STRATEGY FOR ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN THE DEVELOPMENT OF SMALL AND MEDIUM ENTERPRISES IN THE EMERGING MARKET

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Abstract

Small and medium enterprises (SMEs) play a crucial part in the Indian economy. However, SMEs in India are currently operating in a highly competitive environment (Rajamani et al., 2022). Information and communication technology (ICT) can be intended in helping SMEs to become more competitive. The aim of this research is to develop a strategy for the adoption of ICT in SMEs of India. In empirical research methodology, variables are identified, through literature review, that impact ICT acceptance in SMEs and based on this a research model is developed. Then hypotheses are formulated on the basis of identified variables and data is gathered to test these hypotheses. The value of the path coefficient has been used to prioritize the identified variables. The key result highlights that seven of the eleven hypotheses for ICT adoption in SMEs are being accepted and, a validated model for ICT adoption in SMEs is developed. The relevance of the study is that the evolved model can be used to predict higher rates of ICT adoption in SMEs, which fuels the expansion of businesses. Thus, different strategies are recommended for entrepreneurs and the government for the adoption of ICT in SMEs in India, which will help in the growth of SMEs.

Keywords: Small and Medium Enterprises, Information and Communication Technology, Cronbach's Alpha Test, Confirmatory Factor Analysis, Regression Analysis, Strategy Development

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1. INTRODUCTION

Small and medium enterprises (SMEs) contribute to the country's socio-economic growth by boosting entrepreneurship and creating many job options at a low capital cost. SMEs play a crucial part in the Indian economy by contributing considerably to employment, output and export. At the same time, due to globalism, domestic economic liberalism, and the weakening of sector-specific preventive measures, India's SMEs are increasingly operating in a brutally competitive market. Despite the government of India launching numerous programs for the SME support and outreach scheme, they have minimal overall impact (Rajamani et al., 2022). The agreement at the World Trade Organization (WTO) has also drastically lowered the import barriers to constituent economies, like India. Because of the fierce competition in the global market, small businesses must understand their end users, maintain clear communication channels, and give excellent service and fair pricing to sustain their market position. A technically strong, globally competent small industry must be allowed to thrive and deploy a significant contribution to the country's gross domestic product (GDP) (Subrahmanyam, 2005). Organizations can gain a competitive edge by utilizing information and communication technology (ICT) (Beheshti, 2004). E-business can be highly beneficial to SMEs (Jeon et al., 2006). The adoption of ICT systems and online services has created remarkable potential for businesses, and more importantly, it has enhanced their operational efficacy and expanded their business prospects (Chaudhary et al., 2023). For many SMEs and larger businesses, having access to ICTs is crucial for making timely strategic decisions (Nazir & Roomi, 2021).

A literature review found a research gap that Small and Medium Enterprises play an essential role in the growth of the Indian economy. Nevertheless, India's SME sector has experienced a decline in performance over the past few years. ICT has been crucial to expanding SMEs in many nations. As a result, the adoption of ICT by SMEs in the Indian context is a prospective field of research. Based on a literature study in the area of ICT and SMEs, specific research questions emerged:

RQ1: Why do people accept or reject ICT adoption in SMEs?

RQ2: How can SMEs embrace ICT?

In order to address these research questions, this study aims to investigate the factors that influence ICT adoption in SMEs and develop a model for successful ICT adoption in SMEs. As a result, strategy for ICT adoption in India's SME sector is an intriguing research area.

The theoretical/conceptual framework used in the study was established to identify the variables that determine the acceptance or lead to rejection of ICT in SMEs and arrive at a research model. The research model is created with identified variables that have come out from the various literature. This research model is based on studies conducted by many researchers on the use of ICT in SMEs. Hypotheses are generated to validate the variables of the research model. This research highlights the significance of SMEs in the growth of the Indian economy and underlines the declining trends of SMEs in the last few years. In this research, ICT is established as an essential tool for the growth of SMEs. This study gives valuable insight to the entrepreneurs and the Government towards the adoption of ICT for the growth of SMEs. Based on the extensive literature study in the research area, variables are identified for the adoption of ICT in SMEs. From these variables, a research model is developed, hypotheses are made, and hypotheses are tested through a questionnaire survey. The result of the quantitative input is summarized, and the variables that influence the adoption of ICT in SMEs are identified. This research's main findings/contributions are that a validated model for adopting ICT in SMEs has evolved. Seven significant predictors of the adoption of ICT in SMEs have been identified, and further, they are prioritized on the basis of the value of the path coefficient. These variables support strategic planning to increase ICT adoption in SMEs, which fuels business expansion.

