CHAPTER 8

RESULTS AND DISCUSSIONS

The scope of this chapter comprise discussion on the results and findings based on the analysis covered in the previous chapters. This is mainly to bring out the significance, linkages with previous research studies on the subject, interpretation and generalization wherever possible.

8.1 ASSESSMENT OF THE STATUS OF MSMEs, E-BUSINESS APPLICATION SYSTEM AND E-BUSINESS ENABLERS

8.1.1 Status of MSMEs

As per the result from Table 4.1, the percentages of distribution of respondents surveyed agree but not closely with the distribution of the MSMEs in India. The reason for the mismatch has already explained in 4.2.1. Quinn et al (1983) viewed that any MSMEs should have atleast five years of existence in business to undergo the four stages of the life cycle. As high as 76% of firms surveyed for this research have more than 5 years of experience. The average age of MSMEs surveyed is around nine years (Table 4. in this research and hence most of the MSMEs would have reached the last stage of development to conceive and adopt of e-business system in their established SCM.

The survey reveal that 61.1 % of the firms are either successful or more successful in managing SCM. Firms with better infrastructure and the owner having good education background are capable of managing the SCM
successfully. Though many enterprises are micro ones, they are also able to manage their SC successful. This is possible when the e-business systems are implemented and e-business enablers are adopted.

8.1.2 Status of e-business Systems in MSMEs

Table 4.4 gives the percentage usage of 11 e-business systm by the firms surveyed. The usage of MRP II and ERP are 45% and 72.5% respectively. It was noticed that a majority of firms use MRP II as a module of the ERP system, since MRP II requires vast data the cost of ERP package is affordable by money. As much as 57.2% of the MSMEs are using Warehouse management package (WMS). The use of WMS package enables some MSMEs who transport large inventores to their customers in remote places to manage the logistics functions and optimize inventory.

Only 52.7% of the MSMEs are using CRM. The MSMEs are dealing with only few customers, and so the need is limited to have exclusive software to handle customer database. In many cases even the few customers are large enterprises (LE) and they force the MSMEs to use the CRM in any one of the form. Nowadays, due to globalization the tendency for MSMEs is to attract more customers. As high as 61.1% of the MSMEs are using SRM even though they are dealing with few suppliers. Usage of SRM is the result of peer pressure to develop partnerships to expand their capabilities involved in materials requisition, procurement, operating procedures and efficiencies, and exchange of product information.

It is evident form the table, 4.4.the use of APS by MSMEs is only 37.4. The MSMEs are using it in a nominal way for capacity planning, balancing the available resources and planning for various products in a synchronized form. Only 30.5% of the MSMEs surveyed are practicing JIT supply with the help of software package to synchronize all the data from
customer end to supplier end. They supply to LE on hourly basis or day basis, aim to remove the logistic base supply to maintain zero inventory ensuring more flexibility in their operation.

Usage of DSS package by the MSMEs account for 40.5%, mainly used to support the system for data base management and a guide in decision process. A low percentage (11.5%) of the MSMEs are using RFID for quick reading of all kind of inventories, for handling variety of small size components for quick recognition and identification. The extent of usage of EDI is 35.8% primarily for exchanging business transactions, customer orders, invoices, and shipping information with their customers and suppliers.

From the above analysis, it is obvious that may MSMEs use some form of e-business systems for their operation. This is similar to the finding of a study regarding European SMEs, which says that all respondents used at least one of the eight e-business systems surveyed in addition to e-mail Eikebrokk and Olsen (2007).

8.1.3 Association between Success in Managing SC and e-business System Currently Available

A definite association exists between the success in managing SC and e-business system currently available. The results of the chi square test support that there exists an association between the e-business systems MRP, MRPII, ERP, CRM, WMS, JIT, RFID, EDI, Bar coding and successful in managing SC. In general, the success of SCM depends on usage of e-business system. The MSMEs need to take measures to maintain their reputation in the market and also to identify potential areas for technology up gradation. They started adopting various e-business systems to remain successful in managing the SC.
8.1.4 Status of e-business Enablers in MSMEs

As indicated in section 3.3.1, 27.5% of firms use the e-business enabler e-procurement currently. This closely agrees with survey held in USA which states that only 30 percent of the firms have implemented at least a basic e-procurement enabler (Presutti 2003). This MSMEs use e-procurement system to purchase indirect materials for operations, sales, maintenance and administration due to lack of the skill level to handle the virtual data and negotiation. They slowly started adopting it for direct material purchasing.

