ENTERPRISE RESOURCE PLANNING SOLUTION SELECTION CRITERIA IN MEDIUM-SIZED SOUTH AFRICAN COMPANIES

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ABSTRACT

The purpose of this study is to identify the factors that medium-sized South African companies consider important in the acquisition of an Enterprise Resource Planning (ERP) solution. Through an extensive literature review, fourteen ERP selection criteria were identified. Using these fourteen criteria, a questionnaire was developed to test and rate these criteria on a 10-point scale. Results from the survey show that manufacturing and non-manufacturing companies rate reliability, compatibility, service, and support as the most important criteria when selecting an ERP solution.

OPSOMMING

Die doel van hierdie studie is om die faktore te identifiseer wat deur medium-grootte Suid-Afrikaanse firmas gebruik kan word in die aankoop van hulpbronbeplanningstelsels. Deur 'n uitgebreide literatuurstudie is veertien kriteria geïdentifiseer wat gebruik kan word as 'n meganisme om die aankoop van die stelsel te evalueer. Uit hierdie kriteria is 'n vraelys ontwerp wat die kriteria toets en evalueer op 'n tien-punt skaal. Uit die ondersoekresultate is gevind dat vervaardiging- en nie-vervaardigingsondernemings betroubaarheid, versoenbaarheid, diens, en ondersteuning beskou as die belangrikste kriteria wat gebruik kan word in die keuse van 'n hulpbronbeplanningstelsel.

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1. INTRODUCTION

In recent years, the Enterprise Resource Planning (ERP) market has undergone significant change with notable consolidation between role players. Three of the five leading mid-market ERP vendors in 2000 (JD Edwards, PeopleSoft, and Baan) no longer existed as independent companies by 2007. The ERP market also shows signs of maturation as many large companies have completed significant ERP implementations, resulting in sales slowing down in recent years. In response to this trend, leading ERP vendors have sought out new customers in the 'mid-market', with product and marketing strategies being redesigned to match the needs of these medium-sized companies.

Historically, ERP systems have been targeted at large organisations that are willing and able to spend tens or hundreds of millions of dollars on an integrated software system. Focused attention on the mid-market is a relatively new challenge – one that the software industry is still reorganising to meet. While ERP vendors face challenges in positioning, marketing, pricing, and supporting mid-market clients, clients themselves also face challenges. The ERP market has hundreds of products, services, and methodologies that may not all be applicable to the mid-tier customer base. Customers will have to be armed with the right tools to avoid serious errors and make purchases that will generate good returns.

The purpose of this paper is to identify the factors that medium-sized companies consider important in the acquisition of an Enterprise Resource Planning (ERP) solution. Insights developed from this research can be used to develop guidelines for the structured selection of ERP solutions in the medium-sized market.

2. RESEARCH PROPOSITION

Companies invariably turn to technology in their efforts to achieve or sustain competitive advantage. There is a constant need to streamline internal processes, cut costs, raise quality, and achieve tighter levels of integration. One way of realising these objectives is through the use of Enterprise Resource Planning solutions. The selection of an enabling technology platform becomes an important strategic issue because the realisation of these competitive targets largely depends on whether a company's systems can provide the required support. The process of selecting, purchasing, and implementing an enterprise solution is a major strategic decision that can either enhance or compromise the strategic position of a company.

Conversely, it must be remembered that ERP implementations can be very risky, and are often considered to be "a wrong purchase…[that] can adversely affect the organisation…even to the point of jeopardising the very existence of the organisation" [22]. Leading companies such as Dell and Allied Waste have abandoned ERP projects after initially making large investments in the technology [3]. While it is clear that the implementation of ERP systems is an important step towards remaining competitive on a global level, it is also clear that the actual selection of an ERP must be a carefully considered process.

In deciding which selection criteria are to be used for this important decision, the following propositions have been defined to aid the selection process:

a) **Proposition 1:** Medium-sized South African companies use important criteria to select an ERP system for implementation.

b) **Proposition 2:** When medium-sized South African companies select an ERP system, the three most important selection criteria will be *price*, *functionality*, and *service and support*.

c) **Proposition 3:** Manufacturing companies will rate some selection criteria (such as software adaptability) differently from non-manufacturing companies.

