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Electronic Commerce Applications among Indian Small and Medium Enterprises

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Abstract: The cutting edge for business today is electronic commerce. The main vehicle of electronic commerce unequivocally is the Internet and the World Wide Web. With the rapid advancement in the Internet software and hardware and the infrastructure, the electronic commerce is also becoming more and more popular. Many large corporations, small and medium companies and individuals are investing more and more in the Internet business. The main purpose of this paper is to study the effect of e-commerce applications on the operational performance of small and medium enterprises. There are many different types of e-commerce usages that may influence operational performances; in this research we group them according to five different categories: electronic advertising, payment system, marketing, customer support service, order and delivery. For analyzing the data derived from questionnaire, Goodness of Fit Tests and Structural Equation Modeling/Path Analysis were used and the software's which has been used for analyzing the data were LISREL 8.54 and SPSS 18. Survey is considered to be the most appropriate and suitable for this study. According to statistical analysis in this research the results indicates that the electronic commerce applications has been influential on the operational performance in the Indian SMEs.

Keywords: *Electronic Commerce, Small and Medium Enterprise, Operational Performance, Organizational Performance*

1. Introduction

In most countries, small and medium enterprises are the backbone of the economy. According to Schaper and Volery (2004), small businesses are important to all national economies because they provide employment opportunities for people, the next generations of large firms, competition, innovation, an outlet for entrepreneurial activity, exports, specialized products and services, support to big business, decentralization, distributions of economics resources, wealth and opportunities and flexibility in the overall economy (Ababulgu, and Islam, 2007). This study focuses on small and medium Enterprises for two key reasons. First, they are important to economic development in developing countries such as India. The second reason to focus on small and medium Enterprises is that they are in a very good position to adapt to new technology like e-commerce; they may be able to adapt faster than larger companies that can slowed by bureaucracy and stricter staffing hierarchies. Use of ICT in business has been able to make valuable strides towards achieving the goals of organizations that indeed has increased customer satisfaction and profitability. Researchers introduce applying the ICT in business as electronic commerce. Generally, the application of electronic commerce by small and medium enterprises in India is proceeding at a normal rate. E-commerce applications are such as electronic Marketing (Duffy, 2005), ad e (Wang, *et al.,* 2009; Mazandarani, 2010) customer support services (Molla and Licker, 2001), electronic ordering and delivery (Senn, 2000) and electronic payment systems (Hua and Guan, 2000). The impact of business performance has introduced e-commerce as a new business approach toward customer satisfaction profitability. Operational performance of a company is related to activities that improve efficiency and effectiveness of business activities.

Eid (2011) studied the use of e-commerce in business management and concluded that the use of electronic commerce mechanisms is effective on market share and customer satisfaction of the companies. Other studies conducted by Allen and Fjermestad (2001) showed that electronic commerce applications had a high impact on new products development and product quality improvement which itself increases the market share and customer satisfaction. Stroehle (2008) was of the opinion that the application of electronic

commerce in the industry is influential on the improvement of the effectiveness of marketing activities. All these cases show the effectiveness of e-commerce applications on the improvement of operational performance of business. Application of electronic commerce and its impact on operational performance has been confirmed in the investigation of many researchers, in this research a great deal of efforts and time has been exerted to discover that whether this relationship is successful in the small and medium enterprises in India. In this paper, aspects of the initial investigation into the relationship between e commerce applications and operational performance in Indian small and medium enterprises are presented. .

2. Review of Literature

Small and Medium Enterprises in India : In most developing countries, small and medium enterprises constitute the bulk of the industrial base and contribute significantly to their exports as well as to their GDP or GNP. For instance, India has nearly three million SMEs, which account for almost 50 per cent of industrial output and 42 per cent of India's total exports. It is the most important employment-generating sector and is an effective tool for promotion of balanced regional development (Marg, 2001). The definition of SMEs varies in different countries and studies but is usually based on employment, assets, turnover and the balance sheet total (Burns, 2001; Seyal and Rahman, 2003). The following table shows definition of small and medium enterprise by number of employees in different countries of the world.

