Determinants for the Adoption of Digitalization by Manufacturing SMEs in India : An Empirical Study

** Amit Kumar Arora*
*** Priya Rathi*

Abstract

The study attempted to determine the factors/determinants for the adoption of digitalization in SMEs. The study categorized various determinants into internal and external factors. To test the hypotheses, 52 sample units were studied. The results of logistic regression and chi - square test indicated that diversification, profitability, level of competition, managerial factors, and technological factors were significant for the adoption of digitalization. On the other hand, size of the firm and government initiatives were found to be the non - significant factors. Lack of support from the top management and lack of experts were found to be the major challenges for the adoption of digitalization for the firms who had not adopted digitalization.

Keywords : **digitalization, small and medium enterprises (SMEs), manufacturing sector, internal factor, external factor**

JEL Classification Codes : L6, L25, L81

Paper Submission Date : September 25, 2018 ; Paper sent back for Revision : July 10, 2019 ; Paper Acceptance Date : July 15, 2019

The micro, small, and medium enterprises (MSME) segment plays a significant role and is acting as one of the prime drivers of the Indian economy. In India, the economy is predominantly dominated by agriculture and manufacturing industries that are diverse in the type of business and are spread across remote geographies ; so, there is a need for the state to emphasize on creating more technically sound manufacturing units by supporting technology imbibed industrialization. MSMEs are showing great growth in business due to the 'Make in India' initiative for both domestic and international players.

Digitalization is one of the key terms that describe the modern way of doing business and has changed the facet of MSMEs in every domain of business. With the help of digitalization, a big transformation has taken place where many computing devices are used to convert the analog form, hard copies, and manual way of doing business into the digital form. Digitalization has been one of the key enablers for enhancing product quality, reducing the per-unit cost of production, beating the competition by using innovative ways, etc. In general, digitalization in business means leveraging of technology to connect with customers and to carry out routine tasks to sustain or grow in a global environment.

Sumit Gupta, Senior Group President, Yes Bank rightly said on the importance of digitalization for MSMEs

* *Assistant Professor,* KIET School of Management, KIET Group of Institutions, 13KM Stone, Ghaziabad-Meerut Road, Ghaziabad - 201 206, Uttar Pradesh. (Email : amitaroraicwa@gmail.com) ; ORCID iD:https://orcid.org/0000-0001-9311-0740

** *Assistant Professor,* KIET School of Management, KIET Group of Institutions,13KM Stone, Ghaziabad - Meerut Road, Ghaziabad - 201 206, Uttar Pradesh. (Email : priya.rathi@kiet.edu)

DOI : 10.17010/pijom/2019/v12i8/146410

that the macro business environment that the MSMEs are operating under is undergoing a transition. Digitization is becoming increasingly vital for long term survival and future growth (Gupta, 2019).

Digitalization has played a pivotal role in MSMEs in breaking the clutter and beating tough competition from large enterprises. As per the report by KPMG & CII (2015), the MSME sector accounted for 45% of Indian industrial output and 40% of exports. Uttar Pradesh alone contributed 60% of the total industrial output by MSMEs. As per the reports of RBI, till December 31, 2015, there were 1076243 MSME units in Uttar Pradesh. U.P is the second state after West Bengal having 5,238,568 MSME establishments with a total percentage share of 11.55%. This clearly shows the importance of Uttar Pradesh for the MSME sector. Hence, the present study has taken three industrial areas from Uttar Pradesh, that is, Ghaziabad, Faridabad, and Bulandshahr into consideration for the study.

A successful transformation into a digital economy is a necessary step and offers conditions toward a more comprehensive and sustainable growth while augmenting the overall development. To meet the upcoming demands on the way of development, it is essential that countries continually invest in digital infrastructures. Inventing effective organizations for the digital economy is a grand challenge for the future. Digitalization does not only contribute to productivity and efficiency, but also creates new market opportunities and broader socioeconomic development by creating jobs as the biggest business opportunity. However, the key challenges which the MSMEs are facing in the adoption of digitalization are lack of understanding in selecting the right technology solution, a low impact on overall profitability, etc.

Literature Review

The previous studies conducted in the relevant field and which are coinciding with the objectives of our study have been included in this section. The following are some of the studies:

Priya, Prashanth, and Indira (2019) studied 221 merchants of Chennai and attempted to identify the importance and usage of point-of-sale (POS) systems in the context of small merchants and the acceptance and sustainability of these payments. The study found that even after demonetization, cash remained the most preferred mode for a business. It seemed that the merchants would be convinced if it could improve creditworthiness and eligibility to receive loans from banks.

Parida, Sjödin, and Reim (2019) attempted to analyze digitalization through a literature review and how a firm's productivity was impacted by digital and green technology as well as how it helps in analyzing the role which local governments are adopting for developing a sustainable ecosystem. In this study, the researchers contributed by developing a framework by linking digitalization with long term sustainability and innovation in business model innovation.