3. MEDIUM-SIZED SA ORGANISATIONS

There is no universally accepted definition of a medium-sized company in South Africa. Statistics South Africa and Ntsika Enterprise Promotion Agency [13] - a government agency that forms part of the Department of Trade and Industry - categorise companies into five groups. The Small Business Act (Republic of South Africa, 1996) has provided an official definition of four size categories (micro, very small, small, and medium). This categorisation is not followed by the official state agencies: they either add new categories ("survivalist category") or ignore some ("very small category") without explanation. As there are no accurate and exact data available for the number of businesses that fall into each size category, the population size is estimated using the available information. Table 1 (below) shows the classification of company size by headcount according to Ntsika [13]. The classifications shown in Table 1 were applied in the analysis of Table 2 in order to arrive at an estimate of the number of companies that employ between 100 and 500 employees.

Average number of employees in South African firms by size class, 1995 and 1997

Average no. of employees	Surviva-list	Micro	Very small	Small	Medium	Large
In 1995	1	2	5	21	79	456
In 1997	1	2	6	21	80	525
Difference	0	0	1	0	1	69

Source: Adapted from Ntsika [13].
Note that combined data sources are used.

Table 1: Average number of employees in South African firms [13]

Applying the definitions outlined in Table 1 to the data summarized in Table 2 (especially those of Statistics SA and Ntsika), it is estimated that there are 65,000 businesses within South Africa that employ between 100 and 500 staff members.

Different indicators for the size of the SME sector						
Source	**Survivalist**	**Micro**	**Very small**	**Small**	**Medium**	**Large**
Ntsika 1999	184,400	466,100	180,000	58,900	11,322	6,017
Statistics SA, 2000 / Ntsika 2000	Informal: 1,138,854	330,271	94,804	***52,620***	***12,249***	1,628,797
Business Partners	2.3 million	600,000		35,000	n/a	2.9 million
Management Sciences Group Survey, 1999	Micro: 960,740; Informal: 862,580	Formal: 445,880 (of which 357,780 are private)				2.3 million
Eskom Survey, 1999	900,000+ in-home businesses; 3 million if one includes farmers				n/a	3 million
Global Entrepreneurship Monitor, SA 2001	Between 0.73 and 1.15 million	1,709,142				Between 2.44 and 2.86 million
Source: TIPS, 2002						

Table 2: Different indicators for the size of the SME sector (TIPS, 2002)

Owing to the nature of the study, the following sample framework identifies the sample size, with a minimum of 30 manufacturing and 30 non-manufacturing companies across a sample size of 80 respondents (Table 3).

Of the respondents included in the survey, almost 70% had already implemented an ERP solution, with 30% of the respondents interested in implementing a system within the next two years.

4. OVERVIEW OF SELECTION CRITERIA

A careful consideration of future developments in the ERP software market is critical for ERP selection purposes. In a rapidly evolving sector like the software sector, the key players in one phase of industry development may not go on to lead subsequent phases of industry growth and evolution [5,7]. ERP represents the fourth stage in the evolution of software that has been largely targeted at manufacturing enterprises [12]. While features for manufacturing enterprises are widely available and well developed, major investment in non-manufacturing features has only happened in recent years. Non-manufacturing features are largely scarce and underdeveloped when compared to manufacturing features.

		Gauteng	KZN	Eastern Cape	Western Cape	Total
Manufacturing		23	2	0	5	30
Non-manu-facturing	Retail	20	3	2	0	25
	Services	19	5	1	0	25
Total		62	10	3	5	**80**

Table 3: Sample framework

Various researchers have done work to identify ERP package selection criteria. The work of Hecht [8], Bernroider and Koch [4],Verville and Hallingten [22] is integrated and complemented by Baki and Cakar [2], who presented seventeen selection criteria for choosing an ERP package. From the various literature sources, and against the backdrop of the medium-sized South African company, the following criteria were identified as important.

a) Cost (affordability)