Table 1: Definitions of SMEs by number of Employees

Country	Small	Medium	**Country**	Small	Medium
United Kingdom	50	250	Canada	50	50-500
Poland	50	50-250	Brunei	10	10 – 100
Australia	20	21 – 200	Austria	50	50-250
The Philippines	10 - 99	100 – 199	Iran	50	50-250
Thailand	50	50 – 200	Albania	10-40	50-250
Hungary	11-50	51-250	Slovakia	1-24	25-500
Romania	1-20	21-200	Uzbekistan	300	300-1,000

As a legacy of Gandhian philosophy, since independence the small and medium sectors have played an important role in the economic development of India (Gupta, 2006). Enterprise in India is broadly classified into two categories: 1) Manufacturing and 2) those engaged in providing/rendering of services. The" Micro, Small and Medium Enterprises Development (MSMED) Act, 2006" is the first Act for MSMEs which, provides for establishment of a statutory National Board for Micro, Small and Medium Enterprises, filing of memoranda, measures for promotion, development and enhancement of competitiveness of MSMEs, credit facilities, procurement preference and provisions related to delayed payments to micro and small enterprises. The medium sector has been defined for the first time in India and Micro enterprises have been defined for the first time in this Act. Under the MSMED Act 2006, the earlier, rather limited, concept of 'Industries' has been widened to that of 'Enterprises'. Enterprises have been classified broadly into two categories, namely enterprises engaged in the manufacture/production of goods pertaining to any industry; & enterprises engaged in providing/rendering of services. Enterprises have been defined in terms of investment in plant and machinery/ equipment (excluding land & building) as below:

Table 2(a): Definitions before 2 October 2006

Investment ceiling for plant, machinery or fixed assets (land & building)		
Classification	**Manufacturing enterprises**	**Service enterprises**
Micro	Up to Rs. 2.5 million (US$ 50,000)	Up to 1 million Rs. ($ 20,000)
Small	Between 2.5 & 10 million Rs ($ 50,000 & $ 0.20	Up to 1 million Rs. ($ 20,000)
Medium	Not defined before 2006	Not defined before 2006

(Ravi, 2009)

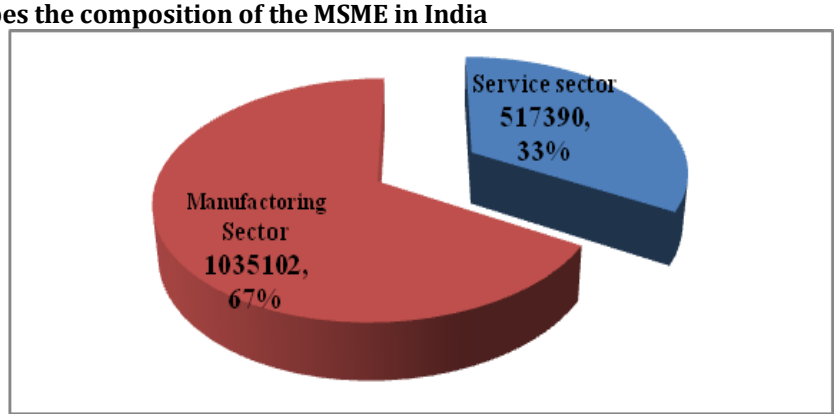
Table 2(b): Definitions after 2 October 2006

Investment ceiling for plant, machinery or equipments	Manufacturing Enterprises*	Service Enterprises**
Micro	Up to Rs. 2.5 million (US$ 50,000)	Up to Rs. 1 million (US$ 20,000)
Small	Rs. 2.5 to Rs. 50 million / (US$ 1 million)	Rs 1 to 20 million Rs (US$
Medium	Rs.50 million to Rs.100 million (US$ 2	Rs 20 to 50 million Rs (US$ 1

(Ghatak, 2010) ** Investment limit in Plant & Machinery ** Investment limit in equipments *** Rs 50 = 1 USD*

The below Graph describes the composition of the MSME in India. This Graph also highlights the decomposition of MSME units based on nature of activity. In the sector as a whole, about 33 percent of enterprises are engaged in services sector and majorities of enterprises are in the manufacturing space (67 percent).