The extent of usage of E-auction was found used by 24.4% for procurement. As high as 145 auction sites are available in the Internet, which provide the support for more efficient pricing, lower transaction costs, global interaction and speed. However, the buyer supplier relationship may not be that effective due to the presence of many suppliers in e-auction. The firms using retail e-payments currently is 42.7% for the purchase made. Regarding e-payment system the MSMEs expect that they must be robust, secure and standardized and should provide enough information for accepted e-payment. Though difficulties are faced sometimes, due to peer firm’s demand, the MSMEs started using e-payment system.

The MSMEs are currently using the e-business enabled certifications for security of payments is 37.4%. This is a structured and hierarchical way of security and certification system created by the member banks for transaction between MSMEs and partners. Only 28.2% of the MSMEs found using electronic signature currently, captured through portable devices and sent instantaneously to firms to manage the delivery errors in an efficient manner. Extent of usage of electronic ID currently by MSMEs is 37.4%, primarily due to pressure from partner involving some important manufacture of components. Though this can be used as a key for
e-payments and an easy to use solution, many MSMEs do not use despite having this facility. This may due to the fear of exploitation.

The use of electronic document management, an e-business enabler is to the extent of 32.8% only. It is widely accepted to use the online catalogues, and portable computing e-business initiatives. In the initial stages, the usage was high, but now slowly it is decreasing due to the more recent forms of e-business technologies. A significantly high 93.12% of MSMEs use internet currently for their business purpose. Most of the MSMEs them use it for order placement, order processing, follow up and checking the order details.

It was found that 70.2% of MSMEs are using the e-business enabler order processing, as mentioned earlier in this section, MSMEs use e-business system, SRM to reduce the transaction cost by using order processing. Similarly a high proportion of 65.6% of MSMEs use the e-business aspect, follow up currently using internet to follow up of the orders placed or follow up for payments. The use of on-line marketing by MSMEs account for 50.47%. This is due to the initiative of e-business that provide opportunity for the MSMEs to carry out online marketing of their specialised products to serve the global market.

8.1.5 Status of Supply Chain (SC) Enablers in MSMEs

From the mean rank values of the Friedman test in Table 4.8, it is found that the two SC enablers viz., close partnership with supplier and customers are having priority in implementation with mean rank value of 3.25 and 3.18 respectively (maximum rank 5). But according to a study done in Turkey SMEs indicate that 32.5% and 22.17% (maximum percentage of 100) of the SMEs using these enablers (Koh et al 2007). The study shows that
building close partnership with supplier is equally important like close partner with suppliers

The usage level of the SC enablers, holding safety stock and subcontracting are with the mean rank values of 2.88 and 2.56 respectively. The MSMEs are slowly started implementing these enablers. As they move towards the usage of e-business systems, they hold more information instead of inventories and subcontracting. The study by Koh et al (2007) shows that the usage of enablers, holding inventories and safety stock have high percentage 42.86% and 37.44% respectively. These percentages closely agrees with the equivalent mean rank values of this study.

Regarding third party logistics (3PL), the mean rank value is 2.6, which is comparable with the values in terms of percentage (27.16%) mentioned in the research by Koh et al (2007). It may be due the fact that MSMEs depend on 3PL to provide a wide variety of transportation and logistics function to enjoy competitive customer service in different functions.

8.1.6 Benefits of SC Enablers

Boeck et al (2009) explored the buyer-seller relationship in Canada, by focusing on how its development influences and also influenced by the use of B2B e-commerce strategies. The study confirms that the e-business can take the buyer supplier relationship to the next level for getting maximum benefits. In the present research dealing with Indian situation, this coordination has only the average influence as the mean rank values are 3.49 and 3.36 (Table 4.9). Perhaps, better coordination is possible by maintaining few suppliers and by practicing e-procurement.

