Build or Buy: A Case Study for ERP System Selection in SMEs

Olga Gomez(✉), Patrick Wriedt, and Fan Zhao

College of Business, Florida Gulf Coast University, Fort Myers, USA
ogomez3492@eagle.fgcu.edu

Abstract. The purpose of this paper is to provide enterprises with valuable input when selecting ERP. This study resulted from a case study on an Air Conditioning Company in Florida, USA. Case study research technique evaluated the data collected from interviews, documents, and observations. The results show the importance of embedding every single factor in order to make a decision. The data analysis confirmed the ultimate decision that was reached by the company.

Keywords: ERP selection · SMEs · In-house ERP

1 Introduction

In today's globally competitive environment, a business will find it very problematic to operate without a structured and uniform information system. Currently, all the business companies are now armed with the ERP system in order to follow the environment change and business development (Zouine and Fenies 2014). Also enterprises need to be responsive and flexible, and will require the same from their information systems. Motiwalla and Thompson (2012) point out that these "integrated information systems are needed today to focus on customers, to process efficiency, and to help build teams that bring employees together that cross functional areas. ERP systems are the specific kind of enterprise systems to integrate data across and be comprehensive in supporting all the major functions of the organization". The goal of ERP system is to make data stream be both dynamic and instant, consequently increasing the usefulness and value of the data. Companies chose to implement ERP because they can reduce costs, increase workflow efficiency, respond rapidly to an always changing marketplace, and excerpt business intelligence from the data.

The theory behind implementing ERP system is to make every aspect of business organized and uniform and also to provide an integrated access to all areas of business. While some enterprises choose ERP solutions from vendors, others benefit from constructing an ERP system in-house. When business executives decide to obtain ERP integrated system, they are faced with evaluating possibilities to have an in-house applications or get it from the shelf of a vendor.

In this research paper we would like to find out key factors influencing the decision making process for the ERP solution selection in small and medium enterprises (SMEs). We want to study more toward the reasons whey a medium size company to

M. Kurosu (Ed.): HCI 2016, Part I, LNCS 9731, pp. 23–33, 2016.
DOI: 10.1007/978-3-319-39510-4_3

buy an ERP system or if they should develop their own system in-house. Each option has to provide a suite of software modules that cover all functional areas of a business (Finney and Corbett 2007). For this purpose, we do not only want to highlight all the advantages and disadvantages that already have been discovered by previous studies, but also analyze different opinions from different employees of a company and the reasoning behind their thoughts about buying a vendor-package or developing a new system in-house. Do they prefer to buy a standardized vendor-package even if it means to customize it in addition to their needs and to learn how the new system works? Or do they prefer to develop their own system in-house? This case study will give an overview of key issues that explain such decisions.

2 Literature Review

Nowadays ERP systems are more popular than ever and more specialized in all business areas. On the competition edge many companies try to elevate qualities of their products and services and get the focus of their customers' attentions (Moohebat et al. 2011). Among the most important attributes of ERP systems are their abilities to automate and integrate an organization's business processes, share common data and practices across the entire enterprise, and produce and access information in a real-time environment (Kamhawi 2007). They have developed enormously over time, so they got very complex and expensive. Based on the situation that almost every vendor-package has to be customized to the specific needs of a company - because the standardized vendor-packages does not suit to all needs - it even get more expensive to buy and implement an ERP system, as well as increase the time required (Harrell et al. 2001). Before beginning an ERP implementation, much planning and thought must go into the process (Gargeya and Brady 2005). In order to achieve this, enterprises should consult experts during the implementation process in order to deliver the above-mentioned benefits, and avoid system failure (Shatat 2015).

For this reason there are many companies that are thinking about if they should buy a vendor-package, lease, outsource, or develop their own system in-house (Harrell et al. 2001). Especially, for SMEs it is more complicated to afford the huge expense of buying an ERP system of a vendor.

