CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 INTRODUCTION

The present study is aimed at identifying the critical dimensions and operating elements of SCM in a developing economy like India, from the perspective of the four entities of the supply chain, namely, Supplier, OEM, LSP and Retailer. Further, some of the constructs of SCM are perceived to act as moderators in enhancing the relationship between the constructs of SCM of the entity and the respective entity’s measures of performance, and accordingly to propose and validate the conceptual framework from the perspective of each of the entity.

5.2 DISCUSSIONS AND CONCLUSIONS

The major findings are summarized, specific research contributions are enumerated and the managerial implications of the research findings are discussed. The limitations of the study are discussed and the directions for future research are pointed out.

In all, in the present study, the critical dimensions of SCM and the measures of performance have been identified from the perspective of the four entities of the supply chain, namely, Supplier, OEM, LSP and Retailer. Four valid and reliable instruments covering the aspects of SCM, developed in the Indian context, from the perspective of the four entities named earlier, have been offered. Furthermore, envisaging a relationship between the critical
dimensions of SCM of the entity and the entity’s measures of performance, conceptual frameworks have been proposed. The conceptual framework proposes that from every entity’s perspective, some of the critical dimension(s) of the entity act as moderator(s) in enhancing the relationship between the critical dimensions and the measures of performance of the entity. In the present study, effect of moderator(s) on the relationship between the constructs of SCM and all the measures of performance have been significant in the case of Supplier, OEM and Retailer. Only in the case of LSP, the relationship has not been significant with one of the measures of performance, namely, Financial Performance. However, the effect is significant with Business Performance.

In each of the instruments, some of the items that were presumed to be relevant to the present study were eliminated during the validation process. This might be due to the following reasons:

- The respondents’ perception that the items (e.g. products are readily available on the shelf in the market, etc., in the OEM questionnaire) are of very low importance in the context of SCM in India.
- It is likely that a larger sample size would not have resulted in elimination of some of the items for want of a better fit.

5.2.1 Summary of the findings: Perspective of OEMs

- As the first initial contribution of the present study, the critical dimensions covering the aspects of SCM from the perspective of OEM have been identified from literature review, followed by expert opinion.
A validated and reliable instrument to measure the aspects of SCM in a developing economy like India is offered. The factors of SCM identified from the OEM’s perspective are: Environmental Uncertainty, Competitive Priorities, Top Management Commitment, Customer Orientation and Involvement of Employees, Information Technology, Strategic Purchasing, Trading Partner Management (Selection, Cross Functional Teams, Trust and Commitment and Long-Term Relationship), External Logistics Integration, Supply Chain Management Techniques, Supply Chain Management Tools, Manufacturing Management, Returns Management and Benchmarking of Supply Chain Activities. The measures of performance were Financial Performance, Trading Partner Performance, Business Performance and Customer Related Performance.

The factors of Environmental Uncertainty (namely, Trading Partner Uncertainty, Customer Uncertainty and Technology and Infrastructure uncertainty) are perceived as the basis for strategy formation and also as the root cause for the various deficiencies of any supply chain.

The factors of Trading Partner Management, namely, Selection, Cross Functional Teams, Trust and Commitment and Long Term Relationships) have been perceived to be acting as moderators in enhancing the relationship between the constructs of SCM and the measures of performance and accordingly a conceptual framework has been proposed.

Through multiple regression analysis, it has been evidenced that the effect of each moderator (namely, Selection, Cross-Functional Teams, Trust and Commitment and Long-Term Relationships) has a significant effect on the relationship
between the constructs of SCM and the measures of performance, taken one a time.

- It has also been evidenced that the simultaneous effect of all moderators has a significant effect on the relationship between the factors of SCM and the measures of performance, taken one at a time.

- It is significant to mention here that based on the analysis, the findings imply that an organisation’s effort in harnessing its trading partners by properly selecting its trading partners, relying on a few reliable suppliers, having a long term relationships with them and having trust and regular communication with the trading partners, enhances the performance of not only the trading partners but also of the organisation as well as the supply chain. These findings are similar to Chen et al (2004) who considered factors, namely, Supply Base Reduction, Long Term Relationship, etc., while measuring buyer-supplier relationships and also suggested to consider other factors, such as Supplier Selection, Supplier Selection, to cover all aspects.

