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IMPACT OF E-SOURCE APPLICATION ON KEY BUSINESS STRATEGIES – EVIDENCES FROM AUTOMOTIVE INDUSTRY OF PAKISTAN

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ABSTRACT

The purpose of this study was to examine e-sourcing applications and practices in automotive industry of Pakistan, specifically to learn the e-sourcing benefits achieved with respect to four key business strategies e.g. supply chain management, total quality management, time based purchasing, and organizational integration. Informal interviews guided by semi-structured questionnaire were managed across three representative case studies, including; a car manufacturer/assembler, motorbike assembler, and agri-equipment manufacturer/assembler. Delphi technique was used to collect and aggregate the final responses. It was observed that e-source applications like IFS (integrated financial system) in agri-equipment manufacturer/assembler, GLO (global logistic ordering system) in car manufacturer/assembler, and SAP modules in motorbike manufacturer/assembler, reflect technological variations. E-source has benefited automotive industry of Pakistan in number of ways e.g. cost reduction, delivery time reduction, faster information processing, deployment of total quality principles in supplier selection, enhanced collaboration and integration within (internal) and across (external) supply chain networks. However, opportunistic behavior, custom problems, consistent change in import/export policy of some countries, financial limits and non cooperative behavior of suppliers, have increased risk and limits long term strategic alliances. The study recommends that information transparency, sharing and communicating e-system achievements within (internal) and across (external) supply chain network/s, common forum to re-solve e-source problems, consistent technological up-gradation, enhance employee training, robust security, etc. as key strategies to enhance e-source benefits.

Keywords: *E-sourcing, Information Technology, Business Strategies.*

1) INTRODUCTION

Businesses all over the world are sharply adopting computer and its applications for many business processes and activities. Introduction of information technology in business process have replaced traditional paper based processes and ultimate change the way business processes being organized and managed within and across supply chains. Consistency in technological advancement has provided a medium to conduct business in a unique manner and these technological advancements have affected every business process and activity including procurement. Among the technological advancement, e-commerce and World Wide Web have revolutionized the way organizations manage their business processes. Electronic commerce involves automation of business-to-business transaction involving telecommunications and computers. Some of the common e-commerce technologies are electronic mail, electronic funds transfer, electronic bulletin boards, electronic data interchange, credits cards, smart cards, internet commerce and e-catalogues (Ukalkar, 2000). Today, e-commerce is no more a competitive advantage rather considered as necessity for survival and growth in the competitive global markets.

In today's world, these technological advancements are considered as source of sustainable competitive advantages. Advancement in hardware and integrated software's like introduction of bar codes, data scanner, wireless handheld computers, wireless kiosks, enterprise resource planning (ERP), direct exchange/uniform communication standard (DEX/UCS), quick response technologies (QRT), system application planning (SAP), point of sale (POS), universal product codes (UPC), radio frequency identification (RFID), electronic data interchange (EDI) has initiated point-of-purchase/point-of-sale transactions that facilities many business processes including e-procurement especially e-source applications (Dunne & Kahn, 1997; Muller-Seitz, Dautzenberg, Creusen, & Stromereder, 2009).

With the introduction of World Wide Web, organizations are experiencing varying degrees of success as they strive to incorporate internet technology in their traditional business processes (Carter & Sheehan, 2004; Cowles, Kiecker, & Little, 2002; Ellis-Chadwick, Doherty, & Hart, 2002; Geoffrion & Krishnan, 2003; Sheang & Jiuan, 2003; Wood, 2002). Business are leveraging internet technologies to improve the

supply chain processes and particularly sourcing process (Bartezzaghi & Ronchi, 2005). Rapid expansion in internet technology and swift return on investment (ROI) considered as the key drivers for the adoption of the electronic sourcing. In this regard, by adopting e-procurement, numbers of companies like, Mercedes-Benz, BMW, Chrysler, Caterpillar, Rover, etc are enjoying remarkable advantages (Ukalkar, 2000).

With respect to e-procurement, there are two critical aspects to the current technological explosion. First, technology has created operational ease in procurement process as a result it has positively supported organizational performances. Secondly, the exponential growth of internet has provided unlimited excess to large pool of suppliers and related information. At large, these two critical aspects generate exceptionally dramatic economic benefits for the entire supply chain. The same is evident from the recent research by the Aberdeen Group that state using an e-procurement solution to automate the acquisition of the goods and services leads to dramatic economic benefits (Aberdeen, 2001; Aberdeen, 2006).

Keeping in view the emerging trends towards information technologies and its adoptability in procurement process invites the attention of the academicians and researchers to probe e-procurement benefits and its' impact on different organizational strategies. Accordingly, this paper is dedicated to identify e-sourcing applications and practices in automotive industry of Pakistan. After knowing current e-source applications and practices, it will be easy to probe the impact of e-procurement practices on various business strategies e.g. supply chain management, total quality management, time based purchasing, and organizational integration. In order to achieve multi-objectives of this study, this research project is carried out in Automotive Industry of Pakistan.

