The Impact of Enterprise Resource Planning Systems (ERP) Effectiveness on the Supply Chain Competitiveness in the Courier Services Sector (An Empirical Case Study)

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EXECUTIVE SUMMARY

The progressive advancements in Information and Communication Technology (ICT) over the last twenty years have mirrored the business surrounding environment, and Competitive Advantage (CA) has had an upper hand on a global level as well as the national level. Company competitiveness and Supply Chain Management (SCM) within the contemporary market have been influenced by the development and advancement of ICT infrastructures and applications. This research examined the impact of Enterprise Resource Planning (ERP) applications in SCM activities on competitive advantage through the performance of a business at a local Egypt market. It used courier Service Company X in Egypt as a case study using SCOR metrics as the measurement of competitiveness. The matrix applied in the study measures SC competitiveness that proceeds from the SCOR model with its five dimensions: Reliability, Responsiveness, Agility, Cost, and, Asset Management efficiency. A random sample of 550 respondents, including staff members from different departments (IT, customer services, HR, accounting and finance, sales, customs, and operation) with different managerial levels and company customers, were selected from the service company under study in Egypt. Data was collected through a questionnaire that consisted of structured questions related to the position of the subjects and five level rating scales adopted from IEEE, APICS, CSCMP by the researcher, based on his professional experience in the area of ERP application. The results of the study revealed that the impact of effectiveness of ERP on supply chain competitiveness was 13.0%. The result revealed that there is a significant impact of effectiveness of ERP on supply chain performance Reliability, Responsiveness, Agility, Cost and Asset management efficiency in a courier service company in Egypt. The study submitted a number of recommendations, including applying the ERP system, which requires not only financial investment, but also needs investment in human resources and the support of top management. Deployment of ERP needs good planning and preparation phases and the pilot test is most important. Increasing ERP effectiveness while building a good relationship with the ERP vendor is considered an important issue.
Keywords: ICT, ERP, SCM, SCMP, Supply chain integration, Supply chain visibility, Supply chain competitiveness,

INTRODUCTION

Growing and advancement of knowledge and technology has brought a new competitive prospect for the Courier service sector in Egypt to satisfy customer needs for quality and performance level and government and stakeholder demands. These Courier companies have been forced to improve the quality of service to their customers through the deployment and implementation of the ERP system, which in turn has improved their performance, efficiency, and effectiveness, thus positively affecting competitiveness. The ERP system was deployed to replace legacy management and computer systems to improve performance by providing a superior management tool to make a positive change in both performance and effectiveness. Consequently, the ERP system plays an important role especially for courier service companies in integrating information for service operations efficiency. Also, ERP embraces the processes of tracking, security, quick delivery times, speed, signature, specialization, and

individualization of express fast services, which are not available for most normal ordinary mail services. There is a perception that ERP has understood the use of best business practices and by applying these practices, this will help to improve or completely substitute old practices to gain an opportunity to be re-engineered. This can ensure promise of an organization's success in the long-term. Kumar & Hillegersberg (2000) state that ERP is an information system (IS) capable of integrating data across the organization's functional areas. These include the capacity for better data analysis, improved levels of organizational performance and efficiency due to improving processes in place that allow for better levels of customer service. ERP advantages afford benefits and values to organizations enabling organizations to be more competitive in the market.
Due to the extensive benefits of the ERP system, some Courier service companies have allocated a huge investment in the ERP system. In this paper, we examine whether the adoption of the ERP system by Courier services companies creates advancement levels of efficiency and performance.

LITERATURE REVIEW

ERP

Technology is the keyword to enhance and improve the integration of supply chain management, the advancement of these tools helping with information-sharing that supports supply chain management (SCM). Nowadays, businesses search to adopt innovative technologies aiming to reach the integration and gain a competitive advantage with their entire supply chain. ERP system is one of those tools that drive progress.

According to Al-Fawaeer and Al-Zu'bi (2013), ERP is defined as a system used for an arrangement of business best practices and advanced technologies to empowers the organization to gain a competitive advantage and achieve its specific business goals by supplying a corporate platform to integrate all aspects of the business. Bafna et al. (2017) describe ERP as business techniques and empowering software that integrates manufacturing, financial, distribution functions to balance and better use of enterprise resources. It is not designed only to integrate internal business functions but also to integrate with customers and suppliers as part of the enterprise's operation. It can provide custom-designed report systems and an integrated database. It helps to form a set of best practices for the business processes that may lead firms to change their structures, business processes, and even their business strategies needed in implementation. Klaus et al. (2000) and Hsu and Chen (2004) agree that ERP system can improve customer responsiveness and product quality and also increase information quality and sharing between different departments within the single company, as well as customers and suppliers in the entire supply chain. Ultimately, this should increase overall business performance to attain a competitive advantage in the national and global market, improving long term profitability.

ERP System Deployment

The deployment process of ERP systems passes through different phases. The length and complexity of each phase depends on the nature and type of industry and operations itself.
According to Markus and Tanis's (2000) model, an ERP implementation consists of four phases: (1) Chartering phase: which includes crucial decisions taken regarding if ERP will have a positive impact on the business or not; (2) Project phase: (getting the system running) involves the customization of ERP software package, testing, troubleshooting including changing the management process and culture; (3) Shakedown phase: referring to the routine use of system, monitoring and evaluated for the performance achieved; (4) Onwards and upward phase: includes system upgrades and supporting service taken.

