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Effect of Managerial Capability and Organizational Capability on Digital Innovation Among Organizations in Sri Lanka

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ABSTRACT

Despite the growing importance of digital innovation to achieve better performance, empirical studies examining different factors that affect digital innovation within organizations are scarce. Further, the findings of existing studies are inconsistent, leading to a knowledge gap within the context. Thus, this research focused on identifying the critical success factors affecting digital innovation from managerial and organizational perspectives. The literature review revealed four factors affecting digital innovation. A new conceptual framework was designed to test the relationships identified, and it was tested using survey data collected from 135 managerial-level employees of organizations that are engaged in digital innovation processes in Sri Lanka. Data were analyzed using the PLS-SEM approach. The findings revealed that top management support and organizational learning had a positive and significant effect on digital innovation. Since there is a dearth of research in the context of digital innovation, the conceptual framework introduced and the findings of the study will encourage organizations to understand and leverage the determinants necessary to foster digital innovation within organizations.

Keywords: Sri Lanka, digital innovation, managerial capabilities, organizational capabilities, Dynamic Capabilities Theory

INTRODUCTION

One of the major challenges faced by contemporary firms in the current dynamic environment is the need to embrace digitalization opportunities permitted by novel digital technologies (Butschan et al., 2019; Ghosh et al., 2017; Loebbecke & Picot, 2015; Richter et al., 2018) and to drive the organization towards a digital transformation through the exploitation of these technologies (Warner & Wäger, 2019). Big data analytics, augmented reality, mobile devices, blockchain, and robotics, etc., have reinvented new business models and value propositions for customers and disrupted the traditional models of business (Sousa-Zomer et al., 2020). Liu et al. (2011) and Vial (2019) have stated that to remain competitive in this environment, traditional firms have also felt the urgency to transform their business models. Based on this premise, digital innovation has become an emerging area of research interest since there is an increasing demand for new digital solutions (Lyytinen et al., 2016).

Thus, for the purpose of this study, digital innovation is identified as “the creation of (and the consequent change in) market offerings, business processes, or models that result from the use of digital technologies” (Nambisan et al., 2017, p.224). A significant amount of literature has provided evidence that there is a positive relationship between innovation and organizational performance (Artz et al., 2010; Kwon-Choi et al., 2013; Clercq et al., 2011; Naranjo-Valencia et al., 2016; Rosenbusch et al., 2011; Valmohammadi, 2017). Further, previous research suggests different types of factors affecting digital innovation such as digital capability (Khin & Ho, 2018), organizational creativity (Sutanto, 2017), entrepreneurial orientation (Mancha & Shankaranarayanan, 2020), digital literacy (Mancha & Shankaranarayanan, 2020), and open communication (Montreuil et al., 2020). It was also observed that the findings of these studies were inconsistent. For instance, management support, although found to have a significant effect on digital innovation in some studies (Montreuil et al., 2020; Scheler, 2013; Shaar, 2015), has been suggested to not have a significant effect on implementing innovation, according to Klein et al. (2001). Further, although communication has been identified as a factor affecting digital innovation, according to Montreuil et al., Grözinger et al. (2020) suggest that communication among team members does not have a significant effect on innovative ideas generation.

As identified above, since it is evident that a number of factors belonging to different dimensions affect digital innovation within organizations and that there are inconsistencies among the findings of different studies, this study aimed to explore the factors which influence digital innovation of an organization, from a managerial and organizational perspective.

Problem Statement

Although there is an increased research interest for digital innovation, literature on digital innovation has not evolved up to the same level. Majority of research studies on digital innovation look at it from a technical, architectural, or information systems perspective (Lyytinen et al., 2016). The factors affecting digital innovation have not been well established through literature, and the existing findings are inconsistent in nature (Khin & Ho, 2018). Further, Sri Lanka's demographic, economic, social, and cultural background is distinct from the context of countries such as the USA, China, UAE, Taiwan, Iran, Sweden, Spain,

and Indonesia, where studies of this nature were frequently found. This could mean that, in Sri Lankan organizations, there could be a unique set of factors affecting digital innovation. Therefore, due to the dearth of studies related to digital innovation within organizations, the lack of studies identifying managerial and organizational level determinants of digital innovation, inconsistent findings of previous studies in the domain, and the difficulty in generalizing the findings of previous studies done in different countries to the Sri Lankan context, a need arises to determine the antecedents of digital innovation in managerial and organizational domains within the context of Sri Lanka. Based on the above research gaps identified, the researcher developed the following research objectives:

1. To identify managerial capability and organizational capability-related factors affecting digital innovation.
2. To assess the impact of the identified factors on digital innovation.