Wroblewski and Asgharian (2018) highlighted that firms who had adopted digitalization had low or less relation with their operational performance. The study was conducted on 24 Swedish firms of various sectors like communication, consumer, financial services, industrial, retail, technology, and autos. Two empirical methods were used for the study: one was a portfolio analysis where firms of different sizes and digital maturity levels were considered on the basis of stock performance and a regression model was used to test whether digital maturity had a profound impact on subsequent operating performance (return on assets). The results showed that firms' stock returns of digitally mature firms differed significantly to returns of less digitally mature firms, that is, digitalization was not positively related to subsequent firm operating performance. The study also discussed that in the long run, probably the positive effect of digital innovations on profit margins could be seen by overcoming the drawbacks, but still, it was difficult to change the internal processes, especially the group harmony as well as synchronizing. Therefore, the researchers clearly stated that their research did not support that digitally mature firms outperformed their less digitally mature peers.

Yacob, Wong, and Khor (2018) studied about green technology adoption initiatives among manufacturing SMEs. For a better understanding of green initiatives in manufacturing, SMEs depend on the management orientation and support toward green technology adoption. The researchers concluded that these practices had a significant impact on the environment, which showed a positive relationship between management thought and the adoption of green initiatives. The researchers also highlighted that even government intervention in the adoption of green initiatives by motivating them and creating awareness among SMEs would give more fruitful results in the future. The study was conducted with 260 Malaysian manufacturing SMEs.

Yadav and Mahara (2018) studied 163 wooden handicraft SMEs located at Saharanpur to determine the factors which were affecting e-commerce adoption by SMEs and also to determine the reason why they had not adopted e-commerce as one of the opted mediums for their business transactions. The technological, organizational, environmental, and strategy model based on the TOE framework was proposed in this research. The findings revealed that organizational, technological, and strategy factors significantly contributed to initial e-commerce adoption.

Maiti and Kayal (2017) highlighted the impact of digitization on India's MSME manufacturing and services sector. In India, the MSMEs are the backbone of the country's economy, but still are lacking in one important resource, that is, proper financing. Digitization has helped a lot of India's MSMEs in searching the alternative ways to procure this scarce resource. Due to this, a significant rise in the operating performance of MSMEs as well as their profitability and productivity has been noticed. Research highlighted the technology acceptance by the literature and presented arguments for better understanding of technology adoption. The authors concluded by saying that digitalization can lead to sustainable business growth and can subsequently increase in trade of the service sector of MSMEs.

Parviainen, Tihinen, Kääriäinen, and Teppola (2017) explained a systematic approach to tackle digital transformation and described four main steps: the first steps talk about a company's recent state or course of action with respect to digitalization, the second discusses how the company can reach these goals, third identifies the gap between the goals and the current state, and at last, the fourth plans a systematic course of action, and finally implements the plan into practice as needed. The data were collected from several companies by using diverse case studies, and existing literature were used to complement the data by describing the first version of the digital transformation model. Researchers highlighted the importance of a proactive approach to be taken to gain a competitive position.

Tomar (2017) highlighted the importance of IT as a critical factor in business growth irrespective of firms' size and presence. The study was an attempt to explore the adeptness of IT deployment in SMEs in India. The sample size consisted of 165 executives to know their opinion regarding the role and benefits of IT in their business operations. The researcher revealed that where the Indian economy is dominated by SMEs, however, still, minimal or limited use of IT is present for their day to day operations.

Fan (2016) highlighted few commonly perceived barriers in digitalization like security, privacy, legal issues, lack of skilled staff, and confidence in digital business adoption. The researcher concluded this on the basis qualitative approach conducted by in-depth semi-structured interviewing of four business owners or managers of small and medium enterprises of Greater Western Sydney that lasted for approximately 50 minutes, which were digitally recorded and transcribed. This research analyzed that small organizations did not easily adopt technology and missed the opportunities opened by the digital economy. To overcome this issue, the SMEs need a proactive approach.

Chauhan, Choudhary, and Mathur (2016) focused on technology adoption by the banking industry to increase the efficiency of its operations. The study adopted basic constructs of the technology acceptance model (TAM) such as perceived usefulness, perceived ease of use, intention to use, and attitude and included additional factors such as social norms and perceived risk to measure e-banking adoption behavior. The study was conducted by

using factor wise analysis to provide implications for bank managers to adopt appropriate strategies to encourage e-banking adoption among the consumers having different demographic characteristics in India.

Weill and Woerner (2015) reported an increase of around 30% in revenue growth and a 27% increase in profit margins for companies that were using digitalization and operated within the digital ecosystem as compared to those who were not using it. In contrast to these findings, the researchers did not observe a pattern or relationship between digital maturity and profitability. The researchers highlighted that smaller companies were willing to take more risks in reengineering their business processes due to less global and flexible policy systems as compared to larger organizations. The qualitative research by conducting a series of discussions with senior executives, who came from 13 large organizations from various domains, was done in March 2012. While discussing with a few respondents, they quoted that companies using digital offerings possessed a greater threat to their core businesses.

Wamba and Carter (2014) assessed the impact how SMEs were using Facebook's event page depending on various characteristics of the organizations. To conduct the research, a survey of 453 SME managers of the B2B industry was done in Australia, the U.S., the U.K., and India with equal distribution. The results were analyzed using hierarchical logistic regression method, which indicated that there were few important factors which played a significant role on social media adoption like innovativeness and firm size. That is, larger SMEs were more likely to use social media tools than smaller SMEs, and young managers were more comfortable with this technology. However, the study also highlighted that few factors did not have any significant impact on the adoption of social media tools, that is, manager's gender, manager's education, and firm's geographical location.