Graph 1: Describes the composition of the MSME in India



Data source: (Annual Reports, Ministry of MSMEs, 2009-10; Afshar *et al.* 2010b)

Electronic commerce applications: E-commerce is changing all business functional areas and their important tasks, ranging from advertising to paying bills. Electronic commerce has attracted significant attention in the last few years. This high profile attention has resulted in significant progress towards strategies, requirements, and development of e-commerce applications (Upkar, 2002; Kalakota and Robinson, 1999 and Afshar *et al,* 2010). The earliest electronic commerce studies can be traced back to those published in 1994 (Cronin *et al.,* 1994; Barker, 1994). Barker (1994) provided one of the first surveys on how small businesses used the Internet for business purposes.

Cronin *et al.* (1994) discussed how e-commerce might change how competitive intelligence was being gathered. They also discussed briefly how small businesses could benefit from such a tool. In the next year or so, more research was published focusing on SMEs and e-commerce (e.g., Cockburn & Wilson, 1995; Fuller & Jenkins, 1995; Poon & Swatman, 1995). Since then, much has been published from the perspective of information systems, marketing, and management (Cited in Poon and Huang, 2004). Turban *et al.* (2002) define e-commerce as: "An emerging concept that describes the process of buying, selling, or exchanging services and information via computer networks". Raymond (2001) defines e-commerce as: "The functions of information are exchange and commercial transaction support that operate on telecommunications networks linking business partners (typically customers and suppliers)." Although there are many different types of e-commerce applications, we can group them according to categories. The following table shall describe five different categories of electronic commerce applications in small and medium enterprises.

Table 3: Various Applications of E commerce

Different Applications of E commerce	Description	Researchers
Electronic Advertising	• Provide product information to customers • Displaying company information on website • Online electronic brochures or buying guides • Display only a range a products which are relevant to the particular customer	Block *et al.* (1996) Ainin & Jaffar (2003) Soh et al. (1997)
Electronic Customer Support Service	• Online help- Frequently Asked Question • Online products update • Handling customers feedback/queries online • Online application/registration • Personalized email communication	Turban *et al.* (2000) Ainin (2000) Fatimah *et al.* (2000)
Electronic Marketing	• Allowing a customer to contact a sales office • Share information with competitors, customers and suppliers • Using internet to find out customers' needs and wants • Using internet for anticipating customer needs • Achieving customer satisfaction through the electronic channel	Arie *et al.* (1995) Block *et al.* (1996) Johnson (2003) Kotler, (2000) Smith & Chaffey (2005)
Electronic Payment System	• Electronic Fund Transfer(EFT) • Online credit card processing • Electronic money • Smart and prepaid card	Lawal (2010) Block *et al.* (1996) Zwass (1998) Fatimah *et al.* (2000)
Electronic Order and Delivery	• Coordinating procurement with suppliers online • On-line ordering of software products • Lower costs per business transaction • Tracking incoming and outgoing goods delivery • Online order entry and delivery • Electronic Data Interchange(EDI)	Johnson (2003) Oakes (2002) Turban *et al.* (2000) Fahri & Omar (2001)

