

FACTORS AFFECTING THE ADOPTION OF E-COMMERCE: A STUDY OF RUBBER MSMES IN PUNE

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Abstract

Being one of the major sunrise sectors, the Indian Rubber Industry has emerged as a significant player in the Indian economic growth story. Its role as a key growth player can be highlighted by the domination of the small-scale sector in manufacturing the rubber products. The small sector enterprises account for 90% of the 6000 plus rubber product manufacturing units and over 50% production of rubber goods in the non-tyre category. Similarly, around 40% of the rubber products export comes from the small-scale sector. Previous studies have demonstrated that the collaboration between E-commerce and rubber small sector enterprises can help in supporting the upturn experienced in recent years. However, many micro, small, and medium-scale enterprises (MSMEs) dealing with the production and processing of rubber merchandise are nonetheless reluctant to choose E-Commerce to enhance their national and international commodity chain. Hence, this paper centres around understanding the reasons behind the hesitance of such MSMEs. For the examination, the information was gathered through organized meetings of proprietors of elastic items assembling and handling firms of rubber industry in Pune. During February-March 2018, a deliberately chosen test of 50 MSMEs (10 adopters of internet business and 40 non-adopters) was taken up for the examination. After treating the data with statistical tools, the paper found that the scale of operations and technical know-how of the owner/manager has a positive impact whereas market competitiveness individually does not impact the adoption of E-Commerce. Also, favourable government policies have been found to boost E-Commerce adoption by firms. In this regard, the paper helps in identifying the important factors which influence the rubber industry's marketing strategy and the primary reasons behind adopting or not adopting E-Commerce.

Key words: E-Commerce Adoption, Rubber Industry, Marketing Strategy, MSMEs

Introduction

Rubber industry acts as a feeder industry to other industries, primarily because of extensive application of its output. Small-scale enterprises solely represent over half of the production of rubber products in the non-tyre segment. (Indian Brand Equity Foundation [IBEF], 2010). It is pivotal for socio-economic development because of its extensive applicability as an industrial raw material as well as the intensive contribution made by the MSME sector.

The Government of India in 2006 had enacted the Micro, Small and Medium Enterprises Development (MSMED) Act which clearly defines the scope of each Micro, Small and Medium enterprises in terms of scale of operations and more importantly investment. When it comes to manufacturing sector the same applies in the case of rubber manufacturing plants. Accordingly, a micro enterprise is defined as an enterprise where investment in plant and machinery is below Rs. 25 lakh. Similarly, for a small scale enterprise the investment in plant and machinery should be more than Rs. 25 lakh but it should not exceed Rs. 5 crore. Whereas, for a medium scale enterprise the investment in plant and machinery should be more than Rs.5 crore but less than Rs.10 crore (Ministry of Micro, Small & Medium Enterprises, 2020).

Market trends over the years have changed with the changing global commodity chains. Traditional sales modus operandi is found redundant in the present world. Today, the creation of a unified image and delivering requisite information to the consumers is one of the greatest concerns of small-scale industries (All India Rubber Industries Association, 2016). The current market reality is that the customers are more aware and are digitally

connected. Studies signify that the E-commerce industry in today's scenario is impeccable to an industry's growing market share (Mukherjee, 2017). Muhammad, Rodrigues and Fernandes (2010), observe three kinds of globalization eras, each with unique global commodity chain. The present phase relates to Digital Globalization following the advent of the Information Revolution.

Currently, India is the third-largest producer and fourth-largest buyer of natural rubber produced globally. Likewise, India secures overall fifth spot as the buyer of natural as well as manufactured rubber (IBEF, 2010). Rubber industry in India has huge development prospects provided they keep pace with the changing environment. With digital globalisation, enterprises are already matching the pace of developing global commodity chains but MSMEs in India are still unable to. These industries are unwilling to adopt e-commerce primarily because of lack of IT knowledge among the entrepreneurs and also due to non-availability of easy market accessibility (Mukherjee, 2017). According to Raghavan, Wani and Abraham (2018), the two tectonic changes namely: demonetization and GST have acted as a catalyst in moving towards the digital platform, but still, about 73% SMEs have not embraced e-business technologies (Snapdeal & KPMG, 2015). These industries are unwilling to adopt e-commerce primarily because of lack of IT knowledge among the entrepreneurs and due to non-availability of easy market accessibility.

