Value Creation in Collaborative Supply Chain Network in Automobile Industry in Karnataka

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Abstract

This paper aims to determine the key factors that influence the value based supply chain in the collaborative network of Automotive sector in India and the extent of information sharing in a B2B set up and its implication on business decisions in the Automobile sector. The paper makes an attempt to examine the value creation in the supply chain network of e-commerce based automobile companies. The predominant factors that influence the Collaborative practices of Automobile Original Equipment Manufacturers (OEMs) in Karnataka and their dealership network in the background of e-commerce is thoroughly examined.

Design/methodology/approach: In the paper, the systemic and logical analysis of value creation expert research made over the past several years is used and statistical analysis(Exploratory Factor Analysis) has been conducted based on the survey results of perceptions of the dealers assimilated through online survey.

Findings: Major empirical findings based on automobile companies' data analysis vide Exploratory factor analysis allow stating that adoption of e-based collaborative arrangements and information sharing based on trust and long term alliance between partners enhances the value creation and results in the improvement in Supply chain management. It thus results in: Savings in cost, Timely decisions based on superior information, Better and positive relationships with Manufacturer-Suppliers and Dealers, Superior and strong collaboration, Integrated customer service and Enhancement of ultimate consumer value.

Originality value: This paper has thoroughly examined the Collaborative network of the e-commerce based automobile co's. and empirical findings suggest that the entire supply chain network has reaped the benefits of technology adoption and its
impact on business results is tangible which could be evidenced in positive outcomes like improvement in Manufacturer-Supplier-Dealer co-ordination and enhancement of long term customer relations.

Research limitations/implications: The presented research work confirms the positive implications of technology on value creation in the supply chain network of e-commerce based automobile companies. Research in this area highlights only the value addition in the collaborative supply chain network in select automobile co's (OEMs) in Karnataka and their dealership network in India. Broader generalisations could be drawn using this information, by selecting a larger sample size. The future research should be made on the entire industry in the country and by bringing more co's. and suppliers into the sampling frame.

Keywords : Value Creation, Collaborative Supply Chain, Information Sharing, Superior Collaboration.

1. INTRODUCTION

The most remarkable facet of the emerging "digital economy" is of course the Electronic Commerce. The Internet, which enables E-commerce, is radically changing not only the way businesses serve and communicate with their customers, but also the way they manage their relations with suppliers and partners. Both the new Internet-based companies and the traditional producers of goods and services are transforming their business processes into e-commerce processes in an effort to lower costs, improve customer service, and increase productivity (DOC, 1999).

The Automotive Supply chain is a complex network that consists of suppliers, manufacturers, distributors, retailers and ultimate users or customers working together to convert raw materials to work-in-process inventory (WIP) to final products. Owing to the high asset value involved and unique characteristics of the production process, firms must develop capabilities for collaborative manufacturing: like sharing of information, managing information technology, achieving operational excellence through strong and superior relationships with partners. In today's I.T. based manufacturing, managers rely heavily on Information technology to store, communicate and for retrieval of data for making informed decisions. Hence Information sharing and collaboration are the true corner stones in the spirit of the Value creation process in the Supply Chain.

According to Report published by Far Eastern Economic Review (1999), China's Internet users are expected to grow from 4 million by end of this year to 10 million by 2000, compared to a paltry 1.5 million in India the same year. China is aggressively developing its IT-based services sector. China's service sector activities used to be labour intensive, but are now increasingly capital and knowledge intensive as China is determined to emerge as Asia's services hub in the 21st century.

Now that the comparative advantage of nations lies in the application of knowledge, rather than on cost advantage, economists are worried that wealth creation in the next century won't be equally spread around the world. In his book, "Building Wealth," Thurow (1999) warns that global disparities are likely to become even wider as what he calls the "knowledge revolution" plays itself out. To gain stature in the global village of the next millennium, he warns, it is no longer enough to maintain free markets, invest in human and physical infrastructure, nurture the rule of law, and build democratic institutions. Unless they rapidly build a ***vibrant knowledge-based services sector***, the developing world might slide down the global *value chain* and slip lower on the slopes of a much steeper pyramid of world power (FEER, 1999). In order to achieve sustainable economic growth and be able to join the global knowledge economy, India needs therefore to accelerate the development of its services sector.

The Indian Automobile Industry perspective:

The Automobile Industry in India: Indian Automobile industry is the 9th largest in the world with an annual production of over 2.3 million units in 2008. India is expected to become one of the destinations for major global automotive industries in the coming years(Timmons 2007). A customized product or service demands that the customer's needs/wishes have to be specified and integrated into the seller's **value-creation process** so that customized adjustments can be made Kleinaltenkamp (1996). The activities necessary for achieving this cause increased customer related coordination costs for the seller. As will be discussed in what follows, this then has significant effects on the division of labor and thereby on value-creation structures in business-to-business markets. OEMs expect their component suppliers to: (1) provide integrated systems rather than individual components, (2) participate in the global automotive chain, (3) raise quality levels, (4) participate in research and development, and (5) monitor and absorb a greater share of the warranty costs. These requirements have considerable implications for the use of integrated IT systems, involving both the supplier network, as well as the customer base. Alliances between various global automobile manufacturers also depend on networks that facilitate communication and the integration of their structures.

Collaboration in the supply chain comes in a wide range of forms, but in general have a common goal: to create a transparent, visible demand pattern that paces the entire supply chain. Several seminal studies have identified the problems caused by a lack of co-ordination, and to what extent competitive advantage can be gained from a seamless supply chain (Forrester, 1961; Lee et al., 1997; Chen et al., 2003). Also, there is little doubt that the success of the Japanese manufacturing model is largely attributed to their collaborative supply chain approach and the tight integration of suppliers in Just-in-Time delivery schemes (Dyer, 1994; Hines, 1998; Liker and Wu, 2000).

