

ORGANIZATIONS' READINESS FOR DIGITAL INNOVATIONS: EVIDENCE FROM ETHIOPIA

Shibiru Ayalew Melesse

Adama Science & Technology University, Ethiopia; email: shibekoo84@gmail.com

ABSTRACT

Organizational readiness theory asserts that “readiness for change” is a precursor to the effective implementation of complex changes. Scholars argue that innovation with digital technologies can be challenging and dynamic and innovation with digital technologies requires multiple and simultaneous adjustments in resources, staffing, culture, decision making, communication and reward systems. However, studies show that organizations are struggling to reap the full innovation potential, and the new ideas do not manifest into product or service deliveries because of the lack of organizational readiness particularly in developing countries. The objective of the current study was therefore to assess organizations’ readiness for digital innovation in Ethiopia using a comprehensive approach; examine if digital innovation readiness differs across sectors in Ethiopia; investigate whether managers rating (perception) of organizational readiness is different from that of non-managerial employees, and identify key barriers and facilitators that provide the time and context of the development of an organizationally “ready” culture in Ethiopia. Organizational readiness for digital innovations was measured using eight dimensions namely resource readiness, IT readiness, cognitive readiness, partnership readiness, innovation valance, cultural readiness, and strategic readiness. Using sample of respondents from different firms in the financial, higher education, manufacturing, and public sectors in Ethiopia, the study found out that digital innovation readiness is far from being good across the sectors in Ethiopia in all standards and the private manufacturing sectors seems to be in a better position in terms of digital innovation readiness with respect to other sectors while the higher education sector appears to be the least. In addition, the results show that there exists disagreement between managers and employees in terms of organizations digital readiness for innovation and that managers are more likely than employees to positively perceive (rate) their organizations’ digital innovation readiness. Finally, both practical and theoretical contributions of the study and policy directions are discussed.

Keywords: Digital innovation; Readiness; Ethiopia; Readiness theory; Readiness for change.

1. INTRODUCTION

Technological innovation demands coordination of substantial resources. Firms’ readiness for digital innovation enables them to reap the benefits of adopting digital technologies. For instance, information systems scholars argue that readiness to innovate with technologies is positively associated with innovation outcomes and negatively related to innovation risks (Lokuge, 2019). Studies also show that about 90% of ideas failed to reach end-users as a result of firms’ lack of readiness (Larsen & Roberts, 1971). In the same vein Pettey & Stevens (2009) noted that substantial opportunities have been lost due to organizations’ lack of readiness for innovation. Emerging technologies such as cloud computing, artificial intelligence (AI), big data analytics, internet of things (IOT), business analytics, and block chain provide unprecedented opportunities to innovate, however they are not immune to failure.

In this proposed study “Digital technologies” refer to emerging technologies such as cloud computing, big data analytics, internet of things, artificial intelligence, block chain, social media, business analytics, wearable, and mobile. These emerging digital technologies are relatively inexpensive, or available on demand, functionally oriented, and flexible and have the potential to connect with both external stakeholders and customers. Such features of digital technologies minimize barriers for technology innovation.

Digital technologies will provide innovation opportunities at lower capital investment, challenging the

traditional equation of innovation with IT sophistication and resource availability. However, organizations are struggling to reap the full innovation potential, and the new ideas do not manifest into product or service deliveries because of the lack of organizational readiness (Snyder-Halpern, 2001; Williams, 2011). Innovation with digital technologies presents new set of challenges. For organizations to succeed in digital innovation, it is required that they unfreeze, freeze, and refreeze their resources similar to three stage model of change management (Lewin, 1951). Hence, innovation with digital technologies can be challenging and dynamic. In addition, innovation with digital technologies requires multiple and simultaneous adjustments in resources, staffing, culture, decision making, communication and reward systems (Lokuge, Sedera, & Nanayakkara, 2018; Nambisan & Sawhney, 2011; Sirmon, Hitt, Ireland, & Gilbert, 2011). Furthermore, the non-exclusivity of digital technologies, where the competitors can easily emulate IT innovations (Nylén & Holmström, 2015) means that organizations must be able to adjust their resources and strategy configurations continuously to achieve competitive advantage (Avedillo, Begonha, & Peyracchia, 2015). It is also important to note that the digitization success stories have demonstrated that not only the modernity of technologies but also their IT decision makers, and organizational culture play a crucial role in implementing innovation (Nylén & Holmström, 2015; Swanson, 2012; Weill & Vitale, 2002).

