CHAPTER 5
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In the previous chapter, the significant results obtained by percentage analysis and testing relevant sets of hypothesis were collected and classified as the grand summary of the results, which formed the basis for this chapter. The appropriate references from the literature had been merged with the knowledge generated by the study to interpret and explain the summarized findings. Thus, this chapter is an attempt to discuss the findings of the present study in the light of the available literature. The results pertaining to determine the effect of ERP systems on organizational performance and productivity are discussed in section 5.1 of the chapter. The findings related to effect of demographic variables on organizational performance and productivity, ERP installation phase, Relationship between resources in implementation phase and changes caused by ERP system on organizational performance and productivity through SEM and general findings about the characteristics of ERP and manufacturing companies are discussed in 5.2, 5.3, 5.4 and 5.5 respectively.

5.1 EFFECTS OF ERP SYSTEM ON ORGANIZATIONAL PERFORMANCE AND PRODUCTIVITY

5.1.1 Effects of ERP System on Organizational Level

The outcome of the study indicated that ERP has significantly affected the organizational performance and productivity. The results as regards the benefits of the ERP system agree with the classification of Hitt et al. (2002), Anderson et al. (2003) and Shang and Seddon (2000, 2002) on this issue and contradict Staples et al. (2002), whose users’ expectations outweighed their final perceptions.
Authors in their studies have also shown significant effect on different aspects of organization. ERP reduce business operating and administration costs (Velcu, 2007), improved overall business performance (Bendoly and Kaefer, 2004), high productivity gains (Brynjolfsson and Hitt, 2000; Park et al., 2002; Kamhawi, 2008), excessive operational performance (Mabert et al., 2001; Hitt et al. 2002; McAfee, 2002; Cottelleer, 2006), integration and process optimization (Davenport et al., 2004; Helo, 2004), improves productivity and managerial effectiveness and removes redundancy (Rajagopal, 2002; Zhang et al. 2005, Huang et al., 2004, Ehie and Madsen, 2005, Kim et al., 2005, Nah and Delgado, 2006, Kamhawi, 2007, Muscatello and Chen, 2008, Chen et al., 2006, Snider et al., 2009). These benefits help companies to remain competitive in this new business environment rather than constituting a new strategic move (Colmenares, 2008).

Hitt et al. (2002) demonstrate that ERP adopters outperform non-adopters on productivity, financial and stock market metrics. The results by Songsheng and Peipei (2010) show that companies that implement ERP system are obviously having better benefits than those have not implemented it. Stratman and Roth's (2002) reported positive ERP improvements related to overall functional efficiency and process re-engineering; however, they reported neutral to negative ERP impacts on control of operating expenses and customer satisfaction.

Consulting survey results of Fortune 500 companies found benefits from ERP due to inventory and personnel reduction, productivity and order management improvement, improved information, improved processes, and improved customer responsiveness (Benchmarking Partners, 1998). Fryer (1999), reported that the top four tangible benefits from ERP implementation are inventory reduction, personnel reduction, productivity improvement, and order management improvement and the top four intangible benefits are information visibility, new/improved processes, customer responsiveness and cost reduction.
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Songsheng and Lingbing (2009) study finds that the corporations who introduce the ERP system are generally better in performance than non-ERP users. The study also finds that the total assets of the ERP users in tested group are increased and the asset-liability ratio is stable after introducing ERP and that both of inventory turnover and account payable turnover of the ERP users have been slowed down instead of speeding up in the first two years after introducing ERP. The decrease of inventory turnover represents that ERP system might need a long time for running.

Chan et al. (2009) rated ten areas where effectiveness was increased or decreased over the previous non-ERP approach. Packaged software use, internal applications and code, hardware and infrastructure, systems operations and management and consulting has partly increased. The organization’s database, desktop products and services, training as well as help desk and user support, were found to have a stronger increased effectiveness through using the ERP. However, two respondents commented that the ERP led to spend more time in managing data in using the ERP. Updated financial information is provided by the ERP, so a broader base of information is quickly made available to people who may need it. However, some respondents reported that the ERP implementation resulted in on-site increased workload levels. They also reported increased data entry and data verification workload. One respondent stated that the support software always had errors and therefore significantly impaired work process effectiveness with generated reports being useless to the organization.

Elragal and Serafi (2011) in his study identified that overall business performance, customer orientation, operational efficiency, task time, lead time, information richness, business process clarity, inventory levels, operational effectiveness, number of errors on job slight, shipment errors, job routine, production capability, internal communication, external communication, customers communication showed a positive relationship while top management communication, customer satisfaction, time per item showed a slight relationship.
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In a 2001 survey of APICS members, IT user groups and others, approximately 70% of respondents reported that their ERP systems were ‘successful’ or ‘very successful’; however, 30% self-described as ‘neutral’ or ‘disappointing’ (Mabert et al., 2003). In a 300-day longitudinal study of a single company’s archival data, McAfee (2002) found that operational performance indicators initially dipped but eventually exceeded the levels that existed when ERP was implemented. Ross and Vitale (2000) found a performance dip after initial implementation of an ERP system. Wieder et al. (2006) did not find any significant performance differences between ERP adopters and the control group - neither at the supply chain level, nor at the overall firm level. According to Kang et al. (2008) also, these mixed findings imply that ERP investment does not always yield positive effects on business performance, leading us to adopt a contingency perspective on its effectiveness.