The decision about if a company should implement an ERP system of a vendor or try to build one in-house could be one of the most important decisions an enterprise has to do because it determines which way a company will go in the future. As we know an ill-conceived decision could break your company up.

Both solutions have their advantages and disadvantages. Starting with an off-the-shelf ERP software, the two main points of buying are that it does not meet all the needs of a company's operations but on the other hand it seems to be faster and the prices are reasonable at the beginning (Harrell et al. 2001). Table 1 summarizes the advantages and disadvantages of both solutions.

Furthermore, buying a software indicates higher upfront costs and less control because companies are more dependent on external (vendor, consultant) support (Panorama Consulting Solutions 2013).

Table 1. Comparison of ERP solutions

System solution	Advantages	Disadvantages
Off-the-shelf ERP	- Based on a good software sophistication there are less complications/"bugs" - If the company's operations can be adjusted to the software then it is a good choice - Provided with long-term training and support from experts - Cost effective - It is continuously improving the software	- The use of customization is often necessary (is often inflexible and has the same functionalities as everyone else who buy the program) - It requires an increase of costs - The time of implementation increases if a customization of the software is necessary - It does not meet all the needs of a company's operations - It creates conflicts if other software are included - To execute an upgrade could be difficulty if your software is already customized
Built-on-house ERP	- Most customized to a company's business and tailored to individual operations - Full ownership of the system - Possibility of a bigger competitive advantage compared to a bought well-known software - Social benefits	- Requires programming skills in the company (hired or subcontracted) - Requires a lot of time to develop the system - Company is responsible for maintenance - Expensive (not only the development and implementation but also maintenance and IT-skilled personnel) - "Bugs" could appear - Hard to upgrade the system

The other alternative of building the software in-house could be the better solution if you want the most customized system which fits perfectly to your business. Also if you want to have most flexibility you should think about develop your own system.

To be sure which alternative should be chosen the managers/companies have to decide well-thought-out how to overcome all of these disadvantages and consider all advantages and disadvantages for both alternatives. For this purpose Harrell et al. (2001) created a few questions to find out if you should consider buying or building a software. Based on your individual situation you have to try to honestly answer those questions, so you are able to find out which alternative suits best to your company.

Olsen (2011) stated that if a small sized company wants to survive it has to be flexible, able to react quickly to market needs, and dynamic and therefore being in control of its own IT system (Olsen and Saetre (n.d.)). Buying an ERP software could be too expensive (customizing, updates, consultants, etc.) and the implementation could be challenging to the company. The company would be too dependent on the

vendor. If a small sized company wants to gain an advantage it has to be flexible and the IT system has to go along with the business of the company.

Olsen and Saetre (n.d.) said that one major effect of building the ERP system in-house is the specification part in which the company has to define functionality, terminology, and important processes. Although it needs a lot of time and be a very complex part of the whole system development, it will create many positive side effects so it should not be interpreted as an IT-cost. Another positive effect is that an in-house built ERP implicates social benefits. Employees could feel more comfortable with the system and they possibly can identify themselves with the own developed system of the company. Preferences of the users could be met much easier compared to those companies who buy an ERP package. If you buy a package then you have to adjust your business processes to the bought ERP system, on the other hand if you develop your own system in-house your system will be created based on the company's business processes. All requirements of the company and its users should be met with the use of an in-house ERP system.

In addition, Umble et al. (2002) mentioned that with the use of developing an in-house ERP system a company is able to find more and creative solutions concerning integration problems. All in all you will have more freedom in your solution creation.

Nevertheless, an in-house development is still viewed as expensive and it takes too much time. "The software costs must be included with all the other costs in the business case for the new processes" (Newing 2000). In addition, Ifinedo (2011) mentioned for having success in ERP systems it is very important to have in-house IT professionals and external expertise, otherwise it would even get more difficult to develop an in-house system without external help. Piturro (1999) stated that it is important to make sure having enough people who are able to complete the implementation. Avoiding personnel shortages is a criteria that has to be considered.