In the light of the above implications of ICT on the major fast growing economies of the world, it is necessary to study in detail the factors affecting the growth of Indian economy in general. The specific problems and prospects of automobile industry would be highlighted since Indian auto industry has become a global hub for low cost manufacturing. The study tries to make a sincere effort to diagnose the problems of the Automobile Industry in India and the Supply chain linkages of Automobile companies in the process of Value creation and make suitable suggestions based on logical and systematic analysis of the data and Empirical testing of data of Automobile companies .

2. PROBLEM STATEMENT

Any given business-to-consumer transaction will involve a larger number of related business-to-business transactions. This transactions multiplier effect is not unique to e-business; however, its expected growth and continued change will add to the challenge of measuring e-business and e-commerce. Growth in transactions is expected because as e-commerce expands related business-to-business transactions will become more fragmented; participants will concentrate on performing their highest valued-activities and rely increasingly on third parties for lower-value added activities. The measurement challenges of this growth include accounting for the increased volumes, identifying the new areas for improvement for automotive dealers (e-business players), maintaining up-to-date information for the known players, and avoiding double counting the value of related transactions.

Change in the scope and nature of e-commerce transactions is expected because electronic business methods permit the players to change their roles relatively easily and they increasingly will do so. Examples of changes in roles are today seen in manufacturers and wholesalers who now sell directly to consumers, and in the "virtual" integration of firms through informal alliances that link firms electronically. These new arrangements impose additional measurement challenges including identifying the new players and their roles, maintaining up-to-date information on them and how their roles are changing, and updating data collection methods (such as including direct-sale "manufacturers" in an appropriate "retail" sales survey frame).

The research study begins with the aim of better understanding what predominant factors influence value creation and how collaborative e-business processes are changing the firm and its internal operations, re-engineering the supply chain and changing the collaborative relationship between manufacturers, wholesalers, retailers and customers, and effects on the automotive industry in India and economic structure. Specific deliverables include the development of a framework for evaluating e-business based collaborative processes' impact across the automotive value chains, and development of a forward-looking collaborative e-commerce taxonomy for supplementing existing automotive industry specific collaborative information systems.

3. RESEARCH OBJECTIVES

The objectives of the study are as follows:

- To determine the status quo of value creation in the collaborative network among companies and their dealership network in the automotive industry in India;

- To identify the predominant factors in the collaborative supply chain in the auto industry and extent of collaboration and information sharing in the configuration and coordination of value creation; and offer suggestions based on the empirical findings.

4. SIGNIFICANCE OF THE STUDY

The ability to collaborate with various players in the supply chain in creating value is critical success factor for all automobile manufacturers. What makes a supply chain successful is the collaboration, visibility, and trust of the various entities in the chain. Online collaboration and rationalisation of the entire value chain is popular in the American, Japanese, and European markets on account of their high sales volumes. These markets provide a reliable sales base for vendors and are well-integrated, making minimal taxation rates, as well as cost advantages for the supplier, possible. In contrast, sales in India are relatively low. Good information sharing and trust building between trading partners improves supply chain visibility that can lead to better coordination and build a solid foundation for collaboration in efficient operations, cost reduction and for perfecting customer service.

5. LITERATURE REVIEW

The effects of changed consumer-goods markets on business-to-business value Chains in developed economies, the demand in consumer-goods markets now exhibits an increasing individualization. This trend, which it is presumed will continue in the future,(Piller,2003) has the result that products offered on these sales markets are becoming increasingly differentiated. It is still a matter of debate to what degree this development has been caused by an actual increase in the diversification of consumers or, in contrast, artificially brought about through strategic marketing measures undertaken by consumer-goods manufacturers (Becker, 2002).

However, the result is definitely a growing segmentation of the various markets into ever smaller niches along with a corresponding diversification of products. This occurs first when existing products are offered in a greater number of models and variations. A vivid example of this development is the automobile industry. In the last thirty years, the number of automobile types offered per model has increased by five to eight times. Similar developments can also be observed in other industries.

Also, there is a second trend often referred to as “mass customization”. A number of Consumers are offered products which have been customized to meet their individual needs. In general, such customization is facilitated through the use of corresponding information-/communication technology. The manifestations of product individualization range from “match-to-order” or “locate-to-order” (assisting the customer in the selection of standard products) to “make-to-order”, in which an offer for goods/services is specifically tailor-made to the individual customer’s requirements. Such forms of mass customization can currently be found in offers for automobiles, clothing articles and shoes, cosmetics, media products, etc. Piller (2003). This more market orientation towards the individual customer in the consumer goods market is primarily sales-motivated. In tailoring their products to their customers’ requirements, sellers hope to be able to demand higher prices. At the same time, they aim at an overall increase of customer satisfaction, thereby improving overall customer relations. All of this will help the seller to maintain a competitive edge on the market. However, there are also costs involved in this which primarily take the form of an increase in “complexity” costs Schweikart (1997). These costs must be taken into consideration but are often ignored in business practice. A customized product or service demands that the customer’s needs/wishes have to be specified and integrated into the seller’s **value-creation process** so that customized adjustments can be made Kleinaltenkamp (1996). The activities necessary for achieving this, cause increased customer related coordination costs for the seller. As will be discussed in what follows, this then has significant effects on the division of labour and thereby on value-creation structures in business-to-business markets:

Adam Smith pointed out that production costs will fall when there is specialization in certain activities, accompanied by an increased output volume. At the same time, however, division of labour requires a greater degree of coordination and cooperation among the different participants – regardless of whether ‘participants’ denotes individual employees, corporate divisions or even entire companies. These additional coordination efforts increase the total costs. The more specialized the participants are, the higher the resulting coordination costs will be. Smith (1876).

Toyota, for instance, has invested in innovations to reduce gas emissions and improve fuel efficiency. The company has made efforts to reduce hydrocarbon, carbon monoxide, and nitrogen gas emissions through Diesel Clean Advanced Technologies—which incorporates technologies such as a computer controlled common rail fuel injection system—or the new Diesel Particulate Nox Reduction System (DPNR), which removes particulate matter (PM) and Nox from exhaust emissions.

