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Significant IT Adoption Factors by Small Enterprises in the Auto Ancillary Industry

Suresh Kasanagottu¹ and Sudipto Bhattacharya²

¹ Research Associate, VIT Business School, VIT University, Vellore, India – 632014, Tamil Nadu

E-mail: suresh.kasanagottu2016@vitstudent.ac.in

² Associate Professor, VIT Business School, VIT University, Vellore, India – 632014, Tamil Nadu, E-mail: sudiptobhattacharya@vit.ac.in

Abstract: The main objective of the current empirical research study is to understand the significant factors that favor or challenge the IT adoption among the small enterprises of the auto ancillary industry. A detailed survey was conducted among the small enterprises and the data was collected through the survey. The data was analyzed using exploratory factor analysis (EFA) and multivariate regression analysis (MRA). The exploratory factor analysis was conducted to establish the validity (through uni-dimensionality) and reliability (through Cronbach's Alpha) of IT adoption constructs. The MRA was carried out to evaluate the relationship among the favoring and challenging factors of IT adoption in auto ancillary small enterprises sector. The favoring factors such as perceived benefits of IT use and government supporting initiatives are in positive relation with IT Adoption, whereas perceived competitive pressure and firm innovativeness are not statistically significant. The challenging factors such as lack of financial capacity, lack of in-house IT manpower, small scale operation and rigidity to change are found to be statistically significant for IT adoption. The current research study identified that the variables such as government supporting initiatives, rigidity to change are found to be statistically significant for IT adoption. The key government supporting initiatives such as low interest rates, subsidies and associated schemes have to be enhanced and ensured that they reach the intended sector of the automobile industry. Also, a range of relevant training programs for the employees in the domain of personality development and information technology utility and its implementation have to be initiated by the small enterprises of the auto ancillary industry to overcome the element of rigidity to change.

Keywords: auto ancillaries, small enterprises, favoring factors, challenging factors, information technology

I. INTRODUCTION

The Auto Ancillary industry in India has gone through a sea change as a result of the foreign automobile manufacturers' entry in the post economic liberalization era. Despite the potential benefits, the adoption of information technology (IT) in the small enterprises is inadequate in India.

In the environment of competitive global business, India is passing through a paradigm shift. The slow influence of demonetization led to a decrease in growth in the last quarter of the financial year 2016. The Indian Government has rolled out Goods and Services Tax (GST) on July 1, 2017 for decreasing the complexity of India's indirect taxes to four slabs such as 5%, 12%, 18% and 28%. This reform will lead to positive growth of the Indian economy in the long run (Focus Economics, 2017, June 20). As a result, the key IT applications such as e-Commerce, customer relationship management (CRM), supply chain management (SCM), Extranet, GST Software related technology, enterprise resource planning (ERP), and Intranet have become the key tools to be adopted and practiced by the small enterprises of auto ancillary industry.

II. DEFINITION: SMALL ENTERPRISES

The Government of India has enacted the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 in terms of which the definition of small enterprises engaged in the manufacture or production, processing or preservation of goods is as under:

Small Enterprise is where the investment in plant and machinery is more than 25 lakh rupees but does not exceed five crore rupees. (Definition of: Micro, Small & Medium Enterprises. *Development Commissioner (MSME) Ministry of Micro, Small & Medium Enterprises*).

III. REVIEW OF LITERATURE

The definition of IT Adoption has been defined in a range of forms based on the purpose of the research in study. In the current empirical research paper, IT which includes customer relationship management (CRM), supply chain management (SCM), e-commerce, extranet, and intranet has been taken into consideration (Moodley, 2002). Both in the developed and developing countries a range of research studies were conducted on the IT adoption by the small enterprises. The pressure from the external sources and savings in the cost of adoption are the favoring instruments and the sources of limited nature are the challenging factors for the IT adoption to be enforced (Simpson and Docherty, 2004).

