Digital Transformation and Organizational Culture of Small and Medium Size Enterprises

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ABSTRACT

Digital transformation process is a relatively new phenomena that is uniquely different form information technological infrastructures changes of the past. There is no proven track record, or established guidelines from which firms can follow or adopt. To undertake digital transformation pioneering firms have to improvise as they attempt to reconfigure their organizational process to take advantage of these emerging technologies. Building on contributions from organizational research this study has explores the role of organizational culture in the digital transformation processes of small and medium size enterprises. It builds on the competing values framework to categorize the organizational culture. Factor analysis identified three archetypes of organizational cultures from the studied sample, that is, the adhocracy culture, the market culture, and the hierarchical culture. As hypothesized, results from the study find small and medium size enterprises with a market oriented organizational culture, as well as, those having an adhocracy organizational culture to have greater intensity of digital transformation. On the other hand, there was no significant relationship between firms with hierarchical organizational culture and digital transformation intensity. Small firms with greater internet business experience

Keywords: Digital transformation, organizational culture, small and medium size enterprises,

INTRODUCTION

The last decade has seen a rapid increases of internet technologies that including cloud computing, big data analytics, social media, and internet of things. However, there has been very little systematic research examining the role of organizational culture in the digitalization of business enterprises. Most research has been driven by consulting firms that provide prescriptions on what firms should to take advantage of these emerging digital technologies. It was not until 2012 that research of digital transformation began to appear in academic journal publications (Parida, Sjödin, & Reim, 2019). Until now very few of those studies have addressed digital transformation in small and medium enterprises. Studies on technology adoption in small and medium size enterprises have often focused on issues related to barriers of information technology adoption facing SMEs. The issue of culture and digital transformation of small and medium size enterprises has rarely been studied. The aim of this study is to start filling in this gap by exploring the adoption of emerging digital technologies (EDT) by small and medium size enterprises.

In this study we define digital transformation as the process of reinventing an organization's business model and organizational culture as it incorporates emerging internet based digital technologies such as cloud computing, social media, big data analytics, machine learning, internet of things (IoT), and block chain into its value creation and value delivery processes. (Westerman, Calméjane, Bonnet, Ferraris, & McAfee, 2011). Digital transformation is much more than the transformation of an organization's information technology (IT) infrastructure. Information technology transformation involves changing the information network infrastructure, communication infrastructure and information storage and access which is often managed by an organization's information technology department. However, digital

transformation requires the redesign of an organization's value proposition, its customer segments, its competition, its distribution channels, its supply chains, its partners and other stakeholders.

LITERATURE REVIEW

Digital transformation of firms is a very recent phenomena it was not until 2011 that academic publications began appearing in academic journals. Early academic attempts to articulate the distinction between firm digital transformation processes and simply adopting information and telecommunication (ICT) technologies was initially articulated by researchers at the MIT Center for Digital Business and Capgemini Consulting (Westerman et al., 2011). In their study report of 2011, where George Westerman and his colleagues reported on their study examining how 50 large traditional companies were managing their digital transformation processes. In that report, they defined digital transformation as the use of digital technologies to radically improve organizational performance. That report provided a framework for examining digital transformation processes centered on three key areas, that is, customer experience, operational processes, and business models. They found that executives were using social media and data analytics to better understand their customers to build loyalty and brand name recognition. By using digital technologies firms were able to automate their supply chain processes and human resource functions leading to increased organizational efficiency. Since that publication an increasing number of academic articles have been published. According to a recent systematic literature review during the period between 2012 to 2018 more than 106 articles on digital transformation have been published (Parida et al., 2019).

At the center of digital transformation is cloud computing technologies. Cloud computing technologies are an extension of virtualization and grid computing services offered to firms by professional computer companies that have global networks of servers located in multiple locations around the world. By using cloud computing services SMEs gain the ability to scale and expand their information processing capabilities without having to invest in the purchase of expensive equipment, software, or computer engineers. They can have access to a large amount of data over the cloud and use the powerful computing capabilities were out of reach for SMEs. Apart from providing computer power and business processing applications, cloud computing allows SMEs to improve operational efficiencies, reduce costs, and eventually achieve sustainable manufacturing systems. By combing cloud computing and internet of things (IoT), SMEs can create cloud manufacturing platforms that enables them to enhance their manufacturing and servicing capabilities, similar to those of large firms. With cloud manufacturing SMEs can use the internet and service platforms to arrange manufacturing resources and provide services according to specific customers' demands.

