

ENTERPRISE RESOURCE PLANNING SOFTWARE SELECTION FOR
A SMALL COMPANY LOCATED IN MID-WESTERN WISCONSIN

by

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ABSTRACT

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With modern technology and the birth of Enterprise Resource Planning (ERP), the manufacturing industry is in much better shape than ever before. But with rapid changes in technology, organizations must be able to keep up with the changes in order to position themselves at the competitive edge. However, the process of implementing an ERP system is not easy. The process involves early planning prior to the implementation and it is also very costly. Many implementation projects have failed due to lack of prior planning, employee commitment, and choosing the wrong ERP system.

This study will analyze a list of the available ERP software and make recommendations on a final three ERP software options for a small manufacturing company located in Mid-Western Wisconsin to upgrade its ERP system.

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Chapter 1

Introduction

Certainly in today's world industrial technology has had a major impact on every organization. Whether it is a small or large organization, being competitive is the key to success. Before the 1990s, every department within an organization had its own storage of information, which could not be accessed by any other departments. The sharing of information was not a very common concept; one department may have had no idea as to what was going on in the other departments. Information was transferred from one department to another, which involved the risk of information being misplaced, lost, or incorrectly entered into another system. This created a very hectic situation for both the employees as well as the customers, especially in situations where the employees wanted to track down the customer's order.

With the rise of Enterprise Resource Planning (ERP) the loss of information as well as the sharing of information is no longer the issue. The ERP system enables employees to share information across the whole organization and also update the information as changes are being made. But since technologies are advancing so rapidly, it is very critical that every organization has the ability to adapt to changes in order to stay competitive.

Purpose of Research

The purpose of this research project is to make the final recommendation on the top three ERP software packages that will best meet the needs of a small manufacturing company located in Mid-Western Wisconsin. For confidential purposes the name of this company will not be stated in this project, but it will be referred to as Company ABC.

Background of The Problem

Company ABC is a small, independent, privately owned manufacturing company that has been passed down four generations. The company has successfully been in business for over 100 years. It is now a very well known company with a reputation for the highest standard of efficiency in its product manufacturing. The company has a total of 55 employees and carries two product lines, which are sold worldwide. Currently Company ABC operates its daily business activities using a system called Effective Management System (EMS). Company ABC uses the EMS system to help manage its inventory, particularly with the reorder point. In addition, the EMS system is also used for doing the Bill of Material (BOM) routing, shop floor control, costing, and accounting, such as accounts receivable and accounts payable. The company has been using this EMS system for approximately 10 years and is thinking about switching to a new ERP system that would help the company to operate more efficiently and effectively. Since there are two separate systems for both the Engineering department and the Information System department, the most important feature that Company ABC would like to see in a new ERP system is the ability to link the engineer's database to the Information System's database. More accurate costing, such as automatic updating versus manual updating of the customers' records is another feature that the company is looking for. Finally, a third feature is the product's capabilities for managing field services. Due to these highly critical features, Company ABC would like to have a new ERP system that include all three features as well as other functional capabilities that would lead to overall organizational improvement.

Research Question

How can we find the top three most updated ERP software packages that fall within a limited range of software cost for a specific number of users that would best meet the needs of company ABC?

Chapter 2

Literature Review

What is ERP?

ERP is the acronym for Enterprise Resource Planning. It is a new information system that was developed in the 1990s as a result of the various business decision support systems incorporated in to the Manufacturing Resource Planning (MRP II) system (Kapp, Latham & Ford-Latham, 2001, p. 22). Enterprise Resource Planning is defined as:

An enterprise-wide set of management tools that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision-making, and providing high degrees of cross-functional integration among sales, marketing, manufacturing, operations, logistics, purchasing, finance, new product development, and human resources, thereby enabling people to run their business with high levels of customer service and productivity, and simultaneously lower costs and inventories; and providing the foundation for effective e-commerce (Kremzar & Wallace, 2001, p. 5).

In similar fashion, Kapp, Latham & Ford-Latham (2001) defined ERP as “a system of integrated procedure, rules and algorithms designed to function consistently time and time again” (p. 85).

However, different people may interpret ERP differently, but the key point in an ERP system is integration. The purpose of ERP is to create a single computer system that can perform all of the functions of every department within an organization by linking all

of the departments into one single database. With the integration of a single database, it enables everyone within different functional areas to share the same information as well as communicate with one another. “What ERP really does is organize, codify, and standardize an enterprise’s business processes and data. The software transforms transactional data into useful information and collates the data so that it can be analyzed” (Norris, Hurley, Hartley, Dunleavy & Balls, 2000, p. 13). According to Jacobs & Whybark (2000), “the easiest way to think of ERP is as a big information system that everybody has access to” (p. 9).

To further explore the topic of ERP, it would be wise to look at the evolution of ERP. According to Kremzar & Wallace (2001), the evolution of ERP dates back to the 1960s, when the Material Requirements Planning (MRP) was first developed. The MRP covered what is called the universal manufacturing equation. The equation included the following four questions: a) What are we going to make? b) What does it take to make it? c) What do we have? d) What do we have to get? After the development of the MRP was the development of the Closed-Loop MRP. The Closed-Loop MRP was a series of functions supporting both planning and execution as well as providing tools for addressing priority and capacity. Manufacturing Resource Planning (MRP II) was the next development, which was an extension of the Closed-Loop MRP. The MRP II provided three new functions including Sales & Operations Planning, Financial Interface, and Simulation. Finally, Enterprise Resource Planning (ERP) emerged from MRP II, which out performs MRP II capabilities and much more (p. 6-10). The following Figure 1, was taken from the book called *ERP: Making It Happen* by Thomas F. Wallace and

Michael H. Kremzar. The figure shows the evolution of ERP with the latest evolution on the outer most circle and the earliest on the inner most circle.

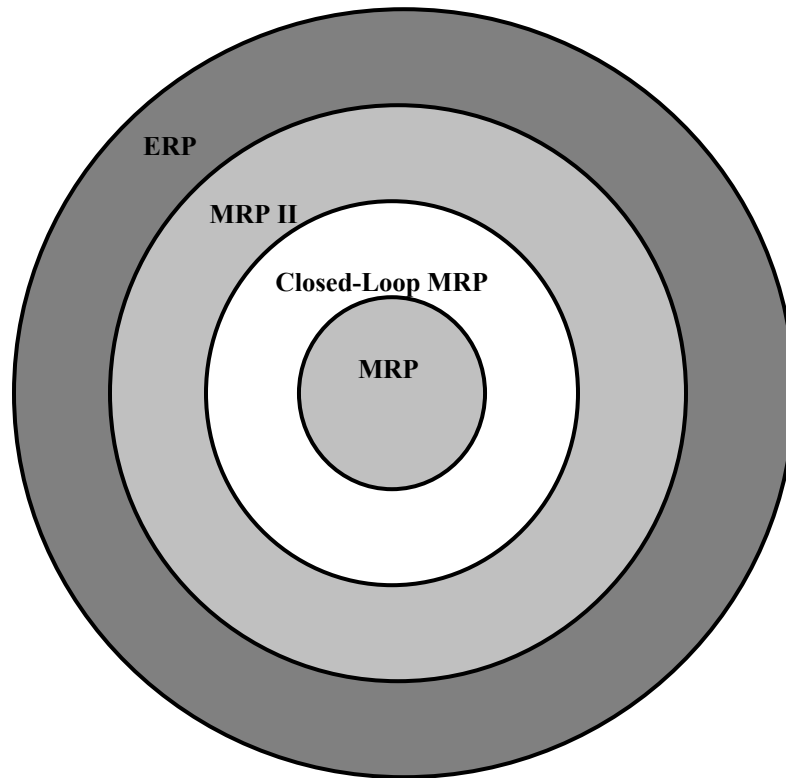


Figure 1. The evolution of ERP.