Mukherjee (2017) identifies E-commerce or electronic commerce as trading goods and services via an online source. Elia, Lefebvre and Lefebvre (2007) found the benefits of e-commerce initiatives includes the reduction in delivery time and overall costs with a commensurate decline in the product manufacturing cycle time along with an increase in market share, revenues and in customer service quality. With the development of E-commerce, there have been significant costs reduction; in terms of transactional and advertisement costs for the producer (Elia, Lefebvre & Lefebvre, 2007; Jahanshahi, Zhang & Brem, 2013; Santarelli & D'Altri, 2003; Shemi & Proctor, 2018). Gregory, Karavdic & Zou (2007) suggest that to enhance an enterprise's efficiency in distribution and communication along with a greater degree of promotion, e-commerce assets are pivotal. Furthermore, it improves price competitiveness in the case of exporters and undoubtedly greater distribution support. So, in today's global market, a company will be able to gain if it invests further in e-commerce and simplifies its online product transferability. Internet-based technology provides an avenue to small market firms to expand their customer reach barring the limitations due to cost and market inaccessibility. While small firms achieve better improvements in the case of marketing, the larger firms are likely to observe greater operational effects. However, some studies have pointed out that small organizations are less likely to adapt to modern technology as compared to large organizations (Ein-Dor & Segev, 1978). Several factors influence this decision. Lefebvre and Lefebvre (1996) categorized them into those originating from sources internal to a company and others relating to external dynamics.

Internal factors refer to firms' organizational characteristics and experience with technology. Studies have shown that an association's previous involvement with technology with respect to exposure and organizational learning affects a company's future decisions in embracing recent advancements (Burgelman & Rosenbloom, 1989). Lefebvre and Lefebvre (1996) found elements like time-since first procurement, the range of technologies used, sorts of innovations embraced as well as requisite knowledge about the modern technology are major determinants of a firm's degree of penetration into latest advancements along with mental acuteness. Firm's size, availability of financial resources and centralization are key components to firms adopting e-commerce (Upadhyaya, Mohan & Karantha, 2017). Other important factors influencing a firm's decision to adopt e-commerce involve the firm's pursued strategy including a firm's strategic orientation, technological awareness and technological policy (Lefebvre & Lefebvre, 1996). One of the main driving forces of a SMEs choice to accept the electronic medium is the management's perception. In particular, a manager's willingness is a key driver of a firm's decision to adopt e-commerce (Lefebvre & Lefebvre, 1996). Ramanathan, Ramanathan & Hsiao (2012), specifies that the willingness is nowhere independent of the macro-economic and firm-level characteristics.

In the same context, the current study focuses on some factors based on a firm's characteristics like the size of the industry, the age of the firm and number of employees. Other than these factors, certain other factors like

technological awareness, competitive pressure, scale of operation of firm and having IT department are also considered to understand whether they affect the adoption of e-commerce.

External factors viz. industrial and macro-economic characteristics in addition to the government policies have huge clout on a firm's decisions to accept e-commerce. Industrial characteristics including competition level—number, type and proximity of competitors—along with demand-side factors, have a clout on the degree of diffusion with technology (Sin et al, 2015). Strong competition within the industry works as a motivating factor for firms to stay ahead in the competition. As the competitors adopt E-Commerce, MSMEs have more inclination towards adopting E-Commerce for strengthening their position in the market (Yanmei, 2008).

Government policies related to the field of industry and technology are important while deciding the future course of action. For instance, the current e-commerce policy of India is likely to bring in more investment in e-commerce. To quote, tax incentives, including investment tax credits, are directed towards cheaper accessibility of e-commerce facilities and consequently enhancement of profitability of the marginalised and not-so-profitable ventures. Besides, industry regulation and government-approved procurement policies are crucial determinants of a firm's judgment on whether to adopt e-commerce or not.

The study has considered some other external factors as well, to interpret the determinants in the adoption of e-commerce in the rubber industry. Besides the macro-economic factors including transactional risks and availability of resources, both capital, and human resource, have also been considered. Industry-level characteristics like type of customers and market accessibility have been focused upon.