Pakistan is an emerging market for automobiles and hence offers immense business and investment opportunities. Through indigenous technical resource and technical tie-ups with well know global companies, the auto parts industry has by and large developed into well organized sector of the country. Pakistan Automotive Industry at large operates under the franchise and technical collaboration & corporations of Japanese, Chinese, European and Korean automakers. In addition to many big giants, numbers of emerging vendors have successfully implemented new information system technologies. Resultantly, to attain process efficiency, on one side, Pakistani automakers are in different

phases to adopt information system technologies, while, on the other hand, number of companies are struggling hard to align their e-procurement systems with their key business strategies. Hence, study in automotive industry of Pakistan presents an opportunity to contribute not only in the doctrine of knowledge rather findings will assist business managers to align their business strategies e.g. supply chain management, total quality management, time based purchasing, and organizational integration with e-procurement practices.

2) LITERATURE REVIEW

Today, information technology has enabled organizations to establish close and long term contact with major suppliers through enterprise resource planning (ERP), inter organizational systems, e-source application, manufacturing resource planning (MRP), e-procurement, e-auctions and electronic data interchange (EDI) (Lee & Whang, 2000; Puschmann & Alt, 2005). Resultantly, these systems have increased efficiency and effectiveness of direct materials flow from point-of-origin to point-of-consumption within and across supply chain networks. With the emergence of latest technologies, procurement is among many other business activities that are normally managed and organized through information technology (Leenders & Fearon, 1997).

E-source revolution started in the late ninety's and grew during the first decade of 21st century. Kraljic (1983) viewed electronic sourcing as a process that identifies new suppliers for a specific purchasing category using internet technology (Kraljic, 1983). Knudsen (2003, p.727) defined electronic sourcing as "the process of finding potential suppliers using internet in general or, more specifically, a B2B market place" (Knudsen, 2003). Tascomi services limited (white paper, p.3) defined e-sourcing as a "web based service that enables organizations to manage their sourcing across the entire process cycle online" (Henry, 2004). In this regard, the most comprehensive definition has been offered by the Aberdeen group defining electronic sourcing as "the use of web based applications, decision support tools and associated services to identify, negotiate, evaluate and configure purchases and supplier relationships that will effectively support supply chain and other business operations" (Minahan, 2001). Based on the above stated definition, it can be concluded that e-sourcing is an electronic mechanism that operates through internet enabled website or an e-market place which allow buyers to navigate

information and based on that information, identify, negotiate, evaluate and configure their purchases. The purpose of e-source application is to facilitate organizational supplier relationship management process.

Number of studies has been devoted to measure the benefits associated with e-procurement and e-source applications (Aberdeen, 2001; Aberdeen, 2006; Minahan, 2001, 2002, 2006). E-source includes activities like request for proposal, request for information, supplier screening and qualification, request for quotation, negotiation, selection and finally e-auctions (Bartezzaghi & Ronchi, 2005; Carr & Smeltzer, 1999; Minahan, 2002; Poole & Durieux, 1999). E-source applications provide competitive advantage by significantly influencing the procurement value drivers, improving the supply chain responsiveness and information transparency (Carayannis & Popescu, 2005). Moreover, through e-source applications, companies can attain cost efficiencies regarding process and procurement cost (Croom, 2000; Mishra, Konana, & Barua, 2007; Zsidisin & Ellram, 2001) and results in a reliable supply of quality goods and services at better prices (Gebauer & Segev, 1998b; Gebauer & Segev, 1998a; Wagner, 1993).

Recently, Moozakis (2001) disclosed that investment trend in procurement technologies (i.e. 53 percent of the overall investments) itself validate the positive outcomes of e-procurement on the organizational performances (Moozakis, 2001). Boer et al. (2001) stated that e-source applications can increase the competitiveness by identifying new suppliers and reduce the supply risk associated with the purchase category (Boer, Harink, & Heijboer, 2001). E-source application also streamlines the purchasing process without focusing on the content of that process. A survey conducted by an IT research and consultant firm showed that internet based electronic procurement can save about 5 percent on high cost strategic goods, allow reduction in procurement staff by 10 percent and offer an increase return on investment up to 13 percent (Konicki, 2002; Lankford, 2004). For these particular reasons e-source applications has the potential to create a competitive cost advantage (Bloomberg, LeMay, & Hanna, 2002). In this regard, Babock Borsing, Bayer, Cisco System Inc, Ford, Boeing, Mercedes-Benz, BMW, Chrysler, Caterpillar, Rover, Chevron, British Telecom and a recent success story of ThyssenKrupp Steel, are few good examples of the companies using e-source applications for their procurement process (Lilischkis & Gmbh, 2007; Ukalkar, 2000). Through e-source application, these companies are

not only driving value from the market but have successfully created healthy competition among their suppliers. In addition to above cited success stories, researchers have also quantified benefits achieved through e-source applications. These include:

- "A 5 to 15 percent drop in product costs" (Minahan, 2006).
- "A 70 percent decrease in process costs" (Minahan, 2006).
- "A 50 to 70 percent reduction in time required to complete a purchase requisition cycle" (Minahan, 2006).
- "It is estimated that nearly 75% of the opportunity for savings in procurement comes from strategic sourcing. It is easy to see why companies are placing an increasing emphasis on sourcing" (Minahan, 2006).
- "After running pilots, users report benefits of 10% to 20% in material cost reductions, 45% to 65% in sourcing cycle-time reductions, and improved process discipline. Firms deploying e-source applications feel that the technology provides competitive advantages, but also brings about profound changes to sourcing and procurement processes" (Travis, Ferrari, & Mitchell, 2001).
- "The biggest benefits come to companies that manage sourcing as a strategic core competency" (Travis et al., 2001).
- "Applying optimization and decision support technology to supply strategy is showing benefits" (Travis et al., 2001)
- "E-procurement continues to grow and was projected to reach $3 trillion in transactions in 2004, up from $75 billion in 2002" (Pearcy & Giunipero, 2008).

Even though the potential benefits of e-source have been realized, however, many companies are facing implementation problems due to non-compliance by end-users (Aberdeen, 2006). In literature, number of factors that can hamper the adoption of e-procurement have been reported, these include: risk, uncertainty, inefficiencies from suppliers and catalogue-content readiness, cultural change, staff resistance and need for firm wide training (Pires & Stanton, 2005). Despite of the adoption problems, the above cited examples of successful companies implementing e-source applications are able to adopt holistic approach towards adoption, have developed sound sourcing capabilities and use e-source applications as a total business proposition. As a result companies are able to control the market rather being controlled by the market (Allen & Hamilton, 2000). Businesses adopting the e-source applications have to

prepare for the future challenges like development of advanced e-source capabilities, centralization of e-source capabilities, improving supplier capabilities and investing in the e-source solutions (Minahan, 2006).

In addition to above stated advantages, cost reduction, flattering of purchasing department, more ease in supplier evaluation and selection, efficiency improvement, faster deliveries, lead time reduction, risk reduction, on time information sharing, better forecasting, improvement in production schedules, better collaboration are among few other e-source benefits. Outcomes from above cited researches suggest that numbers of companies are enjoying e-procurement benefits. However, to adopt and implement e-procurement system, companies need to know the critical impact on various business strategies. Hence, it will be worth knowing to measure the impact of e-procurement practices on various organizational strategies. It is believed that measuring and knowing such impact can practically help business managers to re-define and/or re-align their organizational strategies. Accordingly, proceeding section demonstrates key business strategies and related variable to measure the impact of e-procurement practices on related business strategies.

2.1) E-source Practices & Key Business Strategies

Narasimhan et al. (1998) based on factor analysis categorized business strategies into four main classes and these are; supply chain management, total quality management, time based strategies, internal and external organizational integration (Narasimhan & Carter, 1998). Fundamental goals of these business strategies are the development of sustainable competitive advantages (Hitt, Hoskisson, & Ireland, 2007).

First, supply chain management that stand for "the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses…." (Mentzer et al., 2001) is among the emerging business strategies gaining dedicated attention. Supply chain management (SCM) includes strategies related to the management of activities, functions and processes involved in the conversion of raw material into finished goods. Major supply chain strategies includes, identifying appropriate suppliers, selecting right suppliers, building long lasting relations by retaining and partnering with core suppliers.

Supply chain management approaches beyond 2000 reflect a changing emphasis toward the importance of quality and the role of supplies. Supplier relationships have shifted from opportunistic relations to more cooperative relations. Today, supply management strategies involve suppliers development, early design involvement and improvement (Krause & Ellram, 1997; Ryder & Fearne, 2003), development of purchasing groups (Nollet & Beaulieu, 2005), cross functional teams for suppliers evaluation (Enarsson, 1998), the use of full-service suppliers, strategic outsourcing (Freytag & Kirk, 2003), suppliers selection (Braglia & Petroni, 2000), long-term supplier relationships (Bates & Slack, 1998), strategic cost management (McGinnis & McCarty, 1998), integrated internet linkages (e-source application) and shared databases.