Although the terms MRP, MRP II and ERP are being used throughout most organizations, often people are confused and cannot distinguish the differences between the three. According to Boyle (2000), MRP is an inventory control and production planning system designed for ordering and scheduling dependent demand of inventory, which includes the following components: Master Schedule, Bill of Material and Inventory record file. MRP II is just an expansion of the MRP system with three new capabilities including financial analysis, feed back loops, and marketing plans. Finally, ERP is also an extension of MRP II with additional capabilities, such as better graphical user interface, the use of relational database, fourth language generation, open system portability, and is much more integrated than MRPII. In addition, Kapp, Latham & Ford-

Latham (2001), stated that the differences between ERP and MRP II is the inclusion of a variety of manufacturing processes within ERP, in which modern ERP software is able to handle both discrete work orders and flow orders, JIT and MRP, EDI, and hand-entered orders (p. 86). Wainwright (2002) also stated in his article *ASPs and ERP* that MRP was used for tracking suppliers, work-in progress and the output of finished goods, while ERP was used for all type of business with additional functions including financials, payroll and human resources management. Furthermore, Kremzar & Wallace (2001) also stated in their book *ERP: Making It Happen* that ERP is far better than MRP II for three reasons: a) ERP applies a single set of resource planning tools across the entire enterprise, b) ERP provides real-time integration of sales, operating, and financial data, and c) ERP connects resource planning approaches to the extended supply chain of customers and suppliers.

To better understand the concept of ERP, the system must be viewed from five different perspectives: (1) Data Management, (2) Software modules sharing the same database, (3) Manufacturing philosophy, (4) Business philosophy and (5) Knowledge management (Kapp, Latham & Ford-Latham, 2001, p. 14). The following, Figure 2, was taken out of the book called *Integrated Learning for ERP Success* by Kapp, Latham & Ford-Latham, which shows the ERP sophistication hierarchy of the five different perspectives of an ERP system. The figure shows a bottom-up approach with the least sophisticated view at the bottom and the most complex and strategically advantageous at the top.

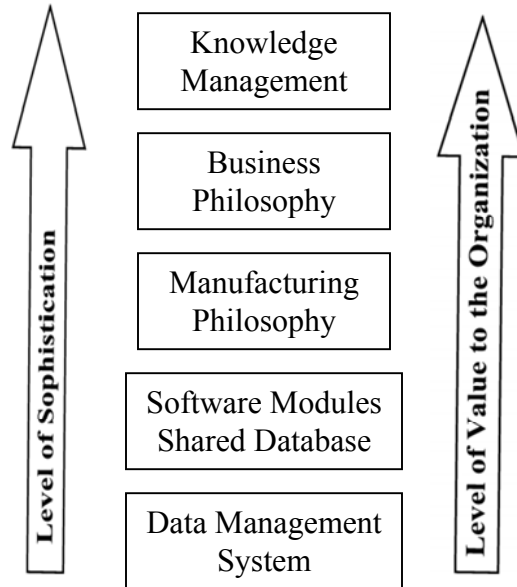


Figure 2. ERP Sophistication Hierarchy of the five perspectives of an ERP system.

In their book Kapp, Latham and Ford-Latham stated that to implement an ERP system successfully an organization must fully understand each of the five perspectives mentioned above. The three defined the first perspective of an ERP system as a large database that stores a large quantity of data. The second perspective of an ERP system was defined as a group of modules all connected onto a central database. The third perspective was to view ERP as a manufacturing philosophy rather than as a software program. The fourth perspective was to view the ERP system as a business philosophy communication tool. Finally, the fifth perspective of an ERP system was to view the information contained in an ERP system as knowledge that can be used by all employees (p. 14-16).

Another approach to understanding ERP suggested by Kapp, Latham & Ford-Latham is to understand each of the individual elements or modules that make up the

ERP system. The following is a list of different elements or modules that are contained in most of today's ERP systems (Kapp, Latham & Ford-Latham, 2001, p. 22-24).

- Business and Strategic Planning Module
- Resource Planning Module
- Executive Decision Support Module
- Sales and Operations Planning Module
- Forecasting Module
- Customer Relationship Management (CRM) Module
- Order Entry, Quoting, and Product Configurator Modules
- Master Production Schedule Module
- Rough Cut Capacity Planning Module
- Material Requirements Planning (MRP) Module
- Detailed Capacity Planning Module
- Production Activity Control (PAC) Module
- Manufacturing Execution System (MES) Module
- Issuing Material to Jobs Module
- Advanced Planning and Scheduling (APS) Module
- Finance Module
- Costing Modules
- Engineering Modules
- Human Resource Modules
- E-Commerce Modules

Reasons for Acquiring an ERP System

Prior to the year 2000, the most important reason for any organization to implement their ERP system would be to solve the Y2K problem. Due to limited space, early computer systems are programmed to store only the last two digits of the year. Early engineering failed to realize that the year 2000 will pose a threat, in which the last two digits of the year will become zeroes causing confusion and leading to system malfunction. Therefore, implementation must take place before the year 2000 to prevent system failure.

Five other reasons for acquiring an ERP system are: 1) to integrate financial information, 2) to integrate customer order information, 3) to standardize and speed up manufacturing processes, 4) to reduce inventory level, and 5) to standardize Human Resource information (Koch, 2002). According to Kremzar & Wallace (2001), operating the business in a rapidly changing and highly competitive environment is the primary purpose of implementing an ERP system. In addition, companies with the following characteristics had successfully implemented ERP or MRP II (p. 12-13).

- Make-to-stock
- Make-to-order
- Design-to-order
- Complex product
- Simple product
- Multiple plants
- Single plant
- Contract manufacturers

- Manufacturers with distribution networks
- Sell direct to end users
- Sell through distributors
- Business heavily regulated by the government
- Conventional manufacturing (fabrication and assembly)
- Process manufacturing
- Job shop
- Flow shop
- Fabrication only (no assembly)
- Assembly only (no fabrication)
- High-speed manufacturing
- Low-speed manufacturing

Although implementing an ERP system may be costly and time consuming, the benefits are worthwhile. With careful planning and selection of the right ERP system, a company may expect to gain significant benefits including dramatic increases in responsiveness, productivity, on-time shipments and sales, as well as decreases in lead times, purchase costs, quality problems, and inventories (Kremzar & Wallace, 2001, p. 15). According to Meta Group, the median annual saving for a fully implemented ERP system was \$1.6 million per year (Mello, 2002).

Reasons Why ERP Implementations Fail

Implementing a new ERP system does not always guarantee successful results. Very few ERP implementation projects will result in success the first time, while others will be total failures. According to Kapp, Latham & Ford-Latham (2001), “The real

reason ERP implementations fail is because employees resist the new ERP software rather than embrace it” (p. 187). Also, the success and failure of implementing a new ERP system does not depend on the quality of hardware and software of an ERP system, but rather in education and training (p. 3). “Success is achieved when organizations take the time to develop a training and education plan prior to beginning the ERP implementation” (Kapp, Latham & Ford-Latham, 2001, p. 8). Jacobs & Whybark (2000) stated that an organization must solve management problems and get the relationships between functions sorted out before it can implement the new system (p. 12).