- In addition to the above, it is noted that the respondents have rated Selection of Trading Partner at the highest level, indicating the importance of the trading partner in successful SCM. Returns Management has been rated the least, which indicates the importance given to end-of-life equipment, particularly in Indian conditions.

- Practitioners could note the above findings and identify critical dimensions of SCM, in their own organizations that need attention, Benchmark the identified critical dimension(s) with best-in-class organizations, and focus
attention on those dimensions to improve upon them for effective implementation of SCM.

5.2.2 Summary of the findings: Perspective of the Trading Partners

- Viewing the aspects of SCM from the perspective of the trading partners is another contribution of this study. As mentioned earlier, the three trading partners from whose perspective the concept of supply chain management has been perceived in the present study are:
  - Supplier (Tier-1 and Tier-2);
  - Logistics Service Provider; and
  - Retailer.

- It is significant to mention here that all the four entities have some common critical dimensions such as Top Management Commitment, Customer Orientation and Involvement of Employees, Information Technology, Benchmarking of Supply Chain Activities, Returns Management, etc. However, the items contained in the questionnaire are specific to the entity and is from the perspective of the entity. Similar is the case with the measurers of performance.

- Similarly, the three trading partners have a common critical dimension, namely, Supply Chain Orientation, which is perceived in this study to act as a moderator and enhance the relationship between the constructs of SCM of the entity and the measures of performance of the entity.
5.2.2.1 **Summary of findings: Perspective of suppliers**

The critical dimensions, in this study, were conceived to be the scaled down versions or subset of the OEM, as most of the activities performed by the Supplier are similar to that of the OEMs. However, as it is conceived in this study that the OEM is the one who plans, designs, and implements and maintains the supply chain, the complexity of the supplier questionnaire has been reduced.

- Validated and reliable critical dimensions and a measurement scale that measure the aspects of Supply Chain Management from the perspective of the Supplier are offered.

- The critical dimensions of SCM identified from the perspective of the Supplier are: Top Management Commitment, Customer Orientation and Involvement of Employees, Information Technology, Manufacturing Management, Returns Management, Benchmarking of Supply Chain activities, Supply Management and Supply Chain Orientation.

- The measures of performance are Financial Performance, Business Performance and Customer Related Performance.

- A conceptual framework is proposed envisaging a relationship between the critical dimensions of SCM and the measures of performance with the dimension, Supply Chain Orientation, acting as a moderator that enhances the relationship between the critical dimensions and the measures of performance.
• It has been evidenced in this study, from the perspective of the supplier, that the moderator, Supply Chain Orientation, has a significant contingent effect on the relationship between the critical dimensions of SCM and all the measures of performance, taken one at a time.

• It is evident from this study that in an environment wherein a supplier is involved in more than one supply chain, his/her clear orientation towards the customer (buyer) would strengthen the relationship between the OEM and the suppliers thereby improving the performance of the supplier as well as the supply chain. Supplier organisations participating in supply chains could note such findings to benchmark their activities and improve upon them to improve effectiveness of implementation of SCM in their organizations.

5.2.2.2 Summary of findings: Perspective of LSP

It is noted that outsourcing of logistics activities have increased due to the realization that advantage in time and cost could be gained from an efficient delivery process.

• Validated and reliable critical dimensions and the questionnaire covering the aspects of SCM from the perspective of LSP have been identified and offered.

• The critical dimensions identified from the perspective of LSP are: Top Management Commitment, Customer Orientation and Involvement of Employees, Information Technology, Freight Forwarding, Distribution/Warehousing,
Transportation, Returns Management, Benchmarking of Supply Chain Activities and Supply Chain Orientation.

- The measures of performance are Financial Performance and Business Performance.

- The critical dimension, Supply Chain Orientation, is perceived to be the moderator that enhances the relationship between the critical dimensions of SCM and the measures of performance. Accordingly, a conceptual framework is proposed.

- The findings indicate that the effect of the moderator on the relationship of the critical dimensions with Financial Performance appears not significant. This may due to the fact that the challenges the TPL companies do have to face, particularly in Indian conditions (Upendram 2004), affect the economic performance of the LSPs.