The results of our study are in contradiction to the studies by Williamson (1997), Barker and Frolick (2003), Davenport, (1998), Gargeya and Brady (2005) who indicated that 3/4 ERP projects were considered as failure and cannot be accepted. And in some cases, it has led to organizational bankruptcy (Bulkeley, 1996; Davenport, 1998; Markus and Tanis, 2000; Scott and Vessey, 2002). Scheer and Habermann (2000) estimated that over half of ERP projects end in failure. However, this could be because, these studies were conducted during the initial phase of ERP. Now, the features and modules of ERP have improved due to requirements of the customer and increased demands.

ERP sometimes show the results after many years of implementation. This is shown in the study by Poston and Grabski (2001), who examined performance changes in three years after the implementation of ERP. The study compared 50 adopters with 50 non-adopters. It revealed that there were no significant improvements in profits, reduction of expenditures, or productivity of the adopters. Only the sales cost ratio was improved in the third year of implementation. It is also proved in Nicolaou’s (2004) study that improvements in profits (e.g. return on assets (ROA), return on investment (ROI)) only
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took place after the second year of implementation. Huang et al. (2009) study indicated
that the business process, process efficiency, and profitability increase in the fourth or
fifth years. This shows that the benefits of ERP are evident in the long term. Regarding
firm size, big firms enhance their business process through process efficiency and
financial performance. Medium-sized firms raise continuing operating income only in the
first five years. Small firms show no improvement. Su et al. (2013) finds that after the
implementation of ERP systems for three years, there are significant improvements in
firm profitability, operational efficiencies, and operating expenses, compared to the
performance before the introduction of ERP systems.

According to Nah (2007), the most highly rated perceived benefits achieved via ERP
systems involve: increased flexibility in information generation; improved quality of
reports-financial statements; increased integration of applications and easy maintenance
of databases. In addition, increased user-friendliness of information systems, time
reductions for accounts closure and preparation of financial statements are also perceived
as benefits derived from ERP applications.

The results of our study indicated that there is a change in organizational performance
and productivity, but the mean value has not increased to a greatest level. In accordance
with our study, Hasan et al. (2010) indicated that the mean value has increased though
not to a great level and the benefits are related to improved information response time,
increased interaction across the company, improved order management/order cycle,
decreased financial costs, improved interaction with customers, improved on-time
deliveries, improved interaction with suppliers, lowered inventory levels, improved cash
management, reduced direct operating costs, availability of information, integration of
business operations/processes, quality of information, inventory management, financial
management, supplier management/procurement, customer responsiveness/flexibility;
decreased IT costs and personnel management.
Katerattanakul et al. (2006) result indicates that the responding firms were experiencing improved performance primarily from the perspective of information. Information response time was faster and interaction across the enterprise was also improved. Other outcomes such as financial close cycle, order cycle, and on-time delivery were also improved, but to a lesser extent. Additionally, the responding firms reported that the areas most benefited from ERP implementation were the availability and quality of information and the integration of business operations/processes.

According to Helo et al. (2008), ERP system results in process improvement and increased process controllability, improved process quality and predictability of business, standardization of business processes, organization transparency, enables departments to integrate activities, improved reporting, discipline in operations, customer/supplier network management, reduction of lead-time, real-time information from products and processes, improved reliability of system, improved on-time delivery, savings on transaction costs, enables new business strategies, improves market responsiveness, supports operative design, simplified system support, improved flexibility and reliable database systems.

Tsai (2008) showed that Taiwanese IT firms after adopting an ERP system have better information flow. Better information flow leads to cycle time reduction, since, apart from the internal functions improvements, the supply chain will be better equipped to answer customers’ real-time demands which enhanced customer service quality. Firm with the ability of answering customers’ real-time demands in turn leads to an overall increase of productivity, and of product and delivery quality. Furthermore, such firms strip redundancy and duplication of materials from supply chain operations. As a result, firms have better resource management and improved decision making and planning, performance improvement, partnership management, scheduling, and quality management, are the most important factors impacting the SCM performance in customer service and cost management.
5.1.2 Effects of ERP System on Internal Processes

It was suggested by experienced professionals that ERP systems can be better predicted by being measured separately at the level of activity areas within the organization, rather than at the broad level. The results of the study revealed that after ERP installation, there was a significant difference in organizational performance related to the internal process. In accordance with the study, Campbell and Sankaran (2005) also reported that ERP systems have a definite internal focus providing organizational connectivity and helping to better coordinate functions within organizations. However, Akyuz and Rehan (2008) argue that a successful ERP implementation will force organizations to streamline the internal functions.