Evangelista, Guerrieri, and Meliciani (2014) focused on studying any effect on countries' economic performance by different stages of digitalization like digital infrastructure, its usage, and digital empowerment. The study was conducted from the period of 2004 - 2008 covering 27 EU countries where a total of 108 observations were used. The study showed a significant impact of digitalization on the economy and society. One of the research findings revealed that mere accessibility to ICT facilities or having ICT infrastructure is only a necessary pre-requisite for effective implementation of digitalization. The researchers concluded that digitalization may drive an increase in productivity, growth in employment opportunities, and social development. However, the researchers also realized that such an exercise did not suffice the necessary conditions for all complex transmissions from digitalization to macro-economic performance.

Raja, Imaizumi, Kelly, Narimatsu, and Paradi - Guilford (2013) highlighted how emerging economies ripped the benefits of digitalization and obtained increases in productivity. The McKinsey Global Institute reported that 3.2 jobs are created for every job of 0.62 displaced through the Internet in the SME sector in developing countries. The one potential benefit which ICT has created not only in the industry using ICT but for other sectors too is creating jobs & employment, increasing the standard of living of the workers, and creating economies of scale. To maximize the benefits, the government should intervene and provide proper resources to support and prepare workers, businesses, and policy frameworks.

Mohamad and Ismail (2009) described the importance of using e-commerce not only in providing this world as a boundary-less market, but for an easy way to diversify businesses as well.

Ramdani, Kawalek, and Lorenzo (2009) studied the SMEs of Northwest of England, and the analysis was done by using logistic regression on a sample size of 102 firms from several industry sectors. Firms with fewer than 250 employees were considered to be SMEs. In this study, the researchers tried to analyze the various technological, organizational, and environmental factors that facilitated technology adoption/diffusion. The researchers revealed that organizations which easily adopted new technology had characteristics like greater management support and less resistance towards change as well as were generally larger SMEs. Environmental factors & technological variables (compatibility, complexity, and observability) were insignificant.

Todd and Javalgi (2007) identified the factors which acted as a prominent factor for the internationalization of Indian SMEs as well as fostered entrepreneurship among the Indian SMEs with the help of information technology. The researchers realized the importance of SMEs in the Indian economy as well as emphasized that the use of IT may help them in increasing their reach to the global markets. The adoption of IT in Indian SMEs was largely dependent upon the government & social development. However, the researchers identified that financial capability, dynamic environment, competition, etc. were the major challenges that the SMEs were facing.

Bengtsson, Boter, and Vanyushyn (2007) attempted to infer the relationship between firm size, use of Internet, and organizational innovativeness. The study highlighted three factors as a distinguishing factor for the adoption of digitalization : Internet champions, top management commitment, and entrepreneurial support. The study indicated that medium-sized firms perceived digitalization as cannibalistic. The researchers concluded that firms who had implemented digitalization had a positive relationship between rational innovation and firm size. The study was done by surveying 379 Swedish manufacturing firms of varying sizes : small having fewer than 20 employees, medium firms having between 20 and 200 employees, and large firms having more than 200 employees.

Objective of the Study

The study was done with the purpose to examine : What are the various internal & external factors /determination for the adoption of digitalization among MSMEs ?

To address the above question, we draw on the emerging literature on the size of the firm, financial performance, managerial factors, and competition level with an emphasis on the adoption of digitalization by MSMEs. This paper presents a conceptual model and hypotheses. The study has considered two basic determinants, that is, internal & external factors. Internal factors are determined with the help of three parameters, which are (a) firm characteristics (size of the firm & diversification) ; (b) financial performance ; and (c) managerial issues. In this study, the size of the firm is determined based on the number of employees, turnover, and investment in plant & machinery. Generally, the studies considered the number of employees or turnover to measure the size, but the present study along with the above has considered the investment in plant and machinery also as one of the basis. Diversification is measured through the number of products. The financial performance of a firm is measured based on profit after tax. Managerial factors analyze the role of management support in the context of providing resources, proper training to make the use of technology easy, and lastly, to learn technology know-how to develop expertise ; whereas, external factors comprise of three different parameters : first, level of competition or number of competitors in that particular segment ; second, government initiatives & schemes or support provided by the government for the adoption of digitalization ; and last, technological factors in which we will be considering the IT infrastructure support available in the country as well as to the manufacturing MSME sector.

Development of Hypotheses

The study considers internal and external factors as significant factors for the adoption of digitalization.

↳ **H1 :** Internal factors play a significant role in the adoption of digitalization.

Internal factors consist of three parameters which are: firm characteristics (i.e, size of the firm & diversification), financial performance, and managerial factors.

(1) Size of the Firm : Wamba and Carter (2014) ; Barron, West, and Hannan (1994) ; Fan (2016), BarNir, Gallaugherb, and Auger (2003) ; and Ramdani et al. (2009) found that large firms were more likely to use digitalization. Generally, to measure the size of the firm, previous studies have used a number of employees or turnover. In the present study, to measure the size, we have considered investment in plant and machinery with the above two. As in India, we have categorized all the companies having investment above ₹ 25 lakhs and up to ₹ 5 crores as small scale firms and above ₹ 5 crores up to ₹ 10 crores as medium - scale firms.