Toyota has extended the scope of its value chain to construct an integrated customer lifestyle support system. The main elements of the value chain Toyota focuses on include e-commerce, financing, and Intelligent Transport Systems. The company’s e-commerce venture in Japan is steadily growing with Web site membership (gazoo.com) having reached three million. On average, 360,000 online requests for price quotes and catalogs are received by Toyota dealers annually, with 10% of these requests resulting in purchases of Toyota vehicles.

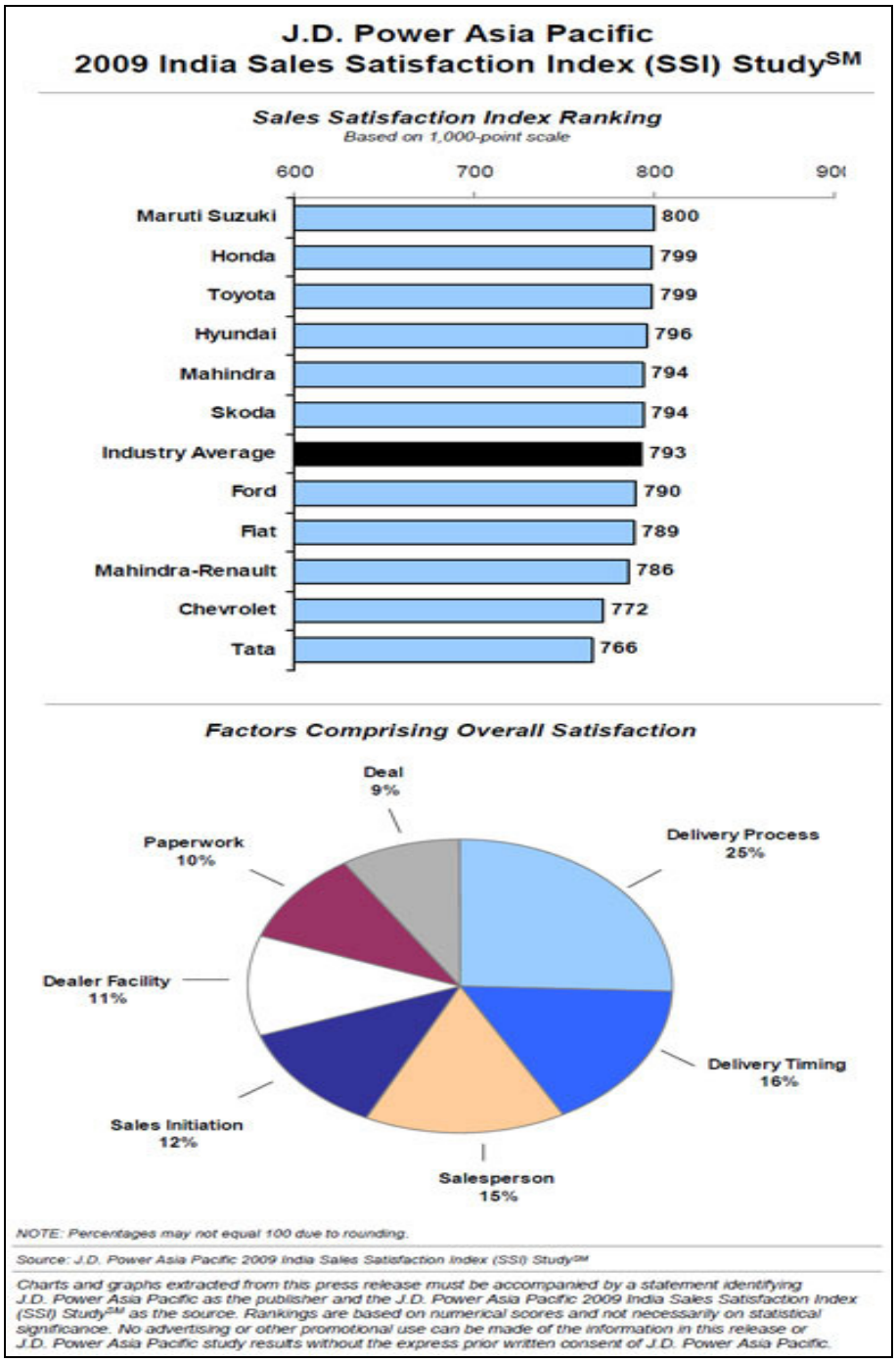
Duncan Austin et.al.,(2003) in their Report on “Changing Drivers: The impact of climate change on competitiveness and value creation in the automotive industry” bring to light the effect of carbon constraints on *value creation.* The purpose of the report is to help investors make better informed

decisions regarding automotive company stocks in light of emerging "carbon constraints" – policy measures designed to mitigate climate change by limiting emissions of carbon dioxide (CO2) and other greenhouse gases.

The report explores how carbon constraints in global automotive markets may affect value creation in 10 leading automotive companies between now and 2015, a timeframe in which major technological and policy changes are possible. The Original Equipment Manufacturers (OEMs) assessed are BMW, DaimlerChrysler (DC), Ford, GM, Honda, Nissan, PSA, Renault, Toyota and VW – the world's largest independent automotive companies.

The geographical scope of the assessment is the United States, European Union and Japanese markets, which together account for nearly 70 percent of current global sales. The report is the result of collaboration between SAM Sustainable Asset Management (SAM) – a Zurich-based independent asset management company specializing in sustainability-driven investments – and the World Resources Institute (WRI) – an environmental research and policy organization based in Washington D.C. Drawing on the respective strengths and expertise of the two organizations, the report analyzes both the risks and opportunities of carbon constraints, and then estimates the combined implications for OEMs' future earnings. The report is explicitly forward-looking, focusing on the main factors affecting OEMs' exposure to carbon constraints, and drawing on the latest publicly available information about the 10 assessed OEMs.