The rest of this paper is structured as follows. In Section 2 of this research, a literature review is conducted, and research gaps are identified. Section 3 analyses the methodology that has been used to conduct empirical research on the adoption of ICT in SMEs. Independent and dependent variables are discussed in this section. The various tools and techniques used in the research process are also highlighted in this section. Section 4 contains a survey study to test the hypothesis for the adoption of ICT by SMEs, and a validated model has evolved, and discussion is done on the outcome of the survey results. Section 5 contains the discussion and provides recommendations for the entrepreneurs and the government for the adoption of ICT in SMEs. Section 6 provides the conclusion of the research and strategy for the adoption of ICT in SMEs.

2 LITERATURE REVIEW

The government of India defined micro, small and medium enterprises (MSMEs) in 2006 and revised it in 2020. According to this, SMEs are those organizations where investment in plant & machinery or equipment is above 1 crore Indian rupee (INR) but not exceeding INR 50 crores, and annual turnover is above INR 5 crores but not exceeding INR 250 crores (Ministry of Micro, Small & Medium Enterprises, Government of India, 2020). According to Rajamani et al. (2022), MSMEs account for 80% of the worldwide economic growth and substantially contribute to the global economy. Most economies are characterized primarily by SMEs, regarded as a driving force of modern economies and competitiveness due to their inventive ability (Battistella et al., 2023).

SMEs are essential contributors to job creation, the development of fast-growing enterprises, and the inspiration of other entrepreneurs and managers to develop new services and enter new markets in industrialized nations (Tell & Gabrielsson, 2013). SMEs are facing new challenges due to the global market competition. The performance of small-scale industries (SSI) has deteriorated from the 1980s to the 1990s despite its significance to the Indian market. Several units' compound average growth rate (CAGR) fell to 5.62 % in the 1990s from 8.40% in the 1980s. Likewise, the CAGR of employment fell from 5.84% to 4.00% between the 1980s and 1990s, while the output rate dropped from 18.66% to 15.31% (Subrahmanyam, 2005, p. 127). Overall, its competence and influence on the Indian economy can be measured by unit expansion, work opportunities, and productivity, which have declined in all the mentioned terms (Subrahmanyam, 2005).

Butt (2005) conducted his research using secondary data from a variety of sources and proposed that SSI must determine their core competency in order to get a competitive advantage. Small-scale businesses must know government policies to grow (Narayana, 2006).

Technological advancements provide infinite opportunities for small and medium businesses to have immediate access to national and worldwide markets (Jones et al., 2011). The COVID-19 pandemic has underscored the necessity for SMEs to engage in digitalization and embrace innovative technologies to remain competitive and sustain their operations within a dynamic business landscape. According to the study conducted by Chen et al. (2016), changes in the business situation have compelled SMEs to find technologies that they did not previously observe as necessary. These adoptions must also be carried out to keep SMEs in sight. Their adoption must be carried out at a rate proportionate to the rate of change (Zamani, 2022). The greater the ability of SMEs to use technologies of the digital world, the greater their chances of long-term competitiveness and growth (Gareeb & Naicker, 2015). Through digitalization, SMEs have several options for establishing and maintaining external links (Radicic & Petkovi, 2023). In order to keep their companies sustainable and satisfy customer demands, modern SME managers are implementing cutting-edge technology systems instead of more conventional ones (Nazir & Khan, 2022).

The necessity of ICT in business development has compelled SME operations to consider this (Chen et al., 2016; Trigueros-Preciado et al., 2013). ICT is a collection of digital technologies used for acquiring, organizing, retaining, processing and transferring data in and out of a specific context (Ritchie & Brindley, 2005). ICT is an excellent tool for disseminating technical knowledge quickly and widely (Acar et al., 2005). As a result, ICT plays a vital role in business (Tayibnapis et al., 2021). SMEs rely heavily on ICT for growth, and to understand the effect of ICT on the growth of SMEs, a literature assessment is done. E-business offers much potential for making commercial transactions within SMEs easier (Jeon et al., 2006). An organization's efficacy can be improved using ICT (Ritchie & Brindley, 2005). Rufai (2014) conducted a study which revealed that the implementation of ICT has a beneficial impact on the operational efficiency of SMEs in Nigeria. ICT's impact on SME business operations has been a subject of frequent consideration (Chen et al., 2016). As a result, a significant number of SMEs are undergoing digital transformation, which has led to greater attention among researchers studying technology adoption in SMEs (Bayo-Moriones et al., 2013). According to various research studies, implementing ICT improves an organization's efficiency. According to the literature on this subject, SMEs that use ICT can expand in the market, get new opportunities, learn more about their clients, and have a better product development process (Fu et al., 2014). Additionally, existing research suggests that SMEs encounter numerous difficulties when implementing and utilizing new technology (Cerchione et al., 2015). According to earlier research (Giotopoulos et al., 2017; Mokhtar, 2016; Radicic & Petkovi, 2023), SMEs with a high and efficient IT infrastructure in terms of technical stacks have a greater rate of success in adopting new technology.