↳ **H1a$_1$:** The size of the firm plays a significant role in the adoption of digitalization.

(2) Diversification : Diversification is measured through the number of products produced by a firm. The study assumes that the more diversified a firm is, the more likely it is to adopt digitalization as compared to less diversified firms.

↳ **H1a$_2$:** Diversification plays a significant role in the adoption of digitalization.

(3) Financial Performance : Financial conditions play an important role in the adoption of digitalization (Maiti & Kayal, 2017). The companies who are good in financial condition are more likely to adopt digitalization as compared to the firms not having a good financial condition. To measure the financial performance, the study considers profit after tax (PAT). The study has taken the average PAT of the last 3 years of firms as a measure of financial performance.

↳ **H1b :** Financial performance of a firm (measured in terms of PAT in cr.) plays a significant role in the adoption of digitalization.

(4) Managerial Factors : Researchers revealed the firms having greater management support are more likely to adopt digitalization (Bengtsson et al., 2007 ; Ramdani et al., 2009 ; Yacob et al., 2018). The study considers support from management, proper training, and the availability of IT experts under managerial factors.

↳ **H1c :** Managerial factors play a significant role in the adoption of digitalization.

↳ **H2 :** External factors play a significant role in the adoption of digitalization.

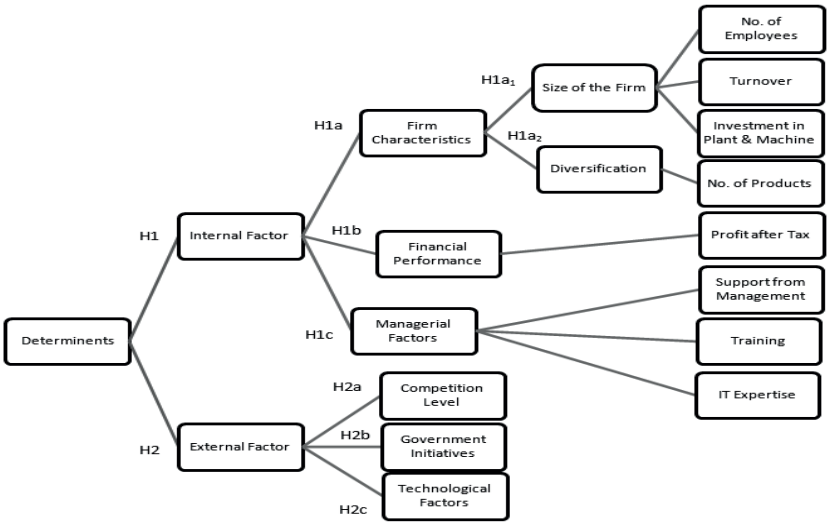
External factors consist of three parameters which are: competition level, government initiatives, and technological factors.

(5) Competition Level : The competition level is also a crucial factor in the adoption of digitalization. The sector where the competition level is more, the chances of adoption of digitalization is more as compared to others (Parviainen et al., 2017 ; Zhu, Kraemer, & Xu, 2002). All the above studies highlight the importance of digitalization to gain a competitive position.

↳ **H2a :** The level of competition plays a significant role in the adoption of digitalization.

(6) Government Initiatives : Government initiatives are also one of the important factors for the adoption of digitalization. Todd and Javalgi (2007) rightly said that adoption of IT in Indian SMEs largely depends upon the government and social development. Parida et al. (2019) also mentioned the role of local government in the adoption of digitalization.

Figure 1. Hypothesis Framework



↳ **H2b :** Government initiatives play a significant role in the adoption of digitalization.

(7) Technological Factors : Zhu et al. (2002) rightly said that technology competence is a significant factor for the adoption of digitalization. Digitalization is a fundamental shift in how a firm delivers value and drives revenue. The most important parameter to increase the standard of living, for increasing the connectivity on social or business domain, and for economic growth & development of the nation is the digital infrastructure. Digital infrastructure includes Internet connectivity, broadband facilities, mobile telecommunications, network infrastructure, a communication satellite, software for automation, end-user devices, etc. Enterprises need to modernize their infrastructure to deliver an agile and efficient foundation.

↳ **H2c :** Technological factors play a significant role in the adoption of digitalization.

The Figure 1 is a figure showing the hypotheses of the study.

Research Methodology

This section of the study includes the research methodology adopted. It includes data collection procedure, sample, and method adopted.

(1) Data Collection Procedure : The study is based on primary data which were collected from small and medium manufacturing (SMEs) enterprises located in Ghaziabad, Faridabad, and Bulandshahr industrial area. For the collection of data, a questionnaire was developed which consisted of basic information regarding the internal and external factors affecting the adoption of digitalization. Convenience sampling techniques were used to collect the data. The data were collected by sending mails, direct interviews, and by using the telephonic interview method. The study is longitudinal, which was conducted during the period from June - September 2018.

(2) Sample : The objective of the study is to know the status of the small and medium enterprises regarding digitalization ; so, the study targeted the firms which were having a minimum investment of ₹ 25 lakhs in plant and machinery and maximum up to ₹ 10 crores. As per the Ministry of Micro, Small, & Medium Enterprises, a manufacturing organization having investment of more than ₹ 25 lakhs but not exceeding ₹ 5 crores is known as a small enterprise ; a firm having investment of more than ₹ 5 crores but not exceeding ₹ 10 crores is known as a medium enterprise. Out of 110 firms targeted on the basis of the convenience sampling method, only 56 responses were received (approx 51 %). Out of 56 responses, we considered only 52 responses as four responses were not appropriate.