FIGURE 1: Sales Satisfaction Index



Source: J.D.Power Asia Pacific 2009

The above diagram (figure1) reveals statistics based on survey of Indian consumers by J.D.Power Asia Pacific, India Sales Satisfaction Index (SSI). It reveals that Toyota is tagged with Honda in Sales satisfaction with 799 points which is above the industry average of 793 on a 1000 satisfaction measuring scale. This indicates the Toyota's endeavour and constant struggle towards enhancing customer satisfaction and putting the 'customer first' as a strategic business mission and

strengthening long term bondage with the customers. This suggests for a complete transformation in the supply chain. If customers needs are to be met, it is a must that all the partners in the supply chain i.e, Component Suppliers-Original Equipment Manufacturer-Dealer should align their objectives in line with that of customers' needs. The Original equipment manufacturers must take in to account the underpinnings of customers' real needs since there is an urgent need for the automobile industry to graduate from "build to stock" to "build to order". For this, to be achieved, superior information sharing and strong collaborative practices amongst all the players in the automotive industry is the need of the hour.

The "Global best, local best" principle "Global best, local best – these commitments rule the development of Toyota's mainstay global models. By "global best" we mean building cars with common value worldwide while pursuing the world's highest levels of quality and performance. The global best concept is fundamental to the Toyota mind-set. We want to give superior quality and outstanding cost performance to customers buying Toyota vehicles throughout the world. On the other hand, "local best" expresses a commitment to accurately reflecting the needs and values of customers in different regions. Toyota enhances the value of its core global models by marrying its commitments to being global best and local best." Toyota (2006: 18)

While examining the literature on collaboration in supply chain, there seems to be increased attention on collaborative efforts in forward supply chains in the last decade based on the assumed premise that closer inter-firm relationships and enhanced information exchanges do improve the quality of decision making, reduce uncertainty, and consequently improve supply chain performance (Whipple and Russel, 2007).

FIGURE 2 : Information-Based Supply Chain Innovations
Supply Chain Innovations

	Opportunity	*Examples*
Substitution Effect	New and improved planning process	Intelligent & scientific planning
Scale Effect	Extensive connectivity & visibility	Coordination; sense & respond
Structural Effect	Re-engineered information, materials & financial flows	Design collaboration, postponement, new financial flow

Source: Information-Based Supply Chain Innovations Hau L. Lee Stanford University

In recent years, numerous studies – many of them conducted by trade associations or management consulting firms – have focused on structural change in the automotive industry and the subsequent reconfiguration of value chains. The focus has often been on cooperation between manufacturers and suppliers and, particularly, on the scope of the value activities carried out by each side Sonnenborn (2009). The configuration and coordination of such activities have been largely ignored. Most notably, there has been little examination of the role of the configuration and coordination of value activities in generating competitive advantages. For the most part, the academic literature on this topic Roth(1992), Holtbrügge (2005) has failed to consider the decision-making approach of strategic management. There is virtually no literature for practitioners that addresses the issue of the configuration and coordination of value activities. This study is intended to fill this gap.

6. DEFINITION AND CONCEPTUAL FRAMEWORK

6.1 Definition and Review of Value Creation, Collaboration and Information Exchange in Supply Chain :

Value creation in Automobile industry which has a strong logistics base, and thus could be defined as "meeting customer service requirements while minimising supply chain costs and maximising partner' profits" Langley and Rutner (2000). They further define logistics value added as "either providing additional services or exceeding customer service requirements that further reduces the supply chain costs or increasing the partners profits and gains in competitive advantage in the marketplace".

Collaboration in a supply chain occurs when "two or more independent companies work jointly to plan and execute supply chain operations with greater success than when acting in isolation" (Simatupang and Sridharan, 2003). Ganesan (1994) posits "trust alludes to the extent to which supply chain partners perceive each other to be credible (i.e., partners have expertise to perform effectively) and benevolent (i.e., partners have intentions and motives that will benefit the relationship). (Yu et al., 2001; Sandberg, 2007) opine that: " Information exchange on the other hand is the extent to which data is accessible to partner firms through mutually agreed exchange infrastructure. *Information exchange (or information sharing) means that retailer and supplier still order independently, yet exchange demand information and action plans in order to align their forecasts for capacity and long-term planning.* Information sharing among supply chain partners is an important prerequisite for effective collaboration". Collaboration can also be defined as a relationship between independent firms "characterized by openness and trust where risks, rewards, and costs are shared between parties"(Sandberg, 2007).

6.2 Proposed Theoretical/ Conceptual Framework

The theoretical framework proposed for this study considers 12 predominant variables that affect the Collaborative supply chain network of the Automobile Industry. The variables are subjected to Exploratory Factor analysis and their inter-relationships are thoroughly examined and interpreted by using correlation matrix, extraction of factors through principal component analysis.

SECTION – A

EXTENT OF INFORMATION SHARING IN THE VALUE CHAIN BETWEEN PARTNERS : FACTOR STATEMENTS AND CORRESPONDING VARIABLES

STATEMENT NO.	STATEMENT	VARIABLE NO.	NAME OF VARIABLE
Statement 1	Accuracy of Information shared with partners	Variable 1	ACCURINFMNSHRD
Statement 2	Mutual access to the partners' databases	Variable 2	MUTACCSDTBS
Statement 3	The extent of cost data shared with the partners	Variable 3	COSTDATASHRD
Statement 4	The use of web-enabled inventory data shared	Variable 4	WEBENBLDDATA
Statement 5	Warehouse information shared	Variable 5	WAREHSINFMN

SECTION – B

COLLABORATIVE PRACTICES BETWEEN PARTNERS IN THE VALUE CHAIN : FACTOR STATEMENTS AND CORRESPONDING VARIABLES

STATE MENT NO.	STATEMENT	VARIABLE NO.	NAME OF VARIABLE
Statement 6	Trust between the partners	Variable 1	TRUSTBTWNPRTNR
Statement 7	Long-term alliance with the partners	Variable 2	LONGTERMALL
Statement 8	Well defined collaborative objectives, scope and responsibilities	Variable 3	COLLBRTVOBJ
Statement 9	Joint forecast and planning arrangements	Variable 4	JOINTFORCST
Statement 10	Jointly established performance measures	Variable 5	JOINTPERFMMEAS
Statement 11	Sharing of risk and reward with the partners.	Variable 6	SHARINGRISKREW
Statement 12	Opportunity for Improvement	Variable 7	OPPRTNTYFRIMPROV