Furthermore, if an organization considers to buy an ERP system it often underestimates the costs by 40 % to 75 % (Piturro 1999). An off-the-shelf system rarely fits perfectly to the needs and requirements of the business of an organization, so they need to customize the program and get external help which will immensely increase the costs in an instant.

King (2005) said that most firms buy packaged software from vendors instead of develop their own system in-house because it is still too difficult to develop and additionally too expensive. Furthermore, another point which has to be considered in an in-house development is how stable and strong an IT department of a company is.

Companies entrust the knowledge and the development of an in-house system to its current employees (IT) but this could be a very risky business and situation if the employees would leave the company ("ERP buy versus build", 2002). In that case they would take the unique knowledge with them and in the end the company would have a problem with its system. Without the responsible persons who are in charge of the ERP system the company is not able to take care and handle this situation.

Rao (2000) tried to find out whether an organization should think about buying or building its ERP system in-house. He used a decision tree model that includes four different options:

1. Developing an own ERP package: This option needs many functional specialists who possess the right knowledge and skills to develop the ERP system in-house.
2. Enhancing the capabilities in the existing system: All the non-integrated computerized business functions has to be measured for integration. Also for this option you need specialized skills otherwise it will not be possible.
3. Buying a ready-made package: To use the vendor-package effective it often requires a specific customization to the needs and requirements of a company.
4. Engaging a software company: In this case it is the use of outside resources. There are some companies who already have developed a software for a client, which can also be used for others with or without any changes.

Daneshgar et al. (2011; 2013) analyzed in their study what kind of factors affect the decision of software acquisition method by large organizations and SMEs. The study was based on a survey of Thai SMEs as a general representative of today's SME. They found out that the following factors are more relevant for large companies than for SMEs:

1. Strategy and competitive advantage
2. Intellectual property
3. Risk (of negative outcome)

Factors that are relevant and important to SMEs and large organizations are:

1. Cost
2. Commoditization
3. flexibility/change
4. Time
5. Scale and complexity
6. Support structure
7. Requirements fit
8. In-house experts
9. Operational factors

And finally, factors that are especially relevant to SMEs (Daneshgar et al. 2013):

1. Availability of free download
2. Ubiquitous systems
3. It should be customizable to specific government or tax regulations

Socrates (2015) mentioned in a general study about decision-making criteria concerning make-or-buy issues that the two most significant criteria in such a situation are cost and quality. On the one hand organizations want to achieve cost savings and on the other hand gain operational advantages.

Overall it can be said that strategical factors are not as relevant as operational factors to SMEs and that in general there are some important factors that affect more the decision process depending on the size of the organization. Furthermore, Daneshgar et al. (2013) speculated in their study that compared to larger organizations SMEs do not chase long-term visions too much and competition seems not to be as intense for SMEs as it is for the larger organizations which are more integrated in a global

competition and not in a local market (but this statement was only based on their study which analyzed SMEs in the Asian region, so it cannot be used as a general statement).

Proper project planning is widely recognized as a critical success factor for a successful vendor packaged ERP implementation for medium-sized enterprises (Doom et al. 2010). This includes:

The project scope - the identification of the business processes affected by the ERP implementation, the choice of ERP modules and the identification of the changes to the standard ERP packages. It is essential that these choices are made correctly;

- The project plan with phasing and the critical path;
- The milestones and deadlines;
- The resources plan;
- Contingency measures.

Thus it is not surprising to see that having clear goals and objectives, user training and education as well as user involvement in evaluation and implementation were commonly considered by companies as key success factors (Beheshti et al. 2014).

