CHAPTER - 7
THEORETICAL AND PRACTICAL IMPLICATIONS

The analysis and findings of the study have got several theoretical and practical implications. The implications reveal many useful inputs and lessons for both theory as well as practice, in the area of IT impact on competitive marketing performance with specific reference to IT investment in the downstream supply chain.

7.1 Theoretical implications of the study

The results of this empirical study provide valuable theoretical implications. Resource based view (RBV) assumes that firm resources for competitive advantage are distributed across firms heterogeneously while not perfectly mobile (Barney 1991, Collis 1994). This implies that the resource should not be easily imitable by competitors so that the owner of the resource can use the resource well. The findings of this study are consistent with the RBV argument. Of the two IT resources examined by this study, IT advancement is more imitable by competitors than IT alignment. IT advancement is the mere adoption of state of art IT ahead of competition in the hope that will give a competitive edge. However, the study shows that aligning such IT resources with channel partners is an important aspect of enhancing supply chain capabilities. Strategies in the direction of IT Alignment to enhance supply chain capabilities are more inimitable and therefore should have a greater impact on firm performance than IT Advancement, as implied by RBV.

The findings of the study reveal no direct impact of IT Advancement and IT Alignment on Competitive marketing Performance and less significant indirect effects on the Market performance (ITAD $\beta=0.183$ and ITAL $\beta=198$). In contrast, Supply Chain Capabilities (SCC $\beta=.469$) has significant indirect effects on market performance. The results demonstrate that the Supply chain capabilities are truly the firm’s IT resource and not IT Advancement, which is an imitable resource. The study supports the RBV view that mere technology investments will not lead to competitive advantage. Barney (1991) argues that IT well embedded in the managerial process or other core capabilities is a source of competitive advantage for firms and the findings on Supply Chain Capabilities support this claim. Utilization of IT to create Supply
chain capabilities is more important than mere adoption of advanced IT solutions. The partial mediation effect of supply chain capabilities between IT resources (IT Advancement and IT Alignment) and performance outcomes (Operational and Strategic Marketing benefits) has been confirmed.

Another theoretical implication of this study is that IT resources may offer possible competitive advantage when mediated by capabilities created through such investment of resources. The results support the RBV framework well, as all the hypotheses were framed with this underlying view and have found strong support.

The study has also led to the understanding of the influence of IT investment through the mediation effect demonstrated by supply chain capabilities. Some of the literature that report weak links between IT productivity and performance (Anderson and Segars 2001; Ross and Weill 2002) lack proper mediators to connect IT investment and performance. The study suggests that it is necessary to incorporate mediators in the research to find the true (indirect) way in which IT investments operate to produce enhanced business performance.

The study examines the supply chain capabilities of the firm and measures the extent of its influence on benefits that lead to higher marketing performance. The concept of supply chain capabilities is difficult to measure; however this study has used the four dimensions – information sharing, co-ordination, collaboration and supply chain responsiveness as a measure of supply chain capability. This measure will be useful to researchers in future.

The current study also makes a contribution to the SCM and IT management literature by adapting from literature and validating scales for multiple constructs including Business environment, Extent of IT usage, Operational Benefits and Strategic Marketing Benefits. All these scales were developed and consist of at least four items with high construct reliabilities. Thus, these scales can provide support to future researchers in the area of IT impact on firm performance.

Finally, the study provides a theoretical research framework that identifies positive and significant relationships between constructs that were developed for IT
resources, capabilities and performance. This framework (Figure 5) provides the foundation for future researchers in the area of downstream supply chain performance. In future, new constructs may be added to provide an in-depth understanding of IT usage in downstream supply chain impact on firm performance.

The implications for the conceptual framework are discussed in the following sections.

7.1.1 The impact of Competitive Business Environment on IT Usage

The highly competitive environment in which manufacturing companies operate is characterized by growing world competition and increasingly demanding customers (Rich and Hines, 1997). Further as the environment gets customer driven, as product life cycles shrink and new products get introduced rapidly, as customers continually demand higher quality, faster response and greater reliability of products (D’Souza, 2002), the environment demands a more responsive behaviour from companies. As proposed in the hypothesis, the competitive business environment has thus led to greater extent of usage of IT in organizations.