7. RESEARCH METHODOLOGY

A survey and interview methods were employed to gather information regarding Value creation in the automobile industry in Karnataka with special emphasis on Car Manufacturers**.** Because of the specific time-focus of this initial reference position, the fact that data referring to the Internet and Internet usage are quick to age does not present a significant problem in this study. Following the standard approach **,** we measure the distributors' perceptions and related variables in terms of a Likert-type scale ranging from 1 to 5 with the following equivalences, ``1": ``not important" or ``strongly disagree"; ``2": ``slightly important" or ``slightly agree"; ``3" : ``neutral"; ``4" : ``important" or ``agree"; and ``5": ``very important" or ``strongly agree". Given the exploratory nature of the study and consistently with our interpretation of ``Value Creation", we decided to leave out considerations of a latent nature. The sample was therefore, restricted to Distributors of three OEM's namely, Toyota, Volvo and Reva in Karnataka State**.** A questionnaire on employees attitudes was designed and pre-tested according to the standard approach and it was dispatched online to 200 such individuals, securing 120 overall meaningful responses from the distributors of all the three OEMs. (60%). Its contents were framed with regard to the fact that Internet based transactions, collaborative practices and communications, and costs tended to remain small and constant over the relevant duration. Assistance was supplied to the respondents in case of difficulty, and SPSS 13 package was employed in data analysis. To complement the survey, interviews were conducted with executives of the Dealership network of Car Manufacturers. All these companies have been actively involved in developing and promoting B2C e-commerce in India.

7.1 Research Design

Research design is an overall framework of a research that explains the direction and method to be used in the study to gather the information needed, either from primary or secondary sources (Malhotra, 2007). According to Neuman (2006), quantitative approach has the characteristic of measuring objective facts using variables where data is separated from theory, statistically analysed and emphasized with its reliability. Quantitative approach has been used to develop hypotheses that consist of all the variables to empirically investigate the above statement vide statistical technique.

Due to adoption of quantitative approach, it is inevitably that the study will be carrying out causal research where the hypotheses formulated earlier consisting of all the variables will be empirically investigated using statistical technique such as charts, tables and other statistical measurements to prove the interdependencies of the factors through exploratory factor analysis.

7.2 Data Collection Methods

In this section, there would be illustration on what methods will be used in collecting the primary and secondary data in order to empirically test the formulated hypotheses, and hence solving the research questions.

7.2.1 Primary Data

For this study, a questionnaire consisting two parts namely, PART-A which highlights questions on dealership related information and PART-B which is very pertinent to this study highlights the online collaborative practices of the dealers with trading partners which is very crucial for the value creation process in the automobile industry. This section consists of two important areas namely,

A. Extent of Sharing Information between partners and
B. Collaborative arrangements with Partners

The first part, tries to investigate empirically, the perceptions of the dealers and assess the extent of online information shared between the partners. It has four main variables, namely, Mutual access to the partners' databases, The extent of cost data shared with the partners, The use of web-enabled inventory data shared and Warehouse information shared between partners.

The second part, emphasises and tries to investigate the collaborative arrangements with partners. It has six main variables, namely, Trust between the partners, Long-term alliance with the partners, Well defined collaborative objectives, scope and responsibilities, Joint forecast and planning arrangements, Jointly established performance measures and Sharing of risk and reward with the partners.

7.2.2 Secondary Data

In this study, most secondary data are extracted from online resource such as online databases, internet findings or other sources. The journal articles of relevant study field are adopted from various library Database like, Proquest Database and Science Direct database. Automobile Manufacturers' websites, SIAM, ARAI, and JD POWER ASIA survey results and other research publications.

7.3 Sampling Design

7.3.1 Target Population

Target population is said to be a specified group of people or object for which questions can be asked or observed made to develop required data structures and information Hair and Bush (2006) . Therefore, the target population in this research study is the focus group of the Car dealers in the automobile industry who sell the cars manufactured by the OEMS, namely, Toyota, Volvo and Reva.

7.3.2 Sampling Frame & Sampling Location

The sampling frame can be defined as set of source materials from which the sample is selected. The definition also encompasses the purpose of sampling frames, which is to provide a means for choosing the particular members of the target population that are to be interviewed in the survey (Anthony G. Turner, 2003). However, sampling location is a place where a research is conducted or/and a place where information is acquired. In this research study, the respondents are the Dealers of various Car Manufacturers' Dealership network spread throughout Karnataka and other parts of India.

7.3.3 Sampling Technique

According to Malhotra (2007), non-probability sampling is less expensive, less time consuming, and require only little sampling skills. Therefore, this sampling technique is adopted to conduct survey in this research. Moreover, units of sample in this research are selected on the basis of personal judgment or convenient because information and targeted respondent is readily available throughout the dealership network.

7.3.4 Sampling Size

In this research, sampling size is determined accordingly by using sample size formula adopted from Krejcie, R.V., and Morgan, D.E. (1970). Malhotra and Peterson (2006) and Zikmund (2003) stated that, larger the sampling size of a research, the more accurate the data generated but the sample size will be different due to different situation. The total targeted population in this research is counting according to the total available dealers of the three OEMs. There are approximately 1200 employees across the Dealership network of the three companies, namely, Toyota, Volvo and Reva and the information is adopted in the last updated date of 30th April 2012 in their respective websites. Therefore, according to the formula used, the sample size in this research will be 200 which accounts to nearly 16.66% of total population. 200 copies of questionnaire were elicited online as an e-mail attachment to all dealers and 120 meaningful responses were received which accounts to 60% response rate.

