

AN INVESTIGATION INTO THE IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING BY SA ICT OPERATORS

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Abstract: *Deployment of network enabled business tools, such as Enterprise Resource Planning (ERP), will be a crucial economic growth factor in the first part of the twenty-first century. Those businesses and countries that are able to adopt these technologies rapidly and seamlessly will enjoy the attendant crest of growth while others will fall behind. This paper explores the deployment of ERP, which is a business model utilizing technology to integrate key business and management processes within and beyond a firm's boundary, in an Information and Communication Technology (ICT) operator. A study was carried out to find out why ICT operators in South Africa are so notoriously slow on ERP uptake even though they stand more to gain by it than other businesses. The findings indicate a strong need and demand for ERP in the South African ICT industry and that clear and quantifiable benefits can arise from successful implementation of ERP by ICT operators and other businesses outside the sector.*

Keywords: *ERP, Competitive advantage, Service delivery, Customer relationship, increased efficiencies and supplier management.*

1. INTRODUCTION

A fundamental shift in the economics of information is underway – a shift that is less about any specific new technology than about the fact that a new behavior is reaching the critical mass. Millions of people at home and at work are communicating electronically using universal, open standards. This explosion in connectivity is the latest wave and for business strategists is the most important wave in the information revolution.

The electronic world has already proved that business is being conducted through electronic media, whether it is through information technology being incorporated in manufacturing lines or business over the internet. According to Jutras (2004), it is imperative for the different departments within a business to communicate effectively and efficiently both with each other and at the same time with their clients.

South Africa (SA) was re-admitted to the international trading arena after its first democratic elections in 1994. Trade sanctions against the country had insulated it from the major impact of the regrouping of international organisations, advances in technology and changing rules in the competitive business environment. Re-entry for SA into international trade meant that market size, composition and segments across the industry had to be redefined.

Naturally, current strategies and tactics of ICT operators in SA have to be modified to adapt to the changing environment. According to Brancheau and Wetherbe (1987), a

common corporate concern is to seek alignment of information technology (IT) investment with business needs and goals. Early information systems of telecommunications companies were paper-based, structured along the lines of the organogram but operating separately from the network. The advent of computers and migration of network components from electro-mechanical to electronic devices have enabled the telecommunications industry to merge its networks with the information systems.

Being aware of the above and understanding the impediments to the impact of globalisation and deregulation of traditional operators, the paper notes the imperative for ICT operators to implement ERP sooner rather than later. This paper discusses the need for ERP implementation by the traditional telecoms operators in SA. The research reveals that employees believe that ERP implementation will lead to competitive advantage. Although the research focused on the SA environment, the results and recommendations are pertinent to all operators in the Southern African Development Community as well as to Africa as a whole.

2. BACKGROUND: ERP SYSTEMS

ERP marks the current generation of resource planning and is a central system, which replaces "islands of information" with a single, packaged software solution that integrates all traditional enterprise management functions i.e. finance, human resources management, project management, data management, warehouse management, customer relationship management, supplier relationship management, e-business and the internet function (Marchand, Kettinger and Rollins, 2000).

In simplest terms, ERP systems use database technology and a single interface to control the all-encompassing information related to a company's business (Jutras, 2004). Along with functionality for enterprise and supply chain management, ERP is typically associated with the use of client/server (recently with internet computing architecture as well) relational database technology and mainframe operating systems (Jakovljevic, 2004).

The functional perimeter of ERP systems expands into its adjacent markets, such as customer relationship management, decision support systems, and e-business, making systems less inward looking. Other value-added aspects of the newest systems include product configuration, field service modules, and internet self-service capabilities that extend system access to more users and/or business partners (Porter and Miller, 1985).

ERP can be the means for business-process reengineering, increasing flexibility and responsiveness by breaking down barriers between functional departments and reducing duplication of effort. An ERP system as a whole can provide the organisation with central availability of information, and hence effective and efficient provisioning of accurate data, communication and service to all customers. A good ERP system can provide businesses with powerful competitive advantage, including increased revenues (Petrisens, 1998).