Inadequacy in skills of technical form, and specific knowledge regarding technology: act as hindrance symptoms for information technology adoption (MacGregor & Vrazalic, 2005). In the Italian context, security factors related to transactions and the technical skills with respect to financial domain play a significant role in the adoption and usage of information technology (Lucchetti & Sterlacchini, 2001). The facilitators: of different parameters for the technological adoption was studied (Cavaye & Hussin, 2007).

In the context of India, the huge costs of information technology adoption and improper dimensions of strategy are the barriers for the IT adoption (Ahuja *et al.*, 2009). In the small and medium enterprises related to auto ancillary sector, the pressures of competitive nature and perception related to advantages form the favoring elements for IT adoption (Kannabiran & Dharmalingam, 2012). Ongori & Migiro, 2010 in their research study reveal that the important advantages of information technology adoption are the attainment and enhancement of competitiveness by the organizations.

For the adoption of information technology in the small enterprises sphere of Nigeria, the decrease in cost and time act as the major factors and drivers (Apulu & Latham, 2011). The market share of the company: employee's involvement and the firm's nature of innovativeness act as imperative tools for the

adoption of information technology (Nguyen & Waring, 2013). The recursive and dynamic elements of the adoption of information technology, the interactions present, and a range of actors via different negotiations was studied and assessed (Sunday, Yanqing, & Hsin, 2014). Coelho & Laporte (2015) in their research study identified that in the domain of small enterprises the usage of enterprise resource planning (ERP) software act as the major driver for the implementation of management practices of vendor and for the information sharing mechanism throughout the supply chain. Chatzoglou & Chatzoudes (2016) through their empirical research revealed that IT infrastructure, firm scope, internet skills, and firm size are the significant factors for the adoption of e-business. Kumar & Kumar Singh (2017) through their research study identified that small and medium enterprises are not proactive in practicing supply chain management systems effectively. In addition, they also found a range of research gaps related to the benchmarking of performance and the quality of service.

The preliminary objective of the research study is to further the already existing research and identify and evaluate the various variables and factors for the adoption of information technology in the auto ancillary sector of small enterprises. The previous literature and research related to the favoring factors and challenging factors of IT adoption is available in the below paragraphs.

A. Favoring factors for IT adoption:

1) *The Perceived benefits of IT use:* A set of advantage of anticipation form that can be useful to companies is defined as perceived benefits (Mehrtens *et al.*, 2001). The enhance system integration and higher innovation related to processes are the perceived benefits of the implementation of IT and electronic business (Raymond and Bergeron, 2008). The significant factor for the usage of software's such as enterprise resource planning, technologies of web and customer relationship management is perceived benefits (Seyal *et al.*, 2007). Increased productivity and cost reduction can be considered as the potential benefits of IT practice (Lymer, 1997). For competing with big companies the usage of information technology can act as an instrument for small enterprises (Alberto & Fernando, 2007). In the small enterprises of New Zealand the IT adoption was positively related to the internet use and its perceived benefits (Voges & Pulakanam, 2011). The small and medium enterprises gain huge benefits by directly investing in technology and they should also consider the capabilities required for adopting information technology (Pratono, 2016).

2) *The Perceived competitive pressure:* The fierce pressure of competition that exists between companies transforms them to become dynamic and adaptable to the business environment. The companies find pressure when they find their competitors using and implementing various information technologies and as a result they decide to embrace and adopt various forms of IT (Cragg *et al.*, 2002). The peer pressure of competitive form in an industry can stress up on other companies to use various technologies such as CRM, ERP, and SCM (Dholakia and Kshetri, 2004). The large volume of IT usage by few companies makes other companies to follow the same path of IT adoption (Bharati & Chaudhury, 2010). The competitive pressure is one of the significant factors for the adoption of information technology such as cloud computing (Safari *et al.*, 2015). The environmental variables such as competitive pressure has direct effect on the adoption of customer relationship management (Ahani *et al.*, 2017).

3) *Government Supporting Initiatives:* The key elements which are leading to the effective implementation of government support initiatives for e-commerce usage by small enterprises are the proprietor form of region electronic market, the innovativeness of the owner, and region electronic market

development which is of staged form (Gengatharen & Standing, 2005). The access of internet, e-commerce and information and communication technology becomes affordable to small enterprises by the implementation of supporting initiative of the government (Tan *et al.*, 2007). The companies can overcome a factor, lack of knowledge, one the significant barriers of e-commerce adoption by the effective initiatives of the government (Stockdale & Standing, 2006).