7.4 Research Instrument

The research instrument that used for the study is the online questionnaire. The purpose of using a Well designed structured Questionnaire in a survey is due to it's accuracy in obtaining desired results and obtaining the direct response and feedback from the respondent groups. The questionnaires can be collected in short period of time and in an easier manner and could be reached to a large number of population.

7.4.1 Questionnaire Design

In this study, the questions in the questionnaire are closed-ended or structured in order to ease the process of analyzing the data from respondents. This questionnaire consists of two parts, section A which relates to information sharing between partners which consists of five variables which were based on ordinal scale. (five point Likert scale) In section B, it consists of questions relating to seven variables which would be formed based on a five point Likert scale which allows respondents to indicate how strongly they agree or disagree with the statement provided.

7.4.2 Pilot Test

Prior to the data processing, a pilot study was conducted and pre-tested by contacting dealers online and nearly 25 respondents affirmed the correctness and technicalities of the questionnaire design. The details would be specified in later section and the pilot test enables the reliability of this instrument to be empirically tested. The survey results would later be tested using SPSS software.

8. RESULTS OF FACTOR ANALYSIS

The Exploratory factor analysis reveals that respondents consider all variables as important in adopting a collaborative e-commerce model in the supply chain for value creation. The technological confluence in designing the business models and collaborative practices is the need of the hour. Here, certain variables are grouped together into specific segments to identify the key factors in collaborative supply chain by applying factor analysis using Principal Component Analysis.

Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity are used to examine the appropriateness of factor analysis. As shown in (Table 1), the approximate Chi–Square statistic is 202.928 with 66 degrees of freedom which is significant at 0.05 level. The KMO static (.639) is also large (>.5). Hence, factor analysis is considered as an appropriate technique for further analysis of data.

TABLE 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.639
Bartlett's Test of Sphericity	Approx. Chi-Square	202.928
	Df	66
	Sig.	.000

Source : Primary Data

Results of Principle Component Analysis for variables related to collaborative practices in supply chain are calculated into communalities (Table 2), total variance explained (Table 3) and rotated component matrix (Table 4) are shown here under:

TABLE 2 : Communalities

	Initial	Extraction
ACCURINFMNSHRD	1.000	.791
MUTACCSDTBS	1.000	.550
COSTDATASHRD	1.000	.643
WEBENBLDDATA	1.000	.492
WAREHSINFMN	1.000	.720
TRUSTBTWNPRTNR	1.000	.645
LONGTERMALL	1.000	.541
COLLBRTVOBJ	1.000	.377
JOINTFORCST	1.000	.449
JOINTPERFMMEAS	1.000	.440
SHARINGRISKREW	1.000	.385
OPPRTNTYFRIMPROV	1.000	.574

Extraction Method: Principal Component Analysis.

Source : SPSS Output of Primary Data

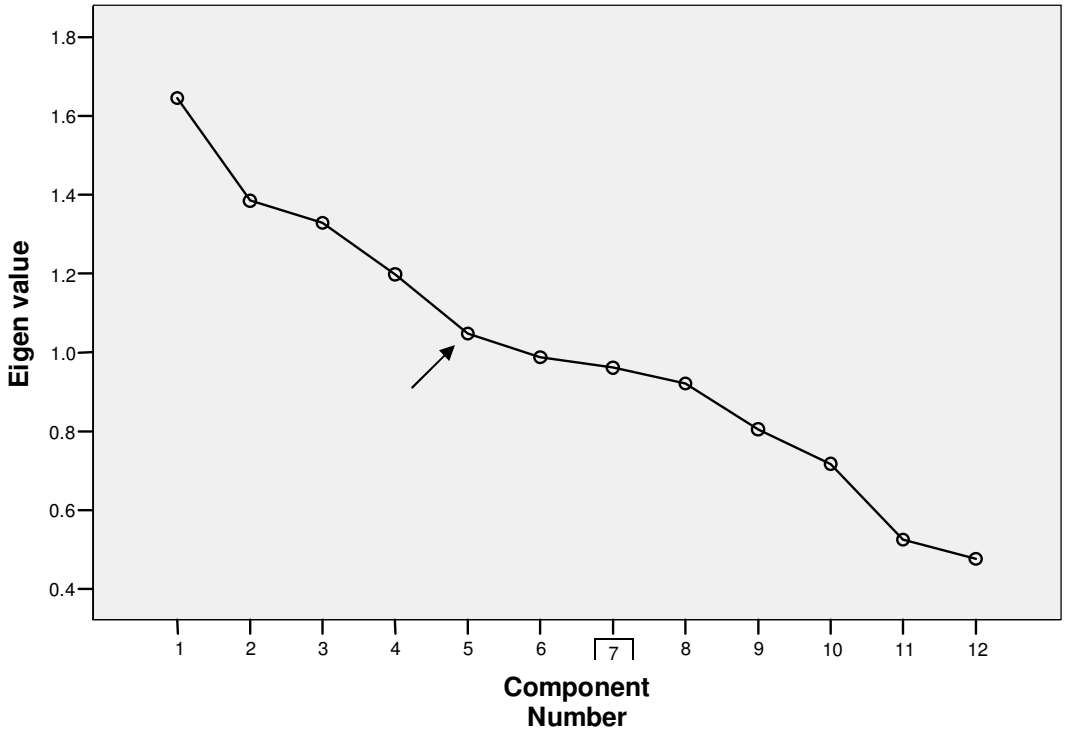
TABLE 3 : Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.645	13.712	13.712	1.645	13.712	13.712	1.381	11.509	11.509
2	1.385	11.539	25.252	1.385	11.539	25.252	1.368	11.400	22.909
3	1.329	11.073	36.325	1.329	11.073	36.325	1.339	11.161	34.069
4	1.198	9.983	46.308	1.198	9.983	46.308	1.263	10.523	44.592
5	1.048	8.734	55.043	1.048	8.734	55.043	1.254	10.450	55.043
6	.988	8.233	63.275						
7	.962	8.013	71.288						
8	.921	7.675	78.963						
9	.805	6.709	85.672						
10	.717	5.978	91.650						
11	.525	4.377	96.027						
12	.477	3.973	100.000						

Extraction Method: Principal Component Analysis.
Source : SPSS Output of Primary Data

Retaining only the variables with Eigen values greater than one (Kaiser's Criterion), one can infer that 13.712 % of variance is explained by factor 1; 11.539 % of variance is explained by factor 2; 11.073 % of variance is explained by factor 3, 9.983 % of variance is explained by factor 4, 8.734 % of variance is explained by factor 5 and over all, the five extracted factors contributed to 55.043 % of variance as per Table – 3.