LITERATURE REVIEW

Digital Innovation

In scientific literature, the concept of digitalization of the innovation process has gained growing attention lately (Brem & Viardot, 2017). As highlighted in various studies, the rapid growth of digital technologies has paved the way for major improvements in many business processes (Galati & Bigliardi, 2019; Levine & Prietula, 2014; Yoo et al., 2012). A major role in the innovation domain has been played by the growth in digital technologies (Holmström & Partanen, 2014; Hylving, 2015). Fichman et al. (2014) have further suggested that digital innovation has the capability of transforming an organization by developing novel business models. Digital innovation has also been known to make certain changes in the competitive environment in which they operate (Vaia et al., 2012). Digital innovation has been regarded as a vital ingredient for organizational success in the current digital age as well (Nambisan et al., 2017). Several studies have examined a cross-industry perspective in identifying the antecedents of digital innovation in different countries (Sousa-Zomer et al., 2020).

Theoretical Background

Dynamic Capabilities Theory (DCT)

The dynamic capabilities framework (Teece et al., 1997) is useful in explaining how sustained competitive advantage is attained by organizations. This theory supersedes the perspective of its predecessor - Resource-Based View (RBV) by drawing attention to the modification of resources so that they match with the external environment, ensuring the survival of the firm in turn (Schilke et al., 2018). The key argument in the emergence of DCT is that the RBV has a rather static approach and inadequate foundation in supporting how strategic adaptation occurs in line with the changing business environment (Priem & Butler, 2001; Schilke et al., 2018; Winter, 2003). DCT also suggests that managerial capabilities and organizational capabilities could assist an organization in outstanding its competition and at the same time improve its innovation capability. Beck and Wiersema (2013) and Wang et al. (2013) have identified managerial capabilities and organizational capabilities as a part of dynamic capabilities. This study focused on the definition provided by Teece et al. (2007), where dynamic capabilities have been defined as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” as the basis in explaining managerial and organizational capabilities.

Based on the above, the researcher used DCT as the theoretical inspiration to support the study's conceptual framework. The following section contains a description of previous research that has looked at various factors that influence digital innovation.

Empirical Studies on Factors Affecting Digital Innovation

Tohidi et al. (2011) and Ghasemzadeh et al. (2019) have identified that organizational learning is positively related to organizational innovation, while Sutanto (2017) has indicated that organizational learning capability and organizational creativity both significantly and positively influence organizational innovation. Wiesböck and Hess (2018) have suggested that digital innovation capability is formulated with digitalization capabilities and digital transformation capabilities. Linke and Zerfass (2011) have identified that internal communication is incidental in fostering an innovative culture. Hu et al. (2012) and Mokhber et al. (2017) have found out that transformational leadership has a positive influence on organizational innovation. Kim et al. (2012) and Hsiao et al. (2014) have highlighted that management leadership and support influence organizational innovation. Basoglu et al. (2013) have stated that quality of communication within the organization has a positive impact on the innovativeness of the organization. Scheler (2013), in her study regarding driving innovation in service organizations, has stated that monitoring the competition arising from the environment, institutionalization of interaction and exchange, top management commitment, systematic approaches, and environmental pressure as conducive for innovation. Zennouche et al. (2014) have indicated that, at the individual level, personality, motivation, and cognition influence innovation, while at group level, structure, climate, leadership, and task influence innovation. Montreuil et al. (2020) and Mokhber et al. (2015) have proposed that some dimensions of transformational leadership positively impact organizational innovation. Shaar et al. (2015) concluded that the top management support directly affects the product innovation and process innovation of a company. Further, Elenkov and Manev (2005) have suggested that there is a significant influence of top management on innovation. Jaiswal and Dhar (2015) have highlighted that; transformational leaders could promote an innovative climate within the organization. Montreuil et al. (2020) have suggested that organizational capability to innovate, leadership, support, communication, culture, and learning impact the organizational capability to innovate.