Therefore, given a substantial potential to innovate using digital technologies, and the risks of not to innovate in today's competitive environment, the current study will scientifically assess organization's readiness of digital innovation within and between sectors and Ethiopia. The organizational readiness for digital innovation will be captured using the most recent instrument developed by Lokuge, Sedera, Grover, and Dongming (2019) for similar purpose.

2. LITERATURE REVIEW

Crossan and Apaydin (2010, p 1155) state that innovation is “a production or adoption, assimilation and exploitation of a value added novelty in economic and social spheres, renewal and enlargement of products, services and markets; development of new methods of production; and establishment of new management systems.” Following the work of Lokuge et al. (2019), the current study defines digital innovation as innovation enabled through or triggered by digital technologies. The key terms in Crossan and Apaydin (2010) definition of innovation such as production, adoption, assimilation, exploitation, renewal, enlargement and development suggest that innovation can happen only when the organization is ready to change its innovation approach periodically.

Lokuge et al. (2019) suggested that the terms “readiness” and “innovation” have been examined under two main perspectives: i) the readiness of an organization to withstand an innovation and ii) the readiness of an organization to deliver or enable innovation. The focus of the current study is on the latter in that it evaluates an organization's level of readiness. Organizational readiness for digital innovation has received neglected attention in the literature (Lokuge et al., 2019; Snyder-Halpern, 2001). Lokuge et al. (2019) defines readiness as a state that is attained prior to the commencement of a specific activity in relation to psychological, behavioral, and structural preparedness of organizations. They also suggested that readiness can be observed from multiple levels and then can be analyzed at the individual, team, department or organizational (Grover, Fiedler, & Teng, 1999; Molla et al., 2009). The current study attempts to examine readiness at organizational level though. In addition, scholars suggested that readiness is best conceptualized as a degree of readiness in a continuum rather than as a dichotomous variable of being “ready” or “not ready”. Hence, according to these scholars organizational readiness for digital innovation is not a monologues construct (Klein & Kozlowski, 2000) rather it is a construct that has a different meaning, measurement, and relationship with other variables across different levels of analysis (Weiner, Amick, & Lee, 2008; Weiner, Lewis, & Linnan, 2009). Hence, in the context of the current study organizational readiness for digital innovation can be defined as “an organization's assessment of its state of being prepared for effective

production or adoption, assimilation, and exploitation of digital technologies for innovation” (Lokuge et al., 2019, p. 446).

1.1. Readiness theory

Researchers argue that theory of organizational readiness for change can be used as theoretical lens to assess organizational readiness for digital innovation (Lokuge et al., 2019). Readiness theory asserts that “readiness for change” is a precursor to the effective implementation of complex changes. Specifically, organizational readiness for change refers to organizational members’ change commitment and change efficacy to implement organizational change (Lokuge et al., 2019; Weiner, 2020; Weiner et al., 2008; Weiner et al., 2009). For instance, Weiner et al. (2009) contends that organizational readiness for change is a state of being both psychologically and behaviorally prepared to take action (i.e.; willing and able). Being prepared for innovations is nontrivial (Nelson & Winter, 1977). Drawing from organizational change literature, it is postulated that organizations produce or adopt, assimilate, and exploit innovation if the changes are i) perceived as necessary (willingness) and ii) the organization has the required capabilities (ability) (Armenakis, Harris, & Mossholder, 1993; Teng, Fiedler, & Grover, 1998).

The readiness theory has also been used by previous researchers (e.g.; Lokuge et al., 2019) to derive appropriate constructs for organizational readiness for digital innovation by conceiving through i) change valance , ii) change efficacy, and iii) contextual factors(for details see Lokuge et al., 2019, pp. 446-447). Based on these three theoretical paradigms, Lokuge et al. (2019) developed validated sub-constructs and measures for assessment of organization’s readiness for digital innovation. They developed seven sub constructs with 21 measures to assess organization’s readiness for digital innovation. The sub-constructs included resource readiness, IT readiness, cognitive readiness, partnership readiness, innovation valance, cultural readiness, and strategic readiness, each of which is discussed below.