Internet of things are technologies connecting physical objects to the internet by embedding those products with sensors and wireless communication technologies such as radio frequency identification (RFID) and matrix bard codes. By embedding sensors into their products, small and medium size firms can use IoT to automated their operations and more efficiently track and manage their supply chains. When combined with machine learning, IoT technologies provide SMEs with capabilities similar to those of large firms. Using matrix bard codes with mobile devices allows SMEs to improve security and marketing communication and a capability to remotely track and control products. Internet of things assistants, such as, Siri or Alexa can be used by small firms to automate and schedule meetings, appointments, deadlines, and inventory control. By connecting to customer IoT devices SMEs are be able to receive direct information about their customers individualized priorities with allows them to provide an individualized value propositions to their customers.

Social media platforms provide SMEs the opportunity to reconfigure their operations, especially marketing, sales, human resources as well as research and development functions. With social media SMEs can establish superior customer relationships and with deeper customer engagement that goes beyond the traditional customer relationship management function. The two-way interaction capabilities that social media platforms bring enables SMEs to manage their customer relationships and shape their brand image as well as building customer loyalty. Through social media SMEs can better understand their customer needs and pains and shape their value proposition tailored to individualized customer needs. The computing power and access to large volumes of data across the internet along with analytical capabilities offered at a relatively low cost provides SME with the ability to dig deeper into their customers and competitors. Access to data and to use this data can help SME better target their most optimal segments with tailored individualized offerings. By having more accurate data mistakes can be avoided. And by understanding patterns of behavior from data analytics SMEs can predict future trends and reduce uncertainties.

Organizational culture can be defined as a set of shared knowledge of values, norms, and attitudes that determine acceptable behavior for members of an organization. There are a large number of studies addressing the relationship between organizational culture and information technology, but most of them have concentrated on the impact of culture on information technology diffusion, adoption, and usage. (Almutairi, 2014; Brdesee, Corbitt, Pittayachawan, & Alsaggaf, 2012; Deshpandé, Farley, & Webster, 2012; Kalmuk & Acar, 2015; Silic & Back, 2013; Tsatsou, 2012).

To examine the relationship between organizational culture and digital transformation in SME in this study we use the Competing Values Framework (Quinn 1988; Quinn and McGrath 1985; (Quinn & Rohrbaugh, 1983) . The framework distinguishes four different architypes of organizational cultures which is based on dominant attributes of different organizations as well as differences in their leadership styles, bonding and strategic orientation the competing values framework identified four cultural archetypes, that is, the clan culture, adhocracy culture, the hierarchy culture, and the market culture. The clan culture and the hierarchical cultures internally focused culture while the adhocracy and the market cultures are externally focused. The dominant attributes of a clan culture is cohesiveness, participation, teamwork and a sense of family where the leadership style is that of a mentor, facilitator or parent figure. Organizational members in a clan culture are bonded with a strong sense of loyalty, tradition and interpersonal cohesion and strategic emphasis is geared towards developing human resources, commitment and morale. The adhocracy culture is the mirror opposite of the clan culture. It is characterized as entrepreneurship driven, creative and a quick adaptive response to external changes. Strategic emphasis is geared towards creativity, growth and resource accumulation. He leadership styles is characterized as that of an entrepreneur, innovator, and risk taker. Members are focused on innovation and risk taking. At the other spectrum a distinction is made between hierarchy culture and the market culture. The market culture like the adhocracy culture is outward looking with the dominant attributes of competition and goal achievement while the hierarchy culture is dominated by rules, order, regulation and uniformity. The leadership style in a market culture is decisive and achievement oriented while in hierarchical culture the leader takes the role of a coordinator. The strategic emphasis in a market culture is focused towards gaining competitive advantage while in the hierarchical culture is focused on stability, predictability and smooth operations. Based on this framework we expect small and medium size enterprises that have adhocracy and market cultures to have greater intensity of digital transformation processes when compared to firms with clan and hierarchical cultures.

RESEARCH METHOD

Data for this study was obtained from an online survey sent to small and medium size enterprises in Canada and India. I developed the survey instrument which was first tested and refined using a pilot study and a group of selected experts. The targeted respondents were selected based on them either being decision makers related to information technology or owner managers of small and medium size enterprise. The initial survey was sent to 500 respondents with 250 sent to Canadian firms and another 250 sent to small and medium size firms in India. However, after three reminders to initial non-respondents and the removal of incomplete responses only 252 responses were fit for further analysis.

Measures of digital transformation intensity of the SMEs were subject to factor analysis. Results of the factor analysis loadings are as seen in Table1. The reliability of the factor loadings was tested using Cronbach alpha. Results of the reliability test show Chronbach alpha at 0.93 which suggest that, the factors is reliable and can be confidently used in further analysis.

Table 1. Measures of Digitalization Intensity

Measures	Factor Loading
The use of digital technologies in the organization's after sales services functions	0.873
The use of digital technologies in the organization's research and development functions	0.862
The use of digital technologies in the organization's information workflow	0.861
The use of digital technologies in the organization's production/operations functions	0.837
The use of digital technologies in the organization's administrative functions	0.819
The use of digital technologies in the organization's sales functions	0.814
The use of digital technologies in organization's marketing functions	0.809
Cronbach Alpha	*0.93*

Following established practice factor analysis was used to reduce the descriptive measures of organizational culture into three underlying factors shown in Table 2. The reliability of the factors was tested using Cronbach alpha. Following the competing values framework, from the factor loadings we can conclude that the first factor refers to the market culture, while the second factor refers to the hierarchal culture, and the last factor refers to the adhocracy culture.