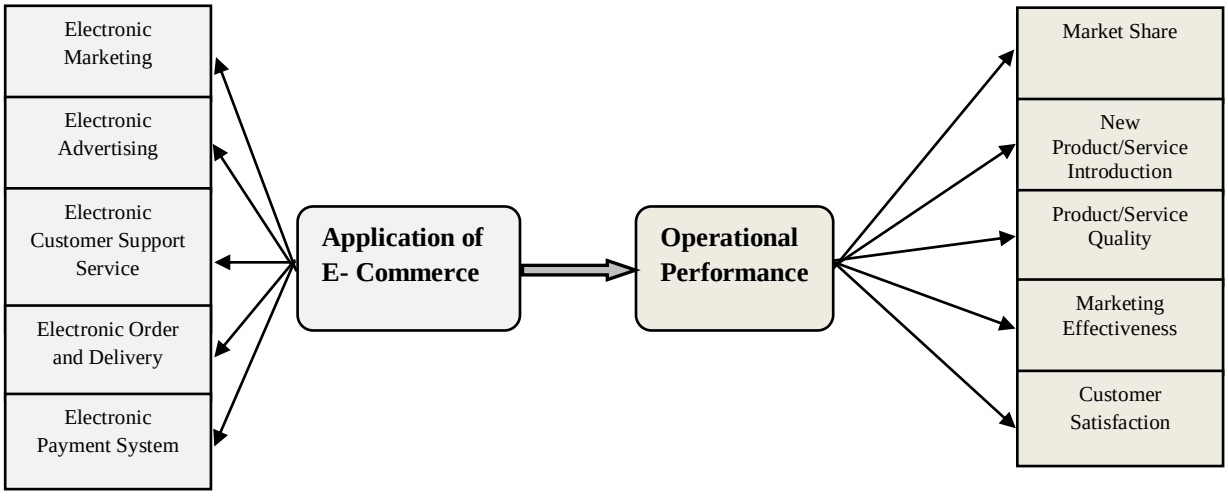
E-commerce offers lower costs per business transaction, especially with respect to mailing and paper costs (Lawal, 2010). Fewer mistakes occur in paperwork because fewer people handle the data (Johnson, 2003). Customer satisfaction is heightened due to better access to order and promotional data. The old rules are breaking down. Companies now share information with competitors, producing "competition". Suppliers and buyers share information: Economic and Cultural boundaries are disappearing – in some market segments businesses must be global (Johnson, 2003). Generally, in the electronic commerce research literature, greater levels of electronic commerce adoption have been linked with improved organizational performance (Nickels *et al.,* 2007 and Kraemer *et al.,* 2002). Berrill *et al.* (2004) believes that Companies that adopt internet technology in various activities are aware of this benefit and hope to improve competitive advantage, communication, and products and services when they adopt e-commerce.

Concepts of operational performance as a part of organizational performance: Many SMEs are becoming ever more focused on their organizational performance. Organizational performance comprises the actual results or output of an organization as measured against its intended results or outputs. Typically, there are different ways to characterize various types of organizational performance in small and medium sized enterprises. The following paragraph briefly shows the different types of them. Dyer and Reeves (1995), proposed four possible types of measurement for organizational performance in small and medium-sized manufacturing firms: 1) human resource outcomes (job satisfaction, absenteeism, turnover), 2) organizational outcomes (quality, productivity, service), 3) financial accounting outcomes (Return on assets, profitability), and 4) capital market outcomes, (stock price, growth, returns). Pierre et al. (2009) argued that

organizational performance encompasses three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, etc.); (b) product market performance (sales, market share, etc.); and (c) shareholder return (total shareholder return, economic value added, etc.) According to Shaker and Basem (2010) organizational performance indicators from relationship marketing perspective are included: Increasing market Share, Retaining current customers, Attracting new customers, creating loyal customers, Increasing profit, Increasing return on investment, Positive image. Venkatrman and Ramanujam (1986) argued that organizational performance have three dimensions: financial performance, operational performance, and stakeholder performance. According to literature review, most common types of organizational performance measures that used in recent empirical research are included: Financial and accounting performance, operational performance and market-based performance (Brealey *et al.,* 2001; Higgins, 1995; Helfert, 1994; Penman, 2001). In this paper we tried to indentify the relationship between application of electronic commerce and operational performance as part of organizational performance. According to Carton and Hofer (2006) operational performance can be further subcategorized into market share, new product introduction, product/service quality, marketing effectiveness and customer satisfaction. So, Hypotheses of this study are tested in the form of one main hypothesis and five sub-hypotheses.

H1*- E-commerce Applications have a significant and positive impact on operational performance in small and medium enterprises*
H1.1- E-commerce Applications have a significant and positive impact on market share in small and medium enterprises
H1.2- E-commerce Applications have a significant and positive impact on new product introduction in small and medium enterprises
H1.3- E-commerce Applications have a significant and positive impact on product/service quality in small and medium enterprises
H1.4- E-commerce Applications have a significant and positive impact on marketing effectiveness in small and medium enterprises
H1.5- E-commerce Applications have a significant and positive impact on customer satisfaction in small and medium enterprises

Figure1: Research model



3. Methodology of the Study

The purpose of this research was to explore possible relationship between the application of e-commerce and the organizational performance in Indian SMEs. The study employed survey research to determine whether an impact exists between the dependent variable—application of e-commerce—and the independent variable—operational performance.
The present study because of dealing with testing the effect of Application of E-commerce variable on operational performance variable (including: Market Share, New Product / Service Introduction, Product /

Services Quality, Marketing Effectiveness and Customer Satisfaction) and develop practical knowledge about the quality of relation and effectiveness between these two variables, from the aim and objectives view point is practical and from method of data collection and analysis view point is descriptive and is of correlative type.