The government and its initiatives play an important role in the adoption of e-commerce and various information technologies by small enterprises (Scupola, 2009). The small enterprises in Malaysia consider that the government policies and assistance in the sphere of internet leads to the adoption of information technology (Shah Alam *et al.*, 2011). The rules, regulations and support of government have huge impact on the survival of small enterprises (Payam Hanafizadeh *et al.*, 2012). The environment of competitive nature and government support will assist small and medium enterprises for adopting information technology (Nugroho, 2015). The organizational factor such as government policies is one of the significant factors influencing the adoption of cloud computing (Wilson *et al.*, 2015). The dearth of finance and government support are the key constraining factors for adoption of technology of sustainable nature (Hasan, 2016).

4) Firm Innovativeness: The adoption and implementation of customer relationship management (CRM) is highly influenced by the management's innovativeness (Nguyen & Waring, 2013). The adoption and practice of enterprise system technologies such as information system depends on the firm innovativeness (Boumediene Ramdani *et al.*, 2009). Parker & Castleman, (2007) in their research study reveal that the company's innovation on the supply side is an important dimension for the growth of e-business in small and medium enterprises. The important organization innovation factors such as company structure, business strategy, firm size, and business objectives assist in the adoption of customer relationship management (Sarmad Alshawi *et al.*, 2011). In the adoption of cloud services by small enterprises, the innovativeness of the company has a critical role to play (Yazn Alshamaila *et al.*, 2013). The company should possess the innovativeness and capabilities for the adoption of customer relationship management technology (Newby *et al.*, 2014). The education of an entrepreneur plays a vital role as a key variable of firm innovativeness for the adoption of technology (Martinez & Romero, 2017).

B. Challenging factors for IT adoption:

1) Lack of financial capacity: The inadequate financial resources act as one of the key challenges for the usage and implementation of highly developed technologies by SMEs (Duncombe and Heeks, 2001). The high cost of investment acts as a barrier for the adoption of any IT related technologies by small and medium enterprises (Poon and Swatman, 1999). The low level of technical knowledge and financial constraints form the major barriers for the organizations to embrace IT and implement (Cragg and King, 1993). The huge capital investment for advanced technology is one of the primary factors, which act as hindrance for adopting IT (Somuyiwa and Adebayo, 2011). The financial planning and capacity plays a significant role in the adoption of enterprise resource planning technology (Ljutic *et al.*, 2014). The lack of finance is one of the key constraining factors for adoption of technology of sustainable nature (Hasan, 2016).

2) Lack of in-house IT manpower: As a result of the complexity in the usage of advanced technology the small enterprises do not embrace for adopting information technology (MacGregor, 2004). Spectrum (1997) in their research identified that the human capital in small and medium enterprises do not possess

the required skills for using IT. Due to the dearth of qualified managerial and technical human resources the companies do not accept the adoption of information technology (Levy *et al.*, 2001). The inadequate knowledge of information technology acts as barrier for adopting IT and its related workforce (Kartiwi and MacGregor's, 2007). Despite of the knowledge of the advantages of using e-commerce the small enterprises require high qualified staff to implement (Packalen, 2010). The key organizational factors such as information system and IT play a critical role in the adoption of customer relationship management technology (Ahani *et al.*, 2017). The quality system related to human resources is one of the predictors of human resource information system technology (Noutsu *et al.*, 2017).

3) Small scale operation: The size of the organization acts as one of the key determining factors for the adoption of information technology (Bharati and Chaudhury, 2010). The enterprise resource planning adoption by small businesses was not successful as a result of the small volume of business operations in China (Yulong Li, 2011). According to Chen and Popovich (2003) the earlier research investigations identify and determine that firm's scale of business operations has huge impact on technologies related to IT. The small and medium enterprises assume that they do not require enterprise resource planning software and also possess the view that high technology is only for highly sophisticated companies (Prakash, 2011). Despite the small scale of operation, the SMEs can adopt enterprise information system applications by the method of digitization (Malawige & Nanayakkara, 2014). The firm size is one of the significant drivers of e-business adoption (Chatzoglou & Chatzoudes, 2016).