Organizations have been quick to understand that the rate of environmental dynamism would influence the business value of IT investment (Li and Ye, 1999). They have understood that demand uncertainty, demanding customers, the drive for efficiency in the light of the recognition that poor deliveries would hurt their business and the commodity-like situation faced by their products, can be better managed through investments in Information technology for competitive advantage. The flexibility provided by IT infrastructure investment is more valuable when uncertainty is higher (Dai et al., 2007). Previous research has thus examined the environmental context of IT investment in business. The present research extends the theory by proposing that the competitive business environment will lead to a greater extent of IT usage through Hypothesis 1 which has found support in the SEM analysis.

7.1.2 The Impact of IT Usage on IT Advancement and IT Alignment

As the Competitive Business environment leads to greater uncertainties in demand in the market, companies are turning to invest in the latest technologies for coping with this situation. Firms increasingly invest more resources in IT in the supply
chain in an effort to develop the internal skills necessary to make full use of advanced technologies (Booth and Philip, 1998). It is likely that firms successfully enhance efficiency in their business activities and processes by adopting advanced IT (Mukhopadhyay et al., 1997; Stank et al., 1999). The greater the extent of IT Usage leads to the higher level of IT Advancement in firms as they strive to seek a differential advantage over competing firms in their industry. The present study also accepts that IT usage leads to greater usage of advanced technology through Hypothesis 2a which is supported in the study.

The advancement and alignment of information technology are equally important for the functional adequacy of supply chain information technology (Hausman and Stock, 2003). Greater IT usage leads to higher investments in advanced IT which simultaneously helps achieve higher system compatibility and integration between channel partners (Philip and Booth, 2001). When newer and more effect technologies are introduced and used by organizations, there is pressure to adopt it across the trading partners and thus greater use of Information Technology leads to greater levels of IT Alignment across downstream channel partners. Thus the current study accepts the previous research findings in this area through Hypothesis 2b which is supported in the study.

7.1.3 The Impact of IT advancement on Supply chain capabilities

IT resources are expected to facilitate supply chain capabilities through the use of advanced technologies and alignment with channel members. In particular IT advancement, that meets the condition for a resource as claimed by RBV is found to have a positive impact on the Supply chain capabilities as Hypothesis 3 is supported. IT advancement has helped firms to gain improved information exchange, co-ordination and collaboration with supply chain partners and thus increase the customer responsiveness of the firm. Lee (2004) asserts that trading partners need to share data/information on changes in supply and demand continuously so that they can respond quickly and this effect seems to be realized when firms invest in advanced IT technology in their downstream supply chain. Proactive use of the latest IT solutions which are more advanced than the competition helps firms to gain better supply chain capabilities and thus confirms the prior research.
7.1.4 The Impact of IT Alignment on Supply Chain Capabilities

The importance of functional integration within the firm has been stressed by Evans et al. (1993). The most advanced technology will not ensure performance unless internal activities across different functional areas are well coordinated. One external factor that influences Supply Chain capabilities along with IT Advancement is IT resource alignment across channel partners (Evans et al., 2003). Firms can raise their supply chain capabilities not only by deploying advanced technologies but when its channel partners invests in having a compatible technology in the context of supply chain IT investments.

Although the alignment of IT Advancement across channel partners is difficult to achieve (Clemens and Row, 1993), this challenge has reduced due to advances in compatible and standardized technologies. High integration and alignment allows two proprietary systems to reduce technical barriers and incompatibility so as to communicate more effectively (Byrd and Turner, 2000). Both the company and their channel partners must show initiatives towards making investments to align their technology with each other. It is found that alignment of the technology with the downstream supply chain partners, influences supply chain capabilities positively and Hypothesis 4 which is accepted in the study lends support to the previous research in this area.