Clearly the issue in dealing with a new ERP system is not solely technology, but planning and commitment. Often organizations overlook their planning when they decide to implement their ERP system. Without much thought on what the ERP system is supposed to do for the company and what the company wants to get out of the system, the implementation process is already underway. According to Kapp, Latham & Ford-Latham (2001), “many Enterprise Resource Planning (ERP) training plans are haphazard, ill conceived, and focused on the wrong topics” (p. 1). They also state that:

During the implementation process, training is treated like a poor second cousin. Training classes are isolated events not relevant to employee jobs. The training offered by the vendor fails to help employees understand the integrated nature of the ERP system. The focus is on technical training, not integration. Training for the system is too early, other times it’s too late. No one knows who attended which training class. Education sessions are missed because of more priorities. Employees do not understand their new roles and responsibilities. Most

organizations spend more time planning the company picnic than they do devising an ERP training plan. (p. 1-2)

Furthermore, Kapp, Latham & Ford-Latham said that a company spends most of its money investing in technology rather than training the employees (p. 3).

In addition to prior planning, change is probably the most frightening issue that an organization has to deal with. “Implementing ERP requires major changes to organizational, cultural, and business processes” (Norris, Hurley, Hartley, Dunleavy & Balls, 2000, p. 13). Kremzar & Wallace (2001) also state “Most companies implementing ERP must undergo massive behavior change to be successful.” They continue by saying that “Many things must be done differently, and this kind of transformation is never easy to achieve” (p. 25). Almost always people are unwilling to change the way they do business or perform their jobs, simply because they are afraid of change. Although change may greatly benefit the company and make life easier for the employees, still there are many people who prefer the old way of doing business rather than the new way. For most people, they are afraid that changes will bring more work and allow less time for completion. For others, they just don’t want to learn new ways of doing things once they are already used to doing it a particular way. According to Norris, Hurley, Hartley, Dunleavy & Balls (2000), “the key to change is the willingness of individuals throughout the enterprise to adopt not only new technology but new ways of working” (p. 13).

As already mentioned, implementing an ERP system is a process that is very costly. Besides the software cost, there are other hidden costs which most organizations fail to realize. These other hidden costs are: integration, data conversion, testing,

documentation, training, and consulting fees (Mello, 2002). According to Kapp, Latham & Ford-Latham (2001) the cost of implementing an ERP system range from three times to ten times the actual cost of the software (p. 3). The Meta Group did a survey of 63 different companies and found that the average total cost of ownership for an ERP system was \$15 million including software cost, staff time, consulting, and hardware cost (Mello, 2002).

ERP Future Outlook

For over a decade the ERP system has had major impact on the manufacturing industry. The ERP system has gone from serving the manufacturing companies to serving other industries, such as health care, financial services, aerospace industry, and the consumer goods sector (Mello, 2002). According to Boyle (2000), the ERP system continues to grow and is currently linked with the Web and E-commerce applications, as well as beginning to use web browsers as the graphical user interface. Furthermore, the future of ERP is being shaped by the following four trends: a) improving integration and flexibility, b) inclusion of e-business applications, c) wider range of customers, and d) adapting to the Internet (Mello, 2002). The idea behind integration and flexibility was to create an application that would easily interact with other applications of different vendors. In the past people didn't realize the importance of sharing information, but now information sharing has become great valuable to all organizations.

However, the task of integrating two or more applications of the same or different vendors is not easy. Often times organizations ended up having more than one system, simply because those systems would not integrate with one another. Therefore, ERP vendors are currently seeking ways to make integration a much easier process for the

users. In addition, the following e-business applications and modules are being added to the new ERP system (Mello, 2002).

- Sales Force Automation (SFA), which handles regular sales tasks and appointment scheduling.
- Customer Relationship Management (CRM), which collects and organizes customer data.
- E-procurement, which focuses on increasing the efficiency of purchasing operations.
- Supply Chain Management (SCM), which automates the planning, coordination, and refinement of a company's supply chain.
- Business intelligence, which provides assistance for decision-making.

According to Mello (2002), ERP is now targeting a broader range of users such as self-service users, mobile users and other companies.

Chapter 3

Research Methodologies

In gathering information for this research project, a team consisting of five people from company ABC was put together to participate in answering questions about their current needs within the company. Each person was chosen from a different department including the Production Manager, Senior Engineer, Sales Manager, Chief Executive Officer, and the Vice President. In addition, a consultant company called SoftSelect System was also used in this research to help generate a list of the qualifying software candidates. The cost of using SoftSelect System is approximately \$1,200. Other optional products and services are also available at additional costs. Appendix A shows other optional products and services provided by SoftSelect System.

Background Information on SoftSelect System, LLC

SoftSelect System is a consultant company that provides services to aid manufacturer and business in implementing their ERP system and other enterprise software. The services provided by SoftSelect System are through its real-time and unbiased software product data, whose database contains over 100 enterprise application packages and their capabilities. According to SoftSelect, its' data is validated by independent auditors. The company has provided services to over 1,500 software implementation projects worldwide. More information about SoftSelect System can be found on the website <http://www.softselect.com>.

Procedure

There are two phases in this project for determining the top three ERP software candidates that best meet the needs of company ABC. Phase 1 is to determine the top ten qualifying candidates, and Phase 2 is to narrow down the list to the top three candidates.

Phase 1: Determining the top ten qualifying candidates. Two sets of questions were distributed to the group of five people already mentioned above, who were put together by company ABC to assist with this research project. These two sets of questions were generated by the SoftSelect Requirements Builder, a computer program provided by SoftSelect System for data gathering purposes. The first set of questions is called the “Executive Questions”, which were generated based on general information provided about the size of company ABC, its annual sales, and the type of manufacturing. This first set of questions are preliminary questions consisting of 148 questions total. The executive questions are shown on Appendix B. The Chief Executive Officer, Vice President, and the Production Control Manager were the three people who contributed the data for this first set of questions. A meeting was set and each person was given a copy of the questions to go through whether the questions apply to company ABC. In addition, a weighted factor was given to each of the questions based on high, medium or low. A High means the question is highly applicable to the company and is a very critical function that the company must have. A Medium means that the question applies to the company but not as critical, the company sees it as having current or potential value. A Low means the function is not needed now, but it will be nice to have now or in the future. Each of the three persons who participated in the first set of questions was given a week to go through the questions, and then compare the results to verify that all three

answers agreed. Different answers to particular questions were clarified by discussion among all three people who had completed the questions.

Upon the completion of the executive questions, the second set of questions was generated based on the response to the executive questions. This second set of questions was called “Requirements Management”, consisting of 41 different modules with a total of 571 questions. This is a more detailed and specific set of questions relating to the activities going on within company ABC and its functional needs. Each of the modules includes questions relating to a particular function within company ABC. Appendix C is a listing of the 41 different modules and the number of questions in each module that are included in this requirements management set of questions.

The CEO, Vice President, Manufacturing Engineer Manager, Production Control Manager, and Sales Manager were all contributors to the second set of data. Each person was given a copy of a specific module that falls within that person’s functional area to go through and answer the questions on. Again, the questions were weighted on a High, Medium and Low basis. Since there were more questions in the requirements management set of questions, everyone was given two weeks to finish answering the questions. After the completion of the requirements management questions, the data was sent electronically to SoftSelect System to be analyzed and to request a report of the top ten ERP software candidates.

Within eight business days a report was sent back from SoftSelect System containing two different sets of top ten software candidates ranked in order from 1 to 10, with 1 being the highest ranked and 10 being the lowest ranked. Along with the two sets of top ten candidates were two other reports, one showing the medium requirements not

met by the vendor, the other showing the high critical requirements not met by the vendor. The candidates are selected based on company ABC's software feature requirements and the estimated software cost threshold for a specific number of users. The candidates are ranked based on the percent matches of the functional requirements of company ABC to the software capabilities listed in the SoftSelect software product database. Appendix D shows the top ten ERP products with a cost threshold between \$30K and \$60K (U.S.) and their percent match with each of the functional requirements of company ABC for 12 to 20 users. Appendix E shows the second set of ERP candidates with a cost threshold ranging from \$60K to \$125K (U.S.) and their percent match with each of the functional requirements of company ABC for the same number of users.