Building relationship with suppliers and customer has increased flexibility in operation and improved forecasting and reduced inventory
according to a study carried in motherboard manufacturing company in Taiwan (Chang et al 2005). As per the present research study, the influence of SC enablers is only average. This may be due to the fact that MSMEs are slow in adopting and practice of the e-business enablers like electronic data interchange with partners.

8.1.7 Contribution of SC Enablers to MSMEs

The results of multiple regression (section 4.3.5) of the study confirms the \( \beta_1 = 3.661, p < 0.001 \) relationship between benefits of using SC enabler and the strategic planning in procurement and distributions. This focuses on technology innovation and efficient manufacturing process with the influence of SC enablers. This result closely with the study by Koh et al (2007). From the results \( \beta_2 = 3.389, p < 0.01 \) it is found a relationship exist between benefits of using SC enabler and the close partnership with customers. Again this agrees with results of the study Koh et al (2007). Moreover the above relationship is confirmed by the study of Lim et al (2006) in Singapore. The present study establishes that SMEs need guidance in the formal process of strategic planning and those that are incapable of preparing strategic plans covering all the activities of SC are unlikely to be successful in the supply chain.

8.1.8 Emphasis of Top Management in SC

Analysis of the mean rank values vide section 4.4.2, indicate the emphasis of top management in SC shows that the MSMEs are influenced averagely by the factors. Raymond and Bergeron (2008) reported that in Canadian SMEs, the importance of internal communication was 67%. In this research, the influence level of internal communication is average with the mean rank of 3.34, can be considered as closely confirming to the above study. It is observed that support by the top management is in the form of
understanding the capabilities and limitation to match with requirement of resources. This results in the development of a good communication system. Top management attitudes towards new technology, knowledge and skills of the management and workforce are recognized as potential requirement for e-business implementation in the SC. This is again confirmed by the investigation by Pavic et al (2007) involving SMEs in UK.

8.1.9 Importance of SCM Attributes

The MSMEs are influenced by e-business attributes as evident form Table 4.5. According to Gunasekaran et al (2004) e-commerce opens up the communication and enlarges the networking opportunities besides enhancing teamwork and customer relationship management. This is due to the fact that success of MSMEs depends on having a small team with multiple specialized talents, who try to enhance open communication between the employees. According to the study by Mistry (2006) manufacturing firms, practicing JIT has maximum influence on reduction in inventory level, free up warehouse space and un-tighten cash flow. Results of the present research indicate reduction in inventory as a factor of SCM attribute in MSMEs exercise greater influence of e-business.

8.1.10 E-business Infrastructure Influence

The Table 4.16 indicate that the MSMEs are influenced by the e-business infrastructure. The case study of Harlingen Waterworks, USA. by Tummala (2006) found that the use of an e-procurement tool assist the company to provide a more accurate costing for the product and service produced by the updation of information system available. The current study also found that the influence of e-business factor, regular updation of information systems with accurate and timely information is average. The buyer-seller relationship was explored by Boeck et al (2009) in multiple case
studies involving buyer-seller relationship of companies in Canada, reveal that the firms should be linked electronically to get maximum benefit in SC partners. The present study (Table 4.16) indicates that as an infrastructure requirement of MSMEs, linking departments electronically exercise an average influence.