To determine the influence of organizational culture on the digitalization of firms in the sample, the three factors measuring organizational orientation were then subject to regression analysis along with three control variables, that is, firm size, firm age, foreign ownership, and export orientation. Firm size and firm age were used to determine the role of firm resources in SME digitalization. We expect relatively larger and experienced SMEs to have less resource constraints making it easier for them to meet the resource needs of digitalization. The SME literature has often used firm foreign ownership and export orientation to reflect the extra advantage that foreign ownership and firm international exposure brings to enhance organizational absorptive capabilities. Since most of the new digital technologies are internet based we expect SMEs with greater experience in using internet technologies to have a greater digital transformation intensity.

Table 3. Measures of Organizational Cultural Orientation

	Market Culture	Hierarchy Culture	Adhocracy Culture
Only your work counts in this organization	0.718	0.150	0.210
It takes more than a year for new employees to get used in this organization	0.689	-0.096	0.169
Job competence is the only thing that matters in this organization	0.669	0.259	0.174
Results are more important than procedures	0.540	0.219	0.215
Management dislikes union members	0.511	0.481	-0.236
I believe that in this organization managers should generally encourage group loyalty even if individual goals suffer	0.510	0.187	0.371
In this organization people are generally tough	0.497	0.464	0.273
Peoples private life is their own business	0.000	0.716	0.210
This organization has a very formal style of dealing with each other	0.488	0.583	-0.039
Meeting times are kept punctual	0.231	0.568	0.332
In this organization orderliness and consistency are stressed	0.111	0.557	0.401
Managers help good people to advance	0.161	0.181	0.724
Everybody is cost conscious here	0.280	0.194	0.655
Mistakes are tolerated in this organization	0.128	0.088	0.653
Cronbach Alpha	0.807	0.670	0.641

RESULTS AND DISCUSSION

Results of the regression analysis illustrated in Table 4., show that for firms in the sample there was no significant differences between smaller and larger firms in their digital transformation intensity. At the five percent confidence level, we find firm age to have negative relationship with the rate of digitalization, which means that younger firms were more likely to have greater use of digital technologies than older firms. On the other hand, firms with internet business experience were found to have greater digital transformation. Foreign ownership was found to have a much higher and significant positive relationship with digital transformation. Suggesting that foreign ownership encourages SMEs to accelerate their digitalization processes. Contrary to what we expected, there was no significant relationship between export intensity and digital transformation, suggesting that there was no difference between exporting and non-exporting firm in terms of their digital transformation intensity. In line with our assumptions, the study findings show a significant strong positive relationship between market oriented organizational cultures and digital transformation intensity. At a ten percent significance level, we find a positive relationship between digital transformation with firms having an adhocracy culture.

Table 4. Regression Analysis

Dependent Variable = Digitalization Intensity	Std. Error	Beta	t-values	p-values
Firm Size	0.189	0.059	0.915	0.361
Firm Age	0.062	-0.156	-2.381	0.018
Foreign Ownership	0.151	0.260	3.585	0.000
Export Intensity	0.003	-0.110	-1.549	0.123
Internet Business Experience	0.070	0.290	4.432	0.000
Market Organizational Culture	0.062	0.186	2.903	0.004
Hierarchical Organizational Culture	0.061	0.021	0.331	0.741
Adhocracy Organizational Culture	0.062	0.113	1.766	0.079

N = 189
R^2 = 0.299

CONCLUSION

Digital transformation process is a relatively new phenomena that is uniquely different form other technological changes of the past. There is no proven track record, or established guidelines to follow, firms have to improvise as they attempt to reconfigure their organizational process to take advantage of these emerging technologies. Building on contributions from organizational research this study has explored the role of organizational culture in digital transformations processes. From the studied sample three archetypes of organizational cultures emerged, that is, the adhocracy culture, the market culture, and the hierarchical culture. Findings from the study showed that small and medium size enterprises with a market oriented organizational culture, as well as, firms having an adhocracy organizational culture tend to have greater intensity of digital transformation. On the other hand, there was no significant relationship between firms with hierarchical organizational culture and the intensity of digital transformation. This study has been limited by the small sample size of small and medium size enterprises. Many small and medium size enterprises are still not yet sure of what to make of these disruptive technologies. Future studies can build on this framework to test whether these results can be replicated in larger samples of SME. For managers of small and medium size firms this study provides a framework for them to redesign their business and organizational processes to take advantage of emerging technologies.

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