- But, with regards to the effect of the moderator on Business Performance, as LSPs operate as intermediaries, they need to ensure that the products reach the destination before the demand for the product lapses.

- Logistics is contributing upto 14% to the Indian GDP. With the measures taken by the Government of India to improve the infrastructure and the opening up of railway transport to private operators, LSPs may start offering cost effective services to their clients, thereby improving their own financial performance.

- It is also noted from literature that customer expectations of TPL-providers continue to evolve forever (Koh and Tan 2005). However, customers are reluctant to pay for the extra
benefits, and that customers expect them in tandem with price reductions (Tan and Kritchanchai 2006).

- Many authors have dealt with logistics management and its relation to performance. But, this study has attempted to capture the dimensions of SCM from the perspective of LSP that would highlight the areas on which the organizations could concentrate on for improving both Business and Financial Performance.

5.2.2.3 Summary of findings: Perspective of Retailers

It is noted that a win-win scenario is where manufacturers and retailers work together to create highly satisfying experiences for the consumer (Desbarats 1999).

- Critical dimensions covering the aspect of SCM from the perspective of the Retailer has been identified from the literature review. These critical dimensions and the questionnaire has been validated through a series of tests.

- The critical dimensions are: Top Management Commitment, Top Management Commitment, Customer Orientation and Involvement of Employees, Information Technology, Materials Management, Store Management, Returns Management, Benchmarking of Supply Chain Activities and Supply Chain Orientation.

- The measures of performance are Financial Performance and Business Performance.
Supply Chain Orientation is envisaged in this study to act as a moderator that enhances the relationship between the critical dimensions of SCM and the measures of performance. Accordingly a conceptual framework has been proposed.

The relationships have been investigated through multiple regression analysis and found that the moderator has a significant effect on the relationship between the critical dimensions of SCM and both the measures of performance.

The findings highlight the basic view that, by working together for the benefit of the end user, the trading partner (in this case, the retailer) stands to perform better, thereby enhancing the performance of the supply chain as a whole.

This finding is in agreement with the contention of Palmer (1994) and Wilson (1996) who noted that channel members working together can improve the stability of prices/returns, provide better financial returns, improve each actor’s ability to supply what the market requires and provide economies of scale and marketing support.

This study from the retailers perspective has been an initial contribution in the Indian context as organized retailing is gaining ground at a very fast space in India.

5.3 ADDITIONAL IMPLICAITONS

5.3.1 Summary of findings: Perspective of the Overall Supply Chain

The basic premise of the present thesis was to contribute from the perspective of the individual entities of the supply chain as well as from the overall perspective. Due to limitation in sample size and also due to lack of
responses for all perspectives from a single supply chain, suitable direct conclusions could not be drawn from the present analyses. However, the following conclusions can be drawn from the present analysis.

- As per the definition adopted for the present study, the purpose of SCM is improving the long-term performance of the individual companies and the supply chain as a whole.

- In line with this definition, the findings of the present study, from the perspective of all the four entities, have indicated that the moderating variable has a significant positive impact on the relationship between the Independent variables and the dependent variables, taken one at a time, except with respect to Financial Performance from the perspective of LSP. Further, from the perspective of the OEM, it can be noted that the effect of the moderating variable has its impact on the Trading Partner Performance as well as on the Business and Customer Related performance of the OEM. Suppliers have a significant direct impact on cost, quality, technology, speed and responsiveness of buyer firms, and strategic outsourcing is considered as a source of great advantage (Paulraj and Chen 2005). So it can be interpreted and concluded that the improvement in Business Performance of the individual entity has a direct positive impact on the Business and Customer Related Performance of the OEM, which in turn contributes to the performance of the overall supply chain.
5.3.2 Summary of findings: Relevance to the Indian Context

The findings from the various analyses are based on data collected in India and interpreted to represent the Indianess.

- Sections 1.3 and 2.5 and 2.4.2.2 sufficiently highlight some of the points that reflect the current status of implementation of SCM in India, which needs improvement and therefore justifies these aspects being considered in the present study.