Esteves and Pastor (2001) proposed a 6-phase life-cycle used for the ERP implementation, as shown in the following table.

(1) adoption	Need for a new ERP system is checked
(2) acquisition	Selecting the right ERP vendor and the right package
(3) implementation	Adapting the business process with ERP, customizing if needed and testing new ERP
(4) use and maintenance	The function of the ERP system is used and checked, training is provided
(5) evolution	It involves system upgrades and maintenance

(6) retirement	Now, old ERP system is replaced with new one

Table: 1 Six phase life cycle for ERP implementation (adapted source Esteves and Pastor, 2001)

Mandal and Gunasekaran (2003) described the ERP implementation in three phases and the related activities for each phase as in the following table.

A- pre-implementation phase activities	B- Implementation phase activities	C-Post-implementation phase decision
1. Risk analysis 2. Preparing a change management plan 3. Forming a cross-functional team communications 4. Considering a phase-based approach for implementation 5. Using proper planning styles for each different tasks	1. Collecting user requirements through formulating a specialized team 2. Setting up a network for monitoring and feedback 3. Providing strong leadership, 4. Accruing top management supports 5. Promoting expertise consultation and user participation, 6. Obtaining approval from parties for what is being undertaken throughout the project	1. Whether the objectives of the ERP system were fully obtained or not 2. Whether the anticipation and project information was accurate 3. Whether the agreed practices and techniques were complied with or not 4. Any other issues which are considered appropriate

Table: 2 Three stages of ERP implementation and related activities (adapted source Mandal and Gunasekaran, 2003)

Implementing an ERP system requires changes in the organizational culture, a long time to implement, adapting business processes and expanding costs. Therefore, companies need to know clearly what ERP system can do and how it can affect the company before thinking of applying and implementing this ERP system.

Critical Success Factors in (ERP) Implementation

Critical success factors (CFS) is critical for assessing what are the risks accompanied by ERP implementation. According to Umble, Haft, and Umble (2003), CFS are clear identification of company strategic goals, excellent project management, the commitment of top management, user education and training, organizational change management, data accuracy and performance measures tools. Al-Mashari, Al-Mudimigh, and Zairi (2003) added more success factors to the Umble et al's (2003), such as management and leadership, visioning and planning, ERP package selection, and communication.

All these success factors must be taken into concern during the implementing ERP. Failure of the ERP system or the unsuitable usage of this system will cause a huge loss for the company and may even lead to insolvency. Shatat and Udin, (2012) stated that many companies only used between 50 and 75% of modules of the ERP system. While Betts (2001) showed that 80 % of the ERP system implemented failed to achieve that was expected from it and also the company objectives.

ERP System Effectiveness Measurement Approach

The issue of ERP effectiveness or success evaluation is an important area of field study, because organizations try to maximize their returns for their investments (ROI) by applying the system. There are different measurement models for ERP effectiveness that can be expressed in the following section.

The DeLone McLean Model. DeLone and McLean's (1992) the IS success model consists of six dimensions of measurements for success:1) information quality, 2) system quality, 3) user satisfaction, 4) use, 5) organizational impact and 5) individual impact. Taken into consideration that measurement of ERP effectiveness using the same tools for an Information system (IS) when evaluating its success for the organizations. On the converse side, Klaus et al. (2000) stated that the ERP systems are not the same as other IS because ERP systems implementation is associated with technological, operational, strategic, managerial and organizational related issues.

The Gable et al. model. In order to avoid these drawbacks from the traditional evaluation of Delone and Mclean's evaluation model, the Gabel model et al. (2003) model was introduced. They built a model used for measurement of ERP consisting of four quadrants: 1) The individual impact: which measures the effect of the system on the employees using the system, such as

individual productivity; 2) Organizational impact: which measures the impact of the system on the organization such as organizational total costs or workforce costs; 3) Information quality: which is related to the relevance or importance of the information output and timeliness; 4) System quality: which measures flexibility, ease of use, and data accuracy of the system.

The extended ERP Systems model. The main variances to the Gable et al. model is an additional two-dimensional vendor/quality consultant, working group effect. The extended ERP Systems model introduced by Ifinedo (2006) worked in the same scope of application measurement as the Gable model, but by adding these dimensions provided an outline to collects more detail data that make difference in the ERP-systems success: 1) Vendor/consultant quality: which measures the influence of quality of the provider of the software on the overall success of the organization such as the relationship with the vendor trustworthiness and credibility, technical support provided; and 2) Workgroup impact: which measures the improvement of communication of functional departments within the organization.

Enterprise System Experience Cycle measurement. According to Markus and Tanis (2000) each experience of the company with ERP is unique and differs from one company to another and even from one specific point of view to another. They categorize an enterprise system experience cycle into different phases/stages (project chartering, project configuration ,shakedown ,onward and upward), where each stage embraces a description of main activities, key players, main common problems and errors, possible outcomes and performance metrics Based on making plans and taking actions if outcomes are not as good as expected, a corrective action must be taken before going to the next phase because the outcome of a previous phase influencing the coming phase.