Resource readiness: While the term “resource readiness” has been employed for brevity, it firmly emphasizes on the “flexibility” that the organization has to configure and reconfigure its resources in order to facilitate the needs of digital innovation. The construct is defined as the flexibility of a shared set of financial, technology, and human resources that provide the foundation on which digital innovation can be delivered upon. Here the emphasis is on flexibility of financial, technology infrastructure, and human resources, this is also in line with notions on flexibility proposed in prior IS studies (e.g.; Kim, Shin, & Grover, 2010) .

IT readiness: IT readiness is defined as the strength of the IT portfolio to facilitate digital innovation. The stability of an enterprise system, which influences the innovation capacity of digital technologies, was discussed in recent studies by Sedera, Lokuge, Grover, Sarker, and Sarker (2016). In addition, Chen, Wang, Nevo, Benitez, and Kou (2017) noted that organizations that use IT to support core competencies will experience improved strategic flexibility, which may lead to innovation and increase performance.

Cognitive readiness: Cognitive readiness be can defined as the strength of the knowledge base in an organization in facilitating digital innovation. This refers to knowledge, skills, and adaptability of the staff as the core readiness facet of digital innovation. Previous studies (Rose, Jones, & Furneaux, 2016; Sedera & Gable, 2010) argued that knowledge, skills and abilities of employees can be of special relevance and significance for organizations that must adapt quickly or rapidly emerging, unforeseen challenges. Both individual and organizational units can be prepared to perform required tasks.

Partnership readiness: Partnership readiness is defined as the affiliation of external stakeholders to an

organizations digital innovation. According to extant literature, organizations seek assistance from a wide spectrum of partners especially for digital innovation including software and hardware vendors, consultants, suppliers, and even customers (Abrell, Pihlajamaa, Kanto, Vom Brocke, & Uebernickel, 2016; Benitez, Ray, & Henseler, 2018; Gawer, 2014). For instance, Abrel et al (2016) highlight the distinct roles of customers and users in supporting digital innovation.

Innovation valance: The innovation valance is adapted from the change valance concept. Innovation valance measures the positivity the stakeholders have toward digital innovation. It refers to the i) attitude, ii) motivation, and iii) empowerment that employees have for digital innovation. Research notes that positive attitudes of employees foster open-ended creativity, which is a key driver for the digital innovation (Lokuge, Sedera, & Nanayakkara, 2018; Mueller, Rosenbusch, & Bausch, 2013). Likewise, motivation is one of the salient attributes that encourage open-ended value creation, especially in demanding circumstances (Berlyne, 1965). Motivational attitude is a psychological state that allows organizations to overcome deficiencies in resources such as finance and human capitals.

Cultural readiness: Cultural readiness is defined as the strength of the core values of an organization that facilitates digital innovation. Organizational culture is highlighted as a crucial factor for any innovation (Damanpour, 1991; Jansen, Van Den Bosch, & Volberda, 2006). The recent literature argues that the organizational culture is the most salient factors for innovation in organizations that thrive the digital economy (Lee, Raschke, & Louis, 2016). Companies such as Google, Apple, and Facebook, have strong organizational cultures that promote innovation (Boudreau & Lakhani, 2013; Jana, 2013). For instance, Lashisky (2011) in fortune Magazine describes Apple as the “world’s biggest start-up,” describing the conducive culture at Apple Inc. for innovation.

Strategic readiness: Strategic readiness is defined as a set of managerial activities that an organization engages in to facilitate digital innovation. Strategic readiness provides the knowledge that communicates a plan of actions and forms the guidelines for compliance in digital innovation. A poor understanding of details of such changes and unawareness of what is expected have been found to be prominent but often unrecognized factors in unsuccessful innovation projects. Studies discuss the importance of clarity, continuous refinement, and communication of strategic goals (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Grover et al., 1999).

3. METHODS

3.1. **Data collection methods:** primary data was collected online using structured questionnaire via Google forms. A sample of 32 subjects from various sectors including higher education (n=9), industry¹ (n=6), public service (n=10), and banks (n=7) responded to the survey questions and used in this preliminary analysis of organizations’ readiness for innovation using digital technologies. 12 of the respondents were non managers, 10 of them were team leaders, 6 of them were middle level managers, and 4 of them were top managers. All of the respondents have attained masters or above education levels. In addition, out of the 32 respondents, 27 of them were male while the remaining (n=5) were female. The average age of the respondents is 33.125 years while their average work experience is 7.2 years.