7.1.5 Supply Chain Capabilities as a Mediator

In this research we proposed the role of Supply chain capabilities (SCC) as a key mediator between IT investment and Competitive Marketing performance. Hair et al (1998) have explained partial mediation as the effect when a relationship between a predictor and an outcome is reduced but remain significant when a mediator is also entered as an additional predictor. This was tested in the SEM. The path ITAD to OPB had a beta= .450 (t=6.278, p<.001). After the SCC was introduced the path had a reduced beta of .335 (t=4.226, p<.001). Similarly, another path ITAL to OPB had a beta =.363 (t=4.854, p<.001). After the SCC construct was introduced the path had a reduced beta of β= .173 ( t=2.042, p<.05). SCC is thus partially mediating the IT resources and IT benefits.
The results indicate that supply chain capabilities are able to mediate and transform IT-related resource into higher value for a firm through improved Marketing Performance. This is not achieved directly but through creating and realizing a significant impact on Operational Benefits and Strategic Marketing Benefits. Only when IT investment is directed to creating supply chain capabilities such as information exchange, coordination, collaboration and responsiveness, the impact of IT resources will be realized in the form of higher Competitive Marketing Performance though Operational Benefits and Strategic Marketing Benefits. The research thus confirms the importance of this mediating construct that links IT resources to the firm’s marketing performance following the previous research finding of Wu et al. (2006).

According to Lummus and Vokurka (1999), in order to make the supply chain competitive, the first step is to acquire a clear understanding of supply chain concepts and be willing to openly share information with supply chain partners. Supply chain capabilities create conditions for information sharing practice which lead to increased responsiveness to customers’ needs in a supply chain (Martin & Grbac, 2003, Van Hoek et al., 2001). Greater coordination and collaboration with channel partners is also facilitated and this leads to reduce uncertainty between supply chain partners and thus enables a firm to respond quickly to changes in customer demand. IT Advancement and IT Alignment together enhance the effect of these supply chain capabilities. This implies that firms interested in improving supply chain capabilities should focus on deploying advanced technologies and simultaneously focus on systems integration with partners.

Further, Supply Chain capabilities explain why some practitioners and researchers have warned that IT investments deliver weak or no improvement in firm productivity (Powell and Dent-Michallef, 1997). As a key mediator, Supply chain Capabilities needs to be created and present to derive favourable returns from IT resource investments.

7.1.6 The Impact of Supply Chain Capabilities on Operational and Strategic Marketing Benefits

Lummus et al. (2003) have argued that in future, as supply chains compete with other supply chains, organizations must understand that responsive supply chains will
outperform those that are less responsive. Firms need to be operationally responsive to compete in the market based on cost, quality, delivery and dependability of service by gaining Operational Benefits from IT investments in the downstream supply chain. They need to, give better service support to their customers through improved information and inventory visibility to their customers, customize pricing and promotion based on consumer reactions in the market and understand customer needs and introduce new products faster through acquiring Strategic Marketing Benefits from IT investments.

It was thus proposed that Supply chain capabilities would create a positive impact on Operational Benefits and Strategic Marketing Benefits. Enhanced information sharing, coordination and collaboration with downstream channel partners leads to effectiveness in handling the ordering process, reduction in order fulfilment cycle times, perfect fulfilment of orders and improved delivery performance. Maintaining lower levels of inventory and satisfying customer orders becomes possible due to greater shared forecast and sales information among the company and its downstream partners leading to reduction in inventory costs. It has been noted that an improved perfect order fulfilment rate from enhanced information exchange can contribute to firm performance (Hult et al., 2002). Previous research by authors (Gunasekaran et al., 2001; Bhagwat and Sharma, 2008) has identified various operational benefits. The new contribution in this research is that Supply Chain Capabilities was hypothesized to have a positive effect on Operational benefits through 

Hypothesis 5 and it was accepted.

As companies develop the capacity to execute their orders on time, in full and without errors they are in a position to render better service support to their customers. Christopher and Lee (2004) have stated that ‘end- to- end’ visibility reduces market risks Customers’ requirement for increased information about stocks is also enabled through improved information visibility through IT investments. They utilize IT to capture demand information in the channel and are now in a position to use the information at input to customize their prices and promotions which leads to greater effectiveness of firm performance (Chatterjee and McGinnis, 2010). The improved information visibility enables firms to understand their customer needs proactively and introduce new products faster than their competitors. Strategic marketing benefits have
been identified in previous research in the marketing context. The new contribution in this research is that it was proposed that Supply chain capabilities would impact Strategic marketing benefits positively and it has been accepted through Hypothesis 6 of the study which is supported.