Task-Technology Fit (TTF) ERP Success Model. According to Goodhue (1995) TIF theory states that IT has a strong effect on individual performance and can get the most benefit if the strength of the IT is equal to the task performed by the users. TTF consists of three main dimensions: 1) task, 2) technology, and 3) user. Tasks are the actions executed to convert inputs into outputs, whereas ERP (technology) is used to support the user to perform their tasks. These three factors affect the acceptance of the system. TTF measures at what degree a technology supports a user in performing the job.

The following metrics have been extracted from the previous model in order to address the most related metrics that cover ERP effectiveness from both the managerial and technological sides. Ifinedo's findings, ERP effectiveness has six components. It can be categorized into two dimensions: 1) ERP Impact and 2) ERP Quality.

ERP Barriers for Adaptation

The adaption of the ERP system usually faces many barriers due to financial, personal, cultural and organizational issues. The adaption contains many phases and faced by resistance from employees. It requires top management support due to its high initial investment and also the commitment of the vendor company. Venkatraman and Fahd (2016) define the main barriers that affect the successful adaption of ERP systems small business enterprise (SMEs) are summarized below.

1.Commitment from Top Management	3. ERP Selection	5. Business Process Reengineering, less Flexibility	7. Expectations from ERP and Cost-Benefit	9. Customization	10. Resistance to Change
2. The readiness of Skilled Resources	4. Ineffective Communication	6. change management process	8. Inadequate End-User Training	11. Confidentiality Source code	

Table 1: List of main barriers that affect the successful adaption of ERP systems in SMEs.

Also, Fernie (1994) has stated that the support and commitment of top management saves a lot of effort granted the resource needed for the ERP system and avoids any associated risk. The implementation barriers lie in the need to change the core business process, new policies, updated strategies and personnel.

Supply Chain Management

Firms realized a long time ago that they face tough competition and that they need to meet the expected changes in customer preference and needs. Supply chain competitiveness (SCC) indicates the ability of the supply chain as a whole to earn a

competitive advantage compared to another supply chain in the same sector (Lambert & Cooper, 2000). SC partner expectation focuses on providing the best services with interacting with each other in forward and reverse flow to achieve an SCC.

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From the above definitions, the main key concept of a supply chain is the following: planning, implementing, controlling, business processes, customer requirements, processing, movement, storage, point-of-origin, point-of consumption, relationship, integration, logistics activities, coordination, managerial processes, motivating, collaboration, organizing, competitive advantage, customer value, suppliers, manufacturers, warehouses, stores, costs, business function, service level, transportation, performance, while derived concepts are operations, efficiently, raw materials, semi-finished goods, finished goods, systemic, sharing data, sustainable, long term, strategic, and right quantity, locations, time.

Supply Chain Management Practices (SCMP)

Supply chain management (SCM) is identified by Lazarevic, Sohal, and Baihaqi (2007) as a strategic management tool for companies to improve and increase their performance and safeguard their competitiveness. On the other side, service supply chain management (SSCM), according to Ellram et al. (2007) is a network of SC members who produce and deliver a service. Baltacioglu et al. (2007) stated that manufacturing and services industries are prompted to purchase some inputs that can be used to provide and deliver values to the end customer. SSCM include planning and management of all activities associated with sourcing and integrating services across departments and outside organizational borders to satisfy customer requirements. As stated by Chowdhury, Alam, and Habib (2017), the structure of service supply chain (SSC) has some similarities with the product supply chain, as the services are created, purchased, and moved from one element to another in a form of a chain. SSCM includes the span Flow of information, money from the original supplier to end customer. According to Lee and Billington (1992), SCM practices can be practiced in both manufacturing and services companies to improve performance and achieve competitive advantage.

According to Chowdhury, Alam, and Habib (2017), there are eleven factors for SCM practices: 1-top management leadership, 2-training, 3- product design,4- supplier quality management, 5-process management, 6-quality data reporting, 7-employee's relations; 8-customer's relations, 9-benchmarking, 10 supplier selection, 11- supplier participation. While Lazarevic, Sohal, and Baihaqi (2007) categorize SCM practices into five dimensions: 1-internal operations, 2-supplier and customer relations, 3-information technology (IT), 4- information sharing, 5- training.

Lazarevic, Sohal, and Baihaqi (2007) stated that information technology and information shared significantly contribute to firm performance. The practice of internal operations also contributes to company performance as well as customer and supplier relationship practice. This means that the internal operations practice is to go between the relationship between customers and supplier's practices. So companies need to achieve internal integration before finish synchronizing their activities with their customers and suppliers.

The integration within the whole supply chain individual partners and increasing their market share are long-term objectives of SCM, while the short term objectives of SCM is to improve performance, reduce lead time and level of inventory stock. In spite of the increasing popularity of SCM, most organizations have not fully implemented it to exploit the benefits. A difficult part of SCM is the lack of understanding of the SCM concept by executive managers. However, SCM is a complex, long and dynamic changeable process. The successful implementation needs to be associated with an understanding of the SCM concept and commitment and support of top management to exploit its benefits.

Supply Chain Performance Matrix

Systems assessing and evaluating the performance of manufacturing and producing supply chain operations are widespread, according to Foggin, Mentzer, and Monroe (2004). There has been little research on Service Supply Chain performance measurement related to the development of sound measurement for service supply chain, as stated by Cho et al. (2012). Different supply chain performance matrix measurements can be expressed in the following section as follows.

