same page, removing roadblocks, creating short-term victories, keeping the momentum going and making permanent modifications [37]. Finally, a prior study shows a framework with essential factors influencing successful change management, like the importance of decisive leadership or resistance to change [38].

2.3. Theoretical background of technology adoption

Adopting new technologies has been extensively studied and all are based on the Theory of Reasoned Action (TRA). This theory is about the attitudes of individuals in a specific situation [39]. For example, in technology acceptance, what are employees' perceptions and attitudes [40]? Davis [41] proposes a model based on the TRA and theoretically explains why users might choose one type of technology. In this model, a person's perceptions about the usefulness and ease of using technologies are two essential factors in technology acceptance [42], [43].

Technology, Organization, and Environment (TOE) Framework extends TRA and represents three main aspects that affect the technology acceptance process in firms [44]: 1)The technological dimension refers to all the technologies used in a firm or those still not used [45]; 2)The organizational dimension includes firm size, personnel attitudes toward change, management support, and change management processes in the organizations [46]; 3)The environmental dimension covers the industry, partners, competitors, regulations, and laws [17]. Our theoretical model in this work uses some of the parameters in the TOE framework.

2.4. Importance and benefits of applying digital transformation

The companies that use digital technologies to create innovative business models gain more profits and bolster margins. They should change the entire value chain from suppliers, producers, and distributors [47]. Digital transformation affects company performance, culture, sales, and marketing processes [48]. Digital transformation changes customer behavior and improves the customer experience. Mobile applications, machine learning, automation, and many other technologies allow customers to get what they need at precisely the right time [49], [50]. In addition, Digital transformation also increases employee experience and helps the HR processes like compensation, performance management, and job improvements [51].

Table 1 categorizes previous studies about digital transformation mainly focusing on value proposition, technological dimension, change management, and environmental dimension.

TABLE 1

PREVIOUS STUDIES ABOUT DIGITAL TRANSFORMATION FROM THE PERSPECTIVE OF VALUE PROPOSITION, TECHNOLOGY, CHANGE MANAGEMENT, AND ENVIRONMENT

Study	Description	Methodology	Studied variables			
			Value proposition	Technology	Change management	Environment
[33]	In this study, the authors present a framework for digital transformation with four dimensions: the use of technologies, changes in value creation, structural changes, and financial aspects.	Literature Analysis, Case Study	*	*	*	
[15]	This study investigates the relation of change management, digitalization, business performance, and green development in Strategic Action Field Theory.	Survey, PLS/SEM		*	*	*
[7]	In this research, the drivers of business model innovation in the aviation industry are studied.	Qualitative, Inductive Theory Building, Case Study	*	*		*
[4]	The authors propose a framework that analyze technological innovation and customer value proposition.	Literature Review	*	*		
[5]	The authors provide a definition of value proposition and identify features that make value proposition unique.	Literature Review	*		*	*
[52]	They use the TOE framework to analyze the digital transformation adoption process in South African retail organizations.	Case study		*	*	*
[53]	This research investigates 12 drivers of digital transformation in manufacturing.	Interviews, Qualitative			*	*
[54]	This study aims to understand how big organizations lead digital transformation process. In this regard, some drivers of digital transformation in Sweden companies are investigated.	Qualitative, Inductive Approach, Case Study			*	*
[55]	They propose the e-business adoption model based on diffusion of innovation theory and the TOE framework.	Survey data from SIBIS, Interviews, Quantitative		*	*	*
[56]	This study represents the elements that affect the process of e-business adoption in European companies. They used the TOE framework and Iacouvo model of technology acceptance.	Survey, Factorial Analysis, Logistic Regression		*	*	*
[57]	This study uses a research model based on the TOE framework and Diffusion of Innovation (DOI) theory to investigate the adoption of e-business in ERP-enabled and non-enabled companies.	Survey, Factorial Analysis, Logistic Regression		*	*	*
[58]	They study digital transformation adoption process in four large North American banks in 5 years.	Qualitative and Quantitative, Visual Analytics		*	*	*
[16]	This paper studies the elements that influence leaders' decision to adopt cloud computing in the UK using the TOE framework.	Survey, Principal Component Analysis, Logistic Regression		*	*	*
[59]	This study integrates the TOE framework and DOI theory to find the adoption factors for mobile applications.	Survey, Structural Equation Modeling		*	*	*
[60]	This study proposes a model based on the TOE framework, DOI theory, and Iacouvo model to explain e-business use among U.S. firms.	Survey, Factorial Analysis, Logistic Regression		*	*	*

III. RESEARCH MODEL

In this study, we determined the factors that influence the digital transformation process in Iranian companies and built a theoretical model that study the relationships between these factors. This section details the constructs, hypotheses, and theoretical model.