Industries have been able to match the pace of developing global commodity chains but still, MSMEs in India are unable to take advantage of the information growth (Mukherjee, 2017). Many studies have highlighted the factors which play an important role in influencing a firm's decision to sell online, however there exists very little research on the topic of adoption of e-commerce and factors influencing it in case of rubber industries. This study is based on regional analysis of primary data collected on rubber industries of Pune, in particular, to understand the dependence of certain variables considered in the past literature as important explanatory variables. Also, the literature on highlighting the factors, driving the manager's acumen and his firm's judgment to venture online, is not exhaustive. Hence, this paper focuses on understanding the rate and determinants of adoption of e-commerce of the MSMEs in the assembling and processing of rubber products in Pune.

This paper is divided into four sections, including introduction. Section two presents the data sources and methodology adopted to fulfil the objectives of the paper. Results are presented and discussed in section three and section four concludes with policy suggestions.

Data and Methodology

This study is based on the regional analysis of primary data collected from the rubber industries' MSMEs of Pune. The data used in the study was collected in March 2018 using a cross-sectional research design. Sampling frame of the respondents was taken down from the Udyog Aadhar registration directory of the Ministry of MSME for the Pune city with almost a thousand registered enterprises indulging in trading rubber products in Pune. Around 220 respondents were selected randomly and from the given set 50 respondents agreed to give the interview. The details of these enterprises were extracted from the firm's details provided by Indian Rubber Directory. The sample was selected on a random basis. Primary data was collected using interview questionnaire. Also, the Firms were screened on the basis of whether they are willing to be interviewed Out of the 50 firms that agreed to be interviewed, 10 practiced e-commerce and 40 were non-adopters. It shows that 80% of the rubber industries from collected sample are non-adopters of e-commerce whereas 20% are the adopters, which is similar to the aggregate economy.

The industry classifies the product into two categories that is tyre and non-tyre, and our sample includes both enterprises (refer to Table 1). From our primary survey, we conclude that 7 were adopters and 3 were non adopters in the tyre category, whereas in non tyre category there were 3 adopters and 37 non adopters.

Table 1: Classification of adopters and non-adopters based on product category

Type of Products	Adopters	Non-Adopters	Total
Tyre	70.0%	30.0%	100% ($n=10$)
Non-Tyre	7.50%	92.5%	100% ($n=40$)

Source: Primary Survey 2018

Primary data was procured through structured interviews. To draw out the response of reasons for not adopting e-commerce by the MSMEs, Likert scale was used on certain parameters which were identified from the literature review. The interview schedule has questions on both internal and external factors and the acceptance of e-commerce by the firms. For internal factors, the paper considers the availability of inventory and technical know-how of the owner. Macro-economic factors including transactional risks and availability of resources, both capital, and human resource, have been considered but also industry-level characteristics like type of customers and market accessibility have been focused upon.

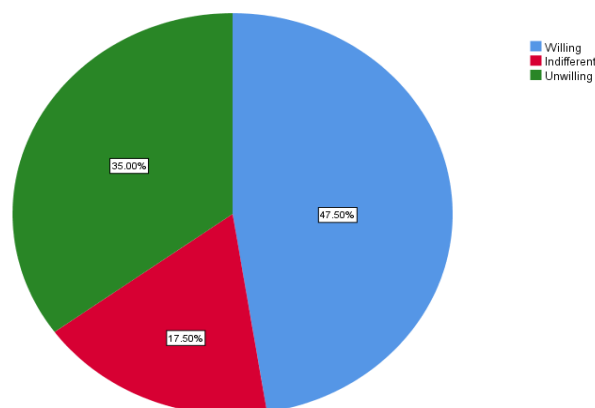
The data has been administered using SPSS version 25.0. Chi-Square Test has been used in the study to draw a relation between the variables. This test makes use of different categorical variables to understand the dependency of these variables with the adoption decision. It is used to decide if there is a significant difference between the expected and observed frequencies in various categories. Moreover, the study focuses on understanding the main reason for the management's unwillingness to sell their rubber products online on e-commerce platforms. The research further inspects the frequency distribution of certain factors identified as the major determinants driving a firm's strategy.