Population, Sample, and Data Collection Procedure: The questionnaire comprised three main sections. The first section asked the respondents about their personal information. The second section contains 21 statements measuring the five applications for E-Commerce: Electronic Marketing, Electronic Advertising, Electronic Customer Support Service, Electronic Order and Delivery, and Electronic Payment System. These statements are formulated by ((Turban *et al.* (2000); Ainin, and Jaffar, (2003); Ainin, (2000); Kotler, (2000); Smith & Chaffey (2005); Soh *et al.* (1997)). Respondent were asked to indicate their extent of agreement using a five point likert scale (with 5 = completely agree, to 1 = completely disagree). For these questions the Cronbach's Alpha coefficient of 0.85 has been calculated. The third section contains 15 statements measuring the five Operational Performance dimensions: Market Share, New Product/Service Introduction, Product/Service Quality, Marketing Effectiveness and Customer Satisfaction. These statements are formulated by (Carton and Hofer, 2006; Combs, *et al.,* 2005; Brealey *et al.,* 2001; Higgins, 1995; Helfert, 1994; Penman, 2001). Respondent were asked to indicate their extent of agreement using a five point likert scale (where 5 = extensively covered, to 1 = weakly covered). For these questions, the Cronbach's Alpha coefficient of 0.88 has been calculated and For analyzing data derived from questionnaire Structural Equation Modeling / Path Diagram has been used. In this study, we used *Stratified Random Sampling* for collect necessary data. The population of the research will be all the small and medium enterprises in Pune which are using electronic commerce and own internet website which is estimated to be 395 units. Out of 395 units, a sample of 120 SME units is to be taking to obtain the primary data. Therefore, 150 questionnaires have been distributed in 3 months period between population samples randomly. After several attempts, only 135 responses were collected. Through the data screening process only 121 responses found to be usable for further analysis. Among all respondents, 44.9% people have management-related education and 25.6% people have information technology-related education.

4. Results of the Study

Goodness of Fit Tests: Given that structural equation modeling has no single statistical test of significance for model fit, several goodness-of-fit measures were used to assess the fit of model. The relative chi-square (chi-square/degree of freedom; χ^2/df), standardized root mean square residual (standardized RMSR), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normed fit index (NFI), and comparative fit index (CFI) were used as goodness-of-fit measures. Due to the sensitivity of the chi-sqare test to sample size, the relative chi-square was used (it should be 3.0 less for an acceptable model) (Tomer & Pugesek, 2003), Standardized RMSR should not be greater than 0.10 and GFI, AGFI, NFI, and CFI should exceed 0.90 to be acceptable (Hair et al. 2006). The goodness of fit of a statistical model describes how well it fits a set of observations. The rate of each index has come in the table 4:

Table4: Goodness of fit tests

χ^2	χ^2 /df	Root Mean Square Residual (RMR)	Goodness of Fit Index (GFI)	Adjusted Goodness of Fit Index	Root Mean Square Error of Approximation	Normed Fit Index (NFI)	Non-Normed Fit Index	Comparative Fit Index (CFI)
89.53	2.64	0.038	0.93	0.94	0.079	0.92	0.94	0.90

The measurement model with all two constructs was using confirmatory factor analysis and t-value (Anderson & Gerbing, 1992). Table 5 presents factor loading and the corresponding t-values of indicators in the measurement model. To be considered adequate, the individual item reliability should be greater than 0.50 (Joreskog & Sorbom, 1996). The factor loading extracted should be at least 0.5 and the t-value should be greater than 1.96 (Bagozzi & Yi, 1988). All indicators are significant at 0.05 levels (Level of confidence 95%). The measurement model exhibited a good level of model fit.