- Sections 4.6.3 and 5.2.2.2, highlights the issues, from the perspective of LSP, relating to the effect of the moderating variable on the relationship between the independent variables and LSP’s FP not being significant. This effect is due to the challenges the TPL companies have to face, particularly in Indian conditions (Upendram 2004). As TPL companies are making inroads into India, their primary purpose would be to sustain their businesses and so would be delivering goods and services at any cost, which is reflected in the significant positive effect of the moderating variable on the LSP’s BP. It is also noted that with the initiatives taken by the Indian government in improving the infrastructure, streamlining tax structures, business organizations having a re-look at their governances and a strong perspective towards the end users, the effect of LSP’s SCO on its FP would also improve. This would enable them to provide additional services to their customers, which would result in enhanced individual performance as well as supply chain performance.
Secondly, Sahay et al (2003), Farooqi (2002) and Dhandapani et al (2004) noted that organizations, having evolved their supply chain strategies, are in their process of implementation to cope up with the increasing uncertainty. Moreover, Sahay and Mohan (2006) noted that 3PL usage is still nascent in India. Chandra and Sastry (2002) reported that Indian manufacturing continues to lag in adoption of efficiency enhancing technologies in warehousing and transportation. With the implementation of supply chain strategies, adoption of integration tools and increased utilization of LSPs for their logistics requirements, Indian organizations would work under improved collaboration and integration and increase their volume of businesses. This would reflect in improved Business and Financial Performance of the individual entity as well as that of the supply chain, as noted earlier. Organizations in India can consider this work as the base and identify those areas, which they can benchmark with best-in-class organizations and improve upon them. With all these measures taken, it is not far off for Indian organizations to reap the benefits of improved supply chain management.

5.3.3 Summary of findings: Implications on various business functions

The implications of the findings for the various business functions are given below.

- **Design**: When buyers and suppliers share important information relating to material procurement and product design issues, they are likely to improve the quality of their
products, reduce customer response time, and increase cost savings through greater product design and operational efficiencies (Carr and Pearson, 1999). Newman and Rhee (1990) found that many supplier product problems were due to poor communication. The findings from the perspective of the OEM and Supplier have indicated an improvement in Business Performance of these entities in the presence of a moderating variable. Business Performance covers such aspects as New Product Development Time, Production Lead Time, etc. This implies that with improved Trading Partner Management of the OEM and better Supply Chain Orientation of the supplier, new products come out of the supply chain at a faster rate and production lead times are reduced, which is an indication of the improvement in product design aspects in the supply chain.

- **Customer Service:** Customer responsiveness describes a firm’s ability to respond in a timely manner to customers’ needs and wants (Tunc and Gupta 1993). The effect of the moderating variable has a positive significant impact on the Customer Related Performance of the OEM and Supplier, Trading Partner Performance of OEM and the Business Performance of both the LSP and the Retailer. These measures of performance from the perspective of the various entities deal with improving customer service by rapidly confirming customer orders, providing materials and services in time and reduction in breakages, etc. These imply that improved supply chain management has a great impact on customer responsive and service.
• **Finance:** Except for LSP, the findings indicate that the moderating variable has its impact on the relationship between the independent and the dependent variables from the perspective of the other entities with respect to Financial Performance of the entities. These findings imply that with better supply chain management, the individual entities in the supply chain improve their financial performance, reduce cost of the products and services, increase market share and provide additional services to the customer. From the perspective of LSPs, the probable reasons for the effect not being significant have been indicated in sections 4.6.3 and 5.2.2.2.

• **Logistics:** The notion of single site manufacturing facilities has been changed geographically dispersed network of resources. The challenges lie in managing the network complexities to collectively create value to the end user (Stank et al 1999 and Stock et al 2000) and integrating logistics with the whole supply chain, with the help of electronic communication. Logistics primarily involves movement of materials and goods in a timely manner to the various points in the supply chain. From the perspective of the LSP, it is evident that the moderating variable has a positive significant effect on the LSP’s Business Performance, which is moving materials in time without damages and improving customer service. From the perspective of OEM, the factors of External Logistics Integration and Supply Chain Design, Structure and Operations contribute, in the presence of the moderating variable, to the increase in the performance of the OEM’s
Business as well as Customer Related Performance. All these contribute to effective logistics management in the supply chain.