7.1.7 Impact of Information Technology on Competitive Marketing Performance

Since the study focuses on the IT investments made in the downstream supply chain, it focuses on enhanced supply chain capabilities as an outcome. It was expected that these supply chain capabilities will lead to operational efficiencies and strategic marketing benefits. As a firm’s downstream supply chain activities are carried out in the market through distribution channels that reach the end consumer, market performance was adopted as the ultimate outcome dependent variable in the study, in order to assess the impact of IT resources on firm performance. SCM is viewed as the tool to connect customers with products (Otto and Kotazb, 2003). Marketing related metrics in SCM therefore measure sales growth, market share, and customer satisfaction. The market performance measures of Sales growth and Market Share are the outcomes of efficiencies in the downstream supply chain activities observed in the market as a result of investment in Information Technology.

Wisner, 2003; Byrd and Davidson, 2003; Wu et al., 2006 and Fawcett et al., 2007) have all included measures of competitive marketing performance benefits in assessing the impact of IT in the supply chain and found positive impact on the same. This study also supports the previous research findings through the acceptance of Hypothesis 7 which confirms the IT impact on competitive marketing performance.

7.2 Practical implications of the study

The study and the findings provide numerous practical implications for managers in the downstream supply chain. The findings of this research assure the managers that IT investments in downstream SCM is an effective way of competing and the implementation of SCM practices using IT does have a strong impact on Competitive Marketing Performance of a firm. For managers, it gives a valuable guidance in their approach to IT investments to trigger business performance. Investment in IT advancement should not be concentrating on technology upgrades.
They should find out if the advancements in technology would lead to improved functional capabilities in the supply chain.

The analysis suggests that the Competitive Business Environment has been a catalyst for firms to adopt higher levels of technology usage in the downstream supply chain. Along with such investments, the study demonstrates that IT alignment with channel partners is necessary for creating good supply chain capabilities. Organizations can gain good levels of supply chain capabilities when its channel partners have compatible technology with that of the organization. Without such alignment of IT resources, the IT system cannot function well.

Currently, supply chain software packages are offered by a variety of vendors and are built using a wide range of technologies. Indiscriminate purchase of such products leads to a failure to achieve system integration across the supply chain with the channel partners finding such IT incompatible with their systems. Deployment of IT without taking into consideration the impact on channel partners is not in the best interest of a firm. Managers should carefully evaluate such new technologies and constantly monitor and track their channel partner’s investments in IT and ensure good inter-firm alignment to maximize supply chain performance. It is important for managers to judge channel partners’ needs and determine mutual benefits that could be derived from the emerging and new technologies before making such investments in the rush to gain competitive advantage in the market place.

IT advancement and IT Alignment do not directly improve market performance. They create good supply chain capabilities in terms of enhanced information sharing, coordination, collaboration and responsiveness in the supply chain. These capabilities lead to the first order benefits in the areas of operations and marketing which ultimately lead to superior competitive marketing performance. This suggests that investments in IT should focus on improvements in these areas particularly in the context of downstream supply chain management. IT resources not directed towards these supply chain capabilities will tend to reduce the overall impact of IT on market performance. Among the capabilities, Collaboration and Supply chain responsiveness have emerged as items creating significant positive impact on benefits.
The antecedents to creating good operational and strategic marketing benefits through such advanced and well aligned IT, is the creation of supply chain capabilities. Of the four dimensions used in the study for supply chain capabilities, supply chain responsiveness has emerged as the most significant dimension. Supply chain managers need to be aware of these capabilities as being crucial to higher firm level marketing performance. Traditionally, defending market share through product superiority and pricing was the strategy. Today however competition is considered a “war of movement” that depends on anticipating and responding quickly to changing market needs (Stalk et al., 1992). The creation of superior competencies is achieved by creating these four dimensions of capabilities in the supply chain.

Operational and Strategic Marketing Benefits contribute positively to Competitive Marketing Performance. Managers in supply chain tend to concentrate more on the operational efficiencies through a metrics-driven lens and fail to focus on the strategic marketing benefits that can be realized through effective deployment of IT resources in the downstream supply chain.

For instance, information flows facilitated by IT can result in increased sales volume by reaching customers directly and promptly whenever a new product is introduced, and by tapping into new markets that were not identified due to lack of market data. IT enables a firm to respond to customer inquiries, track customer orders, and provide better after-sale service. This results in increased customer satisfaction and can lead to higher marketing performance.

The study results indicate a higher positive impact from strategic marketing benefits than operational benefits and underline the importance of a marketing benefit focus in the downstream supply chain. The study thus also highlights that there is room for improvement in the Operational Benefits area and managers in Indian manufacturing companies need to direct their efforts at improving the efficiencies to ensure higher positive impact on competitive marketing performance in future.