The Framework Stewart According to Stewart's (1995) metrics and measures, there are four main supply chain activities processes that need to be measured: 1) Order planning, 2) Supply link, 3) Production level, 4) Delivery link measures that covers the supply chain activities.

The Framework of Kaplan and Norton. Kaplan and Norton (1992) they offered a new approach, which is balanced scorecard based on four different dimensions for measurements: a) Learning and growth perspective: This perception deals with employee self-improvement, training, and attitude toward development; b) Business process perspective: This perspective includes internal business processes. Try to found out whether the products and services are meeting customer requirements or not; c) Customer perspective: This perspective concentrates on more customer focus and customer satisfaction. If customers were not satisfied business, would not survive; d) Financial perspective: This perspective deals with financial records and aims to increases pressures to the need for automation to facilitate computations. Growth and profitability are the goals under this perspective.

Framework of Beamon. Beamon (1999) offered a supply chain measurement system that has three core measures as following: a)Resource measures cost so performance measures in this category are the total cost of producing including labor/maintenance, total costs of resources/input used, total costs of distribution including transportation and handling, cost of miss delivery, etc.; b) Output measures are concerned with the customer responsiveness. The performance measures are total revenue, backorder/ stock outs, amount of time between order and delivery, the proportion of orders filled immediately, on-time deliveries, number of customer complaints, etc.; c) Flexibility measures handle many flexibilities issues like the ability to change planned delivery dates, the ability to change the output level of products produced, ability to change the another manufactured products and the ability to introduce and manufacture a new one. These measures have the goals of accomplishing a high level of customer service, high level of efficiency, and the ability to respond to a fluctuating environment.

The Framework of Gunasekaran. Gunasekaran (2004) classified measures into three categories levels, strategic, tactical and operational levels of measurements. Its goal was to enhance their ability for the management and empower decision-making: 1) Strategic Level: commitment to organizational goals, exploration of broad-based policies, Top-level management decisions, corporate financial plans, and competitiveness; 2) Tactical Level: Resource allocation, measuring the performance of goals set at the strategic level, feedback on the mid-level management decisions; 3) Operational Level: Data analysis, evaluation of decision of low-level managers and workers, ensuring that goals set in the tactical level have happened.

The Framework of Supply-Chain Operations Reference-model (SCOR). SCOR is an industry standard introduced for SCM, according to Apics (2018). It practices a process reference model to clarify and describe a supply chain. This model is combining a mix of business process benchmarking, reengineering, and best practices analysis.is targeting to provid a framework for performance measures and best practices for standard processes. SCOR is based on the administration processes and diverse management such as plan, source, make, deliver and return. It defines the supply chain as one integrated process of these management practices. It is beginning from a supplier's up to the customers. It adheres with operational strategy, work, material, and information flow. Thus SCOR enables communication between supply chain partners.

The nature of the SCOR system is a pyramid consisting of four levels that represent the path a company proceeds on the road to supply chain improvement. The top-level in the pyramid clarifies the scope and content for the model and sets the basic standard for the performance goals. Configuration level represents the organization of the supply chain so that facilitated implementation of the operational strategy. The third level is the operation/processing level includes process element definitions, information inputs, and outputs, best practices, and system competencies to support both leading practices and performance measurements. The fourth level is the implementation level is concerned with identifying which practices will be used to achieve a competitive advantage. SCOR Model provides a list of a performance measure for each task and process in a supply chain, aligns these measures with the strategic objectives and provides the best practices for each measurement. It is therefore used to define measures and evaluate the supply chain.

The SCOR specify supply chain performance metrics used as a measure of the competitive advantage of the organization to describe its competitiveness. The issue of supply chain performance is always important in business research due to its direct impact on overall organizational performance and its future growth. In order to improve the performance within SC, many approaches, different tools can be applied. Integration of supply chain process and activities is vital to increase supply chain performance. For supply chain improvement is looking at the whole chain with all partner, processes, and link as one unit. A key element for this mission is integration between co-partners.

The CA of any organization member in the SC, either the end product or service, can be viewed and evaluated from the SCOR model definition of the SCP which focuses on the five main dimensions: Reliability, responsiveness, agility, cost, and asset management effectiveness. The success of the business organization to master these factors increases its competitiveness in its market.

Supply Chain Integration (SCI)

The term 'integration' is considered a key element for the missions in the SCM. Many definitions of SCM relate to integration. As stated by Pagell (2004), Stock and Boyer (2009), and Mentzer et al. (2001), integration is considered one of the management action practices used to implement SCM, while Lambert et al (1998) state that the master goal of integration is to increase the effectiveness of all processes along supply chain co-partners. Frohlich and Westbrook (2001) stated that an integration of supply chains may probably occur at strategic and operational levels. Many authors conclude that ICT application is the most powerful economic tools that support supply chain integration.