The researcher performed a frequency analysis based on the above literature where it was evident that the most frequently observed four factors affecting digital innovation were Transformational Leadership (TL), Top Management Support (TMS),

Organizational Culture (OC), and Organizational Learning (OL). These were subsequently classified under managerial and organizational capabilities.

METHODOLOGY

Conceptualization

As per the analysis done in the literature review, the four factors that were most frequently observed to be affecting digital innovation within organizations, as stated by most researchers, were selected to develop the conceptual framework of this study. Based on the observations made from the above literature, these factors were broadly categorized under organizational and managerial capabilities. Since literature suggested that managerial capabilities and organizational capabilities can assist an organization in distinguishing itself from the rest of the competition according to DCT (Teece et al., 2007; Teece & Pisano, 1994), this study too, employed DCT to explain the factors recognized under organizational and managerial capabilities. Managerial capabilities refer to all the management actions and behaviors that result in the creation and reconfiguration of the organizational resources (Adner & Helfat, 2003). Organizational capabilities have been identified as those routines and practices which could renew and reorganize the resource base of the organization and enable the organization to cope with change better (Adner & Helfat, 2003). Accordingly, transformational leadership and top management support were classified under managerial capabilities. These were considered managerial competencies because they both pertain to efforts made by the management team to encourage employees to adopt innovative behaviors (García-Morales et al., 2011; Montreuil et al., 2020). Organizational culture and learning were recognized under organizational capabilities since they represent activities that can affect all employees and serve to create a productive change and innovation environment at an organizational level (Adriansyah & Afiff, 2015; Montreuil et al., 2020).

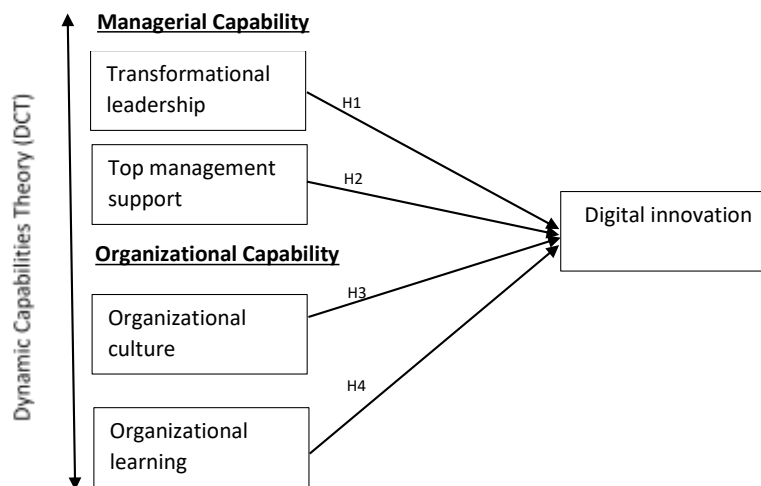


Figure 1: Conceptual framework.

Development of Hypotheses

Based on the above conceptual framework, the study identified several hypotheses which depicted the relationships existing between the identified variables, and they are explained in the sections that follow.

The Effect of Transformational Leadership on Digital Innovation

Transformational leadership, as a form of leadership, has proven to be effective in many countries, as a way which both stimulates the followers to achieve unexpected outcomes and develops their own leadership capacities while committing to the group and the organization in the process (Bass, 1985; Bass, 1998; García-Morales et al., 2011). Thus, according to García-Morales et al. (2011), transformational leadership is defined as the style of leadership that heightens the consciousness of collective interest among the organization's members and helps them to achieve their collective goals. Bass further describes the transformational leadership style to be identified under several features, namely, idealized influence, attributive charisma, inspirational motivation, intellectual stimulation, and individualized consideration. There have also been studies that signify that transformational leadership characteristics positively impact innovation (García-Morales et al., 2008; Gumusluoglu & Ilsev, 2009; Jung et al., 2003; Khalili, 2016; Sattayaraksa & Boon-itt, 2017; Uddin et al., 2017). Transformational leadership is understood to be related to organizational innovation through several features such as collaborative vision, active communication, and an environment that fosters innovative teams (Aragon-Correa et al., 2007). Based on the above premise, the following hypothesis was proposed:

H1: There is a positive effect of transformational leadership on digital innovation

The Effect of Top Management Support on Digital Innovation

Top management support refers to the provision of the support needed for operating processes and also to the role of providing instructions on operating a business (Rodriguez et al., 2008; Rosenbloom, 2000; Swink, 2000). Top management support is said to demonstrate a crucial role in building an organization's innovation-related strategies (Hsu et al., 2018). Tidd et al. (2001) and Tushman and O'Reilly (1997) have shown the vital impact top management has in providing the necessary resource requirements and deploying reward structures to promote innovative initiatives within the organization. Several early studies have supported the notion that in order to foster innovation within organizations, it has to be supported by the top management (Deshpandé et al., 1993; Kohli & Jaworski, 1990; Li & Calantone, 1998). The top management usually makes arrangements for the resource requirement and provides the support needed for achieving innovation success (Rodriguez et al., 2008). When elaborated further, management support is crucial for organizational innovation in a scenario where the employees are given the help and encouragement needed for the new initiatives they are trying to implement (Anderson & West, 1998; Sarros et al., 2008). The relationship between top management support and innovation has received substantial attention in previous literature (Kim et al., 2012; Sharma & Rai, 2003; West et al., 2003). Based on the above premise, the following hypothesis was proposed:

H2: There is a positive effect of top management support on digital innovation.

The Effect of Organizational Culture on Digital Innovation

Schein (2004) refers to culture as values and beliefs shared by members of an organization that guide the expected behavior. The swift changes taking place in the digital innovation field necessitates an organization to foster a culture that promotes innovation performance in order to remain competitive in the industry (Shahzad et al., 2017). Several studies have provided evidence to the substantial relationship that exists between organizational culture and innovation (Clercq et al., 2011; Lounsbury et al., 2019; Lau and Ngo, 2004; Mavondo and Farrell, 2003; Miron et al., 2004). A study by Hislop (2013) has further established that innovation within organizations is impacted by the values of the organization, its beliefs, working environment, sharing of knowledge, and all the cultural aspects within the organization. Based on the above premise, the following hypothesis was proposed:

H3: There is a positive effect of organizational culture on digital innovation.

The Effect of Organizational Learning on Digital Innovation

Organizational learning is regarded as a major dynamic capability of organizations, and learning organizations are said to promote the said capability (Aragon-Correa et al., 2007; Senge, 1994). Organizational Learning is regarded as a process that increases the knowledge of individuals and transforms it into organizational knowledge. Further, it is an exemplification of the organizational culture. When considered as an element of culture, organizational learning can understand people's thoughts, actions, and practices (Jablin & Putnam, 2001). Learning has been identified to enable the organization to identify and remedy its mistakes in order to get acclimatized to the environment better (Asgarnezhad Nouri et al., 2016; Nouri and Ghorbani, 2017). Kiziloglu (2015) states that in the absence of a learning process, there will be a repetition of similar practices, hindering opportunities for innovation. The positive relationship between organizational learning and innovation has been highlighted in several previous studies on innovation (Chen and Chang, 2012; Hussein et al., 2014; Lee and Song, 2015; Wang and Ellinger, 2011; Salehi and Naseri, 2017). Several studies have posited that learning has been known to enhance the performance of an organization in terms of innovation (Lloréns Montes et al., 2005; Liao et al., 2008; Tohidi et al., 2011; Chen & Chang, 2012). Noteboom (2010) has further suggested that a learning organization can be regarded as an innovative organization. Also, on the other hand, it has been found that when the innovation achieved by an organization becomes greater, the level of learning and change required also becomes greater (Sanz-Valle et al., 2011). Based on the above premise, the following hypothesis was proposed:

H4: There is a positive effect of organizational learning on digital innovation.