(3) Method : The data is analyzed through SPSS version 22. Logistic regression is used to study the relationship between internal factors (firm characteristics and financial performance) and the adoption of digitalization. As the dependent variable is categorical, so logistic regression is used in the study. Chi - square test is used to study the relationship between external factors (government initiatives and competition level) and the adoption of digitalization. The reason for using the chi-square test is as both the variables (dependent and independent variables) are categorical. Histograms are also used to show the findings of the study.

Data Analysis and Results

This part of the study consists of data analysis and the findings. The study uses SPSS version 22 to analyze the data. Logistic regression, chi-square test, and graphs are used to analyze the data.

(1) Sample Unit Characteristics : The study considered six manufacturing sectors which comprised of : food industry, cotton textiles, metal products, machinery tools & parts, soft drinks, and chemical products. Out of the total 52 sample units considered, only 33 units were using digitalization, which is 64% (approx).

(2) Relationship Between Internal Factors and Adoption of Digitalization : Logistic regression is used to study the relationship between internal factors (firm characteristics and financial performance) and the adoption of digitalization. As the dependent variable is categorical, so the logistic regression is used in the study. The Table 1 is the outcome of the test.

To determine the extent of explanation of the variance in the dependent variable by the predictive variables, we

Table 1. Model Summary (Relation b/w Internal Factors and Digitalization)

Step	-2 Log likelihood	Cox & Snell *R* Square	Nagelkerke *R* Square
1	21.307[a]	.614	.826

Note. [a.] Estimation terminated at iteration number 11 because parameter estimates changed by less than .001.

Table 2. Classification Table : Relation b/w Internal Factors and Digitalization

Observed			Predicted		
			Digitalization Uses		Percentage Correct
			No	Yes	
Step 1	Digitalization Uses	No	21	1	95.5
		Yes	3	27	90.0
	Overall Percentage				92.3

Note. [a.] The cut value is .500.

Table 3. Variables in the Equation : Relation b/w Internal Factors and Digitalization

		B	S.E.	Wald	*Df*	Sig.	Exp (*B*)
Step 1[a]	No. of Employees	.001	.005	.063	1	.801	1.001
	AAT	-.004	.003	1.421	1	.233	.996
	No. of Products	.371	.184	4.077	1	.043	1.449
	Plant & Machinery (Cr.)	-.019	.029	.460	1	.498	.981
	Profit (Cr.)	.546	.246	4.911	1	.027	1.727
	Constant	-6.971	2.395	8.470	1	.004	.001

Note. [a.] Variable(s) entered on Step 1: No. of Employees, AAT, No. of Products, Plant and Machine (Cr.), Profit (Cr.)

Table 4. Correlation Matrix Among Independent Variables

		Constant	No. of Employees	AAT	No. of Employees	Plant & Machinery (Cr.)	Profit(Cr.)
Step 1	Constant	1.000	-.231	.430	-.843	.216	-.607
	No. of Employees	-.231	1.000	.032	.116	-.387	-.268
	AAT	.430	.032	1.000	-.276	.291	-.766
	No. of Employees	-.843	.116	-.276	1.000	-.278	.402
	Plant & Machinery (Cr.)	.216	-.387	.291	-.278	1.000	-.341
	Profit(Cr.)	-.607	-.268	.466	.402	-.341	1.000

use Nagelkerke *R* square. From the Table 1, it can be inferred that approx 83% variation is explained by the model. From the classification Table 2, we can determine how good the model to predict the actual outcome is. From the Table 2, we can conclude that the model prediction is correct 92.3%. Generally, the model having the prediction power of more than 70% is considered a good model.

From the Table 3, we can interpret that only product diversification/number of products and profit after tax are statistically significant factors for the adoption of digitalization as the significant values are below 0.05. Other factors, that is, the number of employees, average annual turnover, and investment in plant and machinery are not found to be statistically significant for the adoption of digitalization. The following are the studies that coincide with the findings regarding profit as a significant factor (Maiti & Kayal, 2017). Regarding the size of the firm, the study does not coincide with the findings of studies by Wamba and Carter (2014), Barron et al. (1994), Fan (2016), BarNir et al. (2003), Ramdani et al. (2009).

The Table 4 shows the correlation among the independent variables. The relationships among all the variables are below 0.5, which shows that there is no multicollinearity in the data.

(3) Relationship Between External Factors and Adoption of Digitalization : As discussed in the research methodology section, the chi-square test is used to study the relationship between external factors (government initiatives and competition level) and the adoption of digitalization. The reason for using the chi-square test is as both the variables (dependent and independent variables) are categorical.