Digital transformation is a process where digital technologies disrupt companies. This makes company leaders implement strategies to apply new technologies and manage changes in business processes [61]. Successful implementation of digital transformation and change management leads to innovation in value proposition [27] and value networks. We integrated this process with the TOE framework to propose our research model. We selected the constructs related to technology and environment

from the TOE framework. In addition, we selected top management support and change management from the organizational dimension of the TOE framework. Finally, we selected value proposition innovation as a result of applying digital technologies in organizations from the digital transformation process [61]. Our model constructs are: Environmental Dimension, Industry Pressure [57], Government Regulation [57], Technological Dimension, Technology Enabled Assets [62], Compatibility [16], Complexity [16], Value Proposition Innovation, New Offerings [63], New Channels [63], New Customers [63], Change Management [15], and Top Management Support [16]. Table 2 shows the definition of the constructs.

TABLE 2
CONSTRUCT DEFINITIONS

Construct	Definition	Reference
Environmental Dimension	Industry Pressure	Deals with the competitors and partner pressures to increase competitive advantages
	Government Regulation	Corresponds to government strategies and pressures to force and encourage companies to adopt digital transformation.
Technology Dimension	Technology Enabled Assets	Refers to cutting-edge technologies like social, mobile, analytics, cloud computing and IoT (SMACIT) and AI, blockchain, VR, AR, 3-D printing, etc.
	Compatibility	It is the degree to which digital innovations fit with the current business processes and organization values.
	Complexity	Refers to the difficulty level of using digital technologies.
Value Proposition Innovation	New Offerings	Presents how companies offer new solutions to meet their customers' needs.
	New Channels	Deals with the new ways of delivering value to the customers.
	New Customers	Corresponds to new customer groups or market segments to whom the organization will offer the products/services.
Change Management	It is about serving the customers' needs by renewing organizational structures, capabilities, and direction.	[68]
Top Management Support	Deals with the role of leaders in affecting digital innovation processes in the organizations.	[69]

Figure 1 represents our proposed model. It shows that environmental dimension, technology dimension, and change management affect the innovation of value proposition. In addition, environmental dimension affects technology

dimension and change management. Moreover, top management support affects change management.