Overall Design of the Study

In terms of the research design, the researcher approached the research question through an explanatory technique where it attempted to investigate the causal relationship between several variables. This research design had been followed by several previous authors in the domain as well (Hsu et al., 2018; Lita et al., 2020; Tohidi et al., 2011). Further, the study followed a quantitative research method and adapted a survey technique to gather data similar to previous authors such as Hsu et al. (2018), Mokhber et al. (2017), Lita et al. (2020), Rajapathirana & Hui (2017) and Tohidi et al. (2011) who have also followed a survey-based research strategy.

Questionnaire Development

When developing the items of the questionnaire, a total of 112 previous articles were referred to. Out of the articles referred, the most suitable and reliable questions were selected, focusing on the key authors recognized in each field as well as articles published in high-ranked journals, as applicable to the variables measured in this study. Some of the items were adapted to suit the digital context of the study.

Pilot Study

The sample size of a pilot study is regarded to be small and could be varied between fifteen (15) to thirty (30) (Saunders et al., 2019). Accordingly, the researcher conducted a pilot study involving 21 respondents, who were several industry practitioners belonging to organizations undergoing a digital transformation process/ or have digital innovation initiatives in place within the organization. The responses obtained from the pilot study were analyzed using Smart PLS version 3. Based on the comments received during the pilot study and the results of the data analyzed from the pilot study, several revisions were made to the questionnaire. The revised questionnaire was subsequently distributed among the target respondents. To avoid issues with common method bias, due care was exercised at the designing stage of the questionnaire to ensure the accuracy and understandability of the questions by carefully wording each questionnaire item and obtaining expert opinion prior to distributing the questionnaires among respondents (Podsakoff et al., 2003).

Unit of Analysis and Sampling Technique

The unit of analysis of the study was a single organization, inspired by the studies of Mokhber et al. (2017) and Lita et al. (2020). Self-administered online survey questionnaires (Google forms) consisting of items of a Likert scale were distributed among the selected organizations via email. Due to the practical difficulties associated with randomly reaching out to cover the entire population where the population is very large and unquantifiable, time constraints, and restrictions of access due to restrictions in travel imposed with the Covid-19 pandemic situation in the country, it was decided to select convenience sampling as the sampling technique of the study. Convenience sampling has also been followed in several previous studies conducted within the domain (García-Morales et al., 2008; Iqbal et al., 2018; Nouri & Ghorbani, 2017).

Data Collection

The questionnaires were sent out based on the contact information obtained from the current and past MBA candidates of the University of Moratuwa, University of Sri Jayewardenepura, University of Colombo, and the Postgraduate Institute of Management in Sri Lanka. Another set of questionnaires was also distributed among the managerial level employees of leading organizations within the Western Province of the country, based on personal contacts. A filtering question was entered at the beginning of the questionnaire to make sure that respondents belonged to organizations that were engaged in digital innovation initiatives. To ensure the reliability of the study, it was necessary that whoever responded on behalf of the selected organization during the data collection process had an overall understanding of the organization's digital innovation processes, organizational learning initiatives, and culture, etc. To guarantee this, the covering letter of the questionnaire requested only those who belonged to managerial level positions of the organization (E.g., Assistant Manager and above up to Director/Proprietor) to respond to the survey. Selection of the managerial level employees as the respondents was also in line with the previous studies of Mokhber et al. (2017), Rajapathirana and Hui (2017), and Shaar et al. (2015), who have selected managerial level respondents for their studies. Further, in the questionnaire, the section on respondents' demographic information included an item that requested to specify the most appropriate category out of the given list that best matched with the respondents' current positions. Through this, respondents belonging to positions lower than Assistant Manager were identified, and hence the researcher was able to omit their responses from the data analysis process.

DATA PRESENTATION AND ANALYSIS

The minimum required sample size recommended as per Daniel Soper sample size calculator, which is used for PLS SEM-based analyses, was 103. Initially, the researcher planned to collect at least 200 responses with the intention of sufficiently covering the minimum required sample as well as to ensure better validity in responses. However, although 906 questionnaires were distributed, only 197 were received. A total of 709 questionnaires were not received by the researcher. Out of the received responses, the researcher had to eliminate 59 questionnaires since 16 respondents had responded that there were no digital innovation initiatives in place within those organizations, and 43 had responded that they belong to positions below Assistant Manager level. Accordingly, only 138 responses out of the 197 received were usable for the purpose of data analysis. Hence, the total response rate when compared with the total 906 questionnaires sent, as defined by Saunders et al. (2019), was 21.74%, and the active response rate out of the total questionnaires sent was 15.23%.