Finally, it is to be noted that all the constructs in the model have significant indirect effects on Competitive Marketing Performance, which necessitates a holistic
view of improving performance through improving the firms’ efforts across all the dimensions specified in the model.

### 7.2.1 Dimension level analysis findings.

The dimension level analysis has helped to identify specific variables to be focused by supply chain managers.

#### 7.2.1.1 Supply chain capabilities indicators influencing Operational and Strategic Marketing Benefits.

Collaboration and Supply Chain responsiveness have emerged as the indicators in the Supply chain capabilities that have significant influence both on Operational Benefits and Strategic Marketing Benefits. The competitive business environment faced by companies today necessitates a reliable, efficient and collaborated response (Rogers et al., 1993) from the entire supply chain. Supply chain responsiveness should reflect in the reaction to market changes in a coordinated manner among channel members through sharing of information.

For example, if a retailer is responsive to his customer, and transfers his customer preferences to the manufacturer, the overall supply chain responsiveness will be poor if the manufacturer is not quick to react to the information received from the retailer. Responsiveness and collaboration are facilitated by good information sharing and coordination among channel members, which were the other two items in the construct that were not significant. It is necessary that along with usage of advanced IT solutions, steps need to be taken to make the supply chain responsive by actively collaborating with channel members and the study confirms that these two factors have a positive influence on Operational and Strategic Marketing Benefits that impact on Competitive Marketing Performance. The findings demonstrate the importance of these two factors as vital components of Supply Chain Capabilities.

#### 7.2.1.2 Operational benefits indicators influencing Competitive Marketing Performance

An examination of the Operational benefit at the dimension level has revealed that Increased Delivery Performance and Reduction in excess stock has contributed significantly to Competitive Marketing performance. While delivery performance is
customer focused, reduction in stocks has a cost focus. It has been possible to achieve this balance through IT implementation in the supply chain. It is also necessary to focus on increasing the performance in the other metrics of the Operational Benefits as there is good scope for improvement. In comparison, Strategic Marketing benefits has a better influence than Operational Benefits on Competitive Marketing performance in this study and underscores the importance of working towards improving the Operational benefits further.

### 7.2.1.3 Strategic Marketing benefits indicators influencing Competitive Marketing Performance

Overall, Strategic Marketing benefits have a more positive impact on Competitive Marketing performance than Operational benefits. The analysis has revealed the strategic marketing advantage realized through investments in IT in the downstream supply chain. Improved visibility of information and inventory to customers is the most important factor among the benefits contributing to Competitive Marketing Performance. The study also reveals that identifying opportunities for new products has also a higher positive impact on the competitive marketing performance through achieving competitive advantage of launching new products faster than the competition. Further improvements on these two dimensions can lead to better firm marketing performance outcomes.

### 7.2.2 Item Level analysis of Supply chain capabilities, Operational Benefits and Strategic Marketing Benefits

The item level analysis of items in the supply chain capabilities and their impact on operational benefits and strategic marketing benefits has revealed several important findings.

Collaboration has emerged as the factor in Supply chain capabilities that has a positive impact on all items in the Operational Benefits. Similarly supply chain responsiveness has emerged as having a positive impact on all items in the Strategic marketing benefits.

Similarly the item level analysis of items in Operational Benefits and Strategic Marketing benefits and their impact on items in Competitive Marketing Performance
revealed that among the Operational benefits, delivery performance on due date has a significant positive impact on all items in Competitive Marketing performance. Similarly, Improved Information and Inventory Visibility, positively influences the important items, Sales growth, Market share and Customer satisfaction in Competitive Marketing Performance.

Thus the item level analysis have revealed the importance of Collaboration and Supply chain responsiveness towards creating first order benefits for the firm. Delivery performance on due date among the Operational benefits and Improved information and inventory visibility among the Strategic marketing benefits have clearly emerged as key factors that influence Competitive marketing performance positively. Managers should focus on practices that enhance these two benefits to further improve their Competitive marketing performance.

Overall the study has supported the hypothesis of this study that IT investment in the downstream supply chain impacts firm competitive marketing performance positively and presents insights into specific factors that lead to the positive impact of such IT investments.
REFERENCES