Businesses use IT solutions for planning, organizing, and delivering services to keep a competitive edge in an ever-expanding spectrum of markets (Osypchuk, 2019). ICT is thus a critical instrument for assisting business organizations of all sizes in adapting to the different components of the technological revolution, such as digitalization in modern business processes (Kusuma et al., 2020). ICT adoption is a necessary prerequisite in the business and economic context for promoting economic growth in the contemporary global business environment (Okundaye et al., 2019). IT-assisted tools and strategies have been linked to the expansion of small enterprises in this and future eras. Therefore, SMEs are pushed to take benefit of technological improvements to boost activity performance and growth (Akomea-Frimpong, 2022).

According to the existing literature, SMEs have an eloquent part in the evolution of the Indian market, and ICT has a denoting effect on the enhancement of SMEs. In many nations, ICT adoption supports SME growth. Therefore, research in the field of strategy for the adoption of ICT in Indian SME is fascinating. Furthermore, export-oriented SMEs are observed to use ICT more frequently. As a result, the adoption of ICT in export-oriented SME is investigated.

3. RESEARCH METHODOLOGY

The main objective of this study is to determine the variables that affect ICT acceptance or rejection in SMEs, as well as to develop a research model for ICT adoption in SMEs. The research model is based on variables identified via numerous studies. This research model was based on a study in the area of the adoption of ICT in SMEs by different researchers. Variables are identified based on the previous models and literature studies in the ICT adoption by SMEs. The explanations of the variables and the related hypotheses are as follows.

Relative advantage: The literature survey shows that proper management control is essential to acquire a relative advantage in business. Adopting ICT provides an advantage to the organization in a competitive environment. Adoption of ICT leads to increased overall effectiveness and efficiency in the business (Khayer et al., 2021; Narwane et al., 2019). With this background, it is hypothesized:

H1: Relative advantage is a predictor of the adoption of ICT in SMEs.

Social expectations: It is commonly believed that individuals frequently base their actions on the expectations of others. The image regarding the usage of ICT is a crucial factor in deciding whether or not to adopt it. In a small business, adopting ICT relies not merely on the cost-benefit analysis but also on the social expectations of use. Sometimes, people perceive that adopting ICT will boost their prestige in society. It is their perception that high-profile people use ICT, and they have more significant social recognition (Zamani, 2022). Thus, it is hypothesized:

H2: Social expectations are predictors of the adoption of ICT in SMEs.

Firm's innovativeness: It measures how frequently the innovation occurs in the firm. Innovation is possible with the help of ICT by offering new product lines or services, targeting new markets or segments or creating products/services for the market prior to their competitors (Seyal & Rahman, 2003; Winston & Dologite, 1999). With this background, it is hypothesized:

H3: Firm's innovativeness is a predictor of the adoption of ICT in SMEs.

Management attributes: It is the top management's attitude and the management's support for adopting ICT. Managers' positive or negative attitude influences the adoption of ICT in the SME. If the manager is supportive, ICT will be infused into the organization faster. Apart from this, the manager's knowledge about the role of ICT in the organization is also a factor in the firm's adoption of ICT (Jeon et al., 2006; Seyal & Rahman, 2003). Thus, it is hypothesized next.

H4: Management attributes are predictors of the adoption of ICT in SMEs.

Organizational attributes: The factors in this category include the structural attributes of the organization. It is the variety of organizational factors like size of business, type of business, structure of the organization and nature of business that are critical facilitators of ICT adoption (Subawa et al., 2020; Levenburg & Klein, 2006; Rajamani et al., 2022; Seyal & Rahman, 2003; Zelalem & Wubante, 2019). Thus, it is hypothesized next.

H5: Organizational attributes are predictors of the adoption of ICT in SMEs.