During the preliminary analysis, the four multivariate assumptions of normality, homoscedasticity, linearity, and multicollinearity were tested. During the analysis of the structural equation model, the measurement model and the structural model were separately assessed, as recommended by Hair et al. (2014).

Evaluating the Measurement Model

Measurement model analysis included evaluation of the reliability of the constructs and indicators and the evaluation of the validity of constructs and indicators. To assess the reliability, assessments of internal consistency and indicator reliability were performed. Internal consistency (construct reliability) was assessed using Cronbach's alpha and composite reliability values. To ensure indicator reliability, individual indicator loadings were inspected. To ensure the validity of the measurement model, convergent validity (assessed using AVE values) and discriminant validity measures (assessed using the Fornell-Larcker criterion) were used.

Table 1 indicates the results of the reliability and convergent validity analyses of the measurement model.

Table 1: Results of the reliability and convergent validity analyses.

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Organizational Culture (OC)	0.903	0.928	0.722
Digital Innovation (DI)	0.919	0.935	0.675
Organizational Learning (OL)	0.937	0.955	0.840
Transformational Leadership (TL)	0.921	0.938	0.716
Top Management Support (TMS)	0.948	0.960	0.827

The composite reliability values of all the constructs were above the prescribed threshold of 0.7. It was observed that the Cronbach's Alpha value for all the constructs was well above the minimum threshold of 0.7 (Hair et al., 2014) and below the maximum threshold of 0.95 (Hair et al., 2019; Nunnally, 1978).

When considering the variables OC, OL, TL, and TMS, it was observed that the indicator loadings of all the items that were used to measure the variable were above the threshold value of 0.7 as prescribed by Hair et al. (2011). However, when considering Digital Innovation (DI), all the item loadings, except for DI3, were above the threshold. DI3 corresponded to a value of 0.668, which was below the threshold of 0.7. This item was deleted based on Hair et al. (2019) in order to improve the AVE value, and the Cronbach's alpha and composite reliability values of the construct were not adversely affected by this deletion.

In terms of inspecting the validity, it was observed that the Average Variance Extracted (AVE) was greater than the threshold value of 0.5 for all the constructs as recommended by Hair et al. (2011), ensuring the convergent validity of the constructs.

Table 2 indicates the results of the discriminant validity analysis done based on the assessment of the Fornell Larcker criterion.

Table 2: Results of the discriminant validity analysis.

	OC	DI	OL	TL	TMS
OC	0.850				
DI	0.585	0.850			
OL	0.724	0.621	0.917		
TL	0.719	0.557	0.671	0.846	
TMS	0.710	0.646	0.673	0.807	0.909

Table 2 shows that the levels of the square root of the AVE for each construct are greater than the correlation involving the constructs. Therefore, the discriminant validity is established for all the constructs as per the Fornell-Larcker criterion.

Evaluating the Structural Model

The structural model was assessed using the coefficient of determination (R^2) as a measure of the model's explanatory power. According to Hair et al. (2011), R^2 values of 0.75, 0.5, and 0.25 for endogenous latent variables in the model represent substantial, moderate, and weak effects, respectively. The dependent variable in the current study is Digital Innovation (DI) for the purpose of assessing the coefficient of determination (R^2). In complex models with multiple regression, the adjusted R^2 value is obtained to remove biasness (Hair et al., 2014). The adjusted R^2 value for DI was 0.592. This indicated that the R^2 is satisfactory, and 59.2% of the variation in digital innovation is explained and is moderately influenced by the independent variables.

Testing of hypotheses

Using the PLS-SEM, the path coefficients and the significance of the relationships were assessed. The significance of the hypotheses of this study was tested using empirical t values at a 5% significance level (threshold value 1.96) (Hair et al., 2014) and p values obtained through the bootstrapping procedure at a 95% confidence level (threshold value 0.05) (Hair et al., 2014). The results are shown in Table 3.