Several researchers have identified cost as a key consideration in enterprise application selection. Hecht [8], Abedanjo [1], Verville *et al* [22], Sahay *et al* [16], Siriginidi [18], Beheshti [3], Bernroider *et al* [4], Everdingen, Hillegersberg and Waarts [6], Sarkis and Sundarraj [17] are good examples. Cost is a consideration for all companies seeking to adopt ERP. When analysing cost, buyers need to look beyond the initial cost of acquisition, as "installation and on-going costs can reach seven to ten times the initial software cost" [8]. This means that the total cost consideration should include all the costs: initial acquisition, implementation, and ownership.

b) Technical criteria (infrastructure)

Technical issues largely refer to aspects of product design that are not of direct interest to end users. Sahay *et al* [16] point out that compatibility with existing hardware and software infrastructure is an important consideration in the purchase decision. Technical factors such as operating system independence (also known as platform neutrality) and international support (multiple languages, currencies, character sets, etc.) are highlighted by Bernroider *et al* [4] as well as Sarkis *et al* [17]. Sarkis *et al* [17] also add scalability and security to the list of technical considerations. The range of technical considerations will vary significantly from one organisation to another. Additional technical issues that might be considered include compliance with technical standards such as communication protocols, data

exchange, and storage standards. Siriginidi [18] highlights the importance of a technically upgradeable product that uses the latest technology.

c) Functionality

"Software features and their functionality are the most significant issue of all" [16]. The functionality of the software encapsulates the key elements of value that are being procured. Sprott *et al* [19] point out that in some application areas, such as finance and accounting, there are globally accepted practices that help to promote a degree of standardisation, while in other application areas, practices may differ between countries.

d) Service and support

Because of the breadth and complexity of issues that must be addressed in the implementation of ERP, it is important that the service provided by the ERP vendor during and after implementation is of a high quality. In a study by Bernroider *et al* [4], 100% of small- to medium-sized companies rated "good support" as being either very important (42.1%) or important (57.9%). Other researchers also hold the view that service and support is an important ERP selection criterion [8,16, 17].

e) Vision of the vendor

"It is desirable to purchase from suppliers who will maintain or improve their competitive position in terms of their products and services" [15]. Their vision includes the initiatives and investments that a vendor plans to pursue in the future. These are important to a buyer because they involve key decisions about product evolution, key technical issues, future pricing, efforts to influence the general ERP sector, and the availability of complementary factors such as support, training, and add-on modules. The Gartner Group considers vision important enough to make it a dimension of its 'Magic Quadrant' – a tool that is used for rating product vendors [11].

f) System reliability

"Faults in the system can occur due to disconnected lines, system crashes, or an inappropriate, unreliable or wrong response. Such faults not only decrease productivity but also diminish the confidence in the system" [17]. In some businesses, even a few minutes of downtime can cost millions of rands. With the increasing use of the Internet as an enabler of commerce, many online businesses cannot afford to lose system service or experience material degradation in service quality.

g) Compatibility with other systems

ERP solutions will often be integrated with other systems in order to satisfy the unique needs of an organisation. It is important that the selected ERP package can easily be integrated with existing and future software and hardware products [17,19].

h) Ease of customisation (flexibility)

Verville *et al* [23] observed reluctance on the part of clients to change to fit the system. It was the view of an IT director in one case that "…it is a lot harder to change a process than to change software, and users…want …to change the software" and not their process [23]. Bernroider *et al* [4] made similar observations, finding that 94.7% of small- to medium-sized companies rated adaptability and flexibility of software as either important (26.3%) or very important (68.4%). Other researchers have also highlighted customisation as a key factor in ERP procurement [2, 16, 17].

i) Market position of the vendor

"Selecting suppliers who will continue to be able to meet the firm's needs will minimize the costs of changing suppliers" [15]. In a study by Bernroider *et al* [4], 55.6% of small- to medium-sized enterprises rated the market position of vendors as being an important factor in ERP vendor selection. ERP implementations often take a long time to complete, and involve large investments of money and effort. The purchase of an ERP system is a long-term commitment, which means that the "ERP provider must be a long-term partner" [2]. This implies that the long-term viability of the vendor is an important selection criterion. The market position of the vendor is also an important factor because the 'road map' or vision of the vendor is a consideration in the purchase decision. Buyers must consider the capability of the vendor to continue delivering value-adding features over the long term. If the vendor does not hold a strong market position, their vision may be compromised by a number of factors such as takeovers, etc.