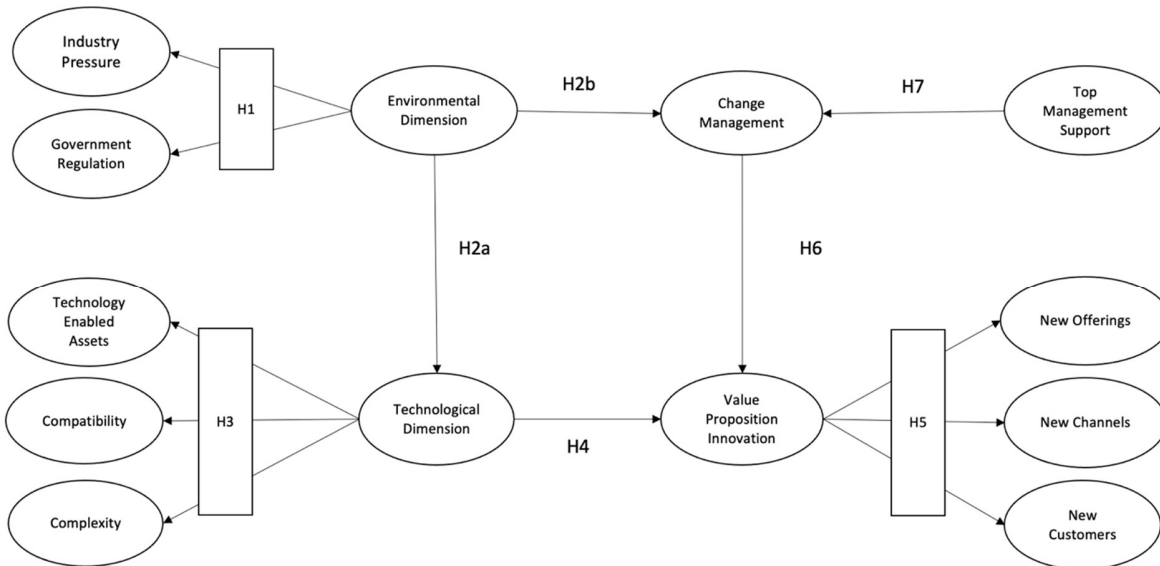


Fig. 1. Value proposition innovation model

The environmental dimension corresponds to partners' and competitors' pressure and firms' interactions with the government [19], [44]. Government regulation is one of the critical aspects that organizations should consider nowadays; It forces action to manage the government rules imposed [70].

The prior research shows that regulatory is a reflex of environmental action [71]. Further, stakeholder pressures are part of environmental strategies [72]. Based on previous research, we believe the environmental dimension is a second-

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order construct [73] demonstrated by industry pressure and government regulation, and we hypothesize that:

Hypothesis 1 (H1). *The environmental dimension is a second-order reflective construct that is composed of industry pressure and government regulation.*

Previous studies show that the environmental dimension leads to technological changes in organizational processes, products or services, and business models [21], [74]–[76]. The organizations are forced to change in reply to their environmental and industry pressures [77]. On the other hand, the rapidly changing environment is an enabler of changes in organizational policy making [24]. Moreover, governmental regulations and laws affect change management [20]. Hence, we hypothesize that:

Hypothesis 2a (H2a). *The environmental dimension has a positive impact on the technological dimension.*

Hypothesis 2b (H2b). *The environmental dimension has a positive impact on change management.*

Technology-enabled assets correspond to new digital technologies like SMACIT (Social, Mobile, Analytics, Cloud and Internet of Things) [3] and Artificial Intelligence, Blockchain, Augmented Reality, Virtual Reality, 3D-printing [78]. It is necessary to understand the type of technologies that firms have already used. On the other hand, compatibility of technology is crucial, and it is the degree to which digital innovations fit with the current business processes and organization values [64]. Another critical factor is the complexity of technology, which refers to the difficulty level of using digital technologies [64]. Thus, we consider the technological dimension as a second-order construct demonstrated by Technology-enabled assets, compatibility, and complexity, and we hypothesize that:

Hypothesis 3 (H3). *The technological dimension is a second-order reflective construct composed of technology-enabled assets, compatibility, and complexity.*

A firm that uses technological innovation and business model innovation maximizes its performance [31]. Business model innovation has three dimensions: value proposition innovation, value creation innovation, and value capture innovation [63], [65], [79]. Prior studies show that technology as an external factor affects the business model and value proposition innovation, and it could be used as a catalyst for developing new value propositions [7], [80]–[83]. Therefore, we hypothesize that:

Hypothesis 4 (H4). *The technological dimension has a positive impact on value proposition innovation.*

Value proposition innovation relates to innovative solutions for clients that change the customer experience and bring new

clients. It also includes the method of offering new solutions to the clients through new channels [63], [65], [83], [84]. Hence, we consider value proposition innovation as a second-order construct demonstrated by new offerings, new channels, and new customers, and we hypothesize that:

Hypothesis 5 (H5). *Value proposition innovation is a second-order reflective construct composed of new offerings, new channels, and new customers.*

Change management is about serving customers' needs by renewing organizational structures, capabilities, and direction [68]. Furthermore, in order to innovate the value proposition, it needs to create new solutions for clients and offers through new channels [63]. The prior research shows a negative effect of business model innovation and value proposition innovation on organizational inertia [85] that resist change management process [86]. Therefore, we hypothesize that:

Hypothesis 6 (H6). *Change management has a positive impact on value proposition innovation.*

Top management supports the business processes changes by decreasing the degree of resistance to change of users [87]–[90]. Furthermore, it affects technology adoption by changing the culture and engaging employees in visions [13]. On the other hand, the prior study shows that top management support facilitates organizational inertia [85]. Hence, we hypothesize that:

Hypothesis 7 (H7). *Top management support has a positive impact on change management.*

IV. EMPIRICAL STUDY

We created a research instrument corresponding to the measurement model (Appendix A) to survey a random sample of Iranian organizations. Our measurement model is a questionnaire consisting of two sections: 1) questions about sample characteristics, 2) questions about construct measurements. The respondents can select their answers on a seven-point numerical scale (1- Strongly Disagree to 7- Strongly agree).