- **Inventory:** The factors related to inventory policy are highly dynamic because of changing market conditions, supply uncertainty, and unavailability of inventory information of other members. Inventory is managed at the optimum level through proper exchange of timely information and proper coordination between the various entities in the supply chain. The present study primarily explores, through the introduction of a moderating variable, the effect of coordination and cooperation of the various entities with each other, to serve the end user. As the findings indicate that the effect of the moderating variable has a significant positive effect on the Business performance of the OEM, which covers issues such as reduction in inventory level, reduction in production lead time and reduction in order fulfillment lead time, this would have a great impact on the inventory level at various stages in the supply chain. Moreover, the impact of the moderating variable on Customer related performance indicates faster confirmation of orders and reduction in delivery lead times, resulting in reduction of inventory in the supply chain.

**5.3.4 Summary of findings: Comparison with other geographical settings**

- Paulraj and Chen’s (2005) empirical study in USA identified key driving forces that assist buyer firms in making their supply management strategic and successful. The results
indicated that strategic supply management is driven by various critical factors including environmental uncertainty, customer focus, competitive priorities, top management support, information technology, and supply chain structure. Environmental uncertainty was found to be a stepping stone for preparedness among supply chain partners.

- Shin et al’s (2000) empirically studied in USA the impact of supply management on the suppliers’ operational performance and buyers’ competitive priorities. The factors of Supply Management were Long Term Supplier-buyer relationships, Supplier Involved Product Development, Quality Focus in Selecting Suppliers and Reduced Supplier Base. Supplier’s performance indicators were Cost, Delivery Reliability, Lead-Time, On-Time delivery and Quality; and Buyer’s Performance indicators were cost, quality, delivery, flexibility. Their findings indicated that an improvement in Supply Management improves both supplier and buyer performance.

- In a longitudinal study on a major player in the automotive industry in UK, Croom (2001) studied the impact of supplier collaboration in the new product development process. The findings indicated that both operational and relational competences are critical factors in the performance of the new product development process. The authors concluded that the ability of customers and suppliers to develop both structured and ad hoc processes of interaction is shown to be important to the development process from early supplier selection process.
Koh et al (2007) investigated the impact of SCM practices followed by small and medium enterprises (SMEs) and the resulting performance of SMEs in Turkey. The authors considered the two factors, namely, Strategic Collaboration and Lean Practices and Outsourcing and Multi-Suppliers for their study to represent SCM practices. Their findings indicated that SME’s SCM practices have a direct impact on Operational Performance and an indirect impact supply chain related Organizational Performance.

Lo et al (2007) examined the impact of Supply quality management practices (Supplier Selection, Long term oriented supplier development and supplier integration) on quality across organizations in china. The findings indicated that quality conscious management (customer focus, continuous improvement and total involvement) speed up the implementation of the SQM practices.

5.3.5 Summary of findings: Generalization of the framework

Irrespective of the nature of the final product, the extant literature highlights the efforts of the major entity in the supply chain to manage its trading partners for improving the performance of the supply chain. Literature also highlights the orientation and commitment of the trading partners towards other entities in the supply chain to improve their performance as well as that of the supply chain. In view of this the proposed conceptual model could be considered for other domains as well, with suitable modifications in the different factors. The present work is
primarily addressed to manufacturing sector, covering the Automobile, Light and Heavy Engineering and the computer hardware sectors. Other sectors, depending on the type of products (innovative or functional), could suitably modify the model and adopt it.

**5.3.6 Summary of findings: Justification for considering the constructs**

- The concept of SCM is still new in India. As per Upendram et al (2004), many challenges are typical to Indian conditions. Also, Sahay et al (2006) have noted from their work that organizations have aligned their supply chain strategy with their business strategy and are in the process of implementation. The authors have further suggested that it is imperative to integrate supply chain objectives, supply chain processes and management focus to implement the business strategy. This justifies the consideration of the construct Top Management Commitment in the Indian context. Similarly, other factors have also been considered in the present study by considering issues that would be relevant under Indian conditions.

**5.4 LIMITATIONS OF THE PRESENT STUDY**

- A larger sample size could have given more insight into the conceptual framework. Unfortunately, the survey could not cover a larger sample due to time constraint and the operational constrains imposed due to limited responses.
from the firms. The limited number of responses prevented proposing a more comprehensive conceptual framework that could be validated through path analysis.