However sometimes, ERP implementation creates a major challenge. It has become common to see a gap between results and the initial objectives (Olivier et al. 2009). The study by Wang et al. (2005) showed that costs average 178 % over budget and implementation periods 2.5 times longer than anticipate. It is a crucial factor in detecting the overall triumph of the ERP implementation, since if the allocated budget is exceeded there is a pressure to reduce the cost on downward phases like training, which are core for implementation project (Saini et al. 2013). “Project managers must grasp technical issues such as system development and process reengineering. But they must also master the human and organizational domains such as change management and end-user involvement.” (Olivier et al. 2009). If top management is not actively backing an ERP implementation, there is little hope for it (Akkermans and Helden 2002).

3 Case Study

In order to research questions thoroughly and extensively, case study research method was chosen. This research method allows to dig into true reasons why enterprises go one way or another. Woo (2007) points out that case studies are suitable to explore new areas and issues where little theory is available. The research was conducted on the premise of a middle-size company, which specializes in air conditioning repairs and installations. The research included numerous interviews with executive team using open-ended questions, and multiple observations.

Data for the research study was collected from an air conditioning company in Bonita Springs, Florida, USA. This type of service business was chosen to display how small and middle-sized companies nowadays truly depend on Internet services and software applications. SMEs have such characters as small-scale production, flexible operation, high rate of assets and liabilities, less competitive, etc. (Zhang and Li 2007). The study was conducted by interviewing IT Director of the company, Steven Smith, HR Director, Jennifer Colombo, CFO, Cathy Baker, and CEO, Louis Bruno. Also, the

data was collected from multiple observations by one of the researchers, Olga Gomez. She spend about two months diagnosing the need of bringing in the new ERP system to the company.

Bruno Air Conditioning company was founded in 2012 by a young entrepreneur Louis Bruno and grew substantially by 2015. Right now the company has 3 locations: Bonita Springs, Tampa, and Orlando, and by December of 2015, company's sales will exceed 27 million dollars with staff of over 130 individuals. IT director of the company was hired at the enterprise five months ago and recognized the need to have an ERP system for the growing business.

Bruno Air Conditioning Company has multiple departments that structure air conditioning business. From customer service department to accounting department, the enterprise uses at least three different systems to operate.

For instance, dispatch department, and customer service experience department use program AcoWin to efficiently record data and extract information when needed. Accounting department operates on Quickbooks program which is synced with AcoWin. Accountants pull numerous reports from AcoWin database to record profits, losses, sales, and expenses. For human resource management, ADP cloud software was chosen to register all the records of employees and account for their salaries. Sales and lead generation department uses Excel program to track information. Also, each subdivision of Bruno Air Conditioning uses Outlook program to communicate between each other. Platforms that company currently uses include Microsoft 7, which is installed on every work computer in the main office, and IOS platform for technicians who use tablets while they are out on the road or at the job site.

The main Customer Relationship Management (CRM) application, AcoWin was chosen by executive team in order to facilitate growing customer orders. The application was chosen because at that time it did provide the enterprise with aspects that were needed. The application uses FoxPro database, which is outdated for current management and cannot do upgrades. Each license per seat costs 1500 dollars, which makes AcoWin extremely expensive. In addition the license for AcoTruck system used by technicians is also costly.

When company brought AcoWin to become major CRM, a lot of expectations were not met. For example, it was not capable of doing much for the company with extreme growth. With the amount of data, that was pushed into it, and the amount of data that needed to be extracted, often AcoWin would spit out reports with errors, corrupted data, or simply freeze during the work process not allowing the users to finish the job timely. Diagram 1 shows where the process was slowing down and how complicated the structure of software is (red lines are examples of the "bottleneck" processes).

The decision to acquire ERP system was made by executive team in August 2015. CEO and CIO of the company tried to look for an ERP application that will suit their business the most, increase productivity by 30 %, and reduce costs.

The company was considering two opportunities: ERP system from vendor Oracle or build in-house ERP, that will be created with the help of outsourcing company ECOS. In addition, Bruno Air Conditioning was considering cloud-based ERP, however, fast enough refused that prospect, because of Internet Service Provider, Comcast. It was found that Comcast could not support the company on the high level because of

the connectivity problems and the geographical area. Also, the company's business is highly dependent on Internet use, thus, a loss of Internet connection can cause the company to fail.