FIGURE 3 : Scree Plot



Source : SPSS Output of Primary Data

From the above diagram (Figure 3), it is apparent from the Scree plot that five factors are having Eigen values above 1.0 (Kaiser's criterion), which clearly indicates that these five factors are extracted through the Principal Component Analysis. For further analysis, the Rotated component matrix indicates what variables are loaded to each factor.

TABLE 4 : Rotated Component Matrix(a)

VARIABLES	Component				
	1	2	3	4	5
ACCURINFMNSHRD	.073	.227	**.849**	-.113	-.029
MUTACCSDTBS	-.210	**.682**	-.032	.180	-.084
COSTDATASHRD	-.137	-.425	**.619**	.242	-.037
WEBENBLDDATA	.015	.139	.139	**.658**	-.143
WAREHSINFMN	-.101	-.290	.311	.204	**.698**
TRUSTBTWNPRTNR	-.187	.220	-.292	-.185	**.665**
LONGTERMALL	**.703**	.201	-.040	-.022	-.068
COLLBRTVOBJ	-.142	-.049	-.062	**.578**	.130
JOINTFORCST	.417	.042	-.074	.030	**.517**
JOINTPERFMMEAS	.141	**.637**	.069	-.071	.065
SHARINGRISKREW	-.254	**.542**	-.111	.195	.025
OPPRTNTYFRIMPROV	**.534**	-.096	-.075	.521	.045

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 7 iterations.

Source : SPSS Output of Primary Data

9. DISCUSSIONS OF MAJOR FINDINGS

On the basis of Varimax with Kaiser Normalisation, 5 factors have emerged as could be evidenced from the above Rotated component matrix (Table 4). Each factor is constituted of all those variables that have factor loadings greater than or equal to 0.5 (Table 4) . Thus 7th and 12th variables constitute the first Factor, conceptualized as " Long term growth of partners". Variables 2nd, 10th and 11th constitute the second Factor conceptualized as "Mutual business conduct online". 1st and 3rd Variables constitute third Factor conceptualized as "Extent of Information Shared ". 4th and 8th variables constitute fourth Factor conceptualized as "Online collaborative practices'. 5th and 6th and 9th variables constitute the fifth Factor which is conceptualized as "Trust building and planning" The identified factors with the associated variables and factor loadings according to Rotated Component matrix (Table 4) are elucidated as follows in the following Correlation Matrix which is significant at 0.05 level.(Table 5).

TABLE 5 : CORRELATION MATRIX

FACTORS		LONGTERM GROWTH OF PARTNERS		MUTUAL BUSINESS CONDUCT ONLINE			EXTENT OF INFORMATION SHARED		ONLINE COLLABORATIVE PRACTICES		TRUST BUILDING AND PLANNING		
	VARIABLES	O.I	L.A	J.P.M	SRR	M.A.D	AIS	CDS	C.O	WED	W.I	TBP	JF
LONGTERM GROWTH OF PARTNERS	OPPRTNTYFRIMPROV(O.I)	1	.196	.001	-.074	-.057	-.021	-.013	.083	.114	.142	-.132	.069
	LONGTERMALL(L.A)		1	.050	-.126	.019	.055	-.084	-.027	-.035	-.158	-.010	.138
MUTUAL BUSINESS CONDUCT ONLINE	JOINTPERFMMEAS(J.P.M)			1	-.042	.098	.055	-.233	-.023	.052	-.072	.073	-.048
	SHARINGRISKREW(S.R.R)				1	.137	.006	-.100	.045	.017	.021	.042	-.069
	MUTACCSDBS (M.A.D)					1	.040	-.126	.026	.086	-.167	.101	-.037
EXTENT OF INFORMATION SHARED	ACCURINFMNSHRD(A.I.S)						1	.232	-.026	-.001	.071	-.187	-.021
	COSTDATASHRD(C.D.S)							1	.107	.178	.225	-.159	-.107
ONLINE COLLABORATIVE PRACTICES	COLLBRTVOBJ (C.O)								1	.061	.095	.008	-.015
	WEBENBLDDATA(W.E.D)									1	.008	-.118	.041
TRUST BUILDING AND PLANNING	WAREHSINFMN(W.I)										1	.143	.107
	TRUSTBTWNPRTNR (T.B.P)											1	.103
	JOINTFORCST(J.F)												1

Correlation is significant at the 0.05 level (2-tailed).

Source : SPSS Output of Primary Data

The correlation matrix clearly suggests the inter dependencies amongst the variables. The constituents of the LONG TERM GROWTH OF PARTNERS factor are : Opportunity for Improvement(O.I) and Long term alliance (L.A). As per (Table 5**)** , the correlation matrix reveals that Opportunity for Improvement has significant correlation with Long term alliance between partners since the 'r' value = (.196). The positive relationship between the variables indicates that the long term alliance between partners using online services will increase the opportunities for improvement in information sharing between partners which is mutually beneficial for growth and thus would enhance the value creation process in the long run for the entire supply chain.