The outcome of the study indicated that time consumption for organizational task has decreased after ERP installation. The results are also consistent with the study by Michel (1997) who found that ERP contributes in increasing speed of order processing, improving invoicing and in drastically reducing its customer-service response times. Time consumption after using ERP systems is reduced, since they replace complex and sometimes manual interfaces between different systems with standardized, cross-functional transaction automation. Cotteleer and Bendoly (2006) and McAfee (2002) also found that order cycle time is reduced, resulting in improved throughput, customer response times, and delivery speeds. Kalling (2003) reported that some companies claim to have reduced their cycle time, improved their financial management, and obtained information faster through ERP systems. Similarly, Mabert et al. (2000) find favourable general perceptions among APICS members related to increased timeliness and availability of information. Ferrando (2001) also reported that the city of Pasadena (one of the first cities to implement an ERP system) have greatly improved the time it takes to develop various reports. Before ERP implementation, it took approximately 10 days per month to produce reports; after ERP was implemented, it takes only 1 day to generate the same reports leaving nine other days per month for other important tasks to be performed.
Information integration problem has become the biggest pain point for enterprises today (Mohania and Bhide, 2008). The results of our study indicated that information accessibility has also improved after installation of ERP systems. This seems to be true, since the provision of timely information improves the decision making process, planning and control of ERP adopters. This perspective is also supported by Wand and Wang (1996) who argue that untimely data are manifested in the form of wrong, meaningless or ambiguous representations. Hasan et al. (2011) also revealed that ERP system implementation benefits are concentrated more in quickly providing high-quality information within firm. Stratman and Roth (2002), Bradford and Florin (2003), Amoako- Gyampah and Salam (2004), Ehie and Madsen (2005), Bradley (2008), Kamhawi (2008), Muscatello and Chen (2008) and Snider et al. (2009) also suggested that ERP systems provide comprehensive and up-to-date information when requested by the user.

Information could be managed properly because large enterprises manage data at a local level, which results in the creation of information silos in where data are redundantly stored, managed, and processed. But, in ERP systems, information has to be put into the system only once and hence, there are greater chances that it is accurate (Vayghan et al., 2007).

In an ERP system, if one discovers that some of the data in the system is incorrect, they can simply change it once instead of having to go to each separate department changing it several times. Various employees can access data simultaneously in ERP systems whereas in outdated and separate legacy systems this task is much less likely. With the integration of departments in ERP systems, personnel from the finance department can obtain information about a customer for example, as well as personnel from the human resources department. This makes access to this information much easier when compared to the legacy systems. A successful ERP system will provide real-time and up-to-date
information to all of a company's decision makers, from executives to front-line employees. Customer service is improved by the rapid release of information.

Olhager and Selldin (2003) proved that ERP system is shown to provide benefits like improved information availability/quality and improved business operations and integration. Stefanou (2002) also reports that the integration of accounting applications, information exchange and reporting capabilities are notable advantages/strengths of ERP system. Increased flexibility in information generation, improved quality of reports, integration of applications and easy maintenance of databases are the major benefits derived from the ERP systems (Charalambos and Sylvia, 2003). But, in contradiction to our study, many organizations experience frustration when they attempt to use their ERP system to access information and knowledge (Radding, 2000).

The outcome of our study indicated that errors' are reduced after ERP implementation. This is possible, since the ERP architecture facilitates integration across different applications supporting concurrent and automatic updates, without the need for manual intervention. Rizzi and Zamboni (1999) and Latamore (2000) also indicated that errors are reduced and employees have access to current information for decision-making since data reentry errors and omissions from one business process to the next are eliminated.

The results of the study also indicated that decision making is improved after installation of ERP system. This is because the ERP is transaction based and allows users to visualize the impact of their decision on real-event scenarios Beagle (2012). Hayes et al. (2001) also revealed that ERP systems lead to increased efficiency and effectiveness in business processes permeating management decision making at all levels.

Hoechst Marion Roussel implemented SAP and found greater flexibility and accelerated decision-making at all levels of the firm (www.sap-ag.de, 1997). But, on the other hand, it has been realised by Booth et al. (2000), Radding (2000) and Adam and Doyle (2001),
Spathis and Constantinides (2003) and Lindley et al. (2008) that, ERP systems are good for storing, accessing and executing data used in daily transactions, but are not good at providing the information needed for long-term planning and decision making as ERP systems are not designed to know how the data are to be used once they are gathered (Inmon, 1999). But, a decision might have been taken wrongly if data is inappropriate. Lynn and Madison (2000) also suggested that decisions based on error-filled data may lead to inefficient and ineffective management of the firm and errors maintained within the ERP system are propagated throughout the entire business.

Contrary to our study, Inmon (2000) suggests that the harsh reality of ERP systems implementation is that it does not prepare data for use and analysis. This is due to the fact that ERP systems lack certain functionality and reporting capabilities (Adam and Doyle, 2001) and the interdependence of multistage processes also requires real-time cooperation in operation and decision-making across different tasks, functional areas, and organizational boundaries in order to deal with problems and uncertainties (Jain et al., 2008; White et al., 2005).

The results of our study depicted that organizational functioning is also improved after ERP installation. In accordance with our study, Danziger and Andersen (2002) reports that increase in efficiency and rationality of behavior by organizational units is the main benefit of ERP systems. Mabert et al. (2001) and McAfee (2002) found that intra-firm ERP systems enable firms to standardize, integrate, and streamline their data and process flows. This is possible, as more and more service centers move beyond basic value-added processing into actual manufacturing (Triplett, 2012).

Granlund and Malmi (2002) argue that a common organization-wide information structure and integrated information system produce significant benefits for global organizations. The results indicated that, due to ERP, people based integration is reduced since there is a decrease for personal contact to coordinate the activities of functional
departments in an organization. According to Scott and Vessey (2000), the standardized firm-wide transactions and centrally stored enterprise data greatly facilitate the governance of the firm.