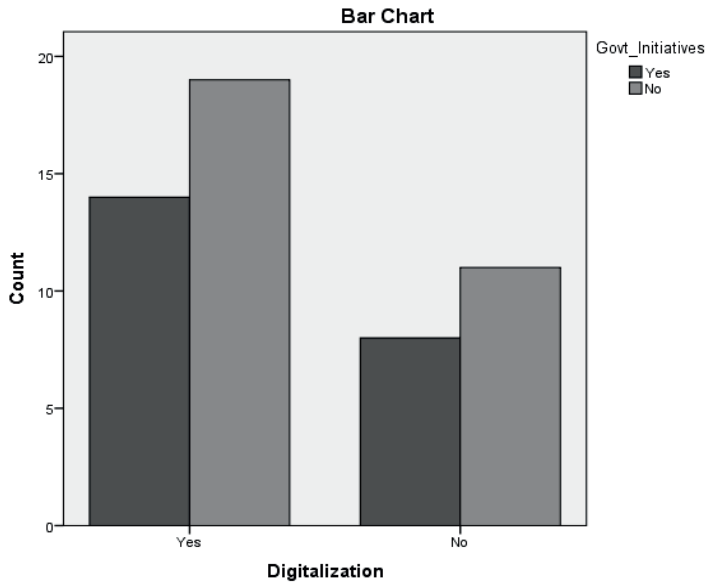
(i) Digitalization and Government Initiatives : The study attempts to determine the impact of government initiatives towards the adoption of digitalization. The Table 5 shows the results of the same.

From the Table 5, we can see that out of the total 33 users of digitalization, only 14 were of the opinion that government initiatives were the reason for the adoption of digitalization, while the remaining 19 firms were of the opinion that government initiatives were not the reason for the adoption of digitalization. On the other hand, out of

Table 5. Crosstab : Digitalization and Government Initiatives

			Govt. Initiatives		
			Yes	No	Total
Digitalization	Yes	Count	14	19	33
		% within Digitalization	42.4%	57.6%	100.0%
		% within Govt. Initiatives	63.6%	63.3%	63.5%
		% of Total	26.9%	36.5%	63.5%
	No	Count	8	11	19
		% within Digitalization	42.1%	57.9%	100.0%
		% within Govt. Initiatives	36.4%	36.7%	36.5%
		% of Total	15.4%	21.2%	36.5%
Total		Count	22	30	52
		% within Digitalization	42.3%	57.7%	100.0%
		% within Govt. Initiatives	100.0%	100.0%	100.0%
		% of Total	42.3%	57.7%	100.0%

Figure 1. Government Initiatives and Use of Digitalization



19 non-users of digitalization, only 8 believed that government initiatives can play an important role in the adoption of digitalization, while the other 11 non-users of digitalization do not coincide with the above opinion. From the above, we can conclude that only 42% of the sample firms (approx) believed that government initiatives play a crucial role. The above findings are clearly shown in the Figure 1.

From the chi-square test (Table 6), we can infer that there is no significant relationship between government initiatives and the adoption of digitalization as the test value is 0.607 which is greater than .05. The above findings are not similar to the studies conducted by Todd and Javalgi (2007) and Parida et al. (2019).

Table 6. Chi-Square Tests : Digitalization and Government Initiatives

	Value	*Df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.001[a]	1	.982		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.001	1	.982		
Fisher's Exact Test				1.000	.607
Linear-by-Linear Association	.000	1	.982		
N of Valid Cases	52				

Note. [a.] 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.04.

[b.] Computed only for a 2 × 2 table.

From the Table 7, we can infer that out of the total 33 users of digitalization, 27 (approx 82%) were of the opinion that competition level was the reason for the adoption of digitalization, while only 6 were of the opinion that competition level was not the reason for the adoption of digitalization. On the other hand, out of 19 non-users of digitalization, 10 believed that competition levels can play an important role in the adoption of digitalization, while the other 9 non-users of digitalization did not coincide with the above opinion. From the above, we can conclude that 71% (approx) of the firms believed that competition level plays a crucial role. The above findings are clearly shown in the Figure 2.

(ii) Digitalization and Competitiveness : This section attempts to determine the impact of competition level on the adoption of digitalization. The Table 7 depicts the results of the same.

From the chi-square test (Table 8), we can analyze that a significant relationship exists between the competition level and the adoption of digitalization as the test value is 0.028, which is lower than .05. The above findings are similar to the studies conducted by Parviainen et al. (2017) and Zhu et al. (2002).

Table 7. Crosstab : Digitalization and Competitiveness

			Competition		
			Yes	No	Total
Digitalization	Yes	Count	27	6	33
		% within Digitalization	81.8%	18.2%	100.0%
		% within Competition	73.0%	40.0%	63.5%
		% of Total	51.9%	11.5%	63.5%
	No	Count	10	9	19
		% within Digitalization	52.6%	47.4%	100.0%
		% within Competition	27.0%	60.0%	36.5%
		% of Total	19.2%	17.3%	36.5%
Total		Count	37	15	52
		% within Digitalization	71.2%	28.8%	100.0%
		% within Competition	100.0%	100.0%	100.0%
		% of Total	71.2%	28.8%	100.0%