We measured environmental dimension, technological dimension, and value proposition innovation as latent variables of the second-order reflective type hierarchical component [91] (Figure 1). Environmental dimension measures industry pressure and government regulation; technological dimension measures technology-enabled assets, compatibility, and complexity; Value proposition innovation measures new offerings, new channels, and new customers; Change management measures top management support. Finally, we used technological dimension to measure the effect of value proposition innovation.

TABLE 3
DESCRIPTIVE STATISTICS OF RESPONDENT CHARACTERISTICS

Respondent characteristics	(n = 220)	
Gender		
Female	26	11.82%
Male	194	88.18%
Age		
18-30	28	12.73%
31-40	115	52.27%
41-50	53	24.09%
51-60	20	9.09%
>60	4	1.82%
Organization characteristics		
Age of the organization		
<2	28	12.73%
2-5	45	20.45%
6-10	39	17.73%
11-20	53	24.09%
>20	55	25%
Industry		
Charity/not for profit	0	0%
Construction/Property	8	3.64%
Consumer Packaged Goods	4	1.82%
Education	7	3.18%
Energy/Mining	21	9.55%
Entertainment/media	4	1.82%
Financial services	20	9.09%
Hospitality/Catering	0	0%
IT and technology	69	31.36%
Legal	1	0.45%
Manufacturing	26	11.82%
Pharmaceutical	10	4.54%
Private healthcare and services	4	1.82%
Professional/Business services	17	7.73%
Public sector (incl. local and central government)	13	5.91%
Retail	4	1.82%
Telecommunications	2	0.91%
Transport, distribution, and logistics	9	4.09%
Utilities	1	0.45%

V. RESULTS

We used our questionnaire and obtained 220 responses from May to November 2021 at an organizational level. It means that we got only one answer from one of the leaders of each organization. The questionnaire was distributed via Google form. Table 3 shows the respondents' characteristics. Respondents are from the range of small to large size enterprises in different industries, including manufacturing, services, and construction. Most of the respondents are male (82.18%) and more than half of them are in the range of 31 to 40 years old (52.27%).

We used a quantitative, empirical methodology to analyze the data using PLS/SEM technique [92], [93]. We used the Smart PLS 3.0 tool [94] to evaluate and analyze the data.

This section presents the measurement model results and analyzes the structural model results.

5.1. Measurement model assessment

We used the PLS algorithm to test if the constructs are reliable or not. Table 4 represents the measurement model results with different metrics including Outer Loading, Composite Reliability, Cronbach's Alpha, and Average Variance Extracted (AVE). Outer loading indicates the constructs' weight, which should be over than 0.70 [95]. Composite Reliability higher than 0.70 indicates the internal consistency of the variables [96]. Cronbach's Alpha indicates the internal consistency and

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should be over than 0.70 [97]. AVE indicates the constructs' convergent validity and it should be more than 0.5 [98].

Our data analysis verifies that all the indicators are reliable because all outer loadings are more significant than 0.723. Moreover, all the constructs are consistent because they are

over 0.917. In our test, all Cronbach's Alpha measurements are above 0.891 indicating the study is internally consistent. All AVEs are over 0.636, indicating convergent validity.

TABLE 4

MEASUREMENT MODEL RESULTS

Construct	Items	Outer Loading	Composite Reliability	Cronbach's Alpha	AVE	Discriminant Validity?
Technology Dimension	Technology Enabled Assets1	0.828	0.940	0.928	0.636	Yes
	Technology Enabled Assets2	0.796				
	Technology Enabled Assets3	0.781				
	Compatibility1	0.829				
	Compatibility2	0.818				
	Compatibility3	0.841				
	Complexity1	0.760				
	Complexity 2	0.755				
Environmental Dimension	Complexity 3	0.762	0.917	0.891	0.650	Yes
	Industry Pressure1	0.853				
	Industry Pressure2	0.847				
	Industry Pressure3	0.767				
	Government Regulation1	0.818				
	Government Regulation2	0.819				
Top Management Support	Government Regulation3	0.723	0.936	0.908	0.787	Yes
	Top Management Support1	0.900				
	Top Management Support2	0.941				
	Top Management Support3	0.921				
Change Management	Top Management Support4	0.777	0.939	0.913	0.794	Yes
	Change Management1	0.900				
	Change Management2	0.904				
	Change Management3	0.874				
Value Proposition Innovation	Change Management4	0.885	0.949	0.939	0.674	Yes
	New Offerings1	0.791				
	New Offerings2	0.806				
	New Offerings3	0.826				
	New Customers1	0.900				
	New Customers2	0.885				
	New Customers3	0.823				
	New Channels1	0.831				
New Channels2	0.776					
New Channels3	0.741					

5.2. Structural model assessment

For assessing the quality of the structural model, we ran the PLS and bootstrapping algorithm with 5000 subsamples [99].