3.2. **Measures of organizational readiness:** organizational readiness was measured using seven dimensions on a scale of 5 (5= strongly agree; 1=strongly disagree) each of which are discussed below.

3.2.1. **Resource readiness:** resource readiness was measured by using three measures. These include i) flexible financial resources (Oke, Walumbwa, & Myers, 2012; Popadiuk &

¹ Industry refers to private manufacturing enterprises.

- Choo, 2006), ii) human resources (Grover & Kohli, 2013), and flexible infrastructure resources (Chen, Wang, Nevo, Benitez-Amado, & Kou, 2015).
- 3.2.2. **IT Readiness:** IT readiness was measured using three measures including i) stability of the enterprise system (Chen et al., 2017; Lokuge, Sedera, & Perera, 2018; Sedera et al., 2016), ii) availability of technological technologies (Nylén & Holmström, 2015; Sedera et al., 2016), and iii) stability of the IT infrastructure (Tilson, Lyytinen, & Sørensen, 2010; Tilson, Sorensen, & Lyytinen, 2012) that were used to collect information about IT readiness of an organization.
 - 3.2.3. **Cognitive Readiness:** Cognitive readiness of an organization was measured using three measures including: i) knowledge, ii) skills, and iii) adaptability of the employees.
 - 3.2.4. **Partnership Readiness:** partnership readiness was suggested to be measured by three items: i) IT vendor relationship (Ceccagnoli, Forman, Huang, & Wu, 2012; Tate, Sedera, McLean, & Burton-Jones, 2014), ii) relationship readiness with management consultants (Bessant & Rush, 1995), and iii) readiness for establishing partnerships with customers or vendors (Lubatkin & O'Neill, 1987; Walther et al., 2018).
 - 3.2.5. **Innovation Valence:** Three measures were used to measure change valence using i) attitude of the employees (Ecker, van Triest, & Williams, 2013; Evanschitzky, Eisend, Calantone, & Jiang, 2012), ii) motivation (Antikainen, Mäkipää, & Ahonen, 2010; Damanpour, 1991), and iii) empowerment (Ecker et al., 2013; Mate-Sanchez-Val & Harris, 2014).
 - 3.2.6. **Cultural Readiness:** Three measures were used to collect information cultural readiness: i) sharing of ideas in a connected workplace (Patanakul, Chen, & Lynn, 2012; Shane, Venkataraman, & MacMillan, 1995), ii) decentralization of decision making culture (Ford & Gioia, 2000; Lengnick-Hall, 1992), and iii) risk aversion.
 - 3.2.7. **Strategic Readiness:** Strategic readiness was measured by three measures: i) the clarity of the goals (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Oke et al., 2012), relevance (Damanpour, 1991; Ecker et al., 2013), and iii) strategy communication (Backmann, 2013; Evanschitzky et al., 2012).
 - 3.2.8. **Overall Readiness:** overall organizational readiness was measured using the mean of all the seven readiness dimensions discussed above.

4. PRELIMINARY RESULTS

The primary objective of this paper is to assess organizations' readiness for digital innovations in Ethiopia to understand the extent of readiness and variations within and across different sectors in the country. This section presents the preliminary result of 32 samples taken from various sectors in Ethiopia. These sectors include higher education sector, private sector (industry), public service sector, and financial sector (Bank).

4.1. Readiness for digital innovations across sectors

The Figure 1 below shows organizations level of readiness for digital innovations by sector using the seven readiness dimensions resource readiness, strategic readiness, cultural readiness, IT readiness, innovation valence, cognitive readiness, and partnership readiness. As can be seen from the figure, level of readiness for digital innovations is far from excellent for all the sectors included in the study. In addition, in all sectors there is variation in readiness levels as measured by the seven dimensions of readiness for digital innovations. Furthermore, the overall readiness level varies across sectors. Relative to other sectors the industry sector (private) seems to be better in readiness level for digital innovations while the higher education sector seems to be the least (see Appendix I&III).