According to Morash and Clinton (1998), integration in the supply chain has to be on both in and out aspects. There is a dispute regarding whether in or out integration is more effective in the supply chain. Groups of researchers support the idea that internal (intra-organizational) integration is most important for SCM integration, followed by external integration. While others, such as Stevens (1990) and Croxton et al. (2001) state that external integration is related to the collaboration coordination and with another member of the supply chain. Stock et al. (1998) state that when integration is done inside the firm employee lead to integration across firms. This will improve the business performance of firms' members within a supply chain in terms of output product and service, customer satisfaction, profitability, and growth. While some authors disagree that internal integration is important for SCM integration the external integration can be a stimulant to internal integration (Richey et al., 2010), the best practice is for the firm to focus on internal and external integration simultaneously (Stank et al., 2001).

According to Bowersox et al. (1999), maximum value to the customers is the main impartial objective of SCI's and to gain CA. Weng (1995) illustrates that supplier-buyer integration in the supply chain leads to higher profits than those with a low level of integration. Vickery et al. (2003) find the positive direct impact of SCI on customer service, which contributes positively to the financial performance including return on both sales and assets. Information integration also represents an important dimension in the supply chain integration process as the data and information about customer orders, inventory, production schedule operational and logistic activities are considered important stated by Davenport (2000).

Wisner (2003) stated that the most common forms of integration are in information sharing, internal and external processes, and integration of technologies and systems. At each stage of integration a technical integration of IS and ERP systems, and also information sharing is recommended, and it is considered as an enabler of interior firm cooperation according to According to Stank, et al. (2001), internal integration can be achieved through information sharing while external integration requires cross-functional teams along supply chain and consumer focus orientation. However, while there are many recommendations on how to integrate supply chains, the recommendations are mainly of a general nature and they do not provide practitioners with specific information on how to implement SC integration (Näslund & Hulthen, 2012).

At the interface level, Application Programming Interfaces (API) is delivered by ERP systems to allow other applications to access ERPs functionality or data. ERP Integration can be done by extracting data from one ERP system database and transforming it into the Extensible Markup Language (XML) format and then transmitted to the other target application. The Integration in e-business solution are much more easily than the remainder of another application due to its designed based on collaboration with other systems, more flexible and have an open architectures, where objects, data, semantics, and logic were extracted using (DOT, XML, database technologies, ODBC application servers, EDI, etc.) and sent to the message broker. to the target application smoothly as stated by Themistocleous, Irani, & Love (2005).

The concept of supply chain integration, generally, is an integration of information, knowledge, processes and through different functions and activities within and exterior of the company. They can work together to improve the level of efficiency with more customer focus, as well as decrease the cost of operation to raise organizational effectiveness.

Supply Chain Visibility (SCV)

Today supply chain, Supply chain visibility is more needed because there is a high need for network collaboration to decrease business and partner risk. It helps in providing real-time insight comprehension to transaction content and information in the supply chain. Barratt and Oke (2007) stated that supply chain visibility refers to how to extend the supply chain partner can share and have access to the same key and beneficial information that is, trusty, timely, easy-to-use and accurate. This emphasizes the importance of sharing meaningful, valuable, and useful in order to produce a sustainable competitive advantage. ICT is the man delivers for visibility. Another definition by Kaipia and Hartiala (2006) is "The sharing of relevant and meaningful information between the supply chain members and echelon in the chain."

To create visibility, firms should not only make sure that information is available and shared; they should also ensure the accuracy, trustworthiness, and usefulness of this information to other partners.

Significance of the Study

The present business environment is portrayed by using increasing vulnerabilities. ERP effectiveness has arisen as an essential new technique for companies to achieve profit goal by reducing the environmental influence. This study will emphasis on the exploration of (ERP) effectiveness influences on (SCC) in a courier service company X. ERP Effectiveness is difficult, it is wanted the first-rate deal due to a variety of motives such as (marketing and competitiveness) motives. Businesses Competitiveness needs to increase the successfulness implementation and deployment of ERP.

METHODOLOGY

Aim of the study

This study aimed to assessing the effect of ERP system on the performance of supply chain and the organizational competitive advantage in a courier service company in Egypt. The question we intend to answer is: What is the specific effect of the ERP system on the courier company supply chain?

Objectives

This study has 3 main objectives;

a) This research targets the relationship between the quality of the ERP system in term of effectiveness and the competitiveness in the supply chain system.
b) Discuss how to improve integration and visibility of courier company supply chain.
c) Discuss how to improve and adapt the ERP System for the courier service company.

Research Model

The following graph summarizes the relationship between the independent and dependent variables

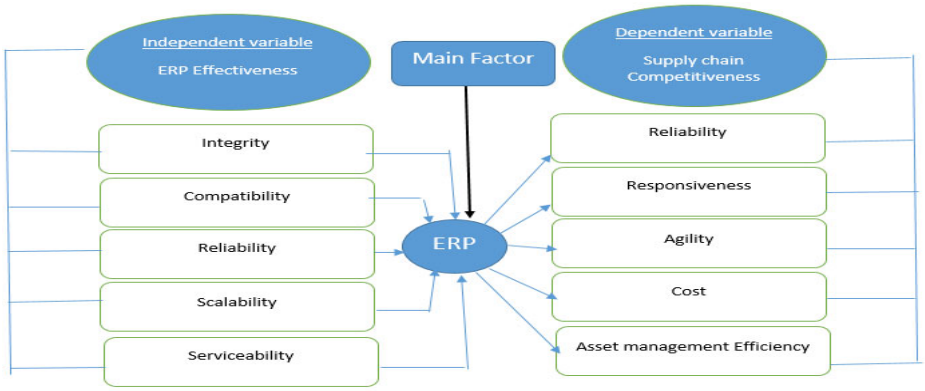

Figure4: The proposed Relational Model between Research variables (Adapted from IEEE, APICS, CSCMP)