Results and Discussion

3.1 Non Adopters

Out of the enterprises who have been non-adopters of E-commerce, it has been observed that only 35% of the managers are unwilling to adopt E-Commerce while 47.5% are willing to adopt and 17.5% are indifferent about the same (Figure 1).

Figure 1: Management's willingness to adopt E-commerce (among Non-adopters)



Source: Primary Survey

Past literature has indicated that some of the factors which influence a manager to not adopt the latest technology apart from lack of funds include technical know-how of the owner, availability of inventory space,

easy market accessibility, changes in national policies and fear of global competition due to lower comparative advantage (Lefebvre & Lefebvre, 1996). However, over the period of time there have been changes in the factors majorly affecting the willingness of firms to adopt or not adopt the E-commerce platform.

Table 2 lists the factors which influence a manager's willingness to adopt E-commerce technology. Considering 5% significance level for the chi-square test, Table 2 highlights that the fear of fraud and management's willingness to adopt e-commerce are not independent of each other. The findings are consistent with the study by Dholakia and Kshetri (2004). Various other factors including inventory availability, competitive pressure and changing government regulations are independent of e-commerce adoption strategy. Similarly, Table 2 also indicates that the current state of market accessibility, as well as the manager's technical know-how, has significant clout on management's unwillingness to adopt B2B E-commerce. Thus, the majority of the non-adopters find two major issues, posing a challenge to their marketing strategy—Lack of technical know-how and market inaccessibility. Most rubber industries refute to take on E-commerce because of the easy availability of market in the neighborhood. Interviews signify that adopting B2B E-commerce would not significantly add to their market base. These challenges are faced by the tyre as well as the non-tyre sector.

Managers of small-scale enterprises, during the phase of integration with new technology, are not inclined to take a huge risk (Rao & Metts, 2003) and this is particularly true when they have limited skills (Ein-Dor & Segev, 1978). Another component significantly influencing managers' unwillingness to adopt e-commerce is their current state of market accessibility.

Table 2: Factors influencing managers' unwillingness to adopt E-commerce technology

Factors	Response	Disagree	Indifferent	Agree	X^2 test statistics
Fear of fraud	Disagree	12	1	7	$X^2 = 17.406$ $df = 4$ $p = .002$
	Indifferent	5	5	0	
	Agree	2	1	7	
Competition fear	Disagree	8	1	7	$X^2 = 5.009$ $df = 4$ $p = .286$
	Indifferent	7	4	2	
	Agree	4	2	5	
Changing Govt. regulations	Disagree	13	3	5	$X^2 = 3.840$ $df = 4$ $p = .428$
	Indifferent	3	2	4	
	Agree	3	2	5	
Nearby Market	Disagree	11	1	1	$X^2 = 21.364$

availability for manufacturers	Indifferent	0	4	2	$df = 4$ $p = .000$
	Agree	8	2	11	
Low inventory available	Disagree	13	3	10	$X^2 = 3.042$ $df = 4$ $p = .551$
	Indifferent	1	1	0	
	Agree	5	3	4	
Technical know-how of owner/manager	Disagree	3	0	5	$X^2 = 12.706$ $df = 4$ $p = .013$
	Indifferent	1	4	4	
	Agree	15	3	5	
Lack of Funds	Disagree	14	4	8	$X^2 = 4.457$ $df = 4$ $p = .348$
	Indifferent	1	2	1	
	Agree	4	1	5	

Source: Primary Survey 2018

Note: X^2 : Chi-Square; df = degrees of freedom

Adopters

In this study, the adopters constitute 20% of the sample. Interview questions included some of the factors that are a result of a firm's adoption strategy (refer to Table 3). Majority of the industries who have adopted E-Commerce agree to the fact that contracts have increased due to the adoption of this platform. This is primarily because of the increased market reach (Shemi & Proctor, 2017). The same can be seen particularly among tyre industries. They see a reduction in cost and competitive advantage as primary reasons behind adopting E-Commerce. 50% of them have disregarded partner pressure as a reason behind adoption.