The case studies of Bayer, Cisco and Sap revealed that by using e-procurement, large pool of suppliers have been reduced to manageable number (Puschmann & Alt, 2005). E-source applications also provide opportunity to develop preferred list of suppliers particularly in the case of MRO purchases (Carr & Smeltzer, 1999). Loup and Giunipero (2005) have identified that sourcing and procurement is now done through specialized software's e.g. ariba, purchasepro and entomo. These software's are developed according to the needs of the company leading to the demise of paper based and laborious traditional purchasing system (Loup & Giunipero, 2005). It means e-source practices can help the organizations to develop preferred list of suppliers that ultimately leads to reduction in supplier base. Additionally, continuous and satisfactory relation with selected suppliers will lead to strategic partnerships. E-source applications also facilitate global sourcing and create opportunities for better and qualitative inputs/supplies. However, successful adoption and implementation requires process (procurement) restructuring or re-engineering. In accordance with the above stated literature, four supply chain strategic variables included are; supply base reduction, the use of sourcing teams, procurement process reengineering, and strategic supplier alliance have been selected to investigate the impact of e-source application on supply chain strategies.

Second, in today competitive arena, the principles of total quality management (TQM) is under consistent consideration. While, explaining relationship between purchasing and TQM, Gonzalez-Benito et al. (2003) stated that one of the core aspects of TQM is the assurance of an adequate supply of materials and components of the right quality, at the right time.

Moreover, through empirical study, they have identified positive relationship between total quality principles and procurement practices (Gonzalez-Benito, Martinez-Lorente, & Dale, 2003). According to TQM principles, selection of the suppliers should be based on quality and reliability and not just price. In this regard, Garvin (1983) explored that organizations whose recruit their suppliers on quality, perform much better than organizations whose recruit their suppliers on any other criteria (Garvin, 1983).

In addition to suppliers' perspective, TQM became a central theme in organizational culture. The philosophy of TQM suggests cultural and business performance improvement through decentralization, accountability and teamwork (Abrunhosa & Moura E Sa, 2008; Philip & McKeown, 2004). Based on the fact that total quality management is an integrated approach towards continuous process improvement, it stresses the importance of involving and improving everyone in the process of "customer driven" continuous improvement. Similarly, business process reengineering is among the fundamental principle of total quality management. In this regard, e-procurement, KANBAN, six sigma, just-in-time management and enterprise resource planning (ERP) are few good examples of business process reengineering.

With respect to procurement, the deployment of TQM principles in e-source can improve the efficiency in context of cost and time by influencing the whole supply chain (Deming, 1986). The firm's technical capabilities should be evaluated while considering decisions regarding e-source applications (Zahay & Handfield, 2004). In this regard, continuous improvement in the technical skills of employees is required for successful adoption and implementation of e-source application. Accordingly, three quality management variables are selected to measure the impact of e-procurement on strategies related to total quality management, these variables are; total quality principles deployed in supplier selection process, positive change in technical qualification of purchasing employees, total quality management facilitate forecasting of material and service needs.

Third, comprehensive analysis of contemporary supply chain practice does indicate that time based strategies and tactics which emerged to deal with the challenges in the logistics environment and to achieve long term objectives of market share and profitability (LaLonde & Masters, 1994).

Time based strategies and tactics, which defined as activities which reduce cycle time and/or improve the synchronization of materials flow through a company and its supply chain (Carter & Hendrick, 1997). During this era, for many firms competitive emphasis has shifted from quality to cycle time reduction (Sin, 1995), moreover, cycle time reduction is one of the principal strategic capabilities of supply chain, and is a key dimension of supply chain strategy (McGinnis & Kohn, 1990). Considering the time based purchasing, fast and efficient procurement can be facilitated by the use of e-source applications (Giunipero & Sawchuk, 2000). Moreover, process efficiency can be maximized and procurement cost can be minimized through e-source applications. For example, just-in-time (JIT) initiatives can optimize the output of the entire supply chain (Kalakota & Whinston, 1997), while, e-source application can serve as a tool for JIT deliveries management. Based on literature synthesis, four time based strategies (variables) i.e. use of time based purchasing strategies, just-in-time deliveries, reduce purchasing cycle time, use of cross-functional teams have been selected to investigate e-sourcing application and its impact on time based variables.

Finally, internal as well as external organizational integration requires the development of intra and inter firm co-operative networks, most being used to reduce production or distribution cost (Brousseau, 1990). This can increase the overall performance of supply chain and individual firms (Vickery & Jayaram, 2003). Now-a-days, based on technological advancements these complex supply networks became virtual networks, where companies trade with suppliers and customers over the Internet in real time (Reddy & Reddy, 2001). In this competitive arena, ensuring a seamless and consistent customer experience at strategic level requires partnerships, strategic alliances and shared systems, while operationally requires competitive services, real-time automation, coordination through standardization, and integration of key business processes within and across key trading partners.