Hayler (2003) argue that as long as organizations can analyze data, supporting different business processes, even across differing data structures that change with the diversity of systems, there is no need to force a rigid standardization of business processes across the organization. But, according to Singla (2008), even though ERP systems are perceived as rigid, some public organizations have experienced a greater level of flexibility in organizational processes after their implementation.

The study showed that the user-interface of ERP system is highly appreciated by the users because of its better designing and features. This is necessary because usability problems can hamper the extent to which a system can be used. Contrary to our study, Singh and Wesson (2009) based on the literature review of Matthews (2008) and Topi et al. (2005) found that ERP systems suffer from numerous usability issues including navigation, guidance, adaptivity and customization, task support and efficiency, UI presentation, output presentation, learnability and memorability.

Security, privacy, and other information control issues also headed the benefits of ERP systems from our study. The results are in accordance with the study by Morris (2011) who suggested that ERP-implementing firms are less likely to report internal control weaknesses than a matched control sample of non-ERP-implementing firms. ERP technology does not impose a specific control structure, but neither can controls be analyzed independently of the technology or its context of use. Management control in ERP becomes a collective activity, as control issues are distributed to different areas of the organization (Dechow and Mouritsen, 2005). ERP systems have become much more universal throughout the company. This creates a greater ease of use, rather than having separate and different programs in different departments. Standardizing the appearance
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and use of the various programs that are used in individual departments creates a greater control and improve productivity.

5.1.3 Effects of ERP System on Innovation, Learning and Growth

Our study found that ERP systems contribute highly in innovation, learning and growth of the employees. According to Karen et al. (2007) also suggested that ERP facilitates the job’s run, and raises the efficiency of employees, and giving more reliability, flexibility, saving time and effort of all the people and managers who work in the organization. Matolcsy et al. (2005) compared indicators of ERP users and found that the performance of ERP users has improved. Past research further suggests that, over time, operational performance improves as employees use the ERP system in different and sometimes unique ways to enhance organizational tasks and processes (Chou and Chang, 2008; Gattiker and Goodhue, 2005; McAfee, 2002; Poston and Grabski, 2001).

Contrary to our study, Roach (1991), Strassmann (1997) and Butler and Gray (2006) found technology is associated with decrease in worker productivity. This may seem to be true in some cases since, from the perspective of the individual user of an ERP system, ERP demands a broader set of information systems and business knowledge (Sein et al., 1999), changes job role definitions, increases task interdependencies (Kang and Santhanam, 2003), restricts flexibility in job tasks (Park and Kusiak, 2005). However, according to Esteves et al. (2005), ERP implementation usually represents a threat to users’ perception of control over their work and a period of transition during which users must cope with differences between old and new work systems. On the other hand, Hunton et al. (2003) found that the performance of ERP users has not been declined after introducing ERP, but not been improved, neither.
5.1.4 Effects of ERP System on Customers, Suppliers and External Agencies

The results of our study indicated that productivity related to customers and suppliers was improved after ERP system installation. These results are important for the organization, since, they need to pay attention to their internal customers to avoid the difficulties associated with this change. Customer benefits come from meeting current needs of customers more efficiently, from identifying the customer needs proactively, and from meeting new customer needs (Chand et al., 2005). Tsai (2008) also reported that, ERP adopters are found to reduce their turnover days of account receivables or inventories, and prolong turnover days of unpaid accounts permitted by their suppliers, thus causing a substantial efficiency elevation after ERP implementation. In accordance with our study, Stratman and Roth (2002), Bradford and Florin (2003), Nah et al. (2003), Huang et al. (2004), Zhang et al. (2005), Nah and Delgado (2006) and Bradley (2008) also showed that ERP implementation improves customer service and satisfaction.

Goodpasture (1995) showed that ERP has also been credited with reducing manufacturing lead times, drastic declines in inventory; breakthrough reductions in working capital; abundant information about customer wants and needs; and the ability to view and manage the extended enterprise of suppliers, alliances, and customers as an integrated whole. Duff and Jain (1998) and Gupta (2000) also showed that, higher effectiveness and efficiency in operations and improved customer satisfaction are the ultimate benefits derived from ERP systems.

In accordance with our study, Rantala and Hilmola (2005) and Barua et al. (1995) showed that ERP enhances the rate of inventory turnover. Contrary to our study, Rabinovich et al. (2003) found that ERP had no positive effects and actually unfavourably affected inventory speculation.
Our study indicated that, ERP systems did not contribute to External Agencies. Though, many companies are implementing ERP packages as a means to enhance competitive services (Martin, 1998; Mirani and Lederer, 1998; Pliskin and Zarotski, 2000), but, there is increasing support in the literature that IT cannot generate an enduring competitive advantage (Hopper, 1990; Kettinger et al., 1994; Mata et al., 1995). An examination of ERP systems using criteria established in research on resource-based views of the firm and chaos/complexity theory indicates that, although ERP is necessary to coordinate complicated, multifaceted operations, it is far from sufficient to promote a strong competitive position over a long term (Lengnick-Hall et al., 2004).

Contrary to our study, Sarkis and Gunasekaran (2003) found that ERP systems are effective in rise and fall of organizations in an increasingly competitive market where globalization has been localized.