Phase 2: Narrowing down the choices to top three candidates. The process of narrowing down the list of twenty candidates to the top three went smoother than was expected. A meeting was set with the Production Control Manager to go through the report of the top twenty ERP software candidates and the two unmet requirements reports. The Unmet Critical and High Requirements report was the primary key in eliminating many of the candidates. About half of the candidates were eliminated quickly because the software did not support many of the high and critical functional requirements of company ABC. The remaining list of candidates was further reduced by analyzing the Unmet Medium Requirements report and the Product Functionality Detail Matrix, which shows a detailed of the capabilities of the packages to each functional requirement of company ABC. After narrowing down the list of candidates the second time there were four candidates remaining. Additional study on the financial condition of

the vendor, the quality of support, and scalability of the package were also conducted to further narrow down the choices from the list of four to the top three candidates. The final remaining three ERP software candidates are MANAGE 2000®, Imprimis™, and INFIMACS II.

Chapter 4

Results, Conclusion and Recommendation

The goal of using SoftSelect System in this project is to come up with a list of the top ten ERP software products that best matches the needs of company ABC, but instead the result from SoftSelect System provides two different sets of candidates. One of the two sets is based on the targeted software cost threshold specified by company ABC. The other set is provided free of charge based on software cost threshold above the targeted software cost threshold. Information on the overall percent matches of the capabilities of the software packages to the functional requirements of company ABC for a cost threshold below the predicted value was also provided, but it does not include the software names and the vendors. A copy of this report is available at additional cost. Since the overall percent matches for the category below the targeted software cost threshold is lower than the other two categories, company ABC decided not to pursue further study on this category. The following, Figure 3, is a comparison of the three groups of candidates based on software cost threshold and the percent matches of the product's capabilities to the requirements of company ABC.

Cost Threshold below		Predicted Cost Threshold		Cost Threshold Above	
Cost Range	%Match	Cost Range	%Match	Cost Range	%Match
\$15K-\$30K (U.S.)	83.2%	\$30K-\$60K (U.S.)	94.4%	\$60K-\$125K (U.S.)	97.8%
\$15K-\$30K (U.S.)	82.7%	\$30K-\$60K (U.S.)	92.4%	\$60K-\$125K (U.S.)	97.5%
<\$15K(U.S.)	79.4%	\$30K-\$60K (U.S.)	90.3%	\$60K-\$125K (U.S.)	97.3%
\$15K-\$30K (U.S.)	76.0%	\$30K-\$60K (U.S.)	90.2%	\$60K-\$125K (U.S.)	96.6%
\$15K-\$30K (U.S.)	74.1%	\$30K-\$60K (U.S.)	90.0%	\$60K-\$125K (U.S.)	95.8%
\$15K-\$30K (U.S.)	72.5%	\$30K-\$60K (U.S.)	80.6%	\$60K-\$125K (U.S.)	94.8%
\$15K-\$30K (U.S.)	70.1%	\$30K-\$60K (U.S.)	88.4%	\$30K-\$60K (U.S.)	94.4%
\$15K-\$30K (U.S.)	66.6%	\$30K-\$60K (U.S.)	87.3%	\$60K-\$125K (U.S.)	93.9%
\$15K-\$30K (U.S.)	64.6%	\$30K-\$60K (U.S.)	86.9%	\$60K-\$125K (U.S.)	93.7%
\$15K-\$30K (U.S.)	47.0%	\$30K-\$60K (U.S.)	86.2%	\$60K-\$125K (U.S.)	92.9%

Figure 3. Comparison of the three categories of ERP software candidates based on percent matches and software cost threshold.

Although there were two different sets of top ten software candidates, there were only 18 candidates total because two of the candidates appear on both sets. INFIMACS II and Best Enterprise Suite were the two software candidates that appeared on both set. Appendix F shows the 18 software candidates and the vendor information. Even though the candidates were ranked in order by the percent matches of their capability to the functional requirements of company ABC, it is not recommended that the number one ranked product is the best. After analyzing the report from SoftSelect System, it was found that a huge number of the products did not fit with company ABC, simply because they did not support the high and critical functional requirements, such as lack of Manufacturing Execution System (MES) functionality, Purchasing, Receiving and Order Entry functionality, and too many third party add on's. Upon further study of the list of candidates, one company was found unstable, and another no one in company ABC has any knowledge about it's product.

As a result of the findings, there was no one ERP software candidate that perfectly matches the needs of company ABC. The highest ranked ERP software candidate was Enterprise IQ with 97.8 percent matches the needs of company ABC. However, it was not included as one of the top three candidates because the software did not support the Field Service functionality and no one has any knowledge about the product. Therefore, the final recommendation of the top three ERP software packages are MANAGE 2000® with 97.5 percent matches the requirements of company ABC, Imprimis™ with 97.3 percent matches, and INFIMAC II with 94.4 percent matches. The three recommended software were chosen without regard to the financial condition of the vendors. A study on the financial condition of each of the last four remaining software

candidates was unsuccessful, due to information unavailable to the public. These are privately owned companies and therefore getting information about their financial condition was not easy. The last candidate to be eliminated from the list was Fourth Shift 7. It was eliminated mainly because too many of the functions needed within company ABC were done through third party, which would require more time and money to integrate the third party add on's.

Perhaps, a higher category of software cost threshold might provide a better-suited ERP software packages for company ABC. However, that is beyond the focus of this study, which is the price of the software must be reasonable enough for company ABC to acquire the product.

Chapter 5

Summary

As stated earlier, the problem of this study was to find the top three most updated ERP software packages that fall within a limited range of software cost for a specific number of users that would best meet the needs of company ABC. Within this study there were three limitations. First, the software candidates are limited to only those that were included in the SoftSelect System product database. Second, since company ABC is a small manufacturing company with annual sales ranging from \$4 million to \$10 million, the software cost threshold is limited to \$30K (U.S.) to \$125K (U.S.) with the specific targeted range in the \$30K (U.S.) to \$60K (U.S.). Third, the number of users is limited to 12–20 users. Upon the completion of this study, it was determined that no one particular ERP software candidate from within the list provided by SoftSelect System fit exactly 100 percent with the needs of company ABC. The best matching candidate was among those that were eliminated from the list. A high percentage match for a specific software product does not guarantee that the product include all of the high requirements of a company. The product may include all of the minor functions but leave out the major functions needed by a company. So the bottom line is that the highest percentage matches may not always be the best, and the lowest may not always be the worst.

In addition, the report generated by SoftSelect System indicates that the more a company is willing to pay for the software, the greater the chance a company will find a better match for its needs. So to get a better ERP software packages match for company ABC, the software cost threshold will need to be increased. However, as mentioned already, success does not come from the best hardware or software. It's the people and

their commitment that make the difference. In today's business world, individualism is a diminishing concept, and the group concept has becoming a part of everyday life. Now almost every project has to be done through groups, and very few are done by individuals. Therefore, a company may have the most advanced technology, but without interaction among the employees and their commitment, it may not be as successful in implementing an ERP system as compare to a company with moderate technology but with employee's commitment. With that in mind, it's not necessary that a company should get the most expensive software, but the software that will perform all the necessary functions within the company.

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Appendix A

Optional Products and Services Provided By

SoftSelect System, LLC.