Table 5: Factor loading and t-values of the measurement model

Construct/indicator	Factor Loading	t-value
Application of E-Commerce		
Electronic Marketing	0.53	8.32
Electronic Advertising	0.51	13.31
Electronic Customer Support Service	0.60	13.95
Electronic Order and Delivery	0.62	12.10
Electronic Payment System	0.80	9.52
Operational Performance		
Market Share	0.53	8.68
New Product/Service Introduction	0.68	14.32
Product/Service Quality	0.66	14.11
Marketing Effectiveness	0.55	11.63
Customer Satisfaction	0.50	8.23

Only Electronic Marketing and Customer Satisfaction had item/indicator reliability below 0.50 but in table 5 the corresponding t-values were significant for all two. According to the results, fitness model is well.

Hypotheses testing using Structural Equation Modeling/Path Analysis: Structural equation modeling (SEM) is a powerful tool to explore and contrast hypotheses on causal relationships among variables using observational data. For all hypotheses of the study below hypothesis test was used.

$H_{o:}\ \alpha = o$ *Null hypothesis:* Correlation between two variables is not significant
$H_{1:}\ \alpha \neq o$ *Alternative hypothesis:* Correlation between two variables is significant

To address the research questions and test the hypotheses, the percentages of explained variance (*R2*) for each endogenous variable and the path coefficients of the hypothesized model were assessed. As it is observed, diagram 1 shows structural model of the study for confirming main hypothesis (and sub-hypotheses) of the study.

Diagram 1: Structural model of study for confirming main hypothesis

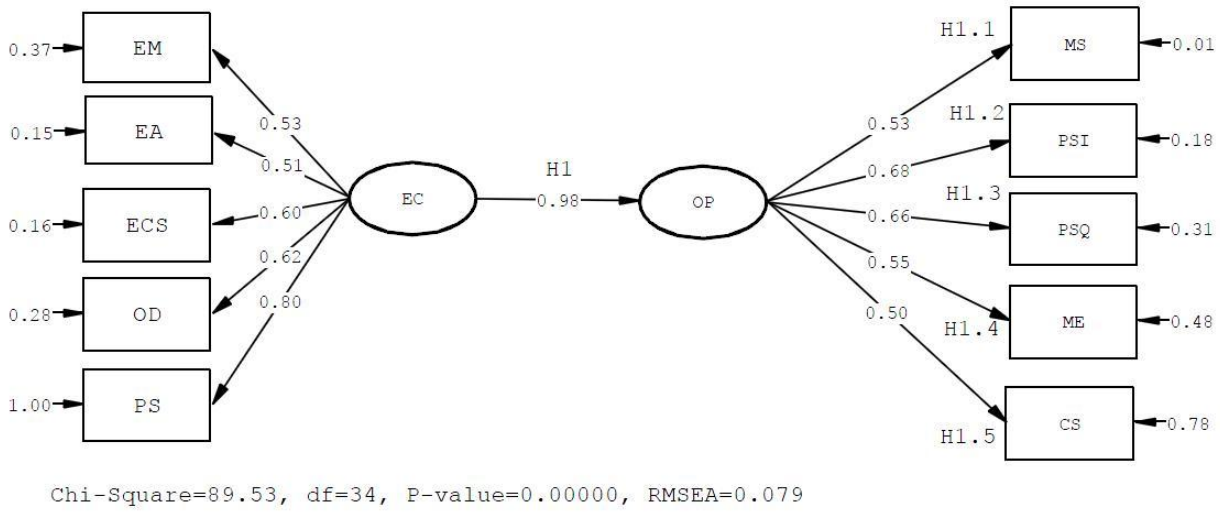
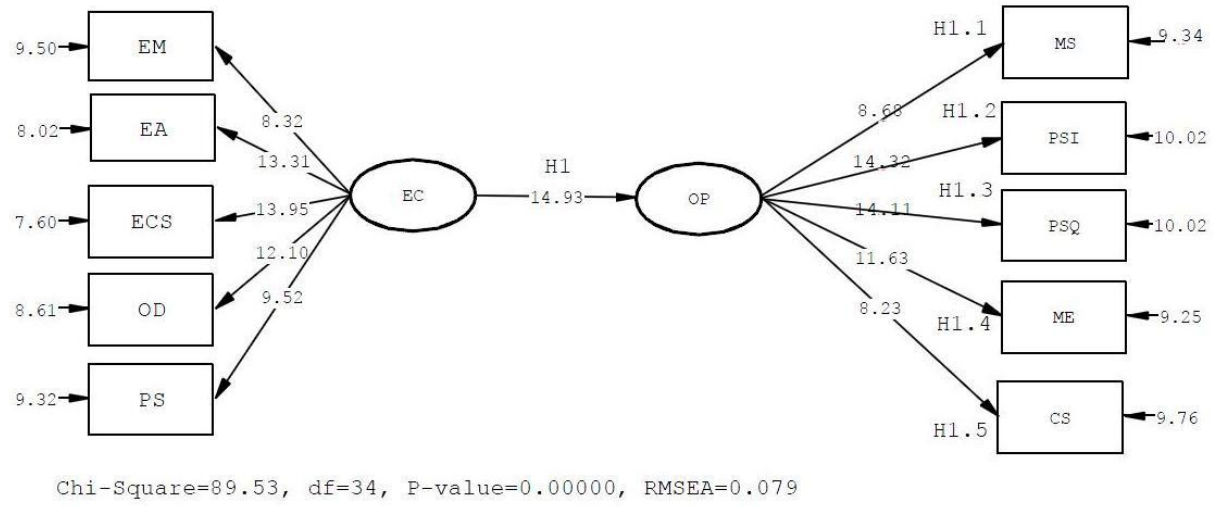