5.2 EFFECT OF DEMOGRAPHIC VARIABLES ON CHANGES CAUSED BY ERP SYSTEM

The results indicated that gender and age of the user does not significantly affect the change caused by ERP system on over-all organizational performance and productivity while educational qualification and designation significantly affects the change in overall organizational performance and productivity due to ERP system. In contradiction to our study, Zviran et al. (2005) found that organizational level, different computing experience and education levels makes no difference in terms of perceived usefulness of ERP systems except for 1 item and in accordance to our study they found that age and gender made no difference in perceived usefulness. Longinidis and Gotzamani (2009) conducted a study on ERP user satisfaction issues and found no significant differences between users with different gender, age, education, and IT experience.
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Yang et al. (2006) study indicated that user characteristics (age, position, department) have significantly influenced on ERP system performance. The working age of system users only has slight influence on use attitude. The study showed that higher working age of users, lower score of use attitude. The reason may be that higher working age users has significant influences on the system function, system quality, user satisfaction and use attitude. User position has significantly influence the system function, system quality, use attitude and user satisfaction. The higher-level position users have better ERP performance than lower-level users. Holsapple et al. (2006) investigated user characteristics (age, education level, management level, and computer experience) as determinants of ERP success.

5.3 ERP SYSTEM IMPLEMENTATION PHASE

The results of our study indicated that all the resources had a positive value with respect to all the resources involved in the implementation process. However, the mean value ranges from 0.559 to 0.785 which is not high. This suggests that ERP implementation is not done in a best manner. This seems to be true, because it consumes time to achieve it and will result in a valuable change in the organization once implementing it as it is an integrated way of business processes because it required change in business practices (Dolmetsch et al., 1998). Somers and Nelson (2001) identified CSF for ERP implementation stage and their mean rankings. The top five CSF included top management support (4.29), project team competence (4.20), interdepartmental cooperation (4.19), clear goals and objectives (4.15) and project management (4.13).

ERP systems in general still have a high initial implementing failure rate (Kumar and Hillegersberg, 2000; Soh et al., 2000; Hong and Kim, 2002; Songini, 2004; Scheer and Habermann, 2000; Barker and Frolick, 2003; Gargaya and Brady ,2005; Bingi et al., 1999; Aloini et al., 2007). Sammon and Adam (2004) noted that high rates of failure also exist in ERP project implementation due to combined effect of inadequate organizational
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analysis at the beginning of the project, the complexities of ERP market and complex implementation.

According to Gartner Group, 70 percent of adopters eventually fail to use it properly and showed that many ERP projects end in failure. Davis and Wilder (1998) discovered that twenty-six percent of IT projects are cancelled before completion and seventy-seven percent respondents considered poor management; seventy-five percent considered changes in business goals during the project; seventy-three percent considered lack of business management support as the main reasons for problems in ERP implementation. According to Rao (2000), 96.4% of firms experience ERP implementation failures. According to a survey among private companies by Cliffe (1999), 65% of executives believe that the introduction of an ERP system create difficulties for business activities due to implementation problems.

Chan et al. (2009) asked the respondents to rate 17 ERP implementation potential problem areas according to the extent of their agreement of disagreement that these had been problems for them. Lack of financial resources, training issues, lack of internal expertise, lack of consensus among the institution’s senior management, quality of the software, inadequate training, resistance to change and alignment between software and business process were found to be a hindrance to effective ERP implementation. Others partly agree that technical issues, lack of consensus among the business owners and lack of understanding on the capability of the software are also ERP implementation problems. A number of respondents could not determine whether these ERP implementation issues are problems or related to vendors not delivering promised functionality in a timely fashion, inadequate communications strategy, customization, or issues in working with external consultants.

According to Saatçioğlu (2008), the most five important barriers are difficulties in changing to new from old systems; difficulties in estimating project requirements;
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significant resistance from staff; high costs of implementation; and poor reporting procedures. Muscatello et al. (2003) found top ten risk factors to be lack of senior manager commitment to project, ineffective communication with users, insufficient training of end-user, fail to get user support, lack of effective project management methodology, attempting to build bridges to legacy applications, conflicts between user departments, composition of project team member, fail to redesign business process and unclear changing requirements. Personnel training, increased costs, adaptation and integration problems are the most prevalent barriers (Nah et al., 2001; Themistocleous and Irani, 2001; Themistocleous et al., 2001).

The results of our study indicated that there were a lot of user related issues while implementation of ERP system. This seems to be true since ERP system implementation changes the way in which the organization works, changes the physical environment and social environment. All these will definitely revoke resistance from the employees and has to be managed effectively before, during and after the implementation of the ERP system. Wu and Wang (2006) pointed that complexity may affect the amount of effort in ERP projects It's impossible to succeed in a technological application unless people have positive attitudes about it and behave in ways that enable to get benefit from it. Yang et al. (2006) suggested that the key success factor for implementing ERP system is the people-centered, and Light (2005) pointed out that the only way of achieving the perfect system.

Yakovolev and Anderson (2001) also noted, the loss of personnel is a common problem on system implementations. Gore et al. (2011) also suggests that the first problem is retaining the ERP trained employees and hiring more qualified people. Issues pertaining to personnel were a go live issue in 62% of the cases (Krasner, 2000). Poston and Grabski (2001) found the number of employees is reduced after the implementation of ERP. However, the number of employees of the controlled samples has been reduced more. Morton and Hu (2008) discovered that the lower the level of business integration and
standardized work processes, the higher the resistance ERP system implementation faces within the organization.