Products and Services for US Consulting Firms

Effective through 3/31/02 or revision • Update at www.softselect.com • Prices in US dollars

<u>System Access Fees</u>	Please Read Important Note #1	Company/organization size <i>(in last fiscal year's revenues or operating budget)</i>			
		<\$20MM	\$20-\$60MM	\$60-\$150MM	\$150MM+
ERP Selection Access		\$ 1,000	\$ 2,000	\$ 4,000	\$ 8,000
All Other Access		\$ 500	\$ 1,000	\$ 2,000	\$ 4,000
Software/Training Package Access (for companies that self-execute all/portions of the process - see note #2)					\$12,000

<u>Optional Services</u>	
Phone support – software training/system technical support (See note #3)	\$ 100/hour
Phone support – job-specific (See note #4)	\$ 200/hour
Research on custom requirements (See note #5)	\$ 10/question/package
Custom filter report (See note #6)	\$ 175
Customized weighting report (See note #7)	\$ 175
Additional software package evaluated – in database (See note #8)	\$ 95 + \$35/ea. extra with combined order
Additional software package evaluated – not in database (See note #9)	\$ 675
Additional seats of the <i>Requirements Builder</i> software	\$ 1,500
Bound copy of report (includes domestic 2-day shipping)	\$ 25
4-day priority processing for <i>Software Selection Report</i> (normally 8 days)	\$ 200
4-day priority processing for post-evaluation custom criteria search and/or software package evaluation (normally 8 days)	\$ 50

Processing Time for Selection Report:

- Normal for standard and reissued reports and - 8 working days
- Priority for standard and reissued reports - 4 working days
- Normal for post-report custom search - 8 working days
- Priority for post-report custom search - 4 working days

**Quantity Discounts
Available: See Prepaid
Services Price List**

Notes

1. Refer to the *Pricing and Proposing Guide* for instructions on proposing software planning services using SoftSelect tools, methods, and research. The SoftSelect *Requirements Builder* software and related methodologies can be used for any type of business or organization in managing operational software projects, standard ERP, industry-specific ERP, CRM, document management, or any combination. There are three major areas of use of the SoftSelect system:
 - ***Software System Selection:*** This is our three-phase process to select software systems.
 - ***Implementation Planning:*** This process results in clarity on how the software to be implemented will support the business's processes. This information is used to adjust the business processes and the software proactively to fine-tune the implementation plan. It is designed to precede and then augment typical vendor implementation planning.

- **Ongoing System Improvement Management:** This service is conducted for firms or organizations seeking to improve existing systems and institute a system of continuous improvement management.

Most of the value for the client software project is in the SoftSelect methodology and utility of the software tools used to establish and manage requirement and issue detail. The *System Access Fees* increase for progressively larger end user firms, as there is a direct correlation with company size and the amount of SoftSelect services and tools consumed and/or the benefits realized.

All System Access Fees include the following from SoftSelect Systems:

1. Access to *SoftSelect* proprietary methodology and related support materials (use manuals, tutorials, etc.).
2. Access to *Requirements Builder* for the consultant firm and other SoftSelect software tools.
3. Access to the *Requirements Builder* for end users (up to 5 seats; additional seats \$1500/ea) and other software tools and methods for a single company requirements/issues profile for as many software *Package Types* as needed.
4. Data management: For example, *SoftSelect* can import requirement lists previously developed by the client.
5. Phone support for up to a few specific questions per call; extended support requirements are chargeable.
6. **Standard Requirements and Software Product Research:** For some software *Package Types*, the service includes built-in or standard requirements for consideration, and for a subset of these *Package Types* we also provide software product research (e.g., ERP). For *Package Types* on which we have research, the services also include:
 - For *Software System Selection*: Software product candidate lists (up to 10) based on the *SoftSelect*-predicted budget and seat count and, if needed, client-specific budget and/or seat count. The report is sent in a PDF (Adobe Acrobat) format.
 - For *Implementation Planning*: If the package being implemented is in the *SoftSelect* database, we can input our research to fill portions of the *System Audit* data fields for the client profile.
 - For *Ongoing System Improvement Management*: Software System Effectiveness Report. This shows the average capabilities of modern software and is useful in considering the value of further investment in existing systems.

Training Requirements: To improve project quality, at a minimum we require that the consultant who substantially leads the project participate in one full system use training course annually unless a software improvement project (substantially using our tools/methods) is completed within the last 6 months. Alternatively, the project lead may take refresher training by telephone (1 to 1.5 hours) for a specific job at a fee of \$150. It is recommended that other team consultants be fully trained in the use of our system.

Additional Costs:

1. *SoftSelect* products and services are presented and sold incrementally. Therefore, when SoftSelect tools and methods are used, an additional *System Access Fee* applies when moving from any of the three major ERP project phases to the next. Specifically: 1) Moving from ERP selection to implementation planning. 2) Implementation planning to ongoing improvement management. 3) Ongoing improvement management to an ERP selection job.
 2. The published access fees are for one end-user profile. A profile contains all data managed by the *Requirements Builder* for one company's software that is under management. If a division of a larger company needs to manage their own profile and needs location-specific implementation planning and/or improvement management, then individual *System Access Fees* are applicable for each business unit based on its size.
 3. If more than one year elapses between when original *SoftSelect* research was issued and further selection research is ordered, a fee of ½ the appropriate *ERP System Access Fee* is due. The basis for this fee is the SoftSelect system is adding new value.
 4. If an ERP improvement management job turns into a selection job, a full *ERP Selection Access* fee is due unless the transition occurs within one month of receiving the original job code. If it is done within a month, the access fee difference is due.
2. **Software/Training Package:** This package is offered to firms who have dedicated personnel resources available to manage and execute the software improvement project (typically \$100MM plus) and who are insistent on not needing support to establish the initial requirements/issues profile. This service package is a fall-back offering and enables consultants to accommodate this scenario vs. lose the opportunity completely. To encourage correct system usage and develop opportunities to sell other services this package is sold with training. The package includes the following from *SoftSelect*: 1) Up to five seats of the *Requirements Builder* software for unlimited end-user usage (selection, implementation, improvement management) for one company profile (additional seats at \$1,500 each). 2) Three admissions to a formal one-day system use training course. 3) Access to *SoftSelect* research for candidate software solutions for one major product type. 4) Quarterly progress review for the first

year by a *SoftSelect* quality auditor. To this package the consulting firm adds a minimum of two days of company-specific training and system setup and telephone support for system use tactics. See *Pricing and Pricing Guide* for details. This service package is for one company using a specific requirements/issues profile for managing unlimited software types (ERP, CRM, etc.). Other divisions or sister companies wanting to use this process and requiring an independent requirements/issues profile must pay an additional direct usage fee. Smaller divisions should consider using the normal consultant deployed option. If a firm wants direct use of the system after having used *SoftSelect* processes for a period of time, certain components of this package may not be necessary and the fee can be lowered. Contact us to discuss these situations.

3. General phone support: Support by a *SoftSelect* trainer for general use training on the system, methodology, and technical support (*\$30 minimum; billed in 5-min. increments*).
4. Job-specific phone support: Support by a *SoftSelect* expert on a specific job for system use and tactics (*\$30 minimum; billed in 5-min. increments*).
5. Custom Research: Research conducted by *SoftSelect* for client-specific requirements. This research is priced per requirement and per package. See the *Research Pricing* sheet for details.
6. Custom Research (up to 10 software packages): Software product lists based on further criteria filters if ordered within 12 months of the original report. If ordered after 12 months of the original report, $\frac{1}{2}$ the *ERP System Access Fee* is due and baseline research will also be delivered.
7. Custom Research: Software product ranking results based on consultant-driven weighting scores. If ordered after 12 months of the original report, $\frac{1}{2}$ the *ERP System Access Fee* is due and baseline research will also be delivered.
8. Custom Research: Research on specific packages in the *SoftSelect* standard software product database. If ordered after 12 months of the original report, $\frac{1}{2}$ the *ERP System Access Fee* is due and baseline research will also be delivered.
9. Custom Research: Research on specific packages not in the *SoftSelect* standard software product database. If ordered after 12 months of the original report, $\frac{1}{2}$ the *ERP System Access Fee* is due and baseline research will also be delivered.