Executive team debated between purchase of Oracle ERP and build-in house ERP for three months. The Chief Financial Officer of the company tried to convince the rest of executive team to go with Oracle. She recognized many advantages for the company if they were to buy from the popular vendor. For instance, all members of the executive team were familiar with the package. They used to work on Oracle platform while they were working at big corporations like Boeing, Hertz, and Gartner. Also, CFO stressed the importance of upgrading opportunities for the growing company. In addition, she pointed out that Oracle is a respected vendor, and will have a lower risk of failure. The disadvantages of buying Oracle were also taken into account. For instance, the company would get little to zero customization, high upgrade costs, and the asking price of three hundred thousand dollars was above company's budget.

The other option of building ERP in house was discussed much more thoroughly than buying from a vendor option. IT director, Steven Smith, was working on in-house ERP project for a long time. He considered working with outsourcing company ECOS from India to acquire the software. Four developers flew from India to meet with executive team for a discussion. The asking price for a project was sixty thousand dollars and project could go to alpha-test in about 6-8 months. The advantages of acquiring ECOS custom-built software seemed very substantial. The company uses DotNet platform and SQL database, which is very convenient for the enterprise. Also, the demos that were demonstrated in front of executive team impressed everybody. Other companies that were considered as candidates for partnership did not even have half of functionalities needed by Bruno Air Conditioning. In addition, the enterprise will own the software, which means that the company does not need to pay anybody for licensing.

In October of 2015, Bruno Air Conditioning reached the decision of building ERP in house. By next year, company projects to operate on a new ERP system, which allows for reduction of costs, user-friendly interface, and full capacity of customization. Projected ERP functionality is counted to be at 90 %.

4 Discussions and Conclusions

Analysis of data was completed through extensive interviews, collections of data, and numerous observations. No surprisingly, most of the key issues we found through our literature review were discussed and emphasized by the company, such as cost, implementation time, requirements fit, and so on. However, there are several interesting findings that we want to share in our case study.

First, even most of the key issues were mentioned during the interview, the company has a full list of all the key factors with different priorities. From the company's perspective, the most important factor they considered was functionality. This seems different with other SMEs who more focus on the cost as the first priority factor. As the IT director mentioned "the main reason we go with in-house system is because we can cover over 90 % of our required functions and features. Other companies that we were

looking at only had half of functionalities." Cost was the number 2 in their list. The number 3 factor they considered is customization. They prefer "more ability to change on demand." Next one in their list is the ownership of the ERP package. They enjoy to own the package with "no copyright agreements, no infringements, and no fees." The next factor they talked is time. "We only need 6–8 months to go alfa." This includes both development time and implementation time.

Second, as we mentioned previously, the IT director worked on in-house ERP project for a long time. We believe the technical background of the key decision maker may impact the decision significantly! In this case study, even CFO with Oracle background tried to convince everyone to go with Oracle, because of the technical background of IT director, who is the key decision maker, eventually, the final decision turned to be an in-house system.

Third, the most popular ERP solution for SMEs is cloud ERP. The company did considered this option, but they have a strong reason to not go with cloud: "We cannot completely rely on cloud, because Comcast shuts down quite often." Therefore, the Internet hardware will be another factor to be considered when a company makes the decisions.

Nowadays, numerous SMEs face a decision to acquire ERP system. As we found out many companies implement ERP system from a popular vendor, however, others try to go their own way by building customized application. This research shows that there are advantages and disadvantages of choosing one approach or another. In our research we found the following trend that buying ERP for the middle size company is more efficient. This research was done only on one company which limits its scope. However, there was enough literature research findings supporting our assumption. Nevertheless, more research has to be done to reach a more accepted solution on this topic.