Supply networks can be facilitated through e-commerce application like, EDI, ERP, SAP etc as information sharing is very much critical for parties involved in transaction (Pearcy & Giunipero, 2008). Firms can achieve an electronic integration by using EDI, ERP, SAP, etc resulting in overall cost efficiencies for both - the buyer and seller (Croom, 2001). Interestingly, web-based networks also provide an opportunity to the firm's to look globally for competitive advantage via global sourcing. Encashment of

these benefits requires an integrated supply chain. Based on literature review, three internal and external integration variables included are; cooperative networks, successful adoption and implementation of e-source application as a mean to achieve integration within and across supply chain networks, facilitation of strategic and global sourcing have been selected to investigate e-source application and its impact on integration variables.

3) METHODOLOGY

The objective of the research is to get an insight of e-source applications, benefits achieved and its impact on four key business strategies i.e. supply chain management, total quality management, time based purchasing, transaction cost and organizational integration. To attain the objectives, this research is carried out through multiple (three) case studies. Historical perspective of procurement and e-source usage, its application and practices served as the real rationale to work in and to measure and identify e-sourcing benefits achieved and its impact on different business strategies in Automotive Industry of Pakistan.

Yin (2003) stated that case study research investigates a phenomena within its real context (Yin, 2003). Case study method allows the questions of why, what and how, to be answered with a relatively full understanding of the nature and complexity of the complete phenomenon (Benbasat, Goldstein, & Mead, 1987; Yin, 2003). However, there exit wide set of choices in conducting case studies like either to select 'single case' or to go for 'multiple cases for the exploration of different situations in its real setting (Eisenhardt, 1989). Selecting single case study or multiple case studies as research design has its own merits and demerits and have been extensively reported in literature (Voss, Tsikriktsis, & Frohlich, 2002; Yin, 2003). For example, single case study provides greater and in-depth information, on the other hand, multiple case studies increases external validity and provide safe guard against observer biasness etc. These merits increase complexity in decision regarding selection between single and multiple case studies. In accordance with the same, to achieve thick description on the above stated phenomenon (Eisenhardt, 1989; Yin, 2003), attain rich triangulation (Jick, 1979; Mentzer & Flint, 1997) and to overcome the objections on generalization of the results of single case study (Yin, 1981), *multiple cases* have been selected. Multiple case studies were selected to draw real and rich picture. It is believed that by applying

multiple case studies differences in the term of e-source applications, its adoption/implementation and current practices can be identified across the industry. Firms in case study were selected based on criteria suggested by (Stake, 1994), i.e. potential for learning. Accordingly, three leading auto firms representing three sectors (i.e. car, bike and tractor) were selected.

The research was designed and conducted according to the Delphi technique developed by a team of researchers named Dalkey and Helmer – a method to combine the informed judgments from a panel of experts (Dalkey, 1998). It is relevant when no hard data or well-established theory is available, but experts have relevant information about the research in focus. As there exist knowledge gap (especially with reference to Pakistan) regarding e-source benefits achieved and its alignment with various business strategies. Therefore, there is a need to collect information from multiple sources i.e. more than one market expert to achieve thick description on the above stated phenomenon and to attain rich triangulation. Here, it is worth noting that e-source applications and e-procurement practices may directly or indirectly affect the output of various departments, resultantly, there is a need to collect information from multiple respondents and then to aggregate responses to draw cumulative picture.

The Delphi method is a procedure for aggregating the information from a panel of experts, based on the premise that aggregation reduces the error of individual responses. Since the Delphi technique is frequently used in forecasting number-based quantities that can be averaged, some additional validation of non-quantitative responses is necessary. In view of this, both the 'consensus' and 'breadth' of responses can be considered in order to maximize the likelihood of identifying likely approaches to the problem. Dalkey (1998) also measures the significance of the results collected through Delphi technique via different experiments. The measuring instrument was based on open ended questions targeted to measure e-source benefits achieved and its impact on different business strategies. Majority of the variables can be best concluded with the help of relevant documents, but, documents are sometimes hard to come by, and firms especially in Pakistan had different policies regarding sharing this kind of information with people outside of the firm, and therefore, Delphi technique was used to collect required data.

The selection criteria and number of respondent to be included in Delphi study is important since it affects the accuracy of results. Therefore, respondents were selected based on three important criteria's which were; a) current procurement personnel (with/or without relevant academic qualification) but posses knowledge about e-source applications and have the capability to define e-source application and aware about its impact on different business strategies; b) respondent spend some time in past and have relevant experience and knowledge about e-source, its application and impact on different business strategies (experts) and; c) decision makers directly or indirectly connected to procurement (top management). Different business strategies and related variables are summarized in Table 3-1.