The ERP system globally preferred by telecoms operators is the Enhanced Telecom Operations map (eTOM). Some of the drivers in this trend are:

- Globalisation of the sector.
- Moving to more of an end-to-end process management approach developed from a customer's point of view.
- Automating customer care, service and network management process.
- Integrating legacy systems with new operations support systems (OSSs) systems.
- Focusing on data services offerings.
- Focus on the total service performance, including customer satisfaction, etc.

The advent of ERP heralds a new beginning for businesses in the new economy (after the burst of the ICT bubble). ICT operators are late to adopt this new technology. The main reason for this reluctance can be found in their monopolistic and conservative origins.

In South Africa, where deregulation is faster and more turbulent than elsewhere, the proper adoption and implementation of ERP will be a significant contributor to competitiveness. (South Africa's ICT sector is still in the phase of "desperate competition" and will transition to "mature collaboration" in the next decade).

3. COMPETITIVE ADVANTAGE AND SERVICE DELIVERY

ERP (e-business) can hold a number of advantages for many organizations. In the areas of customer relationship management, supply chain management, competitiveness, timeliness, data and communications, ERP can assist an organisation to gain an edge over competition and over previous ways of operation. Johnson and Scholes (1999) argue that it is difficult for a competitor to imitate differentiation based on a multiple of compatible linkages and processes throughout the value chain.

Thus, creativity and the management of product and process innovations are essential to competitive advantage. ERP forms a foundation for successfully meeting e-business needs and can measure supplier/partner performance as well as companies' own performance in meeting the needs of their customers (Jutras, 2004).

3.1 CUSTOMER RELATIONSHIP MANAGEMENT (CRM)

With the e-business platform, ERP delivers the solutions, technologies and services companies need. One of the most important of these is customer relationship management, which provides the customer-centric solutions a company needs to plan, build, and retain profitable relationships. ERP customer relationship management eliminates the boundaries that stand between the company and its customers, and drives value into every area of the company's e-business network (Porter and Miller, 1985).

The following example emphasizes the advantage of the system: When a telephone customer phones in to complain about the voice quality on his line, the technician (after the operator has routed the call to the relevant panel of technicians through the call center) will automatically have on the screen in front of him the name, number and other account details of the customer as well as his record of complaints, faults and repairs. The technician can execute a number of line tests through the system, while the customer is on the line.

At the marketing, sales and service level, it gives people the real time information they need to execute targeted marketing campaigns, increase sales, and deliver prompt, superior quality service – whether by phone, fax, internet, or face-to-face. It also works with today's mobile devices, including web-enabled cell phones, laptops and handheld devices. It helps companies to build customer and partner relationships that last a lifetime (Porter, 2003).

At the executive level, ERP customer relationship management helps the company to plan and monitor marketing campaigns, coordinate budgets, perform customer segmentation, identify decision makers, track sales, react quickly to market changes, manage contracts and thereby allows the deployment of sales and marketing resources for maximum impact. At senior management level, it supports better planning by providing flexible management reports on every aspect of customer relationships to enable the continual building of a customer-driven culture throughout the e-business ecosystem. Beyond the company walls, it ensures that business partners share critical information on sales forecasts, order flow and delivery schedules so everyone in the company's supply chain can work towards the goal of total customer satisfaction (Jutras, 2004).

3.2 SUPPLIER RELATIONSHIP MANAGEMENT (SRM)

SRM provides the collaborative solutions needed to evaluate the supply strategy, enable the supply base and engage supply relationships for mutual benefit. With SRM, one can share timely, relevant information on every facet of the procurement and sourcing strategy, resulting in higher compliance and control throughout operations and delivering the maximum return on relationships with all suppliers on a continuous basis. According to Johnson and Scholes (1999), core competencies are likely to be more robust and difficult to imitate if they relate to the management of linkages within the organization's value chain and linkages to the supply and distribution chains. It is the management of these linkages that provides leverage and levels of performance, which are difficult to match.

3.3 E – BUSINESS

In general, e-business is understood as the interaction among business partners with the assistance of information technologies. It refers not only to buying and selling over the internet, but also to servicing customers and collaborating with business partners. The term e-business is often used interchangeably with the term e-commerce. However, it is becoming increasingly accepted that the use of e-commerce should be

restricted to referring to just those transactions, which are used while buying and selling services and goods over the internet. An e-business enterprise is one that utilises the internet and related technologies to compete effectively in its business space (Cronin, 1997).