4) Rigidity to Change: The high cost involved in the adoption of advanced information technology act as a rigidity to change factor by the small and medium enterprises of Italy (Giuri *et al.*, 2008). The rigidity to change, which is one of the key barriers for the adoption and growth of technology exist in small and medium enterprises. The growth of small enterprises will be evident through their integration with the supply chain domain of multinational enterprises (K. K. Morya & Harsh Dwivedi, 2009). The rigidity to change by labor market acts as one of the key challenging factors for the access, adoption and implementation of advanced technology (Ghatak, 2010). From the view of change forces which exist, the companies with high adoption and innovation towards technology are comparatively different from companies with poor innovations (Vijay Gupta and Bindu Gupta, 2014). The resistance to change is one of the significant factors which influences the adoption of enterprise resource planning technology (Awa & Ojiabo, 2016).

IV. RESEARCH GAP

The true potential of IT is not completely acquired by the small enterprises in the auto ancillary industry. The research should emphasize on understanding the effects of the variables such academic qualifications of the owner(s), governmental support initiatives, age of the company, firm innovativeness, rigidity to change, and the company's policy.

V. SCOPE OF THE RESEARCH STUDY:

The major scope of the current empirical study is to comprehend and study the specific factors that are favoring or challenging the IT Adoption in Tamil Nadu, India. The conceptual research model is adopted from G. Kannabiran P. Dharmalingam, (2012). The related hypothesis for testing the relationship between the favoring and challenging factors of IT adoption is as below:

1) Hypothesis

- H1: Higher the perceived benefits of IT usage, higher the IT adoption
- H2: Higher the perceived competitive pressure, higher the IT adoption
- H3: Government Supporting Initiatives will lead to higher IT adoption
- H4: Higher the Firm Innovativeness, higher the IT adoption
- H5: Lack of financial capacity leads to lower level of IT adoption
- H6: Higher the lack of in-house IT manpower, lower the level of IT adoption
- H7: Smaller the scale of operation, lower the level of IT adoption
- H8: Higher Rigidity to change, lower the level of IT adoption