Figure 2 shows the structural model results. Table 5 describes the hypotheses test results, and the results, indicating that our proposed hypotheses in section 3 are all supported.

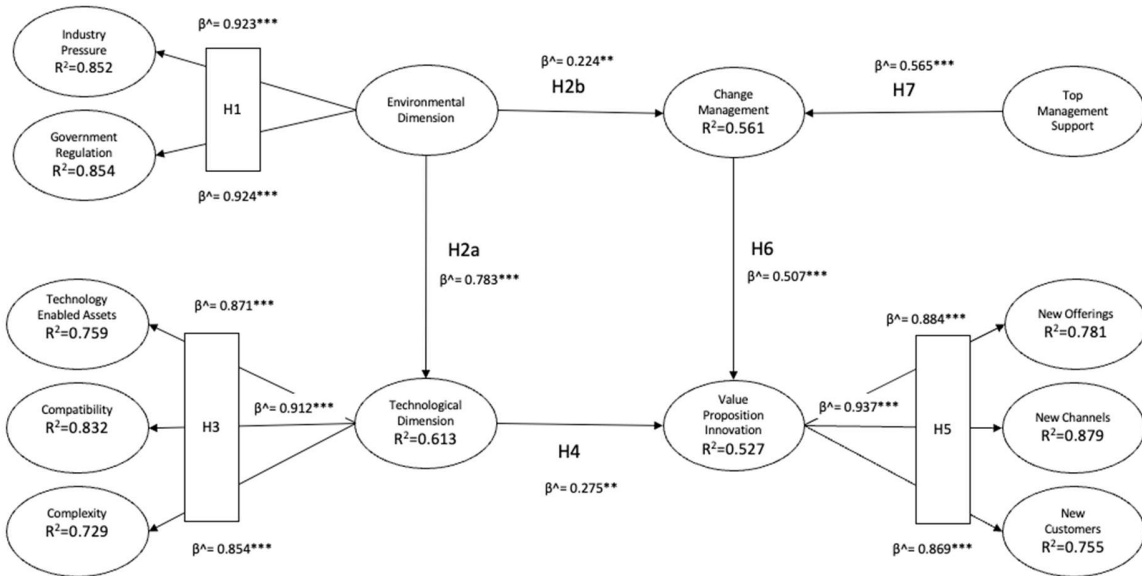


Fig. 2. Value proposition innovation model results. *Significant at p<0.05; **significant at p<0.01; ***significant at p<0.001.

We begin this section by reporting the R², p-values, and β̂ (Figure 2). We identify that seven hypotheses are supported with large effects including H1 because environmental dimension explains 85.2% of the variation in Industry pressure (β̂= 0.923, p<0.001), and explains 85.4% of the variation in government regulation (β̂= 0.924, p<0.001); H2a because environmental dimension explains 61.3% of the variation in technological dimension (β̂= 0.783, p<0.001); H3 because technological dimension explains 75.9% of the variation in technology-enabled assets (β̂= 0.871, p<0.001), and 83.2% of the variation in compatibility (β̂= 0.912, p<0.001), and 72.9% of the variation in complexity (β̂= 0.854, p<0.001); H5 because value proposition innovation explains 87.9% of the variation in new channels (β̂= 0.937, p<0.001), and 78.1% of the variation in new offerings (β̂= 0.884, p<0.001), and 75.5% of the variation in new customers (β̂= 0.869, p<0.001); H6 because change management explains 52.7% of the variation in value proposition innovation (β̂= 0.507, p<0.001); H7 because top management support explains 56.1% of the variation in change management (β̂= 0.565, p<0.001).