j) Compatibility with organisation structure (organisational fit)

ERP vendors provide mechanisms for customisation. These customisation features can be employed to make the ERP fit the organisation. ERP customisation has been observed to be a major contributor to ERP implementation costs. It is desirable to select the package that will most closely match the organisation's structure and processes.

k) Specialised industry knowledge

The software vendor must have knowledge of the industry in which the software is to be deployed [2,16,18]. This enhances the likelihood that ERP implementation will succeed, since industry-specific issues and problems can be accommodated within the solution – or, if not, the company can be made aware of the consequences of its inability to fit the solution.

l) Vendor references

"Because ERP requires a substantial amount of capital investment, the feasibility study involves a greater degree of effort than the typical capital investment analysis" [3]. External parties can assist in providing objective information about the performance of vendor products and services [2]. Objective, valid data about vendor products and services can be difficult to find [8]. Given this fact, it is important that

buyers do not rely exclusively on the information supplied by the ERP vendor. Some companies rely on consulting firms to assist in product selection. Piturro [14] warns that consultants are not always fully independent – a fact that can cloud their ability to provide objective input.

m) Fit with parent/allied organisation systems (corporate compliance)

Global enterprises and large groups of companies often have minimal technology standards and guidelines for technology acquisition. The benefits of pursuing corporate standardisation include improved negotiating power with key vendors, a greater ability to redeploy resources without retraining, and ease of collaboration across functions and divisions. Bernroider *et al* [4] found that 68.4% of small- to medium-sized companies did not consider guidelines from a controlling company to be important in the ERP purchase decision. This was in contrast to responses from large companies in the same study, in which 42% of large companies considered guidelines from a controlling company to be important (18.9%) to very important (24.2%).

n) Implementation time

The cost of ERP implementation includes the indirect cost that companies incur by allocating key staff to the ERP initiative. Resources are often taken away from normal business and assigned to the ERP project on a full time basis. This can result in significant interruptions to normal business operations. In a study conducted by Bernroider *et al* [4], 95% of small to medium-sized companies considered implementation time to be a key factor in ERP selection. Extended implementations also run the risk of losing key project personnel. Mustacello *et al* [12] reported instances of ERP implementations that had failed owing to the resignations of key project team members and leadership.

5. DATA ANALYSIS

Research data was collected by means of a questionnaire, focusing on collecting the appropriate attributes for ERP selection, with a number of filters applied to group respondents. The major measurement scales for the attributes were itemised Likert rating scales. Although these are technically considered to be ordinal in nature, they were assumed to be interval for the majority of analyses [10]. Owing to the fact that the data were not normally distributed (confirmed via a Kolmogorv-Smirnov Goodness-of-Fit Test), these scales were treated as ordinal and thus tested using nonparametric analysis. This type of testing was more appropriate (and accurate) than parametric testing for this type of data.

The Cronbach's Alpha Test was used to determine reliability of constructs. Moreover, the level of importance for each statement was obtained by multiplying the number of responses on each Likert value for each issue. Thereafter, the means and standard deviations were calculated. Based on the mean value, the most important reason regarding the use of derivatives was determined. In order to rank the nonparametric variables, a Kendall's W Test was used as a measure of the agreement of the rankings of variables across cases [20]. Manufacturing companies rated some assessment areas differently from non-manufacturing companies, and in

order to test this, a Mann Whitney U Test was conducted. The Mann-Whitney U test is the nonparametric equivalent of an independent samples t-test (the survey data is not distributed normally - using the Kolmogorov Smirnov Good-of-Fit Test), and compared the differences in the location of the two populations based on observations from the two independent samples.