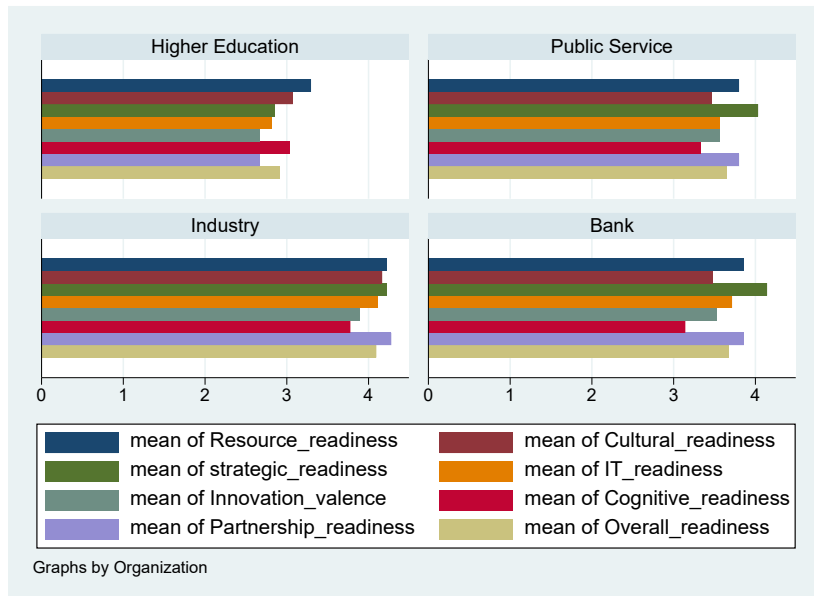


Figure 1 Organizations' readiness level for digital innovation by sector

Figure 2 shows the overall readiness levels of all sectors. There seems to be better readiness level with respect to readiness for resources and strategic readiness. However, there is considerable variation of readiness for digital innovations with respect to the seven dimensions of readiness. As can be seen from the table the overall readiness for digital innovations in Ethiopia is about average.

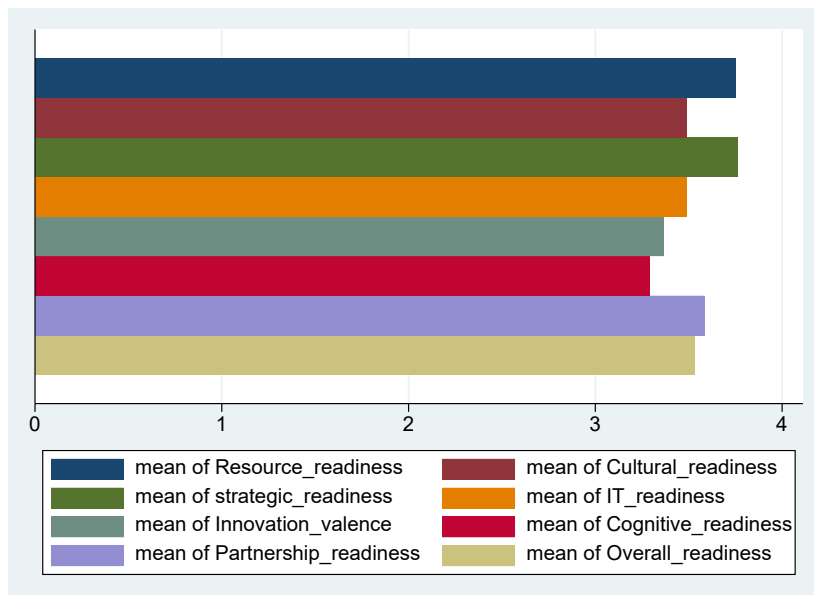


Figure 2 Overall readiness levels of organizations for digital innovations in Ethiopia

4.2. Readiness for digital innovations perceptions of managers and non-managers

Shared beliefs on digital readiness among management and employees are a precursor to successfully guide and implement organizational change. Another goal of the current paper is to examine of how readiness for digital innovations are distributed among managers and employees, or whether their perceptions of digital innovation readiness systematically differ. The preliminary findings reveal that perceptions of digital readiness for innovations differ considerably (see fig 3). In addition, the study shows that employees in managerial positions are more likely to perceive organizational readiness for digital innovation positively than non-managerial employees both within and across sectors (see Appendix II&III).