Perceived risk and habit are the two most probable causes of resistance in ERP implementation (Sheth, 1981; Aladwani, 2001; Amoako-Gyampah, 2007). Increased controls led to significant resistance in all four organizations, as has been seen in many ERP implementations (Elmes et al., 2005; Ignatiadis and Nandhakumar, 2007). Kumar et al. (2008) study found that the primary reasons for user resistance in an ERP implementation were loss of data access, loss of authority and increased restrictions. Soh et al. (2003) found many misalignment issues which can adversely impact ERP acceptance. Resistance to acceptance of the new system can adversely affect use and reduce the gains that can be realized with successful implementation. Researchers have often attributed many implementation problems to users’ resistance to change (Pardo and Fuentes, 2003).

The results indicated that the mean value for top management was 0.736. There is a need to pay more focus on top management since the importance of top management support was instrumental in the successful implementation of a large customized system and appeared to be the driving force behind a successful ERP implementation. Seo (2013) identified challenges in implementing ERP system in large organizations and compared similarities and differences between corporate and university and compared critical success factors with three level ratings (strong, limited and weak) and found that top management was the strongest critical success factor.

The results indicated that mean value for vendor resources was 0.636. These resources should be given adequate consideration, since, vendors and consultants need to understand the business and translate the ERP requirements to the organization and process levels (Gulledge, 2006; Rettig, 2007). The relationship between the software buyer and vendor should be strategic in nature with the ERP provider enhancing an
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organization's competitiveness and efficiency. In their study, Willcocks and Sykes (2000) identified supplier partnering as an enabling critical factor necessary for ERP success. Sarker (2012) provided insights about the phenomenon of cocreation itself and to the stream of packaged software literature by vendors. However, in contradiction, Helo et al. (2008) survey show that vendors and solution providers are well aware of the challenges of using standardized ERP packages.

Another decisive element of ERP implementation success or failure is related to the knowledge, skills, abilities, and experience of the project manager as well as selection of the right team members. They should not only be technologically competent but also understand the company and its business requirements. The results indicated that the mean value was 0.712, which shows that companies need to focus on the project management resources for better implementation. Singla and Goyal (2006) indicated that project management, business process design and implementation team were considered to be the most ranked risk factors in ERP implementation. Helo et al. (2008) found common problems of ERP implementation include complexity in logic of ERP system (45.76 percent) and implementation (35.9 percent), underestimating of both ERP requirements (42.37 percent) and company business process requirement (30.51 percent).

Consultants may be involved in various stages of the implementation: performing requirements analysis, recommending a suitable solution, and managing the implementation. The results of the study indicated that the mean value is not very high which means for better performance, if the company wants to add more modules or purchase ERP, consultants should be properly considered.

The results indicated that hardware and networking resources were not handled in a very efficient manner. Dedicated resources are critical to realize the benefits associated with an ERP package (Robinson and Dilts, 1999). Resource requirements need to be
determined early in the project and often exceed initial estimates and the inability to secure resource commitments up front may doom project efforts (Reel, 1999).

The results of the study indicated that hardware and software problems were also reported to some extent. In accordance with our study, Celeste (2001) also observed that ERP maintenance and upgrade have some unique characteristics and the existing in-house software and hardware replacement models are insufficient for ERP situations.

However, implementing an ERP system into an organization is often a difficult task, and often such projects do not produce the expected benefits (Davenport, 2000; Hayes et al., 2001; Poston and Grabski, 2001; Hitt et al. 2002; Ragowsky and Somers, 2002; Umble et al., 2001; Cotteleer and Bendoly, 2006; Wieder et al., 2006; Liang et al., 2007; Grabski et al., 2009). The adoption of an ERP system, like other IT projects (Chua, 2009), may result in problems for the enterprise despite its advantages aforementioned.

5.4 EFFECT OF COMPONENTS IN IMPLEMENTATION PHASE ON DIFFERENT FACETS OF BSC MODEL FOR MEASURING ORGANIZATIONAL PERFORMANCE AND PRODUCTIVITY

It is assumed that innovations are beneficial, and the organizations that have a greater quantity of “the right stuff” (such as management support, knowledge, and resources) are expected to exhibit both greater quantity (such as frequency and extent of implementation) and quality of IT innovation (such as efficiency, productivity improvement, or usage) (Fichman, 2004). With ERP, the temporary deterioration in firm performance and productivity is theorized to be the result of primary value-chain activities being more complex than previously planned (Brown and Vessey, 1999), a lack of understanding of the system by users (Peterson et al., 2001), inadequate training and support for end-users to help them understand the newly adopted business processes and workflows, inadequate system testing and inadequate communication of system
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objectives (Nicolaou, 2004a). Other causes for this dip include ineffective change management (Motwani et al., 2002) and the severity of the implementation mode (Nicolaou, 2004b; Motwani et al., 2002).

In our model, components of ERP in implementation phase explained 25.9 percent of variance for internal processes and 12 percent of variance for innovation, learning and growth. Ifinedo and Nahar (2009) used SEM techniques and assessed the structural model and found that $R^2$ is 0.18, which suggests that the exogenous factors explained 18 percent of the variance in the ERP success construct and considered it adequate for a study of this nature. The results of their study indicated strong positive relationships between IT assets and IT resources, on the one hand, and ERP success, on the other.

The findings of our study showed that hardware resources are positively associated with internal process, innovation, learning and growth; customers, suppliers and external agency of the organization. Hence, organization should give this factor an important consideration.