All commercial or business transactions, interactions and trade with other businesses that take place over the Internet fall under e-business. E-business includes e-commerce and enhances the relationship between internal customers and external customers/suppliers. According to Loewen (2001), e-business (ERP platform) is an enterprise that uses the web to:

- Reach networks of suppliers
- Broadcast to customers
- Receive information on customers
- Receive revenue from internet transactions; and
- Provide services and products over the web
- Combine processes; organisational structure and technology
- Communicate information
- Leverage service and trade

According to Philips and Thomas (1997), for a very long time American Airlines used its control of the SABRE reservation system (ERP) to achieve higher levels of capacity utilisation than its competitors. Wal-Mart has exploited its EDI links with suppliers to increase its inventory turn around drastically.

Nike has masterfully employed advertising, endorsement, and the micro segmentation of its markets to transform sneakers into high price fashion goods. This is especially relevant from the capture of ideas to the structure of data and the storage and distribution of knowledge (Fraser, 1999). All three companies compete as much on information as they do on their physical products or services. In many ways information and the mechanisms for delivering it stabilise corporate and industry structures and underlie *competitive advantage*.

3.4 TIMELINESS

Another advantage of e-business is that information can be distributed to more people at the same time. Around the world people are pushing employers to provide information more quickly. Employees become quite anxious when they acquire new knowledge, which involves them directly, through people outside the organization or from the media. Breaking news also can be delivered to employees before they come to learn of it elsewhere. With e-business, organizations can provide information on time (Holtz, 1996).

3.5 EMPLOYEE ADVANTAGE

It is important, when implementing strategies, that the responsibilities for each activity relating to the critical success factors are properly identified. The area where this could go wrong is database maintenance, hence a need for knowledge workers (Johnson

and Scholes, 1999). Any organization aspires towards recruiting and keeping the best skills and capabilities, which human resources can offer. This edge makes an organization a sought after commodity. Thus, one of the main aims of the human resources section of an organization is to attract and retain those employees who enable the organization to be at the cutting-end of competitiveness.

For today's college graduates, the use of information technology as a means of accessing information and communicating with colleagues is a given (Porter and Miller, 1985). It can thus be assumed that new graduates will be keener to go for those employers who can provide the technology that they are familiar with, and are knowledgeable about. A company can, therefore, make a strong case that implementing e-business is a way for all employees to learn a new skill that will become vital in the very near future, helping to ensure their employability.

Old information, which is not necessary for daily use, can be archived and stored on compact disks to enable newcomers to "get up to speed" very easily as they can access the information through the database of the organization. Knowledge gained by people over a period of time can thus be stored for future reference, even when the original author has long left the organization. Knowledge workers are becoming a vital resource in the 21st century company. One of the goals of knowledge management is to deliver the intellectual capacity of the firm to the knowledge workers who make the day-to-day decisions that determine the success or failure of a business (Cross and Baird, 2000). According to Granovetter (1973), knowledge repository plays an important role in preserving organizational memory. Nevertheless, technology is only one form of memory that employees tap into when solving problems – and its use is limited.

3.6 MOVING BEYOND E-MAIL

Electronic communication opened up a whole new world of transferring messages. E-mail was introduced to the business world, as the conventional postal service was perceived to be slow and expensive. Messages could be relayed at an instant across the globe, along with attachments that can accompany an e-mail message. These restrictions had to be overcome by business in order to survive; hence ERP systems were created as more companies were driven by the demand to stay competitive (Porter and Miller, 1985). The pervasiveness of ERP will stimulate efforts to incorporate suppliers and customers into integrated business practices.

One big advantage for corporate network managers in using ERP technology over groupware technology is that it means that end users will only need one set of tools to access all networked information, whether it be from outside the organization via the internet or from internal systems via the local intranet. Consider, for example, the case of a group of doctors who need to attend to patients in hospitals, at home and at remote points of service such as clinics. The intranet, with internet capabilities and possibly connected to cellular telephone technology, can access patient records from any site and have the relevant and correct patient information at hand to treat those patients (Cronin, 1997).