Adoption attributes: It is the potential user's perception towards ICT. There is often resistance from the organization to any change in the existing process. It is the level of comfort of the existing employees with the adoption of the ICT (Jeon et al., 2006; Seyal & Rahman, 2003). With this background, it is hypothesized:

H6: Adoption attributes are predictors of the adoption of ICT in SMEs.

End user: This includes end-user characteristics like experience, training, involvement and incentive. Computer knowledge of the end user impacts ICT adoption. The attitude of resistance to change hinders the suave adoption of ICT. The end user looks forward to the training avenues before accepting any new system. Proper training may encourage the end user to adopt ICT. The end user also looks forward to any incentive to adopt the new system (Winston & Dologite, 1999). With this background, it is hypothesized:

H7: End user is a predictor of the adoption of ICT in SMEs.

Owner: Small businesses rely on the owner or crucial individuals to lead business strategy, manage operations, and establish a corporate culture. The owner's ability and disposition impact how quickly a small business can adopt ICT. The attributes of the business owner, such as knowledge, strategy, and involvement, are included in this domain. The owner's knowledge is critical in realizing the full potential of adopting ICT (Ihlstrom & Nilsson, 2003; Seyal & Rahman, 2003; Winston & Dologite, 1999). Thus, it was hypothesized:

H8: Owner is a predictor of the adoption of ICT in SMEs.

Extra organizational situation: The variable explores the dependence of small businesses on consultants and strategic alliances to help infuse ICT. It is the interaction of the ICT implementation with features of the external environment. These interactions focus on the external accessibility of those resources necessary for ICT infusion, which are not immediately available within the firm itself. The extra organizational situation is dependent on the strategic alliance of the firm with other organizations (Nazir & Khan, 2022; Octavia et al., 2020; Winston & Dologite, 1999; Alismaili et al., 2020; Subawa et al., 2020; Ghobakhloo et al., 2011). With this background, it is hypothesized:

H9: Extra organizational situation is a predictor of the adoption of ICT in SMEs.

Government support: The infrastructure support given by the government for the acceptance and deployment of ICT in SMEs. SMEs expect that Government-backed policies should be in favour of easy adoption of ICT. ICT adoption in SMEs will be easier if a distinct budget is allocated to achieve the same (Maroufkhani et al., 2020; Saka & Chan, 2020; Jeon et al., 2006). Considering this context, it is hypothesized:

H10: Government support is a predictor of the adoption of ICT in SMEs.

Financial resource: This represents the financial resources available to the SME to adopt ICT. The net profit of the firm also influences it. ICT adoption will be amiable if the firm has high net assets (Levenburg & Klein, 2006; Rajamani et al., 2022). With this background, it is hypothesized:

H11: Financial resource is a predictor of ICT adoption in SMEs.

For each variables some items are identified to develop the questionnaire. The variables, items and supporting literature are summarized in Table 1.

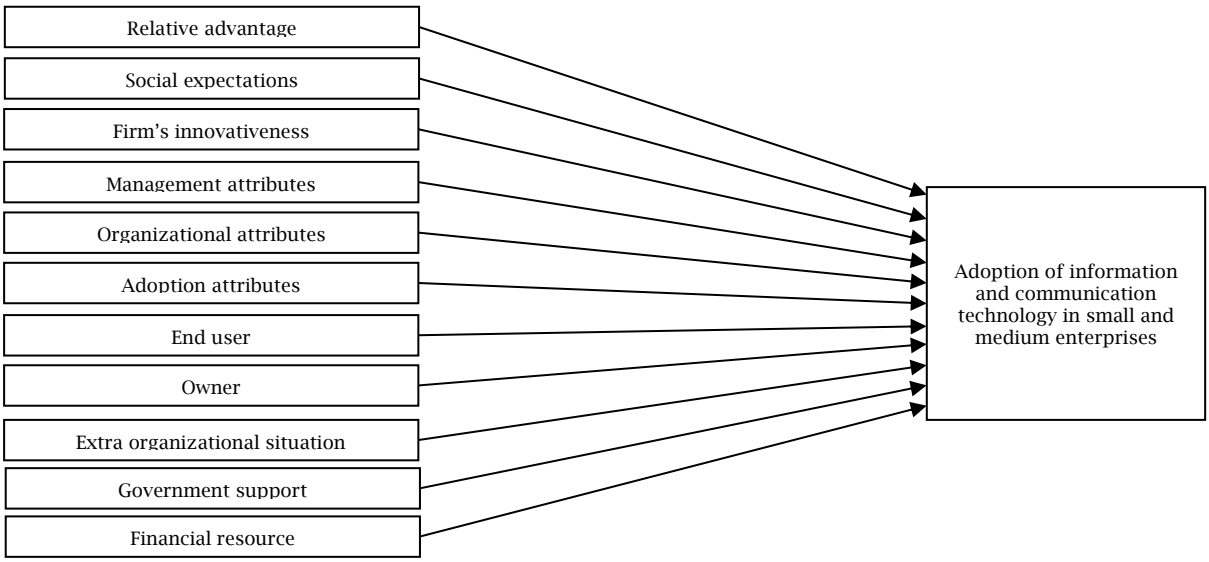
Table 1. Variables, items and supporting literature