Criteria	Total (n = 80)	Manufacturing (n = 30)	Non-manufacturing (n = 50)
Reliability	9.09	9.67	8.74
Service and support	8.71	9.37	8.32
Compatibility	8.61	9.13	8.30
Vision of vendor	8.53	8.90	8.30
Industry knowledge	8.46	8.77	8.28
Flexibility	8.31	8.97	7.92
Vendor references	8.30	8.57	8.14
Organisational fit	8.24	8.90	7.84
Functionality	8.24	8.80	7.90
Infrastructure	8.19	8.93	7.74
Implementation time	8.09	8.50	7.84
Market position of vendor	8.06	8.63	7.72
Affordability	7.99	8.13	7.90
Corporate compliance	7.66	7.70	7.64
AVERAGE	8.32	8.78	8.04

Table 4: Criteria mean scores

The survey instrument was subjected to a pilot test before it was distributed. This was conducted based on the recommendations of Leedy *et al* [9], who suggest using a brief pilot study to test the validity and reliability of the measurement instrument. The pilot was tested on a sample of 10 respondents in both the manufacturing and non-manufacturing sectors. The pilot respondents were asked to check for clarity of instructions and any ambiguities in the statements. Reliability of the constructs was tested both after the pilot was completed and at the end of the survey. The test of proposition one resulted in the Cronbach's Alpha Test result of 0.89, which indicates overall that the constructs (criteria) are valid criteria for evaluating ERP systems. After validation, the mean scores were completed and the average mean score for the total sample calculated as 8.32 (a 10-point scale was used to measure the importance of the criteria), concluding that the criteria are applicable for medium-sized South African companies wanting to select an ERP system (Table 4).

It was evident that reliability, service and support, and compatibility were consistent across all test groups, and not price, functionality, and service and support as originally predicted. Testing these results for proposition 2 by conducting the Kendall's W Test resulted in a value of 0.734, which indicates that a high agreement exists between the selected criteria. Supporting this, a chi-square value of 77.13 and an asymptotic significance level of less than 0.05 shows that there is a significantly high probability of this ordering occurring in the future.

To test proposition 3, the two groups of data - manufacturing and non-manufacturing - are combined and the data ranked. Using the Mann-Whitney U Test, the importance of differences between groups is tested.

Manufacturing vs. Non-manufacturing	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Affordability	666.5	1941.5	-0.853	0.394
Corporate compliance	696.5	1971.5	-0.540	0.589
Implementation time	562.5	1837.5	-1.909	0.056
Organisational fit	426.5	1701.5	-3.297	**0.001**
Reliability	499	1774	-2.783	**0.005**
Compatibility	502	1777	-2.555	**0.011**
Functionality	483	1758	-2.723	**0.006**
Infrastructure	470	1745	-2.852	**0.004**
Flexibility	432.5	1707.5	-3.272	**0.001**
Service and support	478	1753	-2.845	**0.004**
Vision of vendor	581	1856	-1.758	0.079
Market position of vendor	489.5	1764.5	-2.646	**0.008**
Industry knowledge	587	1862	-1.670	0.095
Vendor references	570.5	1845.5	-1.829	0.067

Table 5: Mann Whitney U Test significance

Although all fourteen factors were important to medium-sized businesses in South Africa, manufacturing and non-manufacturing businesses differed significantly on

the criteria of organisational fit, reliability, compatibility, functionality, infrastructure, flexibility, service and support, and the market position of vendor.

6. RESEARCH FINDINGS

The research findings confirmed that the original fourteen criteria were an adequate and important means of selecting an ERP system, supporting proposition 1. Reliability is rated highest by medium-sized companies. This could be an indicator of the strategic nature of ERP purchases: it is critical for the software to deliver the value that it promises, and reliability is a key factor in this equation. Unreliable systems not only "…decrease productivity, but also diminish … confidence in the system" [17]. With reliability being the leading ERP selection criterion, it makes logical sense that service and support was also rated high. This could also indicate that there is a strong correlation between the two selection criteria. Service and support is rated second out of a total of fourteen criteria. This is consistent with the findings and views of other researchers such as Bernroider *et al* [4], Sahay *et al* [16], Sarkis *et al* [17], and Hecht [8].

It is evident from the results that medium-size businesses rated service and support, reliability, and compatibility highest when selecting an ERP solution. This partially supports proposition 2. It is interesting to note that price (affordability) received one of the lowest mean ratings (7.99), appearing thirteenth out of fourteen ERP selection criteria. One reason for this could be the fact that other criteria closely related to price were rated high. Reliability was a key driver of cost of ownership; this criterion received the highest rating overall, and could be instrumental in leading customers to ERP solutions that have lower ownership costs. Compatibility was a driver of acquisition cost. High levels of compatibility with other software systems enable customers to engineer acquisition costs by selecting ERP modules from a range of different vendors. Compatibility also enables customers to select a mix of technologies that are compatible with internal skill sets. Another factor that might explain the reason for the low rating of affordability could be that, having observed the high rate of failed ERP projects, customers focus more on successful ERP adoption and less on inexpensive ERP adoption. It would be interesting to investigate whether customers are willing to pay a higher acquisition price if they perceive a greater chance of successful ERP adoption.