8.1.11 Benchmarking of SCM Activities

The MSMEs are influenced by benchmarking SCM activities (Table 4.17). As per the study of Luo et al. (2001a) about manufacturing firm, e-business enabled supply chain results in maximum benefits to manufacturing operation and business strategy, and the manufacturing operations to be integrated with various supply chain. The results of the present study indicate that integration of manufacturing operation is a benchmarking activity of the MSMEs. It is observed that recently the MSMEs are resorting to technology improvement to reduce the emission of Green House gases and other technologies as per global standard in manufacturing process. By integration of manufacturing operation, it is meant integration of exchange of information about demand forecasts, production plans and delivery dates and the integration of physical flows i.e. the redesign of the supply base and the coupling of systems through techniques such as Kanban and VMI (Cagliano et al 2006)

Thakkar et al. (2008) investigated the issue of information technology (IT) adoption and implementation in Indian manufacturing SMEs. As per that, customer focus is a SCM strategy, significantly influences LE enterprises as means to reduce cost. Though this finding pertains to large industries, this could be adopted in principle to MSMEs also. But in this research (Table 4.17), customer focus is found as one of the prime benchmark activity in MSMEs environment, and this may be due to the changing responsiveness to the need of the customers.
8.1.12 Association between Benchmarking of SCM Activities and the Support by Top Management of MSMEs

A regression analysis was made to establish the association between benchmarking of SCM activities and the top management support (section 4.4.6) involving five variables. But only independent variable, a regression analysis was made, the factor acquisition and implementation of appropriate information system ($X_4$) is having significant relationship with benchmarking activities. Chong et al (2009) examined the influence of inter-organizational relationships on the adoption of e-business in the supply chain of Malaysian SMEs, found relationships such as communication, collaboration and information sharing are significant aspects that affect Malaysian SMEs. It is observed that National Small Industries Corporation (NSIC) provide information services to MSMEs from their website, sector-specific portals and also B2B Web Portal for comprehensive and integrated facilities.

8.2 LEVEL OF E-BUSINESS INFLUENCE ON FACTORS OF SUPPLY CHAIN PERFORMANCE IN MSMEs

8.2.1 Level of e-business Influence on SC Performance Factors

From the mean rank values of the Friedman test results form Table 5.1 regarding 36 SC performance factors considered it is clear that the MSMEs are influenced averagely. The factor, responsiveness to urgent deliveries with highest mean value of 3.47 exercises average level of influence on SC performance. May be this is due to the speed with which the SC can deliver the product to customer as a demand driven operation. The quality of delivered goods is the next factor that influences e-business contribution to the SC performance. It may be due to the fact that it is essential to practice JIT supply for the dedicated customers to satisfy the
customer expectation of quality of the product. Gunasekaran et al (2001) stated that the quality of delivered goods depends on outsourced logistics in the form of 3PL which is a e-business factor to ensure customer satisfaction.

Flexibility in operation is another factor (mean value 3.31) which averagely influenced by e-business contribution to SC performance. It is observed that, MSMEs have limited flexibility in operation to adopt service requirement. The delivery performance is one of the factors which is influenced averagely (mean value 3.27) by e-business for improvement of SC performance. This could be due to vehicle scheduling, warehouse location, and the volume of goods in transit, quality of information exchanged during delivery, number of faultless notes invoiced and flexibility of delivery systems are part of delivery performance.

Saad and Patel (2006) have investigated the relevance of the concept of SC performance in automotive firms in India. The result showed that the concept of supply chain performance was not fully adopted by the Indian automobile sector and highlighted the difficulties associated with its implementation. However, the present study results indicate that MSMEs like automotive accessories manufacturing firm has started using performance measures due to the influence of e-business systems.

8.2.2 Major Factors Influencing Supply Chain Performance

Using factor analysis from (section 5.2.2), thirty six SC performance measurement sub-factors were considered. Subsequently all these thirty six factors reduced to eight important major factors viz., supplier-manufacturer relationship, supplier involvement, SCM operations effectives, order processing, order management, customer expectation, service system, distribution and purchase cycle time. These eight underlying factors mainly contribute to the supply chain performance and the MSMEs can concentrate
on them to improve the supply chain performance. Chae (2009) study offer a practical approach to performance measurement and to present a list of essential key performance indicators (KPIs) focusing on only a small list of KPIs which are critical for their operations management, customer service, and financial viability. This study also confirms that the MSMEs could concentrate on the supplier management factors maximum.