Table 3: Path coefficients and hypotheses testing.

Hypotheses	Path	T statistic	P values	Decision
H1	TL → DI	0.127	0.449	Not Supported
H2	TMS → DI	1.871	0.031	Supported
H3	OC → DI	0.025	0.490	Not Supported
H4	OL → DI	2.617	0.005	Supported

The results of the hypothesis test indicated that H2 and H4 were supported at the 95% confidence level, and H1 and H3 were not supported at the 95% confidence level.

DISCUSSION AND FINDINGS

The first objective of the study was to identify the factors which influence digital innovation under organizational capability and managerial capability. To fulfill this objective, an extensive literature review was carried out. Through the previous studies, four key factors influencing digital innovation were identified. Based on the literature, the conceptual framework was then developed by using these identified factors and hypothesized relationships to find out whether the identified factors have a positive impact on the digital innovation of an organization.

The second objective was to assess the impact of the identified factors on digital innovation. This objective was achieved by testing the four hypotheses identified above from H1 to H4. The analysis revealed that H1 was not supported ($p > 0.05$), indicating that transformation leadership does not have a significant effect on digital innovation. The findings of this study contradict those of Montreuil et al. (2020) and (Mokhber et al., 2017), who have suggested that there is a significant positive effect of transformational leadership on digital innovation. However, there have also been inconsistent findings on the impact of transformational leadership on innovation. For example, there have been findings which suggested that among the sub-dimensions considered under transformational leadership suggested by Bass and Riggio (2006) – intellectual stimulation, individualized consideration, idealized influence, and inspirational motivation, idealized influence has a non-significant relationship with innovation. (Al Ahmad et al., 2019; Jaussi and Dionne, 2003; Li et al., 2016). Jaussi and Dionne (2003) suggested that even if a person is not a transformational leader, any unconventional behaviors shown by a person may be more incidental for innovative outcomes, and these unconventional behaviors explain more variation in innovative outcomes than transformational leadership. Based on these facts, it can be stated that transformational leadership may not always be a guaranteeing factor for organizational innovation, since people with unconventional behaviors within organizations, could also be highly influential for the innovative outcomes of those organizations, even though they are not labelled as transformational leaders. Further, all the traits of a transformational leader, as defined by Bass and Riggio, may not always have a significant effect on digital innovation.

The analysis indicated that H2 is supported ($p < 0.05$). Hence, it can be concluded that top management support has a significant effect on digital innovation. This finding is consistent with several previous studies, such as Shaar et al. (2015) and Elenkov and Manev (2005), who suggested that there is a significant influence of top management on innovation. This finding is further consistent with those of Hsu et al. (2018), who posited that top management support performs a vital role in designing the innovation-related strategies of an organization, and that of Jaiswal and Dhar (2015), who stated that the top management significantly affects the innovative climate of an organization.

As per the analysis, H3 was not supported ($p > 0.05$). This indicates that there is no significant effect of organizational culture on digital innovation. This finding is consistent with the findings of Naranjo-Valencia et al. (2016), who suggested that neither there is a significant relationship between clan culture and organizational innovation nor between market culture and organizational innovation. They further suggested that although traits such as teamwork that are inherent in clan cultures are influential for innovation, they may be effective only when remaining values pertaining to external orientation are present. Naranjo-Valencia et al. further posited that even though the market cultures which are more oriented towards the external environment are supportive of innovation, they may hinder innovation where there is a mechanistic structure, excessive hierarchies, focus on too many details, and excessive pressure on employees. They concluded that although organizational culture may foster innovation, it can also act as an obstacle against innovation. Chen et al. (2018) also posited that the connection between an organization's culture and its innovative strategy is not significantly related to the speed and the quality of innovation of an organization. According to these facts, it could be implied that organizational culture may not always have a positive influence on innovation and that it may depend on different cultural contexts observed within different organizations in the way they are supported by their organizational structures. The finding of this hypothesis, however, is inconsistent with several previous research that had posited that the organizational culture affected positively and significantly on innovation (Aboramadan et al., 2019; Montreuil et al., 2020; Nguyen et al., 2019; Lita et al., 2020; Sousa-Zomer et al., 2020).