Figure 2. Competition Level and Use of Digitalization

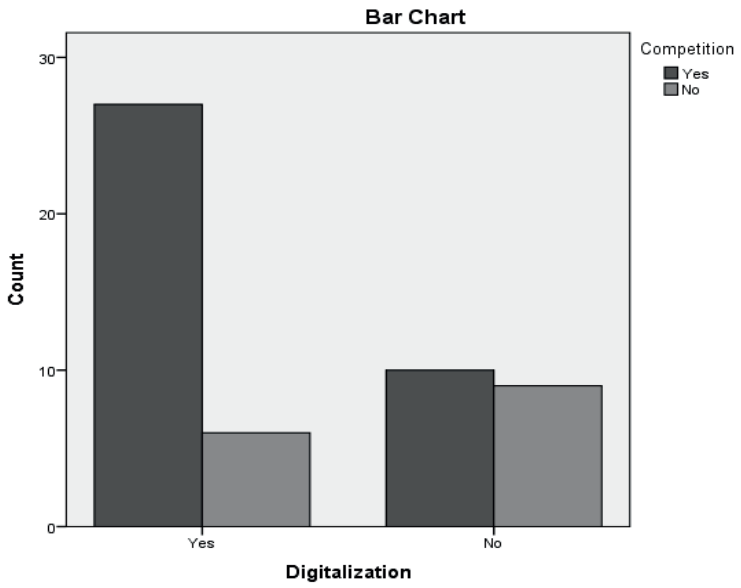


Table 8. Chi-Square Tests : Digitalization and Competitiveness

	Value	*Df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.004[a]	1	.025		
Continuity Correction[b]	3.683	1	.055		
Likelihood Ratio	4.900	1	.027		
Fisher's Exact Test				.054	.028
Linear-by-Linear Association	4.908	1	.027		
N of Valid Cases	52				

Note. [a.] 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.48.

[b.] Computed only for a 2 × 2 table.

Table 9. Results of Hypotheses Testing

	Hypotheses	Accepted/Rejected
H1: Internal Factors	$H1a_1$: The size of the firm plays a significant role in the adoption of digitalization.	Rejected
	$H1a_2$: Diversification plays a significant role in the adoption of digitalization.	Accepted
	H1b: Financial performance of the firm (measured in terms of PAT in Cr.) plays a significant role in the adoption of digitalization.	Accepted
	H1c: Managerial factors play a significant role in the adoption of digitalization.	Accepted
H2: External Factors	H2a: The level of competition plays a significant role in the adoption of digitalization.	Accepted
	H2b: Government initiatives play a significant role in the adoption of digitalization.	Rejected
	H2c: Technological factors play a significant role in the adoption of digitalization.	Accepted

Conclusion and Implications

The objective of the study is to determine the internal as well as external factors that are significant for the adoption of digitalization. The study finds that diversification, that is, number of products and financial performance measured in term of profit after tax (PAT) are the significant factors which play a significant role in the adoption of digitalization. This implies that firms manufacturing more number of products and having high profit after tax used more digitalization as compared to others. The study also finds that support from the top management, proper training, and proper IT infrastructure availability are also crucial factors for the adoption of digitalization in any organization. Firms which were not using digitalization were of the opinion that lack of support from the top management and lack of expertise were the major causes for not adopting digitalization. Higher level of competition is also found to be a significant factor for the adoption of digitalization. Further, the study concludes that size of the firm and government initiatives are not significant factors for the adoption of digitalization. The study suggests that firms that were not using digitalization need to start thinking in this area as it helps to get an edge over the competitors. Though initially, it requires some training and cost ; however, in the long run, the cost of the digitalization will surpass the benefits derived from the same.

Limitations of the Study and the Way Forward

The study also has some limitations like other studies. The outcomes of the present study may not apply to other firms. The results are confined to the sample units only. The study is confined to the manufacturing sector exclusively. The present study considered only small and medium level manufacturing companies. The interpretations are based on information received ; so, the study may be affected due to the respondent bias. The findings of the study are based on 52 firms only ; the sample size should be large to get more accurate results.

In this study, we have considered only manufacturing companies. Future studies can be conducted to know whether the same results apply to the service sector or not. So, further studies can be conducted to know the determinants for the adoption of digitalization by the service sector. Furthermore, studies can be conducted for micro and large level firms as well.

References

BarNir, A., Gallaugherb, J., & Auger, P. (2003).Business process digitization, strategy, and the impact of firm age and size: The case of the magazine publishing industry. *Journal of Business Venturing, 18*(6), 789 - 814. DOI : https://doi.org/10.1016/S0883-9026(03)00030-2

Barron, D.N., West, E., & Hannan, M.T. (1994). A time to grow and a time to die: Growth and mortality of credit unions in New York City, 1914 - 1990. *American Journal of Sociology, 100*(2), 381- 421. DOI 10.1108/17468800710739234

Bengtsson, M., Boter, H., & Vanyushyn, V. (2007). Integrating the internet and marketing operations: A study of antecedents in firms of different size. *International Small Business Journal: Researching Entrepreneurship, 25*(1), 27 - 48. DOI : https://doi.org/10.1177/0266242607071780

Chauhan, V., Choudhary, V., & Mathur, S. (2016). Demographic influences on technology adoption behavior : A study of e-banking services in India. *Prabandhan : Indian Journal of Management, 9*(5), 45 - 59. DOI: 10.17010/pijom/2016/v9i5/92571

Evangelista, R., Guerrieri, P., & Meliciani, V. (2014). The economic impact of digital technologies in Europe. *Economics of Innovation and New Technology, 23*(8), 802 - 824. DOI: 10.1080/10438599.2014.918438

Fan, Q. (2016). Factors affecting adoption of digital business: Evidence from Australia. *Global Journal of Business Research, 10*(3), 79 - 84.