Appendix B

Executive Questions

EXECUTIVE QUESTIONS

- 100 Does your business or organization consist of more than one company or division?
 - 110 Do any of these companies or divisions operate more than one plant?
 - 120 Are raw materials or semi-finished product transferred between these branch companies or divisions?
 - 130 Are customer orders for your product entered at a central location and then disbursed or transmitted to the company/plant responsible for their manufacture or shipment?
 - 140 Do your purchasing activities occur at one central location?
 - 150 Are any of these facilities in another country?
 - 154 Do your financial reports require reporting in both local and international currencies?
- 200 Does your company, or any of its divisions, operate more than one warehouse/distribution center where product or raw material is stored?
 - 210 Are customer orders for your product entered at a central location and then disbursed or transmitted to the warehouse responsible for their shipment?
 - 220 Do these warehouses provide you with forecasts of their demand?
 - 230 Is product shipped to or transferred between these locations?
 - 240 Do you require the ability to plan truck/delivery schedules for your product?
- 300 Do you sell products directly to businesses in the retail or wholesale industries?
- 400 Do you sell products to automotive manufacturers?
- 500 Do you sell products to the Department of Defense (DOD) or to customers in the aerospace and defense industry?
- 600 Do you sell any of your products via cash or credit card?
- 700 Do your products or the services you offer normally require the development of a cost estimate?
 - 720 Are any of the line items on the estimate a combination of a number of independently estimated items?
- 800 Do you prepare quotes for your customers?
- 1000 Do your customers tend to order the same set of products from you each time?
- 1100 Do you ship products to customers on consignment?
- 1200 Do you drop ship purchased material from vendors to your customers?
- 1300 During the order entry process, are special instructions entered on the order that may be required on the shop floor?
- 1400 Do you enter into contractual agreements for pricing purposes with your customers?
 - 1410 Do you bill your customers for progress payments?
- 1500 Do you have sales promotions where special pricing is offered?

- 1600 At the time of order entry, do you further discount the standard, quoted, contract or promotional price?
 - 1610 Are sales order discounts a function of the quantity a customer may order?
 - 1612 Does any line on your sales orders have a discount associated with it?
 - 1620 Are sales order discounts a function of the dollar amount ordered?
 - 1612 Does any line on your sales orders have a discount associated with it?
- 1700 Do you pay sales commission?
 - 1710 Do you split commissions between two or more salespersons?
- 1800 Do you export finished product or import raw materials or component parts?
 - 1820 Do you sell and/or invoice in foreign currencies?
 - 1830 Do you buy and/or pay for materials in foreign currencies?
 - 1840 Do you install your product in the field once it is sold?
 - 1850 Are your products warranted?
 - 1860 Do your customers return rejected product to you?
 - 1865 If you pay sales commissions, do you wish to have the commissions reversed when customers return product to you?
 - 1870 Do you service or repair your product after it has been sold?
- 1900 Are you now, or will you be, accepting customer orders and releases with EDI?
- 2000 Are you now or will you be transmitting purchase orders and change notices to your vendors with EDI?
- 2100 Do you purchase materials in one unit of measure and use or sell them in another?
- 2200 Do you purchase any materials based on historical usage or a predetermined reorder point?
- 2300 Do you solicit price quotations from vendors?
- 2400 Are any of your purchases of raw materials/component parts specific to a particular customer order?
- 2500 Do you purchase and resell products that are not normally stocked?
- 2600 Do any of the products you sell or purchase have a shelf life?
- 2700 In costing your product, do you assign an overhead rate to material?
- 2800 Do you allocate overhead on a direct labor basis?
- 2900 Do you assign an overhead rate to various machines/work centers?
- 3000 Are your products valued at actual cost?
- 3100 Are your products valued at standard cost?
- 3200 Do you require the software to provide support with General Accounting (i.e., Payables, Receivables and General Ledger)?
 - 3250 Do you charge your customers a finance charge for late payments?

- 3260 Do you return rejected materials to your vendors?
- 3270 Do you require the system to track the costs and/or depreciation associated with land, buildings and equipment?
- 3300 Do you track time and attendance information for your hourly employees?
- 3400 Do you track time and attendance information for your salaried personnel?
- 3500 Do you track your employees' skill level, job performance and other human resource-related factors?
- 3600 Do you require the ability to print payroll checks?
 - 3610 Do you need payroll to accommodate operating more than one company, division or plant?
 - 3620 Do you offer your employees a retirement program?
 - 3630 Do you offer your employees bonuses?
 - 3640 Are you a union shop?
 - 3650 Are your factory workers paid on a piece rate or incentive basis?
- 3700 Do you manufacture assemblies and/or package product for shipment to customers?
- 3800 Are you ISO or QS certified or will you seek certification?
- 3900 Do you manufacture pharmaceuticals, food, or medical products?
- 4000 Does the manufacture of your product involve mixing or blending chemicals, chemical compounds, basic raw materials or food products?
 - 4010 Is your manufacturing activity a continuous flow process?
- 4100 Do secondary products or by-products result from the manufacture of your primary product?
- 4200 Do you have a proprietary or a standard set of products that you manufacture on a repeat basis?
 - 4210 Do you require software tools that can assist you with the development of a sales forecast?
 - 4220 During the order entry process, is it common for you to substitute for items out of stock?
 - 4230 Do you schedule the production of your products in the same sequence each time?
- 4300 Do you develop and maintain part drawings and/or bills of material, formulas, or recipes?
 - 4310 Do you track as-designed versus as-built/shipped configurations of your product?
 - 4320 Do you wish to maintain revision level and/or date effectivity control of your shop routings/process sheets?
- 4400 On the average, do your finished products contain more than one raw material, component part, or sub-assembly?
 - 4410 Are common sub-assemblies shared by several products?
 - 4420 Does your product contain any large or costly components or sub-assemblies that are not required until late in the production process?
 - 4430 Does your product contain small C-level items that can be stocked at their point of use?
- 4500 Are your products a combination of a base unit with standard features and options that vary from order to order?

- 4510 For any one unit you sell, can the customer buy more than a quantity of one for a particular feature or option?
- 4520 During the order entry process, are you required to add dimensional information when a given feature or option is selected?
- 4530 Do certain features/options that you choose also require the entry of special lettering, labeling, etc?
- 4600 Is it necessary for you to know the length, width and/or height of your finished product?
- 4700 Is it necessary for you to know the weight of your finished product?
- 4800 Do your customers require that you maintain traceability of the finished item down to the raw materials or component parts that were used to produce it?
- 4900 Are serial numbers assigned to your finished products?
- 5000 Do your finished products have lot numbers assigned to them?
- 5100 Do your work orders/shop paperwork normally carry the name of the customer for whom the product is being manufactured?
- 5200 Do you ship product to customers via common carrier (Fed Ex/UPS)?
- 5300 Do you use or stock fractional quantities of raw material/components?
- 5400 Are you required to maintain Material Safety Data Sheets (MSDS)?
- 5500 Do you inspect incoming component parts/raw materials?
- 5600 Do you rework rejected purchased material received from vendors?
- 5700 Do you drop ship purchased material from vendor to vendor?
- 5800 Do you furnish any raw materials or semi-finished product to outside sources that perform operations on them?
- 5900 Do you have a stockroom that is used to store component parts used in the production process?
- 6000 Do you perform a physical inventory?
- 6100 Do you produce finished product only after a customer order has been received?
- 6200 Are any of your manufacturing processes organized into production lines or work cells?
- 4230 Do you schedule the production of your products in the same sequence each time?
- 6220 Do you have any production equipment that is grouped into departments or functional areas?
- 6300 Are any of your manufacturing processes organized along departmental lines or functional areas rather than production lines or work cells?
- 6310 Do you have any of your production areas organized into work cells or small assembly/production lines?
- 6400 Do you assign crews to various production lines, work centers, etc?