According to the analysis, H4 was supported ($p < 0.05$), indicating that there is a significant, positive association between organizational learning digital innovation. This finding is consistent with the findings of previous studies, which have also posited a significant, positive relationship between organizational learning and innovation (García-Morales et al., 2011; Hsiao et al., 2014; Montreuil et al., 2020; Sutanto, 2017; Tohidi et al., 2011). Learning is also regarded as an important factor for organizational innovation since it permits organizations to realize the mistakes by themselves and their competitors and correct them with the view of adapting to their environment (Nouri et al., 2016). This finding was further consistent with the suggestion that the individual expertise of employees and new knowledge entering the organization is incidental in nurturing innovation (Lin, 2007).

CONCLUSION

This study attempted to determine the factors which affect digital innovation with reference to managerial and organizational capabilities. To explain the relationship between identified antecedent factors and digital innovation, this study used DCT. Analysis of literature revealed the existence of four factors that affected digital innovation. They were transformational

leadership, top management support, organizational culture, and organizational learning. These factors were then regrouped under managerial and organizational capabilities, based on theoretical justifications. According to the analysis, top management support and organizational learning were identified as the two factors which have a significant positive influence on digital innovation, while transformational leadership and organizational culture do not have a significant influence on digital innovation.

IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH DIRECTIONS

Implications

As mentioned in several studies within the domain, comprehensive models and literature are deemed to be lacking when it comes to identifying the antecedents for digital innovation (Khin & Ho, 2018; Loon et al., 2020; Vial, 2019). Through a comprehensive literature review, four factors affecting digital innovation were identified, filling the existing knowledge gaps with reference to empirical studies. Secondly, a new framework unique for this study was developed to fill the knowledge gap existing within the subject area of digital innovation.

The findings could provide inference on specific factors which could have an impact on the digital innovation processes within different organizations, as well as within capabilities of which nature (managerial or organizational) these factors should be leveraged. Managers should focus more on enhancing their support towards innovative initiatives and fostering organizational learning efforts in order to improve the digital innovation processes, according to this study. This may mean investing more in technologies and digital infrastructure to develop new products, services, and work processes (OECD, 2020) and allowing new knowledge to enter and flow freely within the organization (García-Morales et al., 2011). Based on the findings, managers need to take necessary steps to build, lead and leverage a digitally innovative organization, and drive it towards better performance outcomes. In order to achieve this, it is imperative that the organization possesses the appropriate structure, culture, and work processes conducive to digital innovation (Hilmi et al., 2010). The findings could also be helpful for government policymakers to promote digital innovation at regional and national levels, especially aiming organizations that are still rooted in traditional modes of operating, and to communicate the importance of fostering a management structure and a learning environment that support digital innovation to achieve better organizational performance.

Limitations of the Study

It is acknowledged that the current study consisted of several limitations. These limitations could lead the way for additional investigations in future studies in the domain. The researcher had to restrict the study to the Western Province in Sri Lanka and had to rely only on online modes for collecting data due to travel restrictions and practical difficulties in visiting organizations physically due to the COVID-19 pandemic. Even after three to four email reminders, the final usable responses only amounted to 135. Therefore, the generalization of the findings of this study needs to be done carefully, especially for other regions, organizations, and the entirety of Sri Lanka. Due to the restrictions mentioned above, the researcher also had to adapt a convenience sampling method, and generalizing the results of the convenience sampling method to the entire population could be questionable.

Future Research Directions

The conceptual framework introduced in this study could be extended to compare the differences in the antecedents of digital innovation in different sectors and what factors determine the digital innovativeness of organizations, provided the different economic sectors/industries they belong to. Furthermore, this study has considered four antecedents of digital innovation, as appeared in previous literature. However, there are other variables that have also been considered as factors that affect digital innovation, such as digital orientation (Khin & Ho, 2018), entrepreneurial self-efficacy, digital technology self-efficacy (Mancha & Shankaranarayanan, 2020), and CRM practices (Valmohammadi, 2017). These factors and any additional factors could also be incorporated in future studies. In addition, future studies could be extended to examine the effect of digital innovation on organizational performance.

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