Table 3: Summary of Results from survey on factors that led to E-Commerce adoption

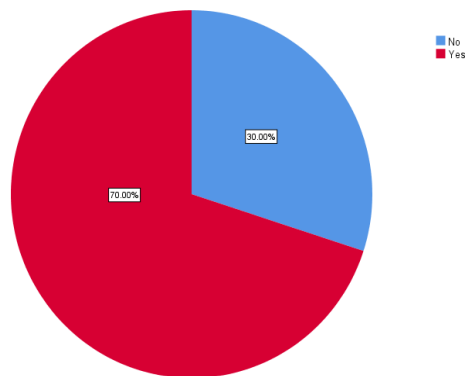
Factors	Agree	Indifferent	Disagree
Cost Reduction	8	1	1
Competitive Advantage	8	2	0

Source: Primary Survey 2020

As shown in Table 4, around 80% of the adopters agree that competitive advantage and cost reduction have been the major factors for them to get incentivized to adopt E-Commerce. The willingness of firms to try new technology has been another factor. However, it is interesting to note that the adopters have disregarded partner pressure as a determinant to opt for the online platform.

Post-adoption, research indicated, 60% of the adopters have observed the impact of online market-place in terms of both, extended market reach and easy customer availability. As per cost reduction, firms have observed that their advertisement costs have reduced significantly. While 50% of them also feel labour cost has reduced. Industries equally believe that there is either an increase or no impact on competition. 70% of the adopters agree that the risks have decreased significantly.

Figure 2: Adopters feelings that E-Commerce will make GST and TCS more feasible



Source: Primary Survey

Figure 2 indicates that there has been a tremendous impact of tax rate on adoption. 70% of the adopters feel that “Tax Collected at Source (TCS)” and “same tax rate across states” provision for E-Commerce sale under GST, has made E-Commerce adoption more feasible. Internet banking has been agreed to be one of the most convenient modes of collecting payment by the adopters of E-Commerce. These findings are parallel to the findings of a study by Raghavan, Wani, and Abraham (2018).

3.3 Testing for Factor Dependence

Past literature indicates two crucial factors (have been considered) which deter a firm to adopt e-marketplace. One is the lack of information among the management regarding technology. Interviews indicated that many of the micro and small firms were resistant to adopt e-commerce because they lack economies of scale, unlike medium and large business ventures. Since small firms are not well-versed with the technology and its advancements, therefore many were not eager to adopt e-commerce. Hence, IT awareness which is an internal factor is investigated for dependency. When it comes to technical know-how, the non-adopters feel that lack of technical knowledge of owners is one of the biggest obstacles in adoption. Adopters, on the other hand, agree that their technical know-how has been one of the greatest strengths that led them to adopt e-commerce.

Another factor that has been determined crucial in past results is market accessibility. Lefebvre and Lefebvre (1996) have highlighted that such industry-level factors mainly comprise of competitive pressure in the industry along with the type of buyers. So, the study will be focusing on two of these factors.

Moreover, studies have shown firm-level characteristics including the scale of business operation, centralization and firm's structure strongly affect a firm's judgment to join an online platform (Dholakia & Kshetri, 2004; Gregory, Karavdic & Zou, 2007). This part of the study empirically draws out the dependence of a firm's willingness to sell online. Chi-square (X^2) statistical tests were performed to determine whether or not there are any significant differences when it comes to the adopters and non-adopters of E-Commerce in terms of factors such as competitive pressure, technical know-how of Owner/Manager, the scale of operation, and having an IT department. Table 4 indicates every firm's degree of acceptance to some of the aforementioned variables.

Table 4: Factors affecting manufacturers in Non-Adoption and Adoption of E-commerce

Factors	Response	Non Adopters (n = 40)	Adopters (n = 10)	Chi-Square
Competitive Pressure	Disagree Indifferent Agree	16 13 11	0 5 5	$X^2 = 5.946$ $df = 2$ $p = .05$
Scale of Operation	Micro Small Medium Large	13 19 7 1	0 5 3 2	$X^2 = 7.969$ $df = 3$ $p = .05$
Technical Know-how of owner	No IT knowledge Indifferent IT knowledge	25 9 6	1 0 9	$X^2 = 21.490$ $df = 2$ $p = .00$
Departments	IT department Non-IT department	10 30	6 4	$X^2 = 4.504$ $df = 1$ $p = .03$
Primary Buyers	Industries Normal Consumers Retailers	23 12 5	6 3 1	$X^2 = 0.050$ $df = 2$ $p = .98$