The results showed that top management is positively associated with innovation, learning and growth of an organization. In accordance with our study, Bajwa et al. (1998) and Wang and Chen (2006) reported that top management support and engagement of quality vendors and consultants are among the most widely cited positive influences in the success of newly diffusing IT systems. Lorca and Andrés (2011) results indicate that the importance of managers’ independence to implement an ERP system in Spanish companies greatly depended on the moment of the implementation.

Senior management involvement increases the success rate of achieving a strategic impact through an IT (Lederer and Mendelow, 1988; Segars, Grover and Teng, 1998; Min, Suh and Kim, 1999; Hartono, Lederer, Sethi and Zhuang, 2003). Mata et al. (1995) also found that managerial IT skills are the only IT resource to be a potential to provide
firms sustainable competitive advantage. Other IT resources attributes such as proprietary technology, capital requirements and technical IT skills have not been documented to provide competitive advantage.

At a general level, evidence from Thong et al. (1996), Bajwa et al. (1998) and Deloitte Consulting (2000) show that there are critical, positive relationships between IT success, on the one hand, and top management support, quality services from external entities, and a clear business vision for IT adoption, on the other. On the contrary, the results of Nah et al. (2007) indicated that enterprise-wide communication and a project management program are key factors influencing the success of ERP implementations, while other factors such as top management support as well as teamwork and composition are not as critical to the outcome.

Successful ERP implementations may exhibit negative effects as many tasks are automated and positions eliminated. Workers reengineered out of a position and redeployed within the company may enter a grieving process resulting in low productivity (Arnold et al., 2000). Assessing user satisfaction about ERP systems can help identify organizational readiness for massive change. Once identified, organizations can tailor their implementation efforts to ensure a critical mass of positive effort and enhance the probability of success (Abdinnour-Helm et al., 2003).

Brynjolfsson, Hitt and Yang (2000) found that certain organizational practices such as the increased use of skilled workers and decentralized and team-based organizational structures increased the value of IT investments. Using survey data, Brynjolfsson and Hitt (1995) found that firms that invested more heavily in business process redesign and devoted more of their IT resources to increasing customer value (e.g. quality, timeliness, convenience) had greater productivity and business performance. All of this research suggests that there can be positive benefits from the automation, process redesign activities and increased timeliness or output quality associated with successful ERP
system deployment, although these effects in the specific context of ERP have not been previously studied statistically.

Many prior studies examining the relationship between investing in IT and the performance level of the organization (Weill, 1992) dealt with the ratio of total IT investment (i.e., software, hardware, personnel) to the entire organization’s performance (the total profit of the organization).

Past research overwhelmingly reports that the immediate after-effects of ERP implementations are fraught with productivity and profitability problems (Davenport, 1998; Poston and Grabski, 2000, 2001; Hitt et al., 2002; Hunton et al., 2003; Nicolaou, 2004a, 2004b). These are thought to be due to possibly severe systems integration problems, misalignment between people, processes and technology, and overall change management issues during and shortly after the implementation process (Nicolaou, 2004a; Murray and Coffin, 2001; Ross and Vitale, 2000; Scott and Vessey, 2000; Soh et al., 2000).

Having clarity about ERP adoption vis-a'-vis business vision positively impacts the overall success of the software (Davenport, 2000; Deloitte Consulting, 2000; Stefanou, 2001). According to Oesterle et al. (2000), success or failure hinges on the effective collaboration among the project teams, the business knowledge of internal business experts and the technical skills of outside IT consultants. On the other hand, Sammon and Adam (2005) argue that unsatisfactory success rates of ERP implementations to date is not an indication of the failure of ERP as a concept, it is the result of inadequate analysis of business requirements in preparation for ERP projects.

Our study found no association between project management resources and change in performance. In contradiction to our study, managers have reported that one of the problems associated with implementing packaged software is the incompatibility of
features with the organization’s information needs and business processes. To achieve the greatest benefits provided by an ERP system, it is imperative that the business processes are aligned with the ERP system. For mid-sized organizations, the risks associated with implementing ERP may be greater than those for larger enterprises, not only because they lack the critical human and technical capabilities of larger organizations, but also because they have fewer resources to rely on in case of disaster. However, Sammon and Adam (2004) noted that high rates of failure also exist in ERP project implementation due to combined effect of inadequate organizational analysis at the beginning of the project, the complexities of ERP market and complex implementation. Ferratt et al. (2006) investigated more than 70 enterprise-resource-planning (ERP) projects and found that greater success in implementation is related to greater adoption of the best practices.

Bergstrom and Stehn (2005) survey results show a general lack of real drivers for ERP implementation and low awareness of the potential benefits and strategic importance, indicating that ERP is not yet regarded as a way of supporting and improving core business strategies. Hence, it is not the implementation of a software system that will yield the major benefits. Rather, it is the change processes aiming for organisation-wide improvements and the ERP approach adoption that will contribute to increased competitiveness.

The study indicated no association between database resources and effect of ERP on organizational performance and productivity. However, in this context, it has often been argued that the quality of data/information is a major determinant of ERP success (Yusuf et al., 2004; Huang et al., 2004; Zhang et al., 2005; Gattiker and Goodhue, 2005).