- 6500 Do you have shop personnel, other than direct labor, who are responsible for machine set-up or changeover?
- 6600 Do you use molds/dies to produce your product?
6610 Do these molds/dies produce more than one part?
- 6700 Do you wish to report labor and/or production output via data collection devices located on the shop floor?
- 6800 Is it necessary for you to track end-item yield/scrap during the production process?
- 6900 Do you wish to track raw material yield/scrap by operation?
- 7000 Does your production process utilize operations whose run times are fixed?
- 7100 Does your production process have any bottleneck operations?
- 7200 Do you need software to plan and schedule periodic/preventive maintenance activities for your production machines/equipment?
7210 Are your production machines/equipment scheduled to a level that prior planning and notice for maintenance is helpful?
- 7300 Does the production or assembly of your product require your operators to use drawings that have balloon/reference numbers for part placement?
- 7400 Do you stock gloves, rags, and other such supplies, in a central location for distribution to various departments?
- 7500 Can your firm's staff and sales and distribution functions benefit from sharing data electronically about customers, markets, products and services, competitors, etc?
- 7600 Does your firm require e-business, business-to-consumer (B2C) functionality?
- 7700 Does your firm require e-business, business to business (B2B) functionality?
- 7800 Does your firm require Web-based customer service?
- 7900 Does your firm benefit from real-time or comprehensive feedback from customers/distributors for product improvement?
- 8000 Does your firm require mobile sales tools for its sales force?
- 8100 Does your firm require functionality to conduct online auctions?
- 8200 Does your firm require its e-business site to personalize interaction with customers?
- 8300 Does your firm require e-business supply chain functionality?
- 8400 Does your firm require a field service management system?
- 8500 Does your firm require an external firm to host your application?
- 8600 Do you require automated manufacturing workflow functionality?
8610 Do you require automated workflow functionality to be customizable?

- 8800 Does periodic maintenance require spare parts that are similar to many machines or pieces of equipment?
- 8900 Do you require product data management (PDM) functionality?
- 9000 Do you require customer relationship management (CRM) functionality?
 - 9010 Do you require telesales functionality?
- 9100 Do you remanufacture products?
 - 9110 Do you need to track specific parts/assemblies that were replaced or refurbished on remanufactured items?
- 9200 Do you require manufacturing execution system (MES) functionality?
- 9300 Do you require warehouse management system (WMS) functionality?
- 9400 Have you or are you considering integrating lean manufacturing practices in your firm?

Appendix C

The Different Modules And Number of Questions

In Each Module Used In The

Requirements Management Set of Questions

Module	No. of Questions
Accounting – Management	1
Automated Workflow	4
Bar Code / Data Collection Techniques	1
Customer Relationship Management (CRM)	2
Customer Service	4
Electronic Business	16
Field Service	2
Fixed Assets	1
Manufacturing Execution System (MES)	1
Product Data Management (PDM)	1
Quality Control / ISO 9000 / SPC	7
Sales Force Automation	1
Warehouse Management	1
Accounts Payable	33
Accounts Receivable	24
Budgeting	3
Capacity Planning, Shop Scheduling & Reporting	36
Contract / Project Management	6
Distribution Planning	10
Estimating & Quoting	13
General Ledger	20
General Questions	9
Human Resources, Time & Attendance and Payroll	30
International Business	4
Inventory Management	21
Item / Part Master Data	32
Lot & Serial Number Control	5
Master Scheduling	28
Material Planning	22
Multi-Company / Multi-Plant	12
Order Entry / Pricing	45
Physical Inventory & Cycle Count	11
Preventative Maintenance	9
Product Configurator	12
Product Costing	25
Product Structure / Bills Of Material	29
Purchasing & Receiving	34
Remanufacturing	4
Sales Forecasting	23
Warranty Tracking/Service	3
Workcenters and Routings	26
Total	571

Appendix D

Top Ten ERP Software Candidates For
Company ABC With A Cost Threshold Between
\$30K and \$60K(U.S.)

Category	1	2	3	4	5	6	7	8	9	10
Accounting-Management	100.0%	100.0%	50.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Automated Workflow	50.0%	87.5%	75.0%	100.0%	50.0%	0.0%	0.0%	75.0%	100.0%	100.0%
Bar Code / Data Collection Techniques	100.0%	50.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Customer Relationship Management (CRM)	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Customer Service	0.0%	100.0%	100.0%	83.3%	100.0%	16.7%	100.0%	0.0%	100.0%	83.3%
Electronic Business	21.4%	85.7%	73.2%	89.3%	82.1%	14.3%	66.1%	14.3%	67.9%	46.4%
Field Service	0.0%	100.0%	100.0%	100.0%	100.0%	50.0%	0.0%	0.0%	100.0%	50.0%
Manufacturing Execution System (MES)	100.0%	50.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Product Data Management (PDM)	100.0%	100.0%	0.0%	50.0%	0.0%	50.0%	100.0%	0.0%	0.0%	100.0%
Quality Control / ISO 9000 / SPC	100.0%	50.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Sales Force Automation	0.0%	100.0%	100.0%	100.0%	100.0%	0.0%	50.0%	0.0%	100.0%	100.0%
Warehouse Management	100.0%	100.0%	25.0%	0.0%	100.0%	50.0%	50.0%	0.0%	0.0%	100.0%
Accounts Payable	98.1%	100.0%	94.4%	98.6%	95.3%	98.1%	92.5%	98.1%	98.6%	97.2%
Accounts Receivable / Debt Collection	96.2%	84.9%	93.4%	97.2%	98.1%	90.6%	99.1%	96.2%	98.1%	99.1%
Budgeting	100.0%	75.0%	100.0%	100.0%	50.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Capacity Planning, Shop Scheduling & Reporting	97.2%	90.4%	88.1%	94.5%	89.9%	76.4%	89.0%	100.0%	75.5%	78.9%
Estimating & Quoting	100.0%	28.1%	87.5%	100.0%	96.9%	100.0%	87.5%	21.9%	96.9%	34.4%
General Ledger	94.7%	100.0%	100.0%	100.0%	94.7%	100.0%	100.0%	100.0%	100.0%	100.0%
General Questions	100.0%	94.1%	88.2%	100.0%	100.0%	88.2%	88.2%	100.0%	100.0%	88.2%
Human Resources, Time & Attendance and Payroll	100.0%	91.7%	100.0%	87.5%	100.0%	95.8%	100.0%	66.7%	83.3%	50.0%
International Business	0.0%	100.0%	75.0%	75.0%	75.0%	37.5%	100.0%	100.0%	25.0%	100.0%
Inventory Management	100.0%	83.7%	100.0%	83.7%	100.0%	91.8%	91.8%	100.0%	95.9%	95.9%
Item / Part Master Data	100.0%	95.9%	100.0%	85.1%	83.5%	97.9%	95.9%	89.7%	79.9%	91.8%