Sl. No.	*Variables*	*Items*	*Supporting literature*
1	*Relative advantage*	Strategic advantage, tactical advantage, management control, and technical advantage	Khayer et al. (2021), Narwane et al. (2019)
2	*Social expectations*	Prestige, high profile, social status	Zamani (2022)
3	*Firm's innovativeness*	New product, new market	Seyal and Rahman (2003), Winston and Dologite (1999)
4	*Management attributes*	Manager's attitude, management support, management thought	Jeon et al. (2006), Seyal and Rahman (2003)
5	*Organisational attributes*	Type of business, size of business, nature of business	Subawa et al. (2020), Levenburg and Klein (2006), Rajamani et al. (2022), Seyal and Rahman (2003), Zelalem and Wubante (2019)
6	*Adoption attributes*	Compatibility, trialability, observability	Jeon et al. (2006), Seyal and Rahman (2003)
7	*End user*	Experience, training, involvement, incentives	Winston and Dologite (1999)
8	*Owner*	Knowledge, strategy, involvement	Ihlstrom and Nilsson (2003), Seyal and Rahman (2003), Winston and Dologite (1999)
9	*Extra organizational situation*	Strategic alliance, ICT consultants	Nazir and Khan (2022), Octavia et al. (2020), Winston and Dologite (1999), Alismaili et al. (2020), Subawa et al. (2020), Ghobakhloo et al. (2011)
10	*Government support*	Infrastructure, policy, budgetary allocation	Maroufkhani et al. (2020), Saka and Chan (2020), Jeon et al. (2006)
11	*Financial resource*	Availability of funds, profit, net assets, and retained earnings	Levenburg and Klein (2006), Rajamani et al. (2022)

On the basis of the conducted literature survey and the identified variables from the existing models on ICT adoption in SMEs, a research model is developed (Figure 1).

Mathematical tools and techniques are used to study the responses and analysis of 11 independent variables concerning a dependent variable. Various multivariate statistical analysis techniques, such as structural equation modelling and regression analysis, can be used to analyse the structural relationships among the variables. In this research, regression analysis is used to establish the relationship between the dependent and independent variables because of the ongoing practice of this kind of research, and it has a state-of-the-art technique of analysis and presentation of results. The relevance of this research tool is that it can explore and establish relationships among complicated data and reduce complex data patterns to a few parameters. These parameters help to make inferences about how variables are related to each other. Regression is a helpful statistical concept that helps to facilitate decision-making by determining the correlation between a dependent variable and independent variables which is used to describe various scenarios.

Figure 1. Research model for the adoption of ICT in SMEs



Questionnaires were developed for the empirical study. Data was collected through the random sampling method. Random sampling method was done from the export-oriented SME of engineering goods. From the universe, a population of 988 export-oriented SMEs of engineering goods is considered for study. Out of the total population 50% i.e., 494 is taken as the sampling frame. This sampling frame is the target respondent. Effort was made to get the responses from the target respondents through personal visit and e-mail. From the defined sample frame 438 samples were received. Further, these samples were scrutinized to check the usability of the responses. It was found that some of the responses were partially filled. These responses were not considered for further analysis. Out of the received sample, 406 responses were gathered through a questionnaire survey were found usable responses. These responses were used for further analysis.

The reliability of the data has been measured by integrating Cronbach's alpha test and confirmatory factor analysis (CFA). This process tested the convergent validity of all the items of a given variable. Some of the items were dropped from further study. Then, regression analysis was done to test the hypotheses. Path coefficients were studied for the acceptance or rejection of the hypotheses. Syntheses of the responses were carried out from the empirical study to know the variables that influence ICT adoption in SMEs.