Since, consultants understand the business and translate the ERP requirements to the organization and process levels, organizations should attempt to maximize their compatibility with their consultant resources. Our study indicated that vendors and consultant resources do not contribute to the success of ERP systems. However, in
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contradiction Ein-Dor and Segev (1978), Thong et al. (1996) and Bajwa et al. (1998) identified that external expertise (quality vendor/consultant) positively influence the success for IT systems. Gefen and Ridings, (2002) study also affirms that the systems’ benefits and impacts tend to be rated highly when quality vendors/consultants are engaged.

The study indicated that software resources did not contribute to ERP system success. However, Umble and Umble (2002) advocated the importance of software capabilities. They found that if the software capabilities and needs are mismatched with a company’s business processes, this can lead the ERP implementation to failure.

The study indicated that user resources are associated with internal processes. This seems to be true since the users are the main actors of the ERP system. If they are not satisfied, the processes will not be done in the intended manner. Peslak et al. (2008) found that the two significant phases which directly influenced preferred ERP use were preparation and training phase, and performance and usefulness phase. Neither transition nor maintenance was found to significantly affect preferred ERP use. Longinidis and Gotzamani (2009) results indicate that three main components that affect the level of satisfaction of an ERP user are interaction with the IT department, pre-implementation processes and ERP product and adaptability.

Ziad et al. (2010) study shows that there is a positive relationship between ERPs implementation success and employee satisfaction, also there is a statistical relationship between enhancement and ERPs success, weak relationship between ERPs success and ease of use and training factors as well as most of these companies depended on the internet. Daoud and Triki (2013) results showed there was a significance impact from the user’s satisfaction and enhancement factor on ERPs implementation success, while there was no significance impact from the ease of use and training on ERPs implementation success.
5.5 GENERAL CHARACTERISTICS RELATED TO ERP IN MANUFACTURING COMPANIES

The results of our study showed that all companies used SAP as ERP and Windows as their operating system. This means that SAP will dominate the software market in the near future. Hence, vendors should try to bring some modules in other ERP softwares for entering into the market.

As far as customization and BPR is concerned, three companies had major customizations and major BPR; five of them had major customization and minor BPR; two of them went for minor customization and major BPR and two of them had minor customization and minor BPR. A recent survey of Fortune 1000 companies regarding ERP customization policies indicates that 41% of the companies re-engineer their business to fit the application, 37% of the companies choose applications that fit their business and customize a bit, and only 5% customize the application to fit their business (Davis, 1998).

The results demonstrated that time taken for ERP implementation was less than 1 year for five companies, between 1-2 years for five companies and 2-3 years for two companies. This suggests that companies have taken enough time for ERP implementation. Besides, some companies were included in the sample, which have installed ERP since 2 years. This may be also the reason for dissatisfaction related to implementation process and less change in mean value related to organizational performance, since productivity depend on the time after ERP installation. Wieder et al. (2006) found that the longer ago an ERPS was initially implemented, the higher the overall firm performance.

Nicolaou (2004) examined the process of ERP system post-implementation review. Based upon prior research and a case study of two firms, the research postulated that the
post implementation review moderated the success of the ERP project, and a conceptual framework of post-implementation review quality was developed. Building on that study, Nicolaou and Bhattacharya (2006) considered the post-implementation review factors and demonstrated that the use of post-implementation review activities resulted in improved differential performance when those activities were performed shortly after system implementation. Poston and Grabski (2001) and Hunton et al. (2003) found that return on assets, return on investment, and asset turnover were significantly better over a three-year period for adopters as compared to non-adopters.

As far as organizational scope was concerned, five companies were confined to single company while seven were having operations in multiple companies. Four companies were using ERP on a national level, three were using at a single site, while five companies were using at multiple sites. Managers can access business transactions that are conducted anywhere within their multi-site system. US-based communications giant AT&T uses the SAP ERP system. AT&T provides communication services in practically every country and territory throughout the world (AT&T Corporate Profile, 2009). Conducting business worldwide means the company does business in multiple currencies and languages. SAP ERP has the ability to translate all imported data into the respective language and currency. For example, when a business transaction is completed in Japan, an American manager can see the real-time data as it would appear in the English language and the US dollar. Having this feature allows AT&T to use one common enterprise system between its US-based headquarters and its branches located throughout the world (Klaus et al. 2000, Utecht et al. 2004).

Our study included 1 small scale company, 3 middle scale companies and 8 large scale companies. However, the results might have been different if the configuration would have been different. Mabert et al. (2003) assert that ERP benefits differ according to firm size (i.e. larger firms experience more ERP benefits than smaller firms). This viewpoint is also supported by Sedera et al. (2003). Firms with bigger IT departments and larger
annual IT budgets might experience higher levels of success with their ERP systems is consistent with other studies (Ein-Dor and Segev, 1978; Mabert et al., 2003; Sedera et al., 2003). Likewise, Gattiker and Goodhue (2004, 2005) find that value of ERP varies, depending organizational structure. It can be argued that larger firms have more employees with general IT skills than smaller firms, perhaps because larger setups have more financial resources to provide such facilities (Hunton et al., 2003), and smaller organizations may be constrained by inadequacies of resources.

The study indicated that HRM was the most common module used by all the companies followed by Production Management, Inventory Management, Financial Management, Purchase Management, Logistics Management etc. Hence, there is still a growing market ahead for modules to be added in the existing ERP system.