Further application of the Mann-Whitney U Test revealed that there were significant differences between the retail and non-retail sub-segments within the non-manufacturing segment, thus supporting proposition 3. For manufacturing companies the top half of the ERP selection criteria list was dominated by criteria that provide guidance on the likelihood of successful implementation. These were factors that focused largely on the current state of the solution, such as how reliable it was, the quality of support available, and the extent to which it could be customised. Out of the top seven ERP selection criteria, only one (vision of the vendor) was focused on the future state of the ERP solution. Non-manufacturing firms appeared to place a stronger emphasis on the future (rather than current) state of the ERP offering. Three out of the top seven ERP selection criteria were focused on matters that relate to future plans for the ERP solution, the extent to which the vendor understands customer's industry, and the extent to which they were able to prove this. The fact that both manufacturing and non-manufacturing firms applied the

same selection criteria for ERP selection suggests that they have a common scope of concerns. The fact that the ERP selection criteria were rated differently by manufacturing and non-manufacturing firms suggests that the two market segments emphasise different concerns when selecting ERP solutions. Manufacturing firms appeared to be predominantly concerned with ensuring successful ERP adoption, while non-manufacturing firms appeared to give equal weighting to ensuring a successful ERP adoption and enhancing that with a steady flow of value-adding features in the future. One reason for this difference between manufacturing and non-manufacturing firms could be the fact the ERP systems were initially developed for manufacturing firms, and were thus richer in manufacturing features than non-manufacturing features. This state of affairs could also suggest that medium-sized non-manufacturing companies that have recently adopted ERP were early adopters, while their manufacturing peers were part of the later majority of all manufacturing companies. If this were true, this could also mean that the recent growth in the middle market was actually the intersection of two distinct markets that were evolving in different ways – that is, the manufacturing market captures smaller companies as it matures, while the non-manufacturing market captures larger companies as it matures. The illusion of a single expanding middle market could simply be the effect of both markets passing through a phase where they were serving similar sized companies.

Given the low number of respondents who proposed new selection criteria, it was concluded that respondents largely felt that the current set of selection criteria would continue to remain relevant in the foreseeable future. This may also suggest that respondents were largely ignorant or unconcerned about developments that may impact future selection criteria. This could be further explained by the fact that 70% of respondents had already implemented their ERP.

7. CONCLUSION

In 2006 *The Economist* reported that SAP wants to expand its customer base from 35,000 to 100,000 customers by "moving downstream". The same article referred to the 19.5 billion USD that Oracle has spent in pursuit of the same objective. ERP vendors have traditionally served a relatively small number of clients who are willing to pay a higher price for highly specialised software products and services. As ERP vendors expand into the middle market, there will be a greater number of customers who are willing and able to pay lower prices. ERP vendors clearly hope to sustain growth by building volume, but this will also mean that the cost of delivery will have to be reduced significantly.

Manufacturing and non-manufacturing firms emphasise different priorities when applying the ERP selection criteria. Although all fourteen ERP selection criteria were important to medium-sized businesses in South Africa, manufacturing and non-manufacturing firms agreed exactly on the first three and differed in their rating of eight of the fourteen ERP selection criteria. It was clear that manufacturing and non-manufacturing companies emphasised different themes in the selection criteria. Non-manufacturing firms appeared to place a greater emphasis on the realisation of potential future gains from ERP investment. For these companies, the vision of the vendor, industry knowledge, and vendor references were the next three important selection criteria after reliability, support, and compatibility. On the other hand,

manufacturing firms appeared to emphasise the criteria that determined how ERP can be made to work in their specific situations. Flexibility, infrastructure considerations, and organisational fit were the next three important selection criteria after reliability, support, and compatibility. Non-manufacturing firms appeared to a hold the view that ERP still had a lot to offer them in the form of new features and capabilities, while manufacturing firms appeared to be more focused on accessing the gains that have been realised by their larger counterparts.