Further, we identify that two hypotheses are supported with medium effect including H2b because environmental

dimension explains 56.1% of the variation in change management (β̂= 0.224, p<0.05); and H4 because technological dimension explains 52.7% of the variation in value proposition innovation (β̂= 0.275, p<0.001).

In addition, we report the F² indicator to determine if a construct has a substantive significance or not. For (F²> 0.350), the construct has a large effect, for (0.350 > F² > 0.150), the construct has a medium effect, and for (0.150 > F² > 0.020), the construct has a small effect [100]. The results summarized in Table 5 shows that all the hypotheses are positive and meaningful but with different effect sizes. H1, H2a, H3, and H5 have large effects, but H6 and H7 have medium effects, and H2b and H4 have small effects.

TABLE 5
HYPOTHESIS TEST RESULTS

Hypothesis	Independent Variable	Dependent Variable	F ²	Effect Size	p-value	Findings	Conclusion
H1	Environmental Dimension	Industry Pressure	5.759	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.923, p < 0.001$)	Supported with large effect
		Government Regulation	5.865	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.924, p < 0.001$)	Supported with large effect
H2a	Environmental Dimension	Technological Dimension	1.584	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.783, p < 0.001$)	Supported with large effect
H2b	Environmental Dimension	Change Management	0.049	Small	0.006	Positively & Statistically Significant ** ($\beta^{\wedge} = 0.224, p < 0.05$)	Supported with medium effect
H3	Technological Dimension	Technology Enabled Assets	3.154	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.871, p < 0.001$)	Supported with large effect
		Compatibility	4.965	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.912, p < 0.001$)	Supported with large effect
		Complexity	2.693	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.854, p < 0.001$)	Supported with large effect
H4	Technological Dimension	Value Proposition Innovation	0.082	Small	0.000	Positively & Statistically Significant ** ($\beta^{\wedge} = 0.275, p < 0.001$)	Supported with medium effect
H5	Value Proposition Innovation	New Offerings	3.560	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.884, p < 0.001$)	Supported with large effect
		New Channels	7.254	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.937, p < 0.001$)	Supported with large effect
		New Customers	3.076	Large	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.869, p < 0.001$)	Supported with large effect
H6	Change Management	Value Proposition Innovation	0.278	Medium	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.507, p < 0.001$)	Supported with large effect
H7	Top Management Support	Change Management	0.311	Medium	0.000	Positively & Statistically Significant *** ($\beta^{\wedge} = 0.565, p < 0.001$)	Supported with large effect

5.3. Discussion

This study uses value proposition [28], [30], change management [37], [38], and technology adoption [44], [45] theories to propose a theoretical model for digital transformation. In this model, we measured value proposition innovation by the effects of technology and change management. Moreover, we measured the effect of environment on technology and change management.

The prior empirical work in digital transformation study adopting specific technology including e-business [55]–[57], [60], cloud computing [16] and mobile applications [59], and they design their research based on technology adoption theories including TOE, DOI, and Iacouvo model [56], [57], [59]. Like previous research, we measured technology dimension and confirm that it is a second-order reflective construct of technology-enabled assets, compatibility, and

complexity (H3). In addition, our model integrates value proposition and change management theories with technology adoption theories which is supported with our empirical study. For proposing the model, we selected the constructs and designed their relationships based on some findings in prior study. We evaluated environmental dimension and verified that like previous studies [19], [70]–[72], it is a second-order reflective construct of industry pressure and governmental regulation (H1). The previous research suggest that organizations need to add values to their business models because of environmental pressure [53], which impacts technology adoption [101]. Moreover, prior research show that environment affects change management [20], [77]. Like previous studies, we found that environment significantly affect the technological dimension (H2a) and change management process (H2b).

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Regarding the technological dimension, we found that while the organization's current technology assets and complexity significantly affect value proposition innovation, the compatibility of technology to company's business processes is more critical (H4). This outcome validates the conclusion of earlier study [55], [59].

The prior work show that top management has an essential role in digital transformation, primarily by leading change and reducing resistance to change [89], [90]. Similarly, in our study, we observed that top management support influences change management process (H7).

We assessed value proposition innovation and validated that like previous studies [65], [83], [102], it is a second-order reflective construct of new offerings, new channels and new customers. Previous research show technology affects value proposition innovation [7], [82] and organizations inertia negatively affects the value proposition innovation [85]. Moreover, we observed that change management in the organizational context turns out to be the most substantial effect. Its impact is three times greater than the effect of using technology in the firm (H6). It proves the findings of previous researchers who deliberate that digital transformation is not about technology but change [61], [103], [104].