3. RESEARCH DESIGN

The objective of this study was to determine the need for the implementation of ERP systems within the ICT industry in SA and provide recommendations in this regard, and to determine the perception of the role and functionality of ERP as an integrated management system. The aim was also to assess the benefits of implementing ERP in SA and the disadvantages of not implementing it.

Research was conducted by soliciting responses from a sample of managers and employees in the telecommunications industry in SA. The sample was based on the length of service in the industry, duration in the current position, nature of position and current/ previous employer. Due to the sensitivity of information in the sector, only 36 respondents out of 50 were prepared to take part in this study. The study focused on the implementation of ERP in SA and did not include respondents from other countries.

The resulting research design can be summarised as follows:

- Determining the ICT industry perception on the role and functionality of ERP as an integrated management system.
- Determining the impact of deregulation, this influences the information communication technology industry in SA.
- Investigating and determining the operational effectiveness of ICT service provider's sub-systems in SA.
- Establishing the possible trends of integrated management systems, i.e. ERP, which could be implemented by service providers in the South African ICT industry within the next five years.

4. FINDINGS AND ANALYSIS

4.1 OVERALL PERCEPTIONS OF ERP SYSTEM

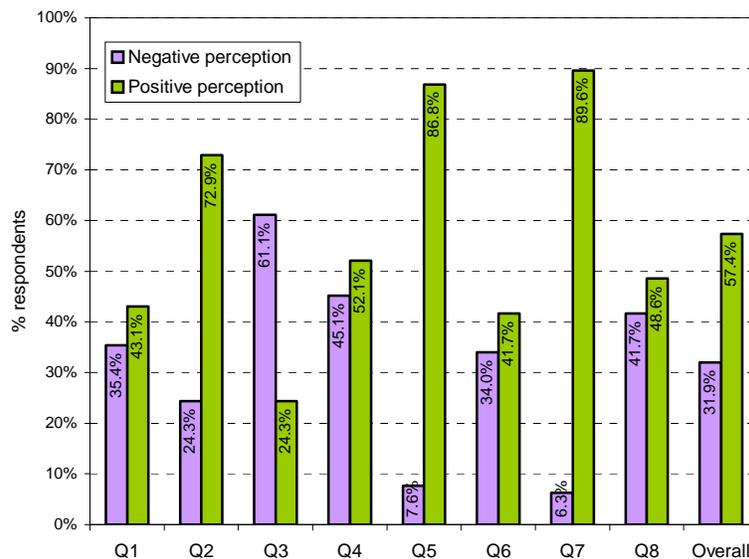
Figure 1 shows the general picture of all the responses in the study. Overall, when the results of all questions are summarised, 57.4 per cent of respondents showed a positive perception towards integrated management systems. Only one question attracted more negative responses than positive responses. This was because 72.2 per cent of the respondents disagreed with the statement that the supplier management tools of their organisations were integrated. Approximately 64 per cent of these respondents were of the opinion that supplier management tools of their organisations were not effective during tender processes and 58 per cent thought that these tools were not fully functional.

From the questions posed to the respondents, it seemed that they were, on average, still in the beginning phase of utilising the information technology to their advantage. However, indications were that the respondents have realised what a powerful instrument they have in the ERP and that they are expecting more integrated management systems.

4.2 PERCEPTION ON THE ROLE AND FUNCTIONALITY OF ERP

The first summarised question dealt with the functionality dimension of ICT subsystems. Results revealed that there was no unanimity on the functionality aspect of ICT subsystems in the telecommunications industry. There was, however, strong support for the observation that ICT subsystems are still in a developmental stage (61.1 per cent). It was also felt that the subsystems are not totally disjointed but rather in the process of development. These are in line with Moore's (2000) suggestion that over the next decade, the new economies of information will precipitate changes in the structure of entire industries and in the ways companies compete.

Figure 1 Overall perception of ERP system



This study showed a strong need and demand for ERP in the ICT industry. Very strong positive support was obtained in this research for the impact that ERP tools may have on ICT operators. Nearly 89 per cent supported the idea that ERP tools will enable ICT operators to have integrated networks and IT systems. The respondents were also of the view that ERP tools will allow a single system engineering group to manage fully integrated IT and network systems. Excellent support (94.5 per cent) was obtained for the view that ERP tools will enable organisations to share information resources across divisions with the guarantee of proper protection. There is also the added advantage of enabling all information resources to be available on a common intranet.