Source: Primary Survey

Note: X^2 : Chi-Square; df = degrees of freedom

The results indicated in Table 4, show that firms that have adopted e-commerce were those which felt there was a high degree of competition in the business compared to non-adopters. This is because of increasing E-Commerce space, every firm is facing competition in the product sale whether it is adopter or non-adopter. When contrasted between the adopters and non-adopters of E-Commerce, it is interesting to note that the majority of the non-adopters do not feel competitive factor as a reason for adoption. However, the adopters mostly agree or are usually indifferent on the competitive factor as a driver to adopt E-Commerce.

In terms of the scale of operation, there is a significant difference among the firms. Interestingly, with the greater scale of operation, the proportion of firms adopting E-Commerce increases. Previous literature has pointed out that firms of larger size tend to adopt new and latest technologies more quickly when compared to the smaller sized firms (Ein-Dor & Segev, 1978; Teo and Tan, 1998). A very rational explanation to this is that these larger firms have much more resources and may have a competitive requirement to stay at the forefront when it comes to integration with the technology.

Similarly, there is a significant difference among owners with technical knowledge, those without technical knowledge and those who have so little that leaves them in the indifferent zone. The owners with technical

knowledge are more enthusiastic and willing to adopt a change in the structure, workforce, and skills that may result in the adoption of E-Commerce. On the other hand, for the proportion of owners with no or little technical knowledge, adopting E-Commerce is very less, due to the fear of accepting changes in work structure, high fixed costs, and acquiring relevant skills etc. Another reason is that non-adopters are inclined to follow a “wait and watch” methodology as they have lack of confidence when it comes to the benefits in relation to the cost.

In the study, availability of an IT department implies ownership of computer(s) and skilled personnel. With regard to accessibility of an IT department, there is a significant difference among adopters and non-adopters of E-Commerce. Firms having IT departments tend towards adopting E-Commerce whereas firms not having IT departments are skeptical about the decision. This is because firms without IT departments are likely to feel that the cost is quite substantial despite the potential benefits. In this way, adopters and non-adopters differ from each other.

Primary buyers of products, an industry level factor influencing a firm’s strategy in terms of adoption of E-Commerce, has turned out to be insignificant. The basic reason is that, as most of the rubber products are demanded as an ancillary product by some other industries, the proportion of direct consumers and retailers for the products are less. The sale of products to other industries is based on orders made by these industries for rubber products. Although the proportion of industry buyers is higher than consumers and retailers, the kind of buyer does not make any significant difference in adoption of E-Commerce. Although there is greater likelihood for larger firms to accept E-Commerce, it is not just the scale of operation but also technical know-how of the owner and competitive pressure that impacts a firm’s decision whether it adopts E-Commerce or not.

Conclusion

This paper finds that scale of operations substantially increases the odds of adoption of E-Commerce, market competitiveness individually does not impact adoption, but along with the technical know-how of the owner/manager, it also has a positive impact on the adoption of E-commerce. Likewise, favourable government policies boost E-Commerce adoption by firms. The results from the research provide the end system users, i.e., the manufacturers of rubber products, with a more vivid interpretation of the numerous considerations influencing a manager’s decision to adopt E-Commerce.

The scope of the study is very vast, still, a researcher will not have any claim that findings are accurate and true in every possible way. The reason behind this is that the social researcher has to collect data under constraints and limitations. This study is not an exception. It also has some limitations and is based on certain assumptions. The sample size taken in the study was very small to generalize the results for Pune as a whole. The financial constraints and paucity of time did not allow the researchers to cover a larger sample size. This research was taken down to analyze the factors responsible for the E-commerce adoption by rubber manufacturing firms and SMEs, but the technical aspect of E-Commerce could not be covered properly. However, even after considering all the limitations and constraints, the paper paves an insight on the need of further research and filling the dearth of literature on the role of E-commerce in giving wings to sunrise sectors in the Indian economy. Finally, the paper has been able to identify new important factors influencing the rubber industry's marketing strategy and the primary reasons behind adopting and not adopting E-Commerce and hence, makes a significant contribution for the research on the topic.

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