5.5 SCOPE FOR FUTURE WORK

- As scope for future work, researchers could consider similar type of studies with larger sample size, which would enable a more comprehensive analysis.

- Researchers could consider similar type of studies in other sectors, namely, organized retailing, which is gaining lot of importance in India.

- Future researchers could do similar studies in other developing economies with larger sample sizes and compare the findings.

- Another area that is gaining importance in the present scenario the world over is the natural and unnatural disruptions that are caused for movement of material and information in the supply chain. This issue would add lot of risk and uncertainty into the system. Future researchers could consider Risk Management as a component of their study on supply chain management in India.

- Future researchers can consider incorporating the following measures of performance listed in Table 5.1, in their study. These unmarked items in Table 5.1 are the original variables that were contained in the questionnaire for which the responses were sought. Appendix 1 through Appendix 4 indicates only the validated items with respect to measures
of performance. The new of performance were considered by adopting the balanced score-card approach and are based on the measures identified by Gunasekaran et al (2001) and Bhagwat and Sharma (2007).

### Table 5.1 Proposed Measures of Performance: Perspective of OEM

<table>
<thead>
<tr>
<th>Measure of Performance</th>
<th>Variables</th>
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<tbody>
<tr>
<td><strong>Financial Performance</strong></td>
<td>Improvement in profitability.</td>
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<tr>
<td></td>
<td>Improvement in return on investment.</td>
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<tr>
<td></td>
<td>Reduction in information carrying cost*.</td>
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<td></td>
<td>Reduction in cost-per-operation hour*.</td>
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<td></td>
<td>Improvement in delivery reliability.</td>
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<td></td>
<td>Reduction in returns processing cost.</td>
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<td></td>
<td>Reduction in cash-to-cash cycle time.</td>
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<tr>
<td></td>
<td>Decrease in total logistics cost (Response Cost + Manufacturing Cost + Transportation cost + Warehousing cost + Supply Cost).</td>
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<tr>
<td><strong>Customer Perspective Performance</strong></td>
<td>Improvement in Quality of goods delivered</td>
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<tr>
<td></td>
<td>Improvement in on-time deliveries in full.</td>
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<td></td>
<td>Improvement in defect free deliveries.</td>
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<tr>
<td></td>
<td>Delivery lead time has improved</td>
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<tr>
<td></td>
<td>Improvement in flexibility in terms of Volume, Variety</td>
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<td></td>
<td>Improvement in buyer-supplier partnership level*.</td>
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<td></td>
<td>Reduction in order fulfillment lead time.</td>
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<tr>
<td></td>
<td>Improvement in handling of customer complaints.</td>
</tr>
<tr>
<td></td>
<td>Reduction in customer query.*</td>
</tr>
<tr>
<td><strong>Trading Partner Performance</strong></td>
<td>Improvement in on-time deliveries.</td>
</tr>
<tr>
<td></td>
<td>Improvement in products/services conforming to specifications.</td>
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<tr>
<td></td>
<td>Increase in number of orders delivered in full.</td>
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<tr>
<td></td>
<td>Improvement in cost effectiveness of the products/services.</td>
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<tr>
<td></td>
<td>Improvement in relationship with trading partner*.</td>
</tr>
<tr>
<td></td>
<td>Decrease in rejection Rate*.</td>
</tr>
</tbody>
</table>
Table 5.1 (Continued)

<table>
<thead>
<tr>
<th>Measure of Performance</th>
<th>Variables</th>
</tr>
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</table>
| **Internal Business Perspective** | Reduction in total supply chain cycle time*.  
Reduction in total cash flow time has*.  
Reduction in inventory level (Incoming, WIP, Scrap, Finished goods).  
Improvement in accuracy of forecasting techniques*.  
Reduction in product development lead time.  
Decrease in planned process cycle time*.  
Improvement in capacity utilization*. |
| **Innovation and Learning Perspective** | Reduction in order booking/ confirmation time.  
Improvement in involvement of trading partners in solving technical problems*.  
Improvement in flexibility to meet customer orders.  
Improvement in customer perceived value of products/services offered*.  
Reduction in new product development time.  
Improvement in partnership level with trading partners*. |