As to the administrative functions of ERP, the majority of the respondents supported the idea and was of the opinion that the human resources information systems of their organisations were fully functional. On the aspect of online financial reporting, respondents were divided with half the respondents not in favour of the idea that such reporting can be performed on line and, on the other hand, 41.6 per cent of the opinion that functions such as travel claims and budgeting can be performed online.

The analysis further reveals that respondents supported the idea that public relations issues are available online in their organisations for communication purposes, but did not support the statements that enterprise management processes for financial, legal and regulatory management were fully integrated in their organisations.

On the aspect of the areas of the operator's business where ERP will be most important or provide the highest impact when implemented, 80 per cent of the responses favoured customer relationship management tools followed by billing and service activation. Supplier relationship management tools and system integration were viewed at the same level followed by repairs and incoming logistics; maintenance got the lowest support.

4.3 IMPACT OF DEREGULATION ON THE ICT SECTOR

The second set of questions dealt with the impact of deregulation, which influences the ICT industry in SA. Before deregulation, efficiency was a rare commodity in the sector and operators were offering very limited services, lacking the latest technological advantages and operational efficiencies.

Today the industry has turned around completely with the introduction of the latest technology and aggressive operational efficiencies. The deregulation and globalisation of the ICT industry also contributed by unleashing competition and it is expected that this trend will continue into the future.

An analysis of the research results showed that 92 per cent of the respondents were in favour of the opinion that ICT operators will face more effective competition in terms of service delivery. Because of the increased competition, ICT operators will thus be compelled to use and apply their integrated management tools more effectively. Respondents also favoured the view that new entrants will capitalise on IT sub-systems in service delivery to their customers.

4.4 THE OPERATIONAL EFFECTIVENESS OF ICT SERVICE PROVIDERS' SUB-SYSTEMS

The analysis showed that respondents were of the opinion that customer relationship management tools will provide organisations with competitive advantage. They felt that customer relationship management tools contribute significantly to the provisioning of excellent customer services in their respective organisations and that a positive relationship exists between the employment of customer relationship management tools and up-to-date record keeping.

The research further showed that an overwhelming majority of respondents were of the opinion that supplier management tools of their organisations were not fully integrated with that of their suppliers and that their supplier management tools were also not highly effective during tender processes. Thus, the view is that currently these tools are not fully functional and that they do not enable suppliers to do effective online invoicing. A strong need for the development of supplier management tools in the ICT sector thus exists.

The research analysis also revealed that ICT sub-systems within SA are disjointed in terms of inter-operability between the different cellular operators as well as between the fixed line operators. The sub-systems within the region were found to lack inter-operability and it appears that the ICT sub-systems in the region do not as yet compare well with that of European ICT sub-systems in terms of inter-operability.

4.5 POSSIBLE TRENDS OF INTEGRATED MANAGEMENT SYSTEMS

This section addresses the last questions relating to the possible trends of integrated management systems, i.e. ERPs, which could be implemented by service providers in the SA ICT industry within the next five to ten years. Respondents did not support the idea that ICT operators will be fully-fledged, paperless entities within the next five years, but were rather in favour of a mix of manual and IT processing systems and of the opinion that ICT operations will still be mostly paper-based after five years. They, however, agreed that ICT operators in SA would be highly effective and automated after ten years.

5. CONCLUSION

The research conducted in this study shows a strong need and continued demand and support for ERP. Competition and globalisation will change the way the ICT industry is providing service and operators will need technological advantages to sustain or increase market share. Also, this research has shown that some clear and quantifiable benefits can arise from the implementation of ERP in the ICT sector.

The unprecedented growth of the industry in South Africa has resulted in a relatively good growth year-on-year and a healthy growth rate is expected to be sustained. Based on the analysis performed in the previous section, it can be concluded that ICT operators in SA will face more competition in terms of service delivery. This will, thus, lead to the increased rivalry and fight for maximum market share. The tactics used in this competition will obviously include integrated management systems that improve service delivery. New entrants to the ICT industry, such as the second network operator (SNO) and other value added networks will capitalise on IT sub-systems in service delivery to their customers.