This paper provides valuable insights towards understanding executives' decision when selecting ERP. Overall we can say that every company has to evaluate its current situation in connection with a rating of all advantages and disadvantages of buying or building an ERP system concerning the specific needs and requirements of the company's business. It is also important that if you want to build your ERP in-house you need to have at least internal expertise and personnel who are able to support your decision. If a company wants to gain most control out of its core IT functions then it has to develop its ERP system in-house because only with this option you are able to create the system you need most and that fits perfectly to your business. Based on our selected company - Bruno Air Conditioning - we can say that it would make sense for medium-sized companies to build an ERP system in-house. However, it has to be taken into account that each different type of business is not the same, thus each individual case has to be valuated with additional courtesy.

References

Adam, M.N.K.B.: The critical success factors of enterprise resource planning (ERP) implementation: Malaysian and American experiences. Multimedia University (Malaysia), ProQuest Dissertations Publishing (2010). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/860327924/1351944351414801PQ/2?accountid=10919 (accessed)

Akkermans, H., van Helden, K.: Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors. Eur. J. Inf. Syst. **11**(1), 35–46 (2002)

Clydebuild Business Solutions: Developing in-house vs. off the shelf (2012). http://www.clydebuiltsolutions.com/wp-content/uploads/2012/05/Inhouse-VS-Off-the-Shelf-May.pdf (accessed)

Daneshgar, F., et al.: An investigation of 'Build vs. Buy' decision for software acquisition in small to medium enterprises. Inf. Softw. Technol. **55**(10), 1741–1750 (2011)

Daneshgar, F., et al.: An investigation of 'Build vs. Buy' decision for software acquisition by small to medium enterprises. Inf. Softw. Technol. **55**(10) (2013) (revised)

Doom, C., Milis, K., Poelmans, S., Bloemen, E.: Critical success factors for ERP implementations in Belgian SMEs. J. Enterp. Inf. Manage. **23**(3) (2010). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/220041605/1351944351414801PQ/5?accountid=10919 (accessed)

ERP buy versus build: ComputerWire (2002). http://phamtrung.wikispaces.com/file/view/ERP+BUY+VERSUS+BUILD.pdf (accessed)

Finney, S., Corbett, M.: ERP implementation: a compilation and analysis of critical success factors. Bus. Process Manage. J. **13**(3) (2007). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/220322969/1351944351414801PQ/19?accountid=10919 (accessed)

Gargeya, V., Brady, C.: Success and failure factors of adopting SAP in ERP system implementation. Bus. Process Manage. J. **11**(5) (2005). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/220320780/1351944351414801PQ/10?accountid=10919 (accessed)

Harrell, H.W., et al.: Expanding ERP application software: buy, lease, outsource, or write your own? J. Corp. Account. Financ., 37–43 (2001). http://search.proquest.com/abicomplete/docview/201614513/7305FEE2CE434CB5PQ/2?accountid=10919 (accessed)

Ifinedo, P.: Examining the influences of external expertise and in-house computer/IT knowledge on ERP system success. J. Syst. Softw. (2011). http://www.sciencedirect.com/science/article/pii/S0164121211001208 (accessed)

Iivari, J.: Implementation of in-house developed vs application packaged based information systems (1990). http://www.researchgate.net/publication/233817667_Implementation_of_in-house_developed_vs_application_package_based_information_systems (accessed)

Kamhawi, E.M.: Critical factors for implementation success of ERP systems: an empirical investigation from Bahrain. Int. J. Enterp. Inf. Syst. **3**(2) (2007). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/222696806/1351944351414801PQ/6?accountid=10919 (accessed)

King, W.R.: Ensuring ERP implementation success. Inf. Syst. Manage., 83–84 (2005). http://search.proquest.com/abicomplete/docview/214132903/fulltext/C000F2C713E54573PQ/1?accountid=10919 (accessed)

Beheshti, H.M., Blaylock, B.K., Henderson, D.A., Lollar, J.G.: Selection and critical success factors in successful ERP implementation. Competitiveness Rev. **24**(4) (2014). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/1658481852/1351944351414801PQ/23?accountid=10919 (accessed)