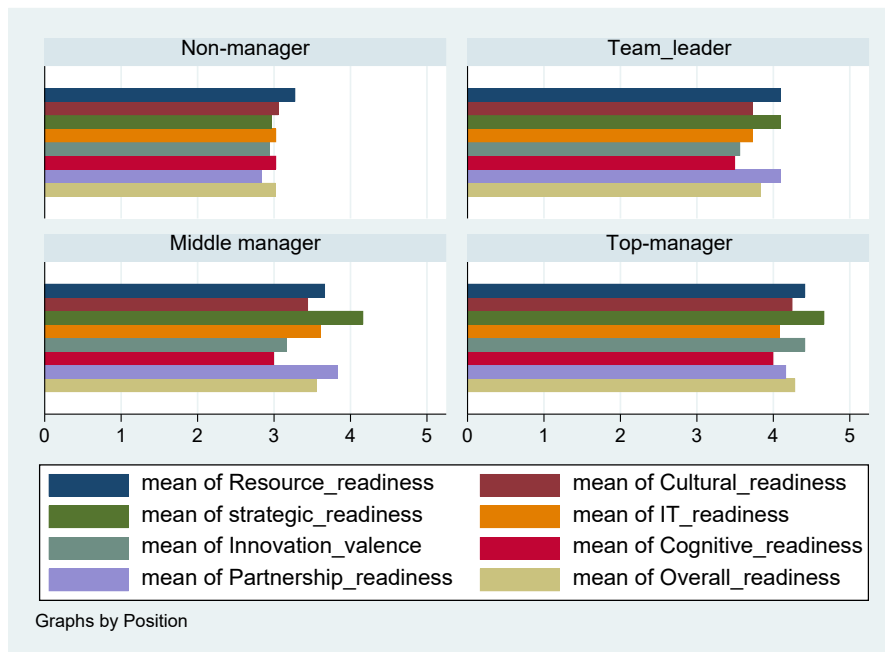


Figure 3 Organizations' readiness level for digital innovation by employee type

5. DISCUSSION

The current paper assesses organizations' readiness for digital innovations across several sectors in Ethiopia with the goal of understanding the extent of readiness level and agreement between managers and employees in terms of their readiness perceptions with reference to digital innovations. The preliminary findings of the study reveal an uneven readiness level of digital innovations across various sectors. In addition, the study shows that organizations' readiness for digital innovations remain far from being an excellent. Furthermore, managers and employees (non-managers) seem to differ in their perceptions of readiness levels where managers tend to perceive readiness for digital innovations more positively than non-managerial employees. In general, the higher education sector seems to be the least compared to other sectors in terms of its level of readiness for digital innovations while the private sector seems to have the highest level of readiness of digital innovations compared to the other sectors. According to Lokuge et al. (2019), highly consistent scores indicate some level of agreement about the constructs of organizational readiness for digital innovation (e.g., a cross a full sample, within stakeholder

groups, within organizational entities). On the other hand, inconsistent scoring may point to areas of differences within these groupings, thus warranting attention.

The current study has limitations. First, because of small sample size ($n=32$), the findings may suffer from internal and external validity problems. Hence, future research can benefit by replicating (extending) this study with an adequate sample size. Second, even though the population of the study is heterogeneous, the current study used non probability sampling technique. The researcher believes that more reliable results can be attained if future studies use probability sampling methods and a large enough sample size.

6. CONCLUSION

In conclusion, organizations' readiness for digital innovations is vital for survival and growth in today's competitive environment especially in developing countries. However, organizations in the developing world such as Ethiopia seem to lack enough readiness for digital innovations. In addition, there seems to exist lack of agreement between managers and employees on how they perceive organizations' readiness for digital innovations. Furthermore, while the higher education sector is supposed to be innovation hub, its level of readiness for digital innovations is the lowest compared to other sectors. On the other hand, the private sector is found to be in a better readiness positions compared to other sectors such as higher education, banks, and public service sectors. Organizations in the study area do not only reflect inadequate level of readiness for digital innovations but also demonstrate uneven (inconsistent) type of readiness for digital innovations as measured by digital innovation readiness measures. The current study has both practical and theoretical contributions.