6. CONCLUSIONS, IMPLICATIONS, AND FUTURE WORK

6.1. Conclusion

This study aims to understand the effect of technology and change management on value proposition innovation and the effect of environment on technology and change management. For this reason, we proposed a model consists of environmental dimension (industry pressure, government regulation), technological dimension (technology enabled assets, compatibility, complexity), value proposition innovation (new offerings, new channels, new customers), change management, and top management support. The research model explains 53% of value proposition innovation with the influences of technology dimension and change management, but the main factor is change management with more than three times effect. We found that environmental dimension has more impact on technological dimension than change management.

6.2. Theoretical implications

The theoretical implication of this study provides an extension to the growing literature on digital transformation and value proposition innovation through the lens of change management and technology adoption theories. We also conducted an empirical study to evaluate our model to determine how value proposition innovation is explained by change management and technology.

6.3. Practical Implications

As a practical implication, the findings expose the critical role of change management in the digital transformation process. It also reveals the significant impression of top leaders on change management. Therefore, companies should pay more attention to change management and leadership in digital transformation instead of the technology itself. Companies should improve their capabilities to manage strategic changes in an ongoing process. C-suite leaders also need to be aware of digital technologies' benefits and encourage employees to use them.

In digital age, managers should understand that new business models are built on digital technologies including big data, analytics, cloud, blockchain, and artificial intelligence. They should try to create consistency between current organizational values and existing systems with new digital technologies. In addition, managers need to take care of competitive pressure and government regulation to apply technology.

To gain value proposition innovation, organizations should address new customer needs. They should develop more innovative products and services in comparison with their competitors. They also need to address unserved market segments for their products and services. In addition, they should use new distribution channels for their products and services that bring more efficiency in their processes.

On the other hand, the governmental legislation should support using technologies in the organizations and should be transparent to support and protect organizations during their digital transformation journey.

6.4. Future work

Eventually, it would be essential to understand the other factors that lead to value proposition innovation, business model renovation, and implementing digital transformation in organizations for future work. Furthermore, new research for analyzing the impact of digital transformation on sustainability and vice versa is recommended.

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APPENDIX A. MEASUREMENT MODEL

Construct	Measurement Items	Authors
Technology-enabled assets	- Our firm is driving new business processes built on technologies such as big data, analytics, cloud, mobile, and social media platforms. - Our firm is integrating digital technologies such as social media, big data, analytics, cloud, and mobile technologies to drive change. - Our business operations are shifting toward using digital technologies such as big data, analytics, cloud, mobile, and social media platforms.	[62]
Compatibility	- Digital technologies are consistent with current values and beliefs - Digital technologies are compatible with managerial and operational needs - Digital technologies are compatible with existing systems	[16]
Complexity	- Digital technologies are easy to integrate with existing processes - Confidence levels in the adoption of digital technologies - Digital technologies are easy to use and manageable	[16]
Top Management Support	-Top managers are aware of digital technologies' benefits. -Top managers support adopting digital technology services. -Top managers encourage employees to use digital technology services. -Top management has adequate resources to adopt digital technology services	[16]
Change Management	- In our company, change management is recognized as part of our corporate culture. -Our firm has the capability to manage strategic change in ongoing processes. -Our managing directors/founders are constantly looking for innovation opportunities. -In comparison with our competitors, our company has significantly more capability in change management.	[15]
Government Regulation	-Legislation supports using digital technologies. -Legislation about using digital technologies is transparent -Firms are legally protected during purchase on the Internet.	[105]
Industry Pressure	-Business partners recommended the adoption of digital technologies. -Business partners requested the adoption of digital technologies. -The firm experienced competitive pressure to adopt digital technologies.	[105]
New Offerings	- We regularly address new, unmet customer needs. - Our products or services are very innovative in relation to our competitors. - Our products or services regularly solve customer needs, which competitors did not solve.	[63]
New Customers	-We regularly take opportunities that arise in new or growing markets -We regularly address new, unserved market segments. -We are constantly seeking new customer segments and markets for our products and services.	[63]
New Channels	-We regularly utilize new distribution channels for our products and services. -Constant changes of our channels have led to improved efficiency of our channel functions -We consistently change our portfolio of distribution channels.	[63]

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