Research Hypotheses

H0	There is no significant impact of the effectiveness of ERP on supply chain Competitiveness
H0.1	There is no significant impact of the effectiveness of ERP on supply chain Performance Reliability
H0.2	There is no significant impact of the effectiveness of ERP on supply chain performance Responsiveness
H0.3	There is no significant impact of the effectiveness of ERP on supply chain performance Agility
H0.4	There is no significant impact of the effectiveness of ERP on supply chain Performance Cost
H0.5	There is no significant impact of the effectiveness of ERP on supply chain performance Asset Management Efficiency

Setting

The current study was conducted at one of the courier service company in Egypt ,which is divided into seven departments (Accounting, Operation, Customs, HR, IT, Sales and Marketing) and its contract customers. The study was applied on a sample from the seven departments and company customers.

Sampling

The target population includes supply chain partners (supplier and customers) in a courier service company the sample size was limited to this study 218 employees from the company and 323 customers based on the following equation formula; $n= t^2 * p * (1-p) / m^2$, where n = required sample size, t = confidence level at 95% (standard value of 1.96), p = estimated frequency (50%) and m = margin of error at 5%. To avoid dropped cases, the researchers decided to have a sample of 222 employees from the company and 328 customers' subjects.

Tools of Data Collection

Five level rating scales consist of 51 questions. The research complied this questionnaire using the different questionnaire in related area SC performance, ERP. Many questions were adapted from IEEE, APICS, CSCMP by the researcher based on his professional experience in the area of ERP application. Total number of questions for independent variable ERP effectiveness 25 questions and total number of questions for dependent variable supply chain competitiveness are 26 questions.

Procedures

The researchers had prepared the tools of data collection after reviewing the relevant literature. The aim of the study was explained to all participants after taking an oral consent from each. The data collected had been written in data sheet. The data had been analyzed statistically using SPSS.

RESULTS

The following table illustrate there is a significant correlation between ERP Systems effectiveness dimensions the supply chain competitiveness dimensions, where Pearson correlation values significant at P-value (0.05).

H0: There is no significant impact of the effectiveness of ERP on supply chain Competitiveness.

Table 3: Multilinear regression test to study the Impact of the effectiveness of ERP on Supply Chain Competitiveness

ariables		ERP Integrity	ERP combinability	ERP Reliability	ERP Scalability	ERP Serviceability
SC Reliability	Correlation	0.133**	0.143**	0.205**	0.150**	0.072
	Sig.	0.002	0.001	0.000	0.000	0.093
SC Responsiveness	Correlation	0.056	0.106*	0.139**	0.122**	0.010
	Sig.	0.191	0.013	0.001	0.004	0.817
SC Cost	Correlation	0.043	0.132**	0.186**	0.354**	0.016
	Sig.	0.311	0.002	0.000	0.000	0.713
SC Agility	Correlation	0.102*	0.052	0.121**	0.115**	0.074
	Sig.	0.017	0.224	0.004	0.007	0.082
SC Asset Management Efficiency	Correlation	-0.088*	0.019	0.096*	0.131**	0.115**
	Sig.	0.039	0.665	0.025	0.002	0.007

Table 2: Correlation matrix between ERP Systems effectiveness on the supply chain competitiveness

Variables	B	t	p-values	R	R2	F	p-values
(Constant)	10.510	10.145	0.000	0.361	0.130	16.312	0.001
SC Reliability	1.124	5.362	0.000				
SC Responsiveness	0.184	2.126	0.03				
SC Cost	0.406	4.426	0.000				
SC Agility	0.305	2.740	0.006				
SC Asset Management Efficiency	0.135	1.109	0.3				

To study the impact of the effectiveness of ERP on supply chain Competitiveness was test by multi-regression and the results were as follows:

- The values of the correlation coefficient (R) to the relation between the effectiveness of ERP on supply chain Competitiveness was (0.361).
- From the results of the coefficient of determination (R2) of multiple regression in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Competitiveness was (13.0%).
- The test significant model regression based on the value of (F), which amounted to (16.312) for organizational performance which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of the effectiveness of ERP on supply chain Competitiveness.
- The values of (T), which amounted to (5.362, 2.126, 4.426, 2.740, 1.109) for (SC Reliability, SC Responsiveness, SC cost, SC Agility, SC Asset Management Efficiency) consequently, which were significant at level (0.05), showing a significant regression coefficient (B).

H0, which stated, “There is no significant impact of the effectiveness of ERP on supply chain Competitiveness” was rejected. In other words, the alternative hypothesis H1 was accepted which stated, “There is a significant impact of the effectiveness of ERP on supply chain Competitiveness.”

H0.1: There is no significant impact of the effectiveness of ERP on supply chain performance Reliability.