8.2.3 Emphasis on Measures of Performance

To assess the emphasis on measures of performance of MSMEs on SCM, a Friedman test was conducted with four factors (Table 5.3). All factors exercise average influence with the factor increase in profitability having a rank value of 3.51. It is observed that in e-business environment the performance measurement can be made by developing a mechanism to monitor the increase in sale and return on investment and profitability in detail. According to Lee (2004)’s exploration, proper employment and effective management of SC can increase the profitability. Not only the study reveal that successful implementation of SCM directly improves operational performance, but also indirectly enhances customer satisfaction and financial performance. This finding agree with the study by Chin et al (2010), who examined the relationships among SCM practices and their impacts on firm financial and non-financial performance.

8.2.4 Inter-relationship between Measures of Performance and the Usage of SC Enablers in MSMEs

A regression analysis was made (section 5.3.2) to find the inter-relationship between measure of performance and the usage of SC enablers in MSMEs involving four variables viz strategic planning in procurement and distribution, third party logistics (3PL), JIT supply, close partnership with customers. All are found contributing significantly.
is of the view that strategic planning in procurement and distribution has relationship with resource planning ultimately with e-procurement tool. Also is observed that the size of the output in MSMEs is relatively small, naturally the logistics activity would be carried out by consolidating the outputs of few MSMEs by a 3PL on behalf of the shipper. The study results by Sahay et al (2003) shows that SCM has relationship with increase in the number of third party logistics (3PL) providers.

8.2.5 Relationship between Measure of Performance and Usage of SCM Attributes in MSMEs

To establish a relationship between the measure of performance and the usage of SCM attributes in MSMEs a multiple regression analysis was carried out. After considering 14 variables only two variables viz: supply chain benchmarking ($X_1$), Electronic Data Interchange (EDI) found having significant influence (section 5.3.3). It is observed that the benchmarking indicators such as delivery speed, enhanced service quality and product experience are compared with that of competitors’ to gain information for the input of measure of performance. The MSMEs use EDI having a localized integration with closely synchromised isolated systems of suppliers and customers as a measure of performance. According to Chan et al (2012), EDI has relationship with the integration of supply chain process.

8.2.6 Emphasis on Business Performance

Table 5.8 gives the mean rank value, involving four factors as a result of the Friedman test towards emphasis of business performance on SCM of MSMEs. All the factors exercise only average influence. The factor order fulfillment secures highest mean value of 3.24. This may be due to the fact that there is a need to design an efficient supply chain to enable timely and accurate order fulfillment for generating, communicating, entering,
processing, picking and delivering customer orders. The above findings closely agree with the results of the study by McIvor and Humphrey (2004), which states that benefits of e-business has significant influence on order fulfilment times.

The factor reduction in production lead time and inventory days with the mean value of 3.22 exert average influence on the business performance factors. The reason being the production lead time is reduced by partnering with technically significant suppliers, which in turn reduces the time for searching of suppliers for critical components and updating the component related information periodically. This result is corroborated in a generalized way by the study of Hamdani and Wirawan (2012), that knowledge and technology in innovation process influences the reduction in production lead time and inventory days.

8.2.7 Customer Related Performance

The Friedman test with four factors to emphasis customer related performance on organization SCM show that the MSMEs are influenced averagely (Table 5.11). The factor improvement of customer orders is having the mean value of 3.47 exercise average influence. This results is somewhat related to the results of the study by Yin and Khoo (2007) which states that coordination and optimization related to the customer orders are having influence with e-supply chain integration. Also, the customer service level (mean value 3.4) is having average influence by e-business. This agree with the result of the study by Pan and Yang (2002), which state that the length of supplier lead time directly affects the customer service level, inventory investment in safety stock and the competitive abilities of a business.

Similarly handling customer complaint is a factor of customer service level, influenced averagely (mean value of 3.34) by the e-business. It
may be observed that handling customer complaints regarding inventory level, on-time shipments, backorders, cycle time for delivery and number of units shipped, using e-business system improve the customer related performance. Tarantilis (2008) has reported that delivery performance of the SC. directly influences the handling customer complaints.