Gupta, S. (2019). Digital empowerment by banks for SMEs in India. *Forbes India.* Retrieved from http://www.forbesindia.com/article/brand-connect/digital-empowerment-by-banks-for-smes-in-india/52795/1

Indian Industries Association. (n.d.). *Provisions for MSME Policy in UP.* Retrieved from https://iiaonline.in/mkb/MSME_Iindustrial%20Policy-Research%20&%20White%20Paper.pdf

KPMG & CII. (2015). *The new wave Indian MSME : An action agenda for growth, 2015.* Retrieved from https://assets.kpmg/content/dam/kpmg/pdf/2016/03/The-new-wave-Indian-MSME.pdf

Maiti, M., & Kayal, P. (2017). Digitization: Its impact on economic development & trade with special reference to services and MSME sector of India. *Asian Economic and Financial Review, 7*(6), 541 - 549. DOI:10.18488/journal.aefr.2017.76.541.549

Mohamad, R., & Ismail, N.A. (2009). Electronic commerce adoption in SME: The trend of prior studies. *Journal of Internet Banking and Commerce, 14*(2), 1-16.

Parida, V., Sjödin, D., & Reim, W. (2019). Reviewing literature on digitalization, business model innovation, and sustainable industry: Past achievements and future promises. *Sustainability, 11*(2), 1-18. DOI: 10.3390/su11020391

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management, 5*(1), 63 - 77. DOI: 10.12821/ijispm050104

Patel, H., & Connolly, R. (2007). *Factors influencing technology adoption : A review*. Information Management in the Networked Economy: Issues & Solutions, 8th International Business Information Management Conference, Dublin, Ireland.

Priya, D. M., Prashanth, J., & Indira, A. (2019). Sustainability of small merchants through digital technologies. *Prabandhan : Indian Journal of Management, 12*(1), 8-20. doi:10.17010/pijom/2019/v12i1/141424

Raja, S., Imaizumi, S., Kelly, T., Narimatsu, J., & Paradi - Guilford, C. (2013). *Connecting to work : How information and communication technologies could help expand employment opportunities.* Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/16243/809770WP0Conne00Box379814B00PUBLIC0.pdf?sequence=1&sa=U&ei=FmNhU4-FoyG2AWvjIC4CA&ved=0CEMQFjAH&usg=AFQjCNFi7YQEoc3Ij4UfVRAcRYT2v19l_g

Ramdani, B., Kawalek, P., & Lorenzo, O. (2009). Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise Information Management, 22*(1/2), 10 - 24. DOI 10.1108/17410390910922796

Todd, P. R., & Javalgi, R. G. (2007). Internationalization of SMEs in India. *International Journal of Emerging Markets, 2*(2), 166 - 180.

Tomar, J.S. (2017). State of IT adoption in SMEs in India. *Prabandhan : Indian Journal of Management, 10*(1), 40 - 53. DOI: 10.17010/pijom/2017/v10i1/109102

Wamba, S. F., & Carter, L. (2014). Social media tools adoption and use by SMEs: An empirical study. *Journal of Organizational and End User and Computing, 26*(2), 1-17.

Weill, P., & Woerner, S. L. (2015). Thriving in an increasingly digital ecosystem. *MIT Sloan Management Review, 56*(4), 27 - 34. Retrieved from http://mitsmr.com/1BkdvAq

Wroblewski, J. B., & Asgharian, H. (2018). *Digitalization and firm performance are digitally mature firms outperforming their peers ?* (Doctoral Thesis). Lund University School of Economics & Management. Retrieved from http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=8945868&fileOId=8945877

Yacob, P., Wong, L.S., & Khor, S.C. (2018). An empirical investigation of green initiatives and environmental sustainability for manufacturing SMEs. *Journal of Manufacturing Technology Management, 30*(1), 2 - 25. DOI : https://doi.org/10.1108/JMTM-08-2017-0153

Yadav, R., & Mahara, T. (2018). Ecommerce adoption : An empirical investigation in wooden handicraft SMEs of Saharanpur, Uttar Pradesh. *Prabandhan : Indian Journal of Management, 11*(8), 20 - 33. DOI: 10.17010/pijom/2018/v11i8/130642

Zhu, K., Kraemer, K., & Xu, S. (2002). A cross - country study of electronic business adoption using the technology - organization - environment framework. *ICIS 2002 Proceedings. 31.* Retrieved from http://aisel.aisnet.org/icis2002/31

About the Authors

Amit Kumar Arora is serving as an Assistant Professor in KIET School of Management, KIET Group of Institutions, Ghaziabad. He is an Associate Member of Cost and Management Accountants (ACMA), UGC-NET, M.B.A (Finance), M.Com, M.A. (Eco.), Ph.D.(P). He has more than 15 years of academic and corporate experience. His areas of interest are accountancy, finance, and economics. He is the author of two textbooks titled Management of Working Capital and Financial Management. His various papers have been published in reputed research journals including the Journal of ICAI-CMA & Scopus indexed journals.

Priya Rathi is serving as an Assistant Professor in the KIET School of Management, KIET Group of Institutions, Ghaziabad. She is an M.Phil, M.B.A (Marketing). Her areas of interest are consumer behavior, service marketing, and sensory marketing. Her papers have been published in reputed research journals.