The constituents of MUTUAL BUSINESS CONDUCT - ONLINE factor are : Jointly established performance measures (J.P.M), Sharing of risk and reward with the partners (S.R.R) and Mutual access to the partners' databases (M.A.D) . The matrix depicts that (J.P.M) has significant correlation with (M.A.D) , and negative correlation with (S.R.R) since the 'r' value = (-.042) This suggests that the Jointly established performance measures(J.P.M) between the trading partners requires constant sharing and accessing the databases mutually(M.A.D) for improving business performance and relations between partners and thus enhancing the value creation process. However, this process may not yield good results when in it comes to sharing of risk and reward with the partners since jointly established performance measures will have a negative impact on Sharing of Risk and Rewards (S.R.R), 'r' value = (-.042). Hence, the Original Equipment Manufacturers (OEMs) should take responsibility to enhance dealer relationships and there is a strong need to institutionalise a suitable Dealer Relationship Management and Supplier Relationship Management policy that covers the full product lifecycle from component development to risk-sharing.

EXTENT OF INFORMATION SHARED between partners factor is constituted by Accuracy of Information shared (AIS) with partners and The extent of cost data shared (CDS) with the partners. Correlation matrix shows a significant relationship between (AIS) and (CDS) with an 'r' value of (.232). It can be inferred that the Accurate information shared between partners and the extent of usage of cost data have a positive relationship. This indicates the OEMs and dealers have a good integrative Web-based interface. Thus it increases the sharing compatibility between partners, which in turn enhances the value creation process.

The factor ONLINE COLLABORATIVE PRACTICES with partners constitutes The web-enabled inventory data (W.E.D) shared between partners and Well defined collaborative objectives, scope and responsibilities (C.O). The correlation matrix depicts a positive relationship between these two variables 'r' = (.061) which indicates there is low degree of positive correlation between these two variables. Todays' Automobile Industry requires a Comprehensive collaborative logistics programme to steer both just-in-time (JIT) procurement and unobstructed delivery. Hence sharing of reliable Inventory data with the partners is vital, as Just-in-sequence (JIS) and JIT require efficient collaborative information networks. To ensure smooth flow of information in the entire process, OEMs need to integrate with their dealers and networks have to be built with a strong IT base..

The factor TRUST BUILDING AND PLANNING constitutes Warehouse information shared(W.I), Trust between the partners (T.B.P) and Joint forecast and planning arrangements (J.F). Correlation matrix shows a significant positive relationship between (W.I), (T.B.P) & (J.F). Inference could be drawn in such a way that the variables Trust Building and Planning between partners and Warehouse Information shared, correlate positively 'r' = (.143). Joint forecast and planning arrangements (J.F) and Warehouse information shared (W.I), have a positive correlation 'r' = (.107). In case of Trust between partners and Joint forecast and planning arrangements the correlation coefficient 'r' = (.103). These values indicate that there is a low degree of positive correlation among these variables. Hence there is a need for meaningful dialogue between the dealers and the OEMs in strengthening mutual bondage and openness in communication which builds trust and aids collaborative planning and forecasting activities.

The above correlation values indicate there is scope for further improvement in relationship between the Dealers and the OEMs. OEMs cannot make accurate and timely decisions in isolation. Therefore, opportunities must be identified on demand with improved data analysis and insights. And, once in the market, supplier and dealer networks have to be developed with reliable local partners. For their integration, Automobile manufacturers have to install virtualised e-learning solutions and increase communication solutions. Any endeavour to build trust among partners with proper planning arrangements, would lead to proper information sharing. Hence a strong bondage of mutual trust would strengthen the long term joint strategic process building between partners and help the value creation process in the automotive supply chain.

10. IMPLICATIONS OF THE STUDY

The inter correlation matrix clearly indicates the positive relationship between the variables which are considered for the study. Our findings demonstrate that the information sharing leads to greater collaboration and thus aids the value creation in the supply chain which in turn leads to better performance of the firms in the entire automotive industry. A lesson here, for the managers is that superior collaborative practices and better information sharing is the first critical step in the process of value creation. The Original Equipment Manufacturers should take responsibility in implementing certain measures which should increase effectiveness and efficiency in the joint core processes of collaborative engineering, procurement and sourcing, and material SCM. The automotive SCM involves intense data exchange and as time elapses, and as trust level is built up, firms may gradually embed their relationship toward joint strategic process building and align their objectives strategically for mutual benefit. Good information sharing improves supply chain visibility that can lead to better coordination and build a solid foundation for collaboration in gaining operational efficiency, cost reduction, customer service perfection and for better value creation. Thus, this study throws light on intelligent collaboration among supply chain members in the automotive supply chain and how superior information sharing leads to cost benefits. By implementing the quality issue into various information sharing links of the automotive value chain, OEMs can become more resilient as the cross-functional integration of quality procedures removes bottlenecks, increases transparency of the procedures and helps eliminate potential risks for the Automotive Industry.

11. LIMITATIONS OF THE STUDY

Even though collaborative process management requires building trust, setting jointly established business goals, and designing inter-firm processes, however, to meet these goals, a strong technological confluence between all the partners in the entire Supply chain is required. Although these goals are not easy to reach, companies could strive to develop well defined collaborative objectives, establish joint performance measures in letter and spirit. The limitation of this study could be attributed to the limited survey sample concentrating only on Automobile companies in Karnataka and their dealership network in India. One such observation is that this study could be extended to other industries which are linked to Automobile industry and study the influence of other industries on the Automotive SCM.

12. CONCLUSION

The present study examines how the Superior Collaborative practices and good information sharing with a strong IT base in the entire automotive supply chain enrich the value creation process. The interplay of many key variables and their inter-correlations are brought to light with five predominant factors emerging out of the Exploratory factor analysis. Optimised collaboration can be achieved by having comprehensive specifications; clear definitions of tasks, targets and competencies; complete requirements management; risk sharing; and open organisation, IT, processes and communication. There is an urgent need for the OEMs to increase their value by collaboratively balancing all resources and optimizing the flow of goods, services, and information from the source to the end consumer. IT should play a pivotal role in enhancing the value of the automaker's preferred suppliers. To conclude, future research in this area prompts for longitudinal studies, which could be aimed at investigating cause and effect relationships in collaboration and information sharing among partners in the Automotive supply chain and their development over a period of time. Respondents from various other countries could be included in the sample, since web-based survey can attract more number of respondents and information could be easily gathered at any given point in time.

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