8.3 INFLUENCE OF E-BUSINESS IN THE SC COMPONENTS OF MSMEs

8.3.1 Influence of e-business in Purchase Decision

The study the influence of e-business in purchase decision, Freidman test was conducted with 11 factors. Based on the mean value all facrs found excersie average influence (Tabe 6.1). Checking price quotes from vendor as a procurement factor is having highest mean value of 3.3. This may be on account of the general procedure followed by MSMEs in purchase to identify the preferred supplier first, check for price quotation through e-business system, negotiate to finalize prices and then place the purchase order with vendor concerned. This result is in consonance with the result of the study by Lancioni et al (2000), that use of the internet purchase management in the SC has direct influence in checking price quotation of vendors.

Warranty issue is influenced averagely (mean value 3.29) as a factor of procurement by the e-business systems. It is observed that in MSMEs the tracking mechanism is used with the help of e-business systems to highlight warranty information, handling of issues related to warranty through internet, improvement on new type of warranties and processing claims. The above findings are in agreement with the study by Subramaniam (2004), that the internet has the capacity to deal with warranty issue and communication with vendors.
The Friedman test also indicate that communication with vendors exert average influence (mean value 3.29) with procurement decisions due to the effect of e-business. It may noted that in MSMEs the communication with vendors is mainly related to service problems like late deliveries, stock-outs, order processing, changes in shipment dates and follow-ups. According to Croom (2005), communication with vendor is the significant benefit of EDI as one of the e-business infrastructure requirement, which agrees with the results of the study.

Related to procurement decision, the MSME Development Institute in India introduced a “Sub-contracting Exchange Scheme” under the Scheme Vendor Development Programme-cum-Domestic both at National and State Level. Programmes are conducted at frequent intervals to provide a common platform for large scale enterprises i.e. purchasing organizations, and Micro, Small & Medium Enterprises as sellers to interact with each other and establish long term linkages.

### 8.3.2 Association between long Term Relationship with Suppliers and e-business Influenced Procurement Decision Factors

To establish the association between e-business inspired purchase decision and long term relationship with suppliers a multiple regression analysis was performed involving two independent variables vide section 6.2.2. The variable, EDI has significant association with long term relationship with suppliers. It is observed that sharing of EDI with suppliers enhance the negotiation in all respects for both the parties. The result of the study by Croom (2005) point out that the EDI enable frequent exchange of data between trading partners and related with e-business infrastructure. Similarly the other variable negotiation with vendor is having significant association. It is to be noted that the degree of negotiation depends on the
clarity needed on issues between parties, desire to develop relationship, improvement to be used in terms of price and other conditions.

8.3.3 Influence of e-business in Inventory Management Decision

It may be noted from variable table 6.4, all the nine Inventory management factors have average influence with the mean value ranging from 2.81 to 3.25. This result agrees with the outcome of the study by Lancioni et al (2000). According to the study with the help of internet, they track inventory levels in field depots and warehouses, communication with customers and suppliers about inventory levels, notification of delays, and communication with customers and vendors regarding inventory levels in field depot and warehouses.

Further, it may be noted that, the Government created infrastructure for the flow of information to MSMEs. They provide a networking system to the MSME sector, called SENET (SMALL ENTERPRISE NETWORK). It facilitate creation of database and provide access to useful information to the target group of small enterprises in electronic form over a network. This network enables the MSMEs to communicate and share information with vendors and customers regarding inventory level in all the entities of SC and also useful for the co-ordination for JIT supply. The MSMEs are also benefited through the communication between cross-functional teams for effective product development.

8.3.4 Relationship between Measure of Performance and e-business Powered Inventory Management Decision Factors

A multiple regression analysis was made involving two independent variables to establish relation between e-business powered inventory management decision factors and measure of performance in section 6.3.2.
Based on the analytical results, the dependent variable measure of performance (Y) has relationship with the independent variables communication with field warehouses and depots on field inventory levels (X₁), EDI programs with vendors for inventory (X₂). The independent variable communication with field warehouses and depots about inventory levels has significant relationship with measure of performance. Rahman (2004)’s study also confirm this. Similarly the other variable EDI programs with vendors for inventory have significant relationship. This is also agrees with the result of the study by Archer et al (2008).