Conceptual Research Model

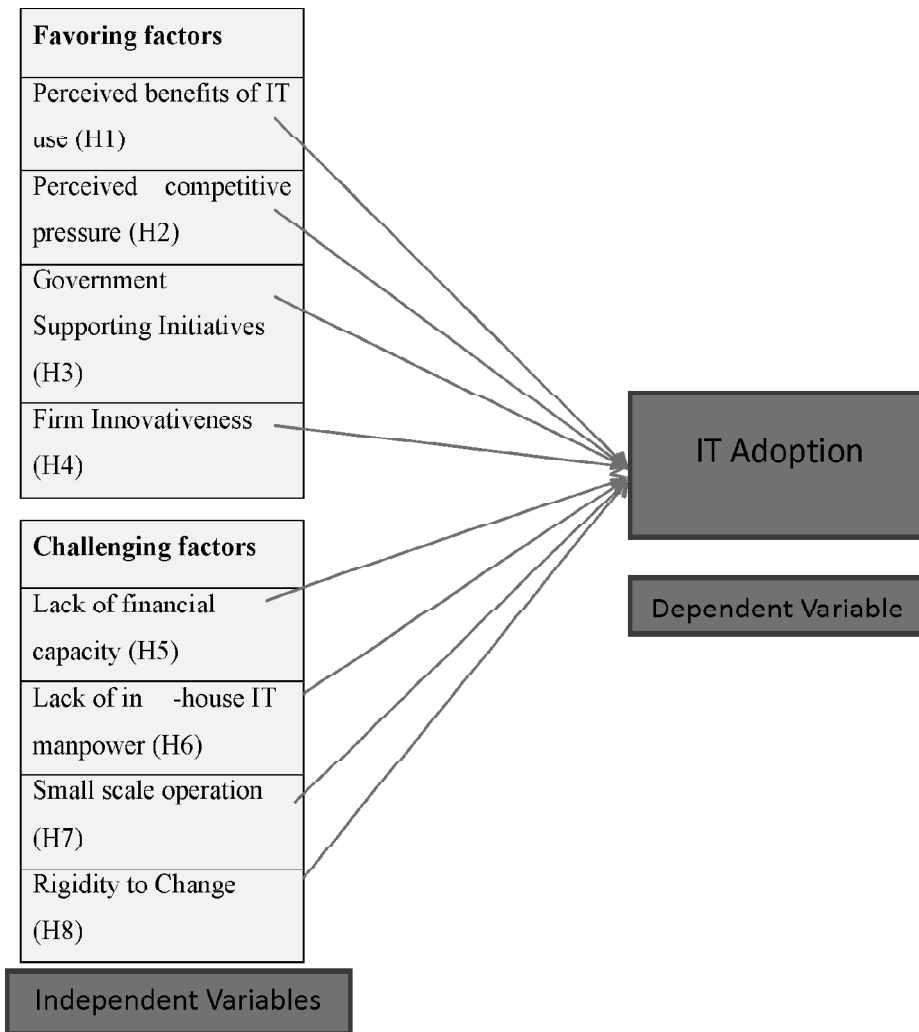


Figure 1: Conceptual Research Model

The small enterprises of auto ancillaries in Tamil Nadu, India were taken as the population for the research study. It included a range of auto ancillaries such as heat treatment units, plastic parts, foundry, engine parts, suspension and mechanical parts, electronic parts, rubber, and electrical parts and other equipment manufacturers. After a thorough literature review and detail discussion with the respective members of the auto ancillaries a pilot study was done with the adapted questionnaire developed by G. Kannabiran P. Dharmalingam, (2012) for testing the content validity and reliability, and the applicability of Questionnaire, the instrument for survey.

The Senior Managers, General Managers, Chief Executive Officers, and the proprietors of the respective auto ancillaries were the respondents of the questionnaire. The first part of the questionnaire included 10 questions about the characteristics of the auto ancillaries. The second part of the questionnaire included 4 questions for exogenous variable, IT Adoption. The third part of the questionnaire included 4 questions each for the endogenous variables such as favoring factors and challenging factors. The respondents were informed to provide their degree of agreement through a five point Likert Scale for the second and third parts of the questionnaire.

Questionnaires were distributed to around 120 auto ancillaries through mail. Out of which 108 responses were received and around 10 questionnaires with incomplete information were discarded.

VI. DATA ANALYSIS AND SUCCESSIVE FINDINGS

The analysis of the data was done using SPSS 22.0. Before initiating the data analysis in detail, the relevant constructs have been tested for validity and reliability. The exploratory factor analysis is performed for checking the uni-dimensionality. From the bellow table of Total Variance Explained only one Eigen value more than 1 is found. Also one factor explains 59.638% of total variance, while two factors explain 67.906% of the total variance and the three factors explain 74.686% of total variance. These results suggest that the relevant scale items are unidimensional.

Table 1
Total Variance Explained (Extraction Method: Principal Component Analysis)

<i>Component</i>	<i>Initial Eigenvalues</i>			<i>Extraction Sums of Squared Loadings</i>		
	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>
1	7.157	59.638	59.638	7.157	59.638	59.638
2	.992	8.269	67.906			
3	.814	6.779	74.686			
4	.674	5.620	80.305			
5	.545	4.543	84.848			
6	.481	4.009	88.856			
7	.427	3.556	92.412			
8	.391	3.260	95.672			
9	.291	2.422	98.093			
10	.121	1.005	99.098			
11	.059	.494	99.592			
12	.049	.408	100.000			

All the constructs of the research model have been tested for the reliability through the Cronbach's Alpha, which are in the range between 0.781 and 0.92.