4. RESULTS

The research model is empirically validated through data collection and analysis. The responses of SME entrepreneurs or senior managers were obtained through random sampling from the targeted population. The responses were gathered through questionnaires. Export-oriented SMEs in Delhi, Noida, and Ghaziabad were randomly sampled. Personal visits to the SME office were conducted to complete the questionnaire. A total of 438 samples were obtained from the defined sample frame. These samples are evaluated to see if the responses are relevant. Some of the responses are observed to be only partially completed. These responses should not be taken into account in the subsequent study. A total of 406 responses are considered valid out of the total sample received. These responses are used in the next phase of the analysis.

The items selected for the various variables are subjected to a reliability test to determine their convergent validity. The Cronbach's alpha test is used for this purpose, with different combinations of items being dropped and retained. The item combination with the highest reliability coefficient, alpha, is identified as the best for further research. CFA is used to conduct a second reliability test by testing the convergent validity of each construct. The collection of items with the recommended cumulative percentage of variance of 50% is examined further (Hair et al., 2006). Regression analysis is done to validate the proposed research

model (Figure 1). Based on the covariance of the dependent variable with all independent variables, the analysis can anticipate its variability.

4.1. Construct validity test

Construct validity was conducted to determine the convergent validity of the items used to measure various variables. The Cronbach's alpha test was utilized to resolve this by dropping and retaining various combinations of items (Table 2). The combination of items with the highest reliability coefficient (alpha) was identified as the ideal for further research. The value of alpha for the best combination of items for a given variable is shown in Table 2. The second construct validity was conducted with the help of CFA. It was carried out for all the variables to check out the convergent validity of each construct. The items with the vested value of a cumulative percentage of variance of 50% are considered for further study (Hair et al., 2006). All the retained sets of items have exceeded the acceptable value of aggregate percentage. The result of confirmatory factor analysis is outlined in Table 2.

Table 2. Construct validity test

Sl. No.	*Variable*	*Total number of items*	*Item retained*	*Cronbach's alpha*	*Cumulative value*
1	*Relative advantage*	6	4	0.6052	50.18%
2	*Social expectations*	5	3	0.6829	61.62%
3	*Firm's innovativeness*	5	2	0.4351	63.94%
4	*Management attributes*	5	3	0.5599	54.43%
5	*Organizational attributes*	7	3	0.5974	56.24%
6	*Adoption attributes*	6	3	0.5484	53.05%
7	*End user*	5	2	0.4597	65.01%
8	*Owner*	5	2	0.4783	65.78%
9	*Extra organizational situation*	6	3	0.4829	50.00%
10	*Government support*	5	3	0.7929	70.74%
11	*Financial resource*	5	5	0.8193	58.07%
12	*Use of ICT*	3	3	0.8726	79.85%

4.2. Regression analysis

The research model (Figure 1) is validated using regression analysis at the 95% significance level. The analysis allowed for predicting the dependent variable's variability based on its covariance with all independent variables. The standardized coefficients, sometimes referred to as beta values, reflect the strength of the relationship between the dependent and independent variables (Table 4). The 't' statistics test is used to determine the significance of the correlation between the dependent and independent variables (Table 4).

The research model shown in Figure 1 accounts for 20.6% of the variation in ICT adoption in SMEs, according to the coefficient of determination (R-square) (Table 3). The beta value (Table 4) displays the correlation strength between the dependent and independent variables. Seven out of the eleven hypotheses regarding ICT adoption in SMEs were accepted. As a result, ICT adoption in SMEs is predicted by "*firm innovativeness*", "*management attributes*", "*organizational attributes*", "*end user*", "*extra organizational situation*", "*government support*", and "*financial resource*". The research did not support four hypotheses, so "*relative advantage*", "*social expectations*", "*organizational attributes*", and "*owner*" are not predictors of ICT adoption in SMEs.

Table 3. Model summary for adoption of ICT as dependent variable

Model	*R*	*R²*	*Adjusted R²*	*Std. error*
1	0.454	0.206	0.184	0.9347

Table 4. Coefficients for adoption of ICT as dependent variable

Hypothesis for construct	*Std. error*	*Std. coeff. (Beta)*	*t*	*Sig.*
Relative advantage → Adoption of ICT in SME	0.086	-0.055	-1.148	0.252
Social expectations → Adoption of ICT in SME	0.066	-0.023	-0.467	0.641
Firm's innovativeness → Adoption of ICT in SME	0.118	0.062	1.336	0.182
Management attributes → Adoption of ICT in SME	0.086	0.004	0.080	0.937
Organizational attributes → Adoption of ICT in SME	0.071	0.094	2.059	0.040
Adoption attributes → Adoption of ICT in SME	0.076	-0.044	-0.930	0.353
End user →Adoption of ICT in SME	0.071	0.046	0.986	0.325
Owner →Adoption of ICT in SME	0.068	-0.032	-0.690	0.491
Extra organizational situation →Adoption of ICT in SME	0.073	0.042	0.898	0.369
Government support → Adoption of ICT in SM	0.062	0.154	2.474	0.014
Financial resource → Adoption of ICT in SME	0.076	0.314	4.993	0.000