The availability, accessibility, scalability, and easy-to-use and ease-of deployment of digital technologies have increased the temptation (and the necessity) for all organizations to innovate using such technologies (Lokuge et al., 2019). This readiness assessment allow organizations understand the capabilities available to them in order to effectively implement digital innovations which will lead to formulation of appropriate policies and strategies in a way they can reap the benefits of digital technologies. The current study also provides information for the organization under consideration how ready it is to innovate with emerging digital technologies. That is, the findings of this study help the case organizations to avoid "false-starts" which have been blamed for the notoriously high rate of innovation failures (Lokuge et al., 2019; Nylén & Holmström, 2015). The literature highlights the importance of the necessity of considering all factors before engaging in innovation (Lokuge et al., 2019; Swanson, 2012). The results of this study may also be used to establish bench marks for comparison against similar firms especially competitors. Periodic benchmarks demonstrate the progress that an organization makes in relation to a particular sub-construct, allowing them to identify facets of improvements or facilitate organization wide knowledge on capabilities. Organizational readiness for digital innovation can be a tool to allocate and manage investments into digital innovation readiness factors. Having understood benchmarked, and identified possible areas of strength and weakness in relation to organizational readiness for digital innovation sub constructs, the organization can now allocate resources in the basis of evidence. The readiness assessment result will develop an evidence based practice to focus on resources and capabilities and pay attention to those aspects that are lacking in an organization. Such an approach will minimize the risks involved in digital technologies and innovation in general. Analysis of data samples based on various demographics or other

distinctions can facilitate potentially useful comparisons for organizations.

In terms of its contribution to the literature, the current study provides consolidated information on organizational readiness for innovation unlike the previous studies that examined the antecedents of innovation bit by bit (e.g.; Roy & Sarkar, 2016; Saemundsson & Candi, 2014; Wan, Williamson, & Yin, 2015). In addition, it does so in a developing country context where a neglected attention has been given by previous study.

AUTHOR CONTRIBUTIONS

Shibiru Ayalew Melesse as a sole author of this paper conceived and designed the analysis, collected the data, performed the analysis, and wrote the paper.

ACKNOWLEDGEMENT

The author received no financial support for the research.

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APPENDIX

Appendix I

	Resource readiness	Cultural readiness	Strategic readiness	IT readiness	Innovation valence	Cognitive readiness	Partnership readiness
Higher Education	-0.926 (0.521)	-1.093* (0.496)	-1.370** (0.472)	-1.296* (0.568)	-1.222* (0.518)	-0.741 (0.469)	-1.611** (0.524)
Bank	-0.365 (0.550)	-0.690 (0.524)	-0.0794 (0.498)	-0.397 (0.599)	-0.365 (0.546)	-0.635 (0.496)	-0.421 (0.553)
Public	-0.422 (0.511)	-0.700 (0.486)	-0.189 (0.463)	-0.544 (0.556)	-0.322 (0.507)	-0.444 (0.460)	-0.478 (0.513)
Constants	4.222*** (0.404)	4.167*** (0.384)	4.222*** (0.366)	4.111*** (0.440)	3.889*** (0.401)	3.778*** (0.364)	4.278*** (0.406)
<i>N</i>	32	32	32	32	32	32	32
<i>R</i> ²	0.107	0.148	0.318	0.174	0.197	0.089	0.293

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1 Regression output for testing readiness for digital innovations differences by sector

Appendix II

	Resource readiness	Cultural readiness	Strategic readiness	IT readiness	Innovation valence	Cognitive readiness	Partnership readiness
Non-manager	-1.139* (0.545)	-1.194* (0.534)	-1.694** (0.489)	-1.056 (0.643)	-1.472* (0.561)	-0.972 (0.495)	-1.333* (0.577)
Team leader	-0.317 (0.558)	-0.517 (0.547)	-0.567 (0.501)	-0.350 (0.658)	-0.850 (0.575)	-0.500 (0.507)	-0.0667 (0.591)
Middle manger	-0.750 (0.609)	-0.806 (0.597)	-0.500 (0.546)	-0.472 (0.718)	-1.250 (0.627)	-1.000 (0.554)	-0.333 (0.645)
constants	4.417*** (0.472)	4.250*** (0.462)	4.667*** (0.423)	4.083*** (0.556)	4.417*** (0.486)	4*** (0.429)	4.167*** (0.500)
<i>N</i>	32	32	32	32	32	32	32
<i>R</i> ²	0.187	0.178	0.391	0.118	0.214	0.155	0.285

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 Regression output for testing readiness for digital innovations differences by employee type

Appendix III

	Overall readiness	Overall readiness
Non-manager	-1.266* (0.473)	
Team-leader	-0.452 (0.485)	
Middle-manger	-0.730 (0.529)	
Higher education		-1.180* (0.440)
Bank		-0.422 (0.465)
Public		-0.443 (0.432)
Constant	4.286*** (0.410)	4.095*** (0.341)
<i>N</i>	32	32
<i>R</i> ²	0.252	0.223

Standard errors in parentheses
 * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Regression output for testing readiness for digital innovations differences