Table 4: Simple linear regression test to study the impact of the effectiveness of ERP on supply chain Reliability

Variables	R	R2	B	F	t	p-values
SC Reliability	0.241	0.058	0.389	33.794	5.813	0.001

The impact of the effectiveness of ERP on supply chain Reliability was tested by linear simple regression and the results were as follows:

- The value of the correlation coefficient (R) to the relation between the effectiveness of ERP and supply chain Reliability was (0.241).
- From the results of the coefficient of determination (R2) of regression simple linear in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Reliability were (5.8%).
- The test significant model regression based on the value of (F), which amounted to (33.794) which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of effectiveness of ERP on supply chain Reliability and rely on the value of (T), which amounted to (5.813), which were significant at level (0.05), showing a significant regression coefficient (B).

H0, which stated, “There is no significant impact of the effectiveness of ERP on supply chain performance Reliability,” was rejected. In other words, the alternative hypothesis H1 was accepted which stated, “There is a significant impact of the effectiveness of ERP on supply chain performance Reliability.”

H0.2: There is no significant impact of the effectiveness of ERP on supply chain performance Responsiveness.

Table 5: Simple linear regression test to study the impact of the effectiveness of ERP on supply chain Responsiveness The impact of the effectiveness of ERP on supply chain Responsiveness was tested by linear simple regression and the results were as follows:

Variables	R	R2	B	F	t	p-values
SC Responsiveness	0.141	0.020	0.302	11.172	3.342	0.001

The value of the correlation coefficient (R) to the relation between the effectiveness of ERP and supply chain Responsiveness was (0.141).

- From the results of the coefficient of determination (R2) of regression simple linear in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Responsiveness were (2.0%).
- The test significant model regression based on the value of (F), which amounted to (11.172) which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of effectiveness of ERP on supply chain Responsiveness and rely on the value of (T), which amounted to (3.342) which were significant at level (0.05), showing a significant regression coefficient (B).

H0, which stated, “There is no significant impact of the effectiveness of ERP on Supply chain performance Responsiveness” was rejected. In other words, the alternative hypothesis H1 was accepted which stated “There is a significant impact of the effectiveness of ERP on supply chain performance Responsiveness.”

H0.3: There is no significant impact of the effectiveness of ERP on supply chain performance Agility.

Table 6: Simple linear regression test to study the impact of the effectiveness of ERP on Supply Chain Agility

Variables	R	R2	B	F	t	p-values
SC Agility	0.163	0.027	0.443	15.045	3.879	0.001

The impact of the effectiveness of ERP on supply chain Agility was tested by linear simple regression and the results were as follows:

- The value of the correlation coefficient (R) to the relation between the effectiveness of ERP and supply chain Agility was (0.163).
- From the results of the coefficient of determination (R2) of regression simple linear in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Agility were (2.7%).
- The test significant model regression based on the value of (F), which amounted to (15.045) which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of effectiveness of ERP on supply chain Agility and rely on the value of (T), which amounted to (3.879) which were significant at level (0.05), showing a significant regression coefficient (B).

H0, which stated, "There is no significant impact of the effectiveness of ERP on supply chain performance Agility" was rejected. In other words, the alternative hypothesis H1 was accepted which stated, "There is a significant impact of the effectiveness of ERP on supply chain performance Agility."

H0.4: There is no significant impact of the effectiveness of ERP on Supply chain performance Cost.

Table 7: Simple linear regression test to study the Impact of the effectiveness of ERP on Supply Chain Cost

Variables	R	R2	B	F	t	p-values
SC Cost	0.234	0.055	0.518	31.642	5.625	0.001

To study the impact of the effectiveness of ERP on Supply Chain Cost was test by linear simple regression and the results were as follows:

- The value of the correlation coefficient (R) to the relation between the effectiveness of ERP and Supply Chain Cost was (0.234).
- From the results of the coefficient of determination (R2) of regression simple linear in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Cost was (5.5%).
- The test significant model regression based on the value of (F), which amounted to (31.642) which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of effectiveness of ERP on Supply Chain Cost and rely on the value of (T), which amounted to (5.625) which were significant at level (0.05), showing a significant regression coefficient (B).
-

H0, which stated "There is no significant impact of the effectiveness of ERP on supply chain performance Cost" was rejected. In other words, the alternative hypothesis H1 was accepted which stated, "There is a significant impact of the effectiveness of ERP on Supply chain performance Cost."

H0.5: There is no significant impact of the effectiveness of ERP on supply chain performance Asset Management Efficiency.

Table 8: Simple linear regression test to study the Impact of the effectiveness of ERP on Supply Chain Asset management Efficiency

Variables	R	R2	B	F	t	p-values

SC Asset management Efficiency	0.105	0.011	0.311	6.155	2.481	0.01

The impact of the effectiveness of ERP on supply chain Asset Management Efficiency was tested by linear simple regression and the results were as follows:

- The value of the correlation coefficient (R) to the relation between the effectiveness of ERP and supply chain Asset Management Efficiency was (0.105).
- From the results of the coefficient of determination (R2) of regression simple linear in the previous table, we find that there is the impact of the effectiveness of ERP on supply chain Asset Management Efficiency were (1.1%).
- The test significant model regression based on the value of (F), which amounted to (6.155) which was significant at level (0.05), which confirms the significant regression model.
- It has been through model significant regression coefficient test (B), which explains the presence of the impact of effectiveness of ERP on supply chain Asset Management Efficiency and rely on the value of (T), which amounted to (2.481) which were significant at level (0.05), showing a significant regression coefficient (B).