Moohebat, M.R., Jazi, M.D., Asemi, A.: Evaluation of the ERP implementation at Esfahan steel company based on five critical success factors: a case study. Int. J. Bus. Manage. **6**(5) (2011). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/867071719/1351944351414801PQ/14?accountid=10919 (accessed)

Motiwalla, L.F., Thompson, J.: Enterprise Systems for Management. Pearson Education Inc., New Jersey (2012)

Newing, R.: Why the cash benefits are notoriously difficult to quantify: MEASURING RETURN ON INVESTMENT by Rod Newing: Industry in general has a dismal record in tracking return on investment - 80 % of companies cannot even compute the total cost of ownership for their ERP solutions: [Surveys edition]. Financial Times [London (UK)] 19 July 2000 (2000). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/248889899/EDB2B8972CE4EF2PQ/10?accountid=10919 (accessed)

Olsen, K.A.: In-house programming: an option for small and medium sized niche companies (2011). http://www.nik.no/2011/5-1-olsen11InHouseProgramming (accessed)

Olsen, K.A., Saetre, P. (n.d.): ERP for SMEs - is proprietary software an alternative? http://home.himolde.no/∼olsen/artikler/P81CompletePaper.pdf (accessed)

Panorama Consulting Solutions: ERP Systems: Build vs. buy (2013). http://panorama-consulting.com/erp-systems-build-vs-buy/ (accessed)

Piturro, M.: How midsize companies are buying ERP. J. Accountancy (1999). http://www.journalofaccountancy.com/issues/1999/sep/piturr.html (accessed)

Rao, S.S.: Enterprise resource planning: business needs and technologies. Ind. Manage. Data Syst., 81–88 (2000). http://search.proquest.com/abicomplete/docview/234920592/780D0E602EB0477DPQ/2?accountid=10919 (accessed)

Saini, S., Nigam, S., Misra, S.C.: Identifying success factors for implementation of ERP at Indian SMEs and large organizations and multinational organizations. J. Model. Manage. **8**(1) (2013). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/1315354996/1351944351414801PQ/20?accountid=10919 (accessed)

Shatat, A.S.: Critical success factors in enterprise resource planning (ERP) system implementation: an exploratory study in oman. Electron. J. Inf. Syst. Eval. **18**(1) (2015). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/1697718578/1351944351414801PQ/12?accountid=10919 (accessed)

Sokrates, J.M.: Decision-making criteria in tactical make-or-buy issues: an empirical analysis. EuroMed J. Bus. **10**(1), 2–20 (2015)

Umble, E.J., Haft, R.R., Umble, M.M.: Enterprise resource planning: implementation procedures and critical success factors. Eur. J. Oper. Res., 241–257 (2002). http://down.cenet.org.cn/upfile/94/200526163844188.pdf (accessed)

Wang, E., Chou, H.-W., Jiang, J.: The impacts of charismatic leadership style on team cohesiveness and overall performance during ERP implementation. Int. J. Proj. Manage. **23**(3), 173–180 (2005)

Woo, H.S.: Critical success factors for implementing ERP: the case of a Chinese electronics manufacturer. J. Manuf. Technol. Manage. **18**(4). (2007). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/208175880/1351944351414801PQ/8?accountid=10919 (accessed)

Zhang, Q., Li, Z.: Study on ERP-based cost control in SME. Manage. Eng. **1** (2007). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/1355856125/EDB2B8972CE4EF2PQ/1?accountid=10919 (accessed)

Zouine, A., Fenies, P.: The critical success factors of the ERP system project: a meta-analysis methodology. J. Appl. Bus. Res. **30**(5) (2014). http://search.proquest.com.ezproxy.fgcu.edu/abicomplete/docview/1655564764/1351944351414801PQ/3?accountid=10919 (accessed)