8.3.5 Influence of e-business in Transportation Management Decision

The Friedman test involving five factors which influence e-business in transportation management was made (Table 6.7). All the five factors are influenced averagely by e-business with the mean value ranging from 3.11 to 3.47. This result is in consonance with the results of the study by Rahman (2004). According to him the internet exert influence on the following transportation management factors viz., transportation cost, scheduling pickups at regional distribution centres, scheduling drop-offs at regional distribution centres, monitoring on time arrivals of carriers and mode of transportation.

8.3.6 Trading Partner Performance and e-business Enabled Transportation Management Decision Factors

To test the relationship between e-business enabled transportation management decision and the trading partner performance, a multiple regression analysis with five independent variable was made (section 6.4.2). Only the following three variable reduction in transportation cost (X₁), status of scheduling pickups at regional distribution centers (X₂) and degree of monitoring on time arrivals of carriers (X₄) found similar contributing. There
exists a proper association between trading partner performance and reduction in transportation cost. This result partially confirms with the study by Saad and Patel (2006), that adoption of SC performance measures is significantly linked to cost control including transportation cost.

### 8.3.7 Association between Long Term Relationship with e-business Inspired Order Processing Management Factors.

To establish the relationship between e-business inspired order processing management decision factors and long term relationships with suppliers, a multiple regression analysis involving two independent variable was employed in section 6.5.2. A significant relationship between the dependent variable long term relationships with supplier and independent variable checking credit status of customers. Similarly, reduced order processing time and long term relationship with supplier are significantly related. This result closely agree with the result of the study by Hartley et al (2004), stating that adoption of electronic data interchange (EDI) has significant relationship with reduction in paperwork, automation of routine transaction activities, and reduction in order processing time and payment process.

### 8.3.8 Influence of e-business in Customer Service Management Decision

From the mean rank values shown in table 6.12, it may be noted that all eight customer service management factors excersice average influence with the mean value ranging from 3.18 to 3.49. Maintaining customer promising time and customer complaints having mean rank value 3.49 and 3.46 respectively excercising average influence by the e-business systems. This result agree with the result of the study by Tarantilis (2008); that ERP system influences the maintenance and handling of customer complaints.
Further, the influence of e-business system on customer service management factor providing technical service is only average (mean value 3.43). According to Lancioni et al (2000) e-business influences the factor providing technical service, which agree with the result of the present study. Further, it may be noted that MSME Technology Development Centres (MSME-TDCs), which are product specific Centres, provide technical support to attend to specific problems and render technical services, develop and upgrade technologies, manpower development, and training in specific product groups.

8.3.9 Relationship between Customer Related Performance and e-business Influenced Customer Service Management Factors

To test the relationship between e-business enabled customer service management factors and customer related performance, a multiple regression analysis was made with four independent variables as dealt in section 6.6.2. All the four variables are similarly related. It may be noted from the analysis that there is a significant relationship between customer service management and management of outsourcing of customer service functions. According to the study by Koh et al (2007) there exists a significant relationship between SCM activities and outsourcing of customer service function. Likewise a significant relationship exists between notification to customers during emergencies and customer service management. This is similar to the finding of Lancioni et al (2000) that e-business has significant relationship with notification customers during emergencies and customer service management. The existence of significant relationship between receipt of customer complaints and customer service management is confirmed by the results of the study by Li et al (2006); that customer service has significant contributions to handling customer complaints.
8.3.10 Production Scheduling Decision Related Aspects of SCM and e-business

Using the mean rank of Friedman test results from table 6.15, it is found that all four factors related to production scheduling decision exert average influence with the mean rank value ranging from 3.05 to 3.28. The factor coordination of production schedules with vendors has a mean value of 3.28, exercising average influence. However, the study by Gunasekaran et al (2004) states that the developments in SCM activities influence the factor coordination of production schedules with vendors. Similarly the factor coordination of production schedules with warehouse and multiple manufacturing sites with mean value of 3.18 is influenced averagely by the e-business systems. This result agree with the study of Yin and Khoo (2007); that the e-business information flow network influences coordination of production schedules with warehouse and multiple manufacturing sites.