Table 2
Reliability Statistics

<i>Constructs</i>	<i>Reliability Statistics</i>	
	<i>Cronbach's Alpha</i>	<i>Items</i>
IT Adoption	0.92	4
Favoring factors for IT Adoption	0.814	4
Challenging factors for IT Adoption	0.781	4

The reliabilities of the scale are good in comparison to the acceptable level of field research, which is 0.70.

To evaluate the relationship among the explanatory variables such as the favoring and challenging factors of IT Adoption, multiple regression analysis was conducted.

Table 3
Multivariate Regression Analysis Results
Coefficients

<i>Model</i>	<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>		
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>T</i>	<i>Sig.</i>
(Constant)	0.093	0.173		0.535	0.594
Perceived benefits of IT use	0.134	0.06	0.148	2.241	0.027
Perceived competitive pressure	0.094	0.058	0.1	1.612	0.11
Government Supporting Initiatives	0.211	0.059	0.237	3.59	0.001
Firm Innovativeness	-0.037	0.071	-0.039	-0.525	0.601
Lack of financial capacity	0.147	0.052	0.176	2.853	0.005
Lack of in-house IT manpower	0.128	0.051	0.144	2.511	0.014
Small scale operation	0.516	0.089	0.571	5.829	0.001
Rigidity to Change	-0.204	0.094	-0.198	-2.175	0.032

The results of the multiple regression analysis from the above table show that two out of the four favoring factors are statistically significant for the IT adoption. Perceived benefits of IT use with p value of 0.027 and Government Supporting Initiatives with p value of 0.001 indicate positive relation with IT Adoption. In addition, government supporting initiatives show higher influence with beta value of 0.237 than perceived benefits of IT use with beta value of 0.148.

Also the hypotheses such as Perceived competitive pressure and Firm Innovativeness are not statistically significant as their p values are 0.11 and 0.601 respectively.

Further, the above results reveal that all the challenging factors such as Lack of financial capacity, Lack of in-house IT manpower, Small scale operation, and Rigidity to Change are statistically significant for IT Adoption. Also, the hypotheses of Small scale operation and Lack of financial capacity indicate higher influence with beta values of 0.571 and 0.176 than the hypotheses such as Rigidity to Change with beta value of (0.198) and Lack of in-house IT manpower with beta value of 0.144 respectively.

VII. DISCUSSION

The acknowledgement of the competitive landscape and the perceived benefits of IT use alone would not suffice for the adoption of IT among the small enterprises of the auto ancillary sector unless effective measures are taken to overcome the challenges of IT adoption. The strategy of outsourcing can be taken into consideration to overcome the hindrances of skilled IT manpower. The key measures by government such as low interest rates, subsidies and associated schemes can be enforced to handle the constraints posed by inadequate financial capability. The technology related to cloud computing can be adopted by small enterprises through the formation of associations to deal with the critical challenges of small scale of business operations. The challenge of rigidity towards change can be overcome by imparting relevant training programs in the domain of personality development and information technology utilization and its implementation among the employees.

VIII. CONCLUSION

The composite development of the country can be attained through the adoption of information technology among the small enterprises. The effective implementation of the existing government policies, schemes and relevant subsidies in the domain of information technology has to be framed. Also, the critical measures for the development of innovative and practical global business practices have to be embraced to ensure that they reach the intended sector of the automobile industry. From the perspective of an organization, a wide range of training programs both in-house and outbound relevant to IT have to be provided to the competent human resources to enrich their knowledge and for the better usage of IT applications.

IX. LIMITATIONS AND FUTURE SCOPE

The current research was performed in the Indian State of Tamil Nadu's auto ancillary sector. The size of the sample under study has to be enhanced and also the research study has to be conducted among all the small enterprises of the auto ancillary sector throughout the country. As a result of the further study with a sample representation of all the states of India, the statistically drawn inferences will be of better applicability.

Factors of Information Technology adoption by the small enterprises in the Auto Ancillary Industry have the potential for future scope of research. The future research can focus on the information technology adoption factors such as organizational culture, firm's age, and proprietor's educational qualifications. A research study across various cultures and nationalities can also be done to comprehend the advanced information technology applications used by the already developed countries and leverage the same and implement them in the developing nations.

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