Table 3-1: Business Strategies and related Variables under Investigation

BUSINESS STRATEGIES	VARIABLES
Supply Chain Management	Reduction of Supplier Base.
	Supplier Alliances.
	Use of Sourcing Teams.
	Purchase Process Re-engineering.
Total Quality Management	Implementation of Total Quality Principles.
	Technical Qualification Required for Purchasing.
	Forecasting of Material and Service Needs.
Time Based Strategies	Just in time (JIT) delivers management.
	Strategic Cost management.
	Purchase Cycle Time.
	Use of Cross Functional Teams.
Internal and External Organizational Integration	Development of Co-operative Networks.
	Electronic Data Interchange/Enterprise Resource Planning, SAP, etc
	Strategic Sourcing Management.

Majority of Delphi studies use a minimum of 15-20 respondents and run over periods of several weeks. The number of respondents is generally determined by (1) the number required to constitute a representative pooling of judgments and (2) the information summarizing capability of the research team. Consequently, very large numbers of respondents generate many items increasing the complexity of the summarizing process. Due to time limitation and somewhat non-cooperative behavior of the respondent organizations, this study involves 13 candidates, (four members each from company-1 and company-2, while, five from

company-3), which allows enough breadth in responses and also limits the number of respondents to a manageable number. Initially, each respondent were asked with same set of questions, in response, each respondent submits his/her own independent opinion to the relevant questions in the interview. The results of a given round of responses were summarized and reported to the group, who were then asked to reassess their replies in light of the feedback. Given the final set of individual answers, the group answer is expressed as a formal aggregation.

Next section presents snapshot of three leading auto manufacturer/ assembler representing Automotive Industry of Pakistan.

4) CASE DESCRIPTION & FINDINGS

Case – 1st

First study was focused on Pakistan's leading engineering concern in the automobile sector with market share of more than fifty percent, an ISO 9002 certified company for its assembly plant of tractors, engines, industrial & agricultural products, as well as material testing and gauge control laboratory. In 2003, company has introduced an internet platform named IFS (integrated financial system) to manage financial perspectives including e-procurement within and across registered suppliers' network of 170 national and multinational vendors. With respect to supply chain strategies, though company has implemented integrated financial system (IFS) to manage their procurement electronically, however, managers believe that company is struggling to achieve supplier base reduction. That means either company is unable to align their e-source application with supply chain strategies properly or it is hard to achieve supplier base reduction in small markets as shared by business manager that "practically supplier base reduction is impossible due to highly opportunistic market behavior".

Nevertheless, managers are not hopeless as company is planning to extend their e-business i.e. electronic data interchange in near future to integrate various business processes with their core suppliers. In this regard, managers cited that sharing of procurement plans on consistent basis is under consideration for near future. Major e-transactions both with national and multinational suppliers includes; auxiliary goods such as paints and tools, operating supplies such as lubricating oil, nuts and

bolts, and related maintenance facilities normally managed through integrated financial system. By the virtue of this e-system i.e. procurement process reengineering, company has achieved remarkable cost reductions, process efficiency, and enhances supplier collaboration. For example, only on one item (nuts & bolts), company saving exceeds more than four million rupees annually and on average company has achieved cost reduction of 20-30 percent on all their major supplies. Here it is worth noting that at present company is in strategic alliances with couple of multinational vendors, however, for the same, managers did not give credit to their newly adopted e-procurement practices.

Study also revealed that e-source application facilitate time based purchasing by reducing purchase cycle time and this leads to strategic cost management. For example, e-source practices has flatten the purchase department, reduce delivery in some of their supplies/parts from 45 days to 15 days and in some cases (products) less than 5 days, faster information processing through email, and teleconferencing etc. It has been observed that company has successfully initiated procurement process reengineering. Interestingly, top management is thinking to endorse cross functional sourcing teams – a first step to move towards strategic alliances. However, due to opportunistic behavior, increasing competition, tight economic conditions and high political interference, still company is unable to formulate long term strategic alliance with suppliers as a result unable to reduces its supplier base.

Additionally, integrated financial system (e-source application) has also facilitated the deployment of total quality principles in the selection of suppliers. Similarly, IFS has forced the company to improve and enhance technical qualification of their concerned employees to properly respond to new operating environment. Managers disclosed that at present, IFS (e-system) is limited to financial perspective therefore; company is unable to integrate forecasting and other business processes across their supply network.

Case – 2nd

Second, study spotlights a leading motor bike manufacturing/assembling company with highest market share in bike industry. Through SAP, company manages e-transactions of worth two billion rupees annually with 200 national and multinational suppliers. Though, company

manages their major supplies through SAP (e-source application), still every time suppliers have to submit new bids to get new orders that mean company provokes competitive environment. Generally, it was observed that company is unable to reduce supplier base and still wondering to attain strategic alliances. Additionally, managers reported that company prefers to maintain functional/departmental interaction with majority of their suppliers as compared to establish strategic alliances. On one side discussions reveal that company is unable to achieve required level of trust and commitment due to opportunistic behavior, quality issues, low or careless response from some of their suppliers and number of environmental crisis (i.e. current terrorism situation in the country, energy scarcity, political instability etc).