5. DISCUSSION

There are 11 hypotheses for the adoption of ICT in SMEs (Table 4). Based on the standard coefficient (Beta) value shown in Table 4, seven hypotheses have been accepted at a 95% significance level. Value of std. coeff. (Beta) for the four hypotheses is negative and these four hypotheses did not support the study; they are *H1*, *H2*, *H6*, and *H8* (Table 5). "*Relative advantage*", "*social expectations*", "*adoption attributes*" and "*owners*" are not supported as the predictor of ICT adoption in SMEs. The investigation provides evidence for hypotheses *H3*, *H4*, *H5*, *H7*, *H9*, *H10*, and *H11*, as indicated in Table 5 and the value of std. coeff. (Beta) for these seven hypotheses is positive. Therefore, the variables of "*firm's innovativeness*", "*management attributes*", "*organizational attributes*", "*end user*", "*extra organizational situation*", "*government support*", and "*financial resource*" have been identified as

predictors for the adoption of ICT in SME, as presented in Table 5. The value of R^2 (the coefficient of determination) is 0.206 (Table 3) describes the proportion of variance in the dependent variable that can be explained by the independent variable. A verified model for the use of ICT in SMEs has been developed, as depicted in Figure 2. On this basis, the following strategies are recommended for the adoption of ICT in SMEs.

5.1. For entrepreneurs

Financial resource: It has been proven via several studies that effective ICT use increases an organization's efficiency and effectiveness. Therefore, it is advised that a strategy be developed such that a predetermined portion of the overall expenditure be set aside for the adoption of ICT in SMEs.

Extra organizational situation: Entrepreneurs should think about forming strategic alliances with businesses utilizing ICT at a higher level to adopt ICT effectively.

Firm's innovativeness: It is advised that business owners create a plan to position their company as an innovative one by implementing cutting-edge ICT techniques.

End user: Business owners should think about providing their staff with ongoing ICT training and incentives. Entrepreneurs should make an effort to break down employee reluctance to use ICT.

Organizational attributes. The organization should be developed and designed in such a way that it should have the scope for the adoption of ICT. Information and Communication Technology should be integral to the organisation's infrastructure.

5.2. For government

Government support: It is recommended that the Central/State Government(s) consider providing more support in terms of infrastructure and policy for the adoption of ICT in SMEs. The government may consider attaching awards and recognition for the use of ICT in SMEs. The government should consider appointing professionals to check the status of ICT use in SMEs and suggestions for improvement.

Financial resource: It is suggested that the government set aside a predetermined amount of the total grant/loan for the required investment in ICT. The government may also offer tax benefits.

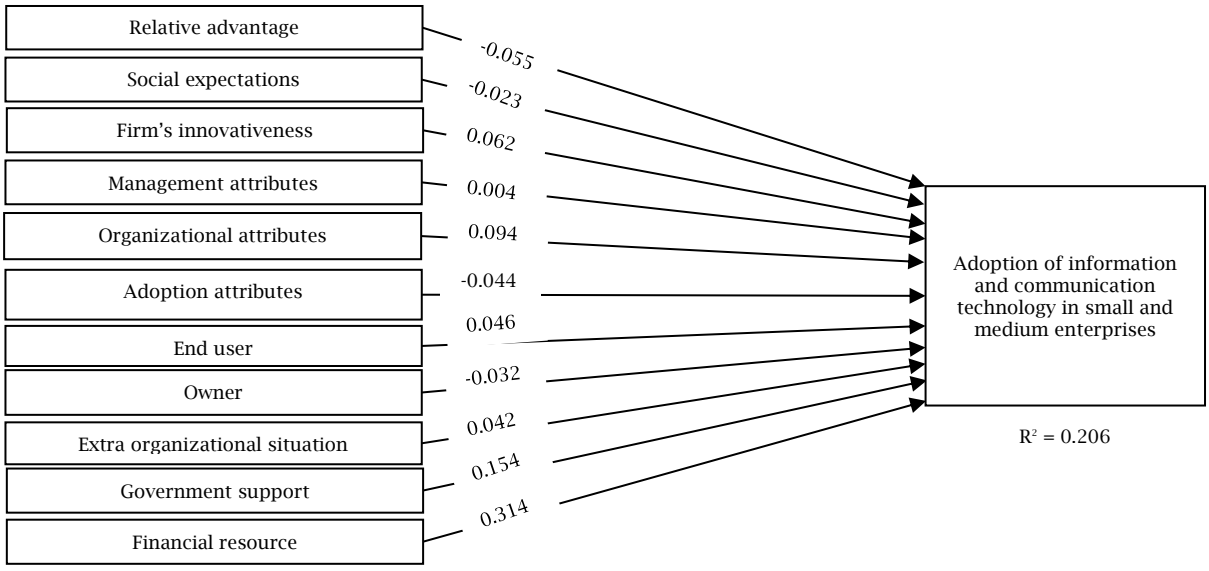
End user: A strategy should be formulated so that ICT is an integral part of the course curriculum of various training programmes for entrepreneurs that government departments organise occasionally. The government may also fix benchmarks for the adoption of ICT.