8. REFERENCES

[1] **Abedanjo, D.** 2003. Classifying and selection of e-CRM applications: An analysis-based proposal, *Management Decision*, 41(6), 570-577.

[2] **Baki, B. & Çakar, K.** 2005. Determining the ERP package-selecting criteria: The case of Turkish manufacturing companies, *Business Process Management Journal*, 11(1), 75-86.

[3] **Beheshti, H.M.** 2006. What managers should know about ERP/ERP II, *Management Research News*, 29(4), 184-193.

[4] **Bernroider, E.** & **Koch, S.** 2001. ERP selection process in midsize and large organisations, *Business Process Management Journal*, 7(3), 251-257.

[5] **Christensen, C. M., Anthony, D. S.** & **Roth, E. A.** 2004. *Seeing what's next - Using the theories of innovation to predict industry change*, Boston, MA: Harvard Business School Press.

[6] **Everdingen, Y. V.**, **Hillegersberg, J. V.** & **Waarts, E.** 2000. ERP adoption by European medium-size companies, *Communications of the ACM*, 43(4), 27-31.

[7] **Grove, A. S.** 1997. *Only the paranoid survive - How to exploit the crisis points that challenge every company and career*, London, England: Harper Collins.

[8] **Hecht, B.** 1997. Choose the right ERP software, *Datamation*, 43(3), 56-58.

[9] **Leedy, P. D.** & **Ormrod, J. E**. 2005. *Practical research planning and design*, 8th edition, Upper Saddle River, NJ: Merrill Prentice Hall.

[10] **Malhotra, K. N.** 1999. *Marketing research: An applied orientation*, Upper Saddle River, NJ: Merrill Prentice Hall.

[11] **Maynard, B.** & **Genovese, Y.** 2005. *Magic Quadrant for the ERP manufacturing midmarket*, Gartner Group.

[12] **Muscatello, J. R.**, **Small, H. M**. & **Chen, J. I.** 2003. Implementing enterprise resource planning (ERP) systems in small and midsize manufacturing firms, *International Journal of Operations and Production Management*, 23(8), 850-871.

[13] **Ntsika Enterprise Promotion Agency.** 1999. *State of small business in South Africa*, Pretoria: Policy and Research Division.

[14] **Piturro, M.** 1999. How midsize companies are buying ERP, *Journal of Accountancy*, 188(3), 41-48.

[15] **Porter, E.M.** 1980. *Competitive strategy: Techniques for analyzing industries and competitors*, New York, NY: Free Press.

[16] **Sahay, B. S.** & **Gupta, A. K.** 2003. Development of software selection criteria for supply chain solutions, *Industrial Management and Data Systems*, 103(2), 97-110.

[17] **Sarkis, J.** & **Sundarraj, R. P.** 2000. Factors for strategic evaluation of enterprise information technologies, *International Journal of Physical Distribution and Logistics Management*, 30(3/4), 196-220.

[18] **Siriginidi, S. R.** 2000. Enterprise resource planning in reengineering business, *Business Process Management*, 6(5), 376-391.

[19] **Sprott, D.** 2000. Componentizing the enterprise application packages, *Communications of the ACM*, 43(4), 63-69.

[20] **SPSS for Windows**. 2005. *Rel. 14.0.0.*, Chicago: SPSS Inc.

[21] **TIPS**. 2002. *The economics of SMMEs in South Africa*, Study by Berry, A., Von Blottnitz, M., Cassim, R., Kesper, A., Rajaratnam, B. & Van Seventer, D. E., available at www.tips.org.za.

[22] **Verville, J.** & **Bernadas, C.** 2005. So you're thinking about buying an ERP? Ten critical factors for successful acquisitions, *Journal of Enterprise Information Management*, 18(6), 665-677.

[23] **Verville, J.** & **Hallingten, A.** 2002. An investigation of the decision process for selecting ERP software: The case of ESC, *Management Decision*, 40(3), 206-216.

[24] **Wikipedia**. 2006. *Open-source software*, available at http://en.wikipedia.org/wiki/ open-source software.