Conversely, some managers also reported that company is working with some multinational vendors (in some core products) since long and it is believed that SAP has strengthened their relationship with core suppliers. In this regard, it is reported that top management is committed to diversify e-source application i.e. technological extension (electronic data interchange across supply chain network) in near future. Lubricants, ball bearings, consumables, cleaning products, paints etc are among some of the products procure through SAP costing two billion rupees annually. With the help of SAP company has achieved process efficiency, better information sharing and cost reduction between 15 to 20 percent not only in direct rather in indirect supplies too. These achievements strengthened integration and collaboration and facilitates requesting and ordering via web-based tool more affordable and convenient for company. Moreover, e-procurement through SAP has benefited organization in term of cycle time reduction which leads to strategic cost management. For example, SAP has flattened the purchase department; reduce average delivery time from 60 days to 10 days and in some case less than 24 hours because of just-in-time inventory management. It means for the company, successful e-procurement implementations included more than merely a new information technology system. Interestingly, prior to the adoption and implementation of SAP, procurement department was labor intensive and full of error potential. It has been reported that many departments/ sections by pass procurement department and number of transactions were carried out even without involving procurement personnel. However, SAP has drastically reversed the procurement situation.

During group consensus with managers/respondents (third phase of Delphi technique), the benefits of e-procurement has been properly recognized, however, managers have suggested the need for the re-adjustment of business strategies that includes realignment of purchasing operations and reorganization of procurement process. Despite of the fact that company has achieved remarkable milestones, however, managers/ experts were with the opinion that company is still struggling for better inputs in the areas like transparent information sharing, cooperative networks and risk minimization.

Case – 3rd

Third, study highlights a case study of joint venture of a Japanese car manufacturer and Pakistan auto assembler. Prior to the adoption and implementation of e-source application, company deal individually with vendors on transactional basis. Procurement department had to negotiate with vendors, convert purchase requests into purchase orders, handle queries and monitor feedback. Resultantly, top management frequently receives unlimited complaints and in response they have to resolve hundreds of the procurement complaints every year. In response, company has decided to implement e-procurement system initially for their direct and regular purchases. To adopt and implement e-procurement, company has initiated e-platform called GLO (global logistics ordering system) with the objective to integrate with Enterprise Resource Planning (ERP). Through this software company manages their fifty three (53) national and multinational registered suppliers. However, at later stage, company has allowed new and potential suppliers to apply online via internet where bids can easily be transferred to GLO system.

Glass windows, mirrors, filters, steel & metal items, bearings & lubricating items, paints and tools etc are among some of the products procure through global logistics order system. Since its implementation, GLO save 30% on all their major purchases compare to past transactions. Notable achievements enhanced integration and collaboration within and across their supply network as result invite the attention of the company to extend the scope of GLO (e-source) by adding all the purchases through e-procurement. For example, in the process of new product development, through GLO, procurement department communicate requirement to their core suppliers well in time and allow them to practically participate in product design process. Additionally,

implementation of GLO system has benefited organization in term of cycle time reduction which leads to strategic cost management. For example, GLO system has flattened the purchase department and helped the company to reduce number of personnel from 7 to just 3 personnel but with improved qualifications; reduce delivery time from 40 days to 15 days for their international purchases and in some case less than 24 hours for their local purchases.

Discussion with the managers/experts revealed that the usage of online procurement system has improved the image of the organization and enhanced the caliber of their procurement personnel. Additionally, managers have reported, immediate feedback, better collaboration in various procurement activities, better level of sharing (new ideas, data, news, etc), reduce fear of technology, easy access to information, enhanced knowledge, new sense of empowerment, perceived opportunities for dialogue, help in distance learning, shorten communication cycle, perceived customer satisfaction, time saving and perception about contribution to organizational successes are major millstones company have achieved through global logistics order system (GLO). However, managers were of the view that technically more enhanced software's are required by the organizations to integrate internal and external supply networks. Finally, it has been reported that e-source applications (GLO) has profound impact on company's demand management (forecasting) mechanism. For example, after adoption of GLO, company has successfully reduced (up to 73%) its' supply and demand imbalances.

5) DISCUSSION & CONCLUSION

This paper was initiated with the objective to identify e-procurement benefits achieved and its impact on four major business strategies which are supply chain management, total quality management, time based strategies, internal and external integration. Outcomes reveal that automotive industry of Pakistan has achieved remarkable gains in several areas like, cycle time reduction, cost reduction, better integration and improvement in procurement process. In this regard, findings demonstrate that through e-source application auto companies have successfully reduced cycle time from approximately two months to just half month which have profound impact on company overall cost structure. Moreover, with respect to cost reduction, auto companies have

achieved significant cost reduction i.e. up to 30%. Though cost reduction vary from company to company, still cost saving are noteworthy. Third key gain from e-procurement practices is process improvement. During discussions, procurement process improvement was unanimously ranked the most valuable gains among others. Here, it is worth mentioning that companies under observation have similar situation as of other companies in their concerned sectors prior to the implementation of e-source systems, however, after the adoption, companies have achieved incredible improvements in their procurement procedures. However, industry is struggling hard to capitalize end gains into long lasting strategic achievements.