8.3.11 Vendor decision Related Aspects of SCM and e-business

Four factors were considered for the Friedman test and Table 6.16 shaws the mean value of all factors ranging from 3.06 to 3.18 All these factors have only average influence. Schlenker and Crocker (2003) examined the value of Internet technologies and the factors that account for the lack of successful small business deployments of the SME Gateway in South Africa. This study confirms that partnerships with technology suppliers be evaluated at the best by the business value present in the relationship. Therefore, small firms can explore their business, market and vision with their current and potential suppliers.
8.3.12 Emphasis of Long Term Relationships with Suppliers on SCM

Eight long term relationship factors considered to study their emphasis on SCM. Table 6.17 gives the mean value score by factors ranging from 2.85 to 3.34. All exercise average influence. The factor maintenance of long-term relationship with trading partners secures a mean rank of 3.34. This outcome agree with the result of the study by Rebecca and Ravi (2007), which states that the e-procurement system influences the factor maintenance of long-term relationship with trading partners. Likewise, the factor organization view of trading partners as a virtual part of the extended organization also has only average influence (mean rank 3.06). A similar view was expressed by Croom (2005), that usage of ERP facilitates trading partners as a virtual part of the extended organization.

8.3.13 Dependency of Trading Partner Performance and e-business Powered Long Term Relationship with Suppliers

The dependency between long term relationships and trading partner performance was tested using multiple regression analyses with three independent variables in section 6.9.2. The independent variable considered are maintenance of long-term relationship with trading partners ($X_1$), trading partners participation at various product development stages in the organizations ($X_2$), and organization sharing risks and rewards with the trading partners in a transparent manner ($X_3$). All the three independent variables have significant relationship with trading partner performance. This is similar to findings of Rahman (2004).

8.4 MODELLING OF E-BUSINESS INFLUENCING FACTORS FOR SC PERFORMANCE

The Interpretive Structure Modelling of e-business influencing factors for SC performance provides a framework in section 7.2.5 to identify
and summarize the relationships among e-business influencing factors. The model segregates the e-business factors influencing supply chain management MSMEs into four different levels. While Level I comprise infrastructure and supplier related factors, level II contains inventory factors, level III has SC performance factors and Level IV deals with e-business availability.

Level I, the Factors F6, F9, F10, F11 and F13 having strong dependence power and driving power are the linkage variables having relationship on both sides. These are supplier management related factors and have strong influence on SC performance. Hence, the MSMEs have to devote better attention on these factors for improvement. Level II, the factors F7, F12 and F14 have strong driver power and hence are called as driver variables. The firms have to adopt proper strategy, which enable them to set the benchmark, so as to compare with the SC of other firms. As this will have an impact on the inventory management of MSMEs, they have to concentrate more on monitoring and improve these factors.

Level III factors F2 and F15 which have strong dependence power and hence they are known as dependent factors. It’s SC performance mainly depends on the infrastructure and supplier related factors. The levels IV have factors F1 and F3 with low dependence and driving power and are labelled as autonomous factors. The MSMEs devote more attention on these factors to ensure better performance. These basic factors constitute the primary requirement of e-business systems implementation.

The ISM model serves as a learning tool to develop better understanding of the meaning and significance of the SC factors with the influence of e-business. The driver variables that ensure benefits to MSMEs are; e-inventory management in SC (F7), firm’s strategy on SC (F12) and SCM benchmarking (F14). Thakkar et al (2008) explored the issue of information technology (IT) adoption and implementation in Indian
manufacturing small-and medium-scale enterprise (SMEs) for enhancing the capabilities of their supply chain. They have developed an ISM model with inter-relationships among the factors in three levels which were used for deriving managerial insights.