Diagram 2 also shows significance and resulted parameters from main hypothesis test. Significance value of 14.93 for the main hypothesis was determined. Significance value of the main hypothesis is placed out of (-1.98, 1.98) interval, therefore, the formed relation is out of the null hypothesis and indicates the ratification of the main hypothesis of the research. According to results of these two models (relation is based on standard estimation of 0.98 and is based on significance equal to 14.93) hence, main hypothesis is confirmed.

Diagram 2: Structural model of study for confirming main hypothesis



Based on the analysis done using path analysis, results of testing the hypotheses of the study can be seen in table 6. Standardized coefficient and significance value in confirming or rejecting the hypotheses (significance of hypotheses) was used.

Table 6: Results of testing the hypotheses of the study using path analysis

Hypotheses of the study	Path		Standardized coefficient	The Significance of Values	Testing of Hypotheses
H1	**Application for E-Commerce**	**Operational Performance**	**0.98**	**14.93**	**Confirmed**
$H_{1.1}$	Application for E-Commerce	Market Share	0.86	GOOD	Confirmed
$H_{1.2}$	Application for E-Commerce	New Product/Service Introduction	0.96	GOOD	Confirmed
$H_{1.3}$	Application for E-Commerce	Product/Service Quality	0.78	GOOD	Confirmed
$H_{1.4}$	Application for E-Commerce	Marketing Effectiveness	0.86	GOOD	Confirmed
$H_{1.5}$	Application for E-Commerce	Customer Satisfaction	0.97	GOOD	Confirmed

5. Discussion and Conclusion

Electronic commerce is a process whereby organization share and exchange information, maintain relationships and conduct business transactions using technologies. Such activities carried out by organizations or businesses basically involved in five different business processes or activities, namely, advertising, marketing, order and delivery, payment and customer support and services. On the other hand,

operational performance as a part of organizational performance can be further subcategorized into market share, new product introduction, product/service quality, marketing effectiveness and customer satisfaction. Researchers such as (e.g. Wang, et al., 2009; Mazandarani, 2010; Duffy, 2005; Molla and Licker, 2001; Hua and Guan, 2000 and Senn, 2000) argued that e-commerce applications in the industrial and service sector has great impact on improvement of the different sections of the organizational performance. From the Operational perspective e-commerce offers a quick move for the success of business. Results of the present research hypotheses clearly ratified the above said claims. Results of fitness indicators of the model show that the proposed model is confirmed. Therefore, the proposed model was suitably able to place the variables of the study and show their relationship with their dimensions. According to statistical analysis in this research the results indicates that the electronic commerce applications have a significant and positive impact on operational performance in Indian SMEs.

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