Management attributes: ICT has been identified as one of the vital growth enhancers through research. Therefore, the government should design an appropriate approach to train business owners to have a constructive attitude toward ICT adoption. As a result, business owners and managers should consider incorporating more ICT into their operations.

Table 5. Summary of research hypotheses

	Hypotheses	***Result***
H1	Relative advantage → Adoption of ICT in SME	Not Supported
H2	Social expectations → Adoption of ICT in SME	Not Supported
H3	Firm's innovativeness → Adoption of ICT in SME	Supported
H4	Management attributes → Adoption of ICT in SME	Supported
H5	Organizational attributes → Adoption of ICT in SME	Supported
H6	Adoption attributes → Adoption of ICT in SME	Not Supported
H7	End user → Adoption of ICT in SME	Supported
H8	Owner → Adoption of ICT in SME	Not Supported
H9	Extra organizational situation → Adoption of ICT in SME	Supported
H10	Government support → Adoption of ICT in SME	Supported
H11	Financial resource → Adoption of ICT in SME	Supported

Figure 2. Model for adoption of ICT in SME



6. CONCLUSION

A survey of the literature suggests that SMEs play an essential role in the growth of the Indian economy. ICT can be a great facilitator to improve the efficiency of SMEs and thus lead to their growth. Variables that influence the adoption of ICT in SMEs are identified through various literature reviews, and then a research model is developed. To validate this research model, hypotheses are formulated for each identified independent variable and data is gathered through a questionnaire to test these hypotheses. The research findings are that seven of the eleven hypotheses are being accepted, and a validated model for ICT adoption in SMEs has evolved. As a result, "*firm's innovativeness*", "*management attributes*", "*organizational attributes*", "*end user*", "*extra organizational situation*", "*government support*", and "*financial resources*" have been found as predictors of ICT adoption in SMEs. The study discovered no evidence to support four hypotheses about "*relative advantage*", "*social expectations*", "*organizational attributes*", and "*owner*", and they are not proven as predictors of ICT adoption in SMEs.

Analysis and interpretation of the research show that SME entrepreneurs should design a strategy for the proper allocation of funds for ICT and form strategic alliances with enterprises that use ICT at a higher level. Aside from that, entrepreneurs should design a strategy for their company as an innovative organization by implementing innovative ICT techniques. Entrepreneurs should also consider conducting regular ICT training programs and providing incentives to their personnel. It is suggested that the Central and State governments should explore providing more assistance for ICT adoption, whether in infrastructure, tax benefits, policies, or other means. The government should formulate a strategy to include the adoption of ICT in various training programmes for entrepreneurs from time to time. The strategies developed in this research will support the smooth adoption of ICT in SMEs. Limitations of the research are that due to paucity of time and funds, the sample survey was drawn from three cities in India, and only some respondents avoided participating in the questionnaire survey due to their busy schedules. The responses are based on the respondents' perceptions, and with time, people's opinions towards ICT adoption for SMEs may change.

Further research can be done to validate the acceptance of the research model developed here for SMEs of other sectors to test the adoption of ICT and to consolidate the model for wider acceptability. A longitudinal study may be conducted to validate the model and the recommendations made in this research further. This research will act as a spark for future researchers in the field of SMEs.

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