H0, which stated, "There is no significant impact of the effectiveness of ERP on supply chain performance Asset Management Efficiency" was rejected. In other words, the alternative hypothesis H1 was accepted, which stated "There is a significant impact of the effectiveness of ERP on supply chain performance Asset Management Efficiency."

FINDINGS

The main finding of this research can be summarized as the following.

1. The study sample of participants in the survey agrees for the whole phrases axis (Reliability) with weight percentile was (83.6%).
2. The study sample of participants in the survey agrees for the whole phrases axis (Responsiveness) with weight percentile (79.6%).
3. The study sample of participants in the survey neutral for the whole phrases axis (Cost) with weight percentile was (65.2%).
4. The study sample of participants in the survey agree for the whole phrases axis (Agility) with weight percentile was (72.5%).
5. The study sample of participants in the survey response for the whole phrases (Neutral) with weight percentile was (63.5%) to (Asset Management Efficiency) axis.
6. The study sample of participants in the survey agrees for the whole phrases axis (Data integrity) with weight percentile was (79.0%).
7. The study sample of participants in the survey agree for the whole phrases axis (Compatibility) with weight percentile was (76.0%).
8. The study sample of participants in the survey agrees for the whole phrases axis (Reliability) with weight percentile was (75.5%).
9. The study sample of participants in the survey agrees for the whole phrases axis (Scalability) with weight percentile was (72.5%).
10. The study sample of participants in the survey agree for the whole phrases axis (Serviceability) with weight percentile was (72.5%).
11. There is a significant correlation between ERP Systems effectiveness dimensions the supply chain competitiveness dimensions.
12. The impact of the effectiveness of ERP on supply chain competitiveness was (13.0%).
13. There is a significant impact of the effectiveness of ERP on supply chain performance Reliability.
14. There is a significant impact of the effectiveness of ERP on supply chain performance Responsiveness.
15. There is a significant impact of the effectiveness of ERP on supply chain performance Agility.
16. There is a significant impact of the effectiveness of ERP on supply chain performance Cost.

17. There is a significant impact of the effectiveness of ERP on supply chain performance Asset Management Efficiency.

CONCLUSION

The use of technology by people of all ages increases expectations of customers and either explicitly or implicitly adds more challenge to the company to try to meet these requirements and expectations and even attract their customers. The advance in technology affects the business environment where the customer looks for innovation, high responsiveness and flexibility, better service and service quality.

Technology affects the way of doing business. The investment in technology now a day is highly secured and has the highest rate of ROI among other investment. Online shops and social media are the tools of today business.

The implementation of ERP technology in supply chain raise completion between companies to adopt the best and latest technology. There is a strong link between ERP and supply chain competitiveness and performance, however, ERP alone not achieve the target another factor such as top management support by providing necessary financial, human resource. Training, good IT infrastructure and good relation with a vendor help to achieve the target.

The impact to be superior require deploying a selective ERP package as a whole package with the main aim of integrating all of the business function inside the organization, as well as between supply chain partners to achieve the main target which is competitiveness.

Recommendation

The insight of this research, data, and information collected and analyzed. There are many challenges that obstruct improve and adapting the ERP system on the courier company such as Human resources, Lack of commitments of Top Management, ERP selection, Lot of customizations, ineffective communication, and poor ERP vendor support.

A number of recommendations to overcome these challenges for improving and adapting an Effective ERP system to achieve competitiveness supply chain from the researcher's viewpoint are recapped as shown.

Applying the ERP system not only requires financial investment, but also needs investment in human resources and the support of TOP Management. Employee training and development is considered a key enabler in the successful implementation of an ERP system. Human drive a machine where he uses it to get the best of its capabilities. Many previous cases show a low level of ERP effectiveness due to incompetent human resources that can use and develop this system.

Deployment of ERP needs good planning and preparation phases. The need of the company should be carefully identified and assessed also precision analysis should be conducted to determine the best convenient system and tools that can suit and fit well to the company. Several ERP deployment fails because of bad planning and unsuitable selection that does not match the organization or don’t fit the nature of the business. Many customizations are not preferred in the ERP system and not lead to the planned required result. External consultants can be involved in these phases for their experiences in Assessing current ERP system and its pitfalls and deploying a new ERP system compatible with the courier company business nature.

When starting the ERP system implementation in a company, there is a strong recommendation to make a pilot test. This pilot test will enable the company cross-functional team (Technical and managerial) to access carefully the performance and the change required to be done before going real implementation of the new system.

Building a good relationship with the vendor is considered an important factor for support an ERP effectiveness.

Increased integration and visibility activities of the supply chain in the company through using different technology tools, such as GPS and the Barcode system to enable customers to get on time updates for their shipments and many other facilities such as schedules pickup, on time delivery notification message.

Recommendation for Future Research

Many areas in supply chain integration and visibility still need more research either academically or professionally. The following list of proposed research areas that could be important for supply chain professional and practitioners.

1. ERP system cost and return on investment can be calculated and quantified.
2. The challenge associated with ERP customizations.
3. Comparative study between the service sector and the industrial sector, examining the effects and differences of ERP system dimensions in both sectors in Egypt.
4. Change management rising with ERP system implementation.

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