With the latest technological developments and globalisation, it will be important for SA operators to keep abreast of the impacts of these developments and hence improve service provisioning of their customers. The research also revealed the strong positive relationship, which exists between customer relationship management tools and excellent customer services. This can provide operators with a competitive tool for a better service provisioning.

As detailed above, the expansion of the ICT industry in SA will result in the need for better service provisioning and integrated management systems necessary for the services required. As shown in this paper, more respondents are in favour of ERP for better service provisioning. It can be argued that the benefits of implementing ERP as a way of doing business by the ICT sector far outweigh the costs.

The 91.6 per cent support of the respondents for the statement that ICT operators in South Africa will be highly effective and automated after 10 years can be used to conclude that ERP systems have not been fully implemented or not fully utilised. Thus, ERP systems in the ICT sector and more specifically in the telecommunications industry are at a developmental stage. It can also be concluded that a strong need and demand for ERP in the ICT industry exists. ERP tools will thus have a positive impact in the ICT industry in terms of integrated networks and IT systems. In addition, it can be concluded that ERP tools will enable organisations to share information resources across divisions with the guarantee of proper protection.

It is proposed that organisations develop their ERP systems in order to generate a competitive advantage. Thus, in order to deal effectively with disjointed IT and network systems in the ICT industry; operators are to develop and implement ERP systems in ICT organisations. As developed ERP systems will deal effectively with security of information, it is recommended that such systems be implemented where success of organisations and businesses are dependent on the protection of their trade secrets.

It can thus be concluded that the respondents are of the opinion that ERP tools that are automated and integrated will result in enhancement of customer relationships and consequently in improved customer satisfaction. It can also be concluded that the previously mentioned relationships will inevitably lead to improved administrative functioning with its resultant contributions to customer satisfaction for companies in the ICT sector and more specifically for the telecommunications industry.

6. REFERENCES

- Brancheau, J.C. and Wetherbe, J.C. 1987. Key issues in information systems Management. *Management information Systems quarterly*, Vol. 11, No. 1, pp. 23-45.
- Cronin, M.J. 1997. Nets at work; knowing how employees use the Intranet is good business. Available:
<http://library.northernlight.com/SG19990714110006004.html>
- Cross, R. and Baird, L. 2000. Technology is not enough- Improving performance by building organizational memory. *Sloan Management Review*, Spring.
- Davenport, T.H. and Short, J.E. 1990. The new industrial engineering- Information technology and business process redesign. *Sloan Management Review*, Summer, pp.11-27.
- Fraser, S. 1999. Intranets Become Mainstream. Available:
<http://www.advisor.com/Articles.nsf/ID/OA990903.FRASS58>
- Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology*, Vol. 78, pp.1360-1380.

- Holtz, S. 1996. *The Intranet Advantage*. *PC Week*. Boston: Macmillan Computer Publishing.
- Jakovljevic, P.J. 2004. ERP system evaluation and selection. Available: <http://www.technologyevaluation.com/research/ERP>.
- Johnson, G. and Scholes, K. 1999. *Exploring Corporate Strategy*, 5th edition. Essex: Prentice Hall.
- Jutras, C.M. 2004. Can ERP meet your e-business needs? Available: <http://www.technologyevaluation.com/research/ERP>.
- Marchand, D.A., Kettinger, W.J. and Rollins, J.D. 2000. Information Orientation- People technology and the bottom line. *Sloan Management Review*, Summer.
- Moore, G.A. 2000. *Living on the fault line*. 1st edition. New York: HarperCollins publishers Inc.
- Petrissens, A. 1998. Convergence of telecommunications and multimedia- towards wireless and internet communications. *IDC special report*, November.
- Philip, B. and Thomas, S. 1997. Strategy and the New Economics of Information. *Harvard Business Review*, September – October.
- Porter, M.E. and Miller, V.E. 1985. How information gives you competitive Advantage. *Harvard Business Review*, Vol.63, pp.149-160.
- Porter, M.E. 2003. Strategy and the Internet. *Harvard Business Review*, March. pp. 63.