With respect to supply chain strategies, supply based reduction, the use of sourcing teams, procurement process reengineering, and strategic supplier alliances are among the major supply chain variables, selected to investigate the impact of e-source application on supply chain variables. Though e-source application leads to supply based reduction in automotive industry of Pakistan yet achievements need further improvement. Group discussions highlight opportunistic behavior, custom problems, strict import/export policy for Muslim world and non cooperative behavior of suppliers, as major problems to achieve long term strategic alliances. Interestingly, e-source applications have successfully reengineered procurement process from paper based activity to paper less activity. In this regard, the use of intranet catalog, punch-out, auction and request for quotation (RFQ) are few e-procurement practices frequently exercised through e-source applications. Nevertheless, industry seems familiar with cross functional teams still such practices are lacking in procurement process.

Next, three quality variables, quality principles deployed in supplier selection process, positive change in technical qualification of purchasing employees, total quality management facilities forecasting of material and services needed were selected to investigate the impact of e-source application on TQM variables. Outcomes reveal that e-source applications have facilitated the deployment of total quality principles in the selection of suppliers and today industry has better and qualitative suppliers. In this regard, in industry, the most valuable contribution of e-source application is an extension of suppliers' database. Accordingly e-source platform has provided companies with unlimited, however, relevant and manageable list of suppliers for their various supplies. Amazingly, this

change has forced the industry to improve and enhance technical qualification of their concerned personnel to properly respond to new operating environment. Based on valuable gains, industry has decided to extend the scope of their e-source applications by adding more products. Finally, it is worth mentioning that industry is still unable to integrate their e-source applications with their forecasting mechanism. Although, e-commerce application like, EDI, ERP, SAP, RFID etc provide sufficient grounds to adjust supply and demand imbalances, however, in this aspect, little evidences has been reported in the industry.

Thirdly, time based strategies include; just-in-time inventory management, reduce purchasing cycle time, use of cross functional teams and strategic cost management were selected to investigate the impact of e-source application on time-based variables. In comparison to other business strategies, industry has achieved incredible improvements in time based strategies. For example, cycle time reduces from average 45 days to few days for international suppliers and less than 24 hours in case of local suppliers. Additionally, e-source applications have facilitated the entire industry to adopt just-in-time inventory management system. Similarly, notable cost savings can be observed that has facilitated the industry to expend e-source application within and across all the key suppliers. Moreover, e-systems within business to business have provided opportunity to save cost, especially in context of indirect materials. Findings disclosed that procedurally, e-source application work better and quicker and at a much lower cost than the traditional procurement practices. Finally, outcomes disclose that industry is struggling hard to establish strategic and cooperative networks, with open and transparent information sharing and minimum risk mitigation. Though e-system facilitates financial collaboration across suppliers' network, still, industry is unable to extend collaboration in other key areas.

Based on above stated outcomes, it can be concluded that e-procurement has profound impact on major aspects of purchase function in automotive industry of Pakistan. It provides cost saving, lesser the number of procurement staff, reduce cycle time, deployed quality principles, saves time but enhanced associated risk. Conclusively, the findings of this project empirically validate positive outcomes achieved from e-procurement. However, careful implementation of e-source application requires dedicated efforts and handsome investment. It is suggested that

information transparency is required to reduce risk, share and communicate objectives of the e-systems and its current achievements within (internal) and across (external) supply networks. Additionally, common forum to re-solve e-source problems, consistent technological up-gradation, enhance employee training, robust security, etc. can be some other preemptive measure that can multiply e-source benefits. The outcomes of this project provide some interesting insights; first, e-procurement has benefited the industry that means use of technology in procurement process is not only beneficial in technological advance countries, rather organizations can achieve meaningful gains even in less technological advance countries like, Pakistan. Second, alignment of e-source application with various business strategies can help organization to achieve remarkable competitive advantages. Since, this research was limited to case study of just three organizations from the industry, resultantly outcomes cannot be generalized. The results of this study can be generalized, if the scope of research extends to more sectors & industries. Similarly, a more systematic sampling could also add to the validity of findings.

Note: Findings presented in this paper have been illustrated from author's PhD research project titled "Transforming and Redesigning the Existing Supply Chains into Integrated Value System – a Case Study of Automotive Industry of Pakistan. Author pays special thanks to Dr. Chee Yew Wong, Professor, Institute of Logistics Management, University of Hull, England for his valuable guidance and consistent encouragement.

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