Product Key:	1 INFIMACS II / Relevant Business Systems, Inc.	6 ICIM (Interactive Computer Integrated Mfg.) / Metasystems, Inc.
	2 ERP Plus / Powercerv Corporation	7 MAX-Dynamics / Kewill ERP, Inc.
	3 Best Enterprise Suite / Best Software, Inc.	8 WinMAGI / Manufacturing Action Group, Inc. (MAGI)
	4 Made2Manage / Made2Manage Systems, Inc.	9 MILLENIUM III / Rover Data Systems, Inc.
	5 VISUAL Manufacturing / Lilly Software Associates, Inc.	10 WinMan / TTW Incorporated

Category	1	2	3	4	5	6	7	8	9	10
Lot & Serial Number Control	100.0%	100.0%	75.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Master Scheduling	75.0%	91.7%	25.0%	84.2%	91.7%	63.3%	90.0%	85.0%	65.8%	95.8%
Material Planning	100.0%	100.0%	95.5%	100.0%	100.0%	100.0%	100.0%	100.0%	95.5%	90.9%
Order Entry / Pricing	96.8%	98.9%	95.7%	92.6%	88.3%	96.0%	85.6%	87.2%	95.5%	86.7%
Physical Inventory & Cycle Count	100.0%	100.0%	100.0%	85.4%	80.5%	100.0%	100.0%	98.8%	100.0%	100.0%
Preventative Maintenance	12.5%	6.3%	68.8%	62.5%	100.0%	75.0%	56.3%	6.3%	87.5%	81.3%
Product Configurator	100.0%	100.0%	100.0%	91.7%	100.0%	83.3%	100.0%	83.3%	66.7%	83.3%
Product Costing	100.0%	100.0%	94.7%	81.3%	100.0%	94.7%	84.0%	100.0%	94.7%	92.0%
Product Structure / Bills of Material	100.0%	97.6%	89.3%	82.1%	78.6%	97.0%	91.7%	85.7%	91.1%	90.5%
Purchasing & Receiving	99.5%	100.0%	88.2%	90.9%	88.7%	98.9%	82.5%	86.0%	95.7%	88.7%
Sales Forecasting	70.6%	82.4%	94.1%	94.1%	76.5%	73.5%	33.8%	73.5%	50.0%	69.1%
Warranty Tracking/Service	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	50.0%	0.0%	100.0%	100.0%
Workcenters and Routings	100.0%	93.1%	100.0%	84.6%	83.8%	70.8%	81.5%	100.0%	63.1%	61.5%
Overall Product Diagnostics (ratio of Yes/No):	94.4%	92.4%	90.3%	90.2%	90.0%	88.6%	88.4%	87.3%	86.9%	86.2%

Product Key:	1	INFIMACS II / Relevant Business Systems, Inc.	6	ICIM (Interactive Computer Integrated Mfg.) / Metasystems, Inc.
	2	ERP Plus / Powercerv Corporation	7	MAX-Dynamics / Kewill ERP, Inc.
	3	Best Enterprise Suite / Best Software, Inc.	8	WinMAGI / Manufacturing Action Group, Inc. (MAGI)
	4	Made2Manage / Made2Manage Systems, Inc.	9	MILLENNIUM III / Rover Data Systems, Inc.
	5	VISUAL Manufacturing / Lilly Software Associates, Inc.	10	WinMan / TTW Incorporated

Appendix E

Top Ten ERP Software Candidates For
Company ABC With A Cost Threshold Between
\$60K and \$125K(U.S.)

Category	1	2	3	4	5	6	7	8	9	10
Accounting-Management	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	50.0%
Automated Workflow	100.0%	100.0%	100.0%	100.0%	50.0%	50.0%	75.0%	100.0%	0.0%	75.0%
Bar Code / Data Collection Techniques	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Customer Relationship Management (CRM)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Customer Service	100.0%	83.3%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%	50.0%	100.0%
Electronic Business	92.9%	64.3%	60.7%	100.0%	21.4%	71.4%	64.3%	64.3%	64.3%	73.2%
Field Service	50.0%	50.0%	100.0%	100.0%	0.0%	100.0%	50.0%	50.0%	50.0%	100.0%
Manufacturing Execution System (MES)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Product Data Management (PDM)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	50.0%	50.0%	0.0%
Quality Control / ISO 9000 / SPC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Sales Force Automation	100.0%	100.0%	50.0%	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%
Warehouse Management	100.0%	100.0%	100.0%	100.0%	100.0%	50.0%	100.0%	50.0%	100.0%	25.0%
Accounts Payable	100.0%	94.4%	99.5%	99.1%	98.1%	97.7%	99.1%	100.0%	93.9%	94.4%
Accounts Receivable / Debt Collection	100.0%	96.2%	96.2%	94.3%	96.2%	92.5%	90.6%	97.2%	97.2%	93.4%
Budgeting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	75.0%	50.0%	100.0%	100.0%
Capacity Planning, Shop Scheduling & Reporting	100.0%	99.1%	100.0%	100.0%	97.2%	100.0%	99.1%	89.0%	93.6%	88.1%
Estimating & Quoting	100.0%	100.0%	100.0%	100.0%	100.0%	56.3%	96.9%	53.1%	31.3%	87.5%
General Ledger	100.0%	100.0%	100.0%	100.0%	94.7%	100.0%	92.1%	100.0%	100.0%	100.0%
General Questions	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	88.2%	100.0%	100.0%	88.2%
Human Resources, Time & Attendance and Payroll	100.0%	91.7%	58.3%	33.3%	100.0%	50.0%	100.0%	50.0%	100.0%	100.0%
International Business	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	75.0%	100.0%	50.0%	75.0%
Inventory Management	100.0%	95.9%	100.0%	100.0%	100.0%	100.0%	91.8%	99.0%	87.8%	100.0%
Item / Part Master Data	100.0%	100.0%	100.0%	100.0%	100.0%	97.9%	91.8%	100.0%	81.4%	100.0%

Product Key:	1 EnterpriseIQ / IQMS	6 ERP For Extended Systems / MAPICS Corporation
	2 MANAGE 2000® / ROI Systems, Inc.	7 Vantage / Epicor Software Corporation
	3 Imprimis™ / Tangible Vision, Inc.	8 Fourth Shift 7 / SoftBrands (formerly AremisSoft)
	4 Adonix X3 / Adonix Transcomm, Inc.	9 PRONTO / PRONTO Software Inc.
	5 INFIMACS II / Relevant Business Systems, Inc.	10 Best Enterprise Suite / Best Software, Inc. (formerly Sage)

Category	1	2	3	4	5	6	7	8	9	10
Lot & Serial Number Control	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	75.0%
Master Scheduling	98.3%	91.7%	100.0%	100.0%	75.0%	100.0%	83.3%	100.0%	85.0%	25.0%
Material Planning	97.7%	100.0%	100.0%	100.0%	100.0%	100.0%	95.5%	95.5%	97.7%	95.5%
Order Entry / Pricing	97.9%	97.9%	97.9%	98.9%	96.8%	99.5%	90.4%	100.0%	92.6%	95.7%
Physical Inventory & Cycle Count	100.0%	100.0%	100.0%	100.0%	100.0%	90.2%	100.0%	100.0%	100.0%	100.0%
Preventative Maintenance	93.8%	100.0%	100.0%	31.3%	12.5%	100.0%	75.0%	56.3%	100.0%	68.8%
Product Configurator	100.0%	100.0%	100.0%	83.3%	100.0%	83.3%	100.0%	100.0%	100.0%	100.0%
Product Costing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	94.7%
Product Structure / Bills of Material	86.9%	100.0%	100.0%	100.0%	100.0%	97.6%	97.6%	95.2%	98.8%	89.3%
Purchasing & Receiving	100.0%	98.9%	100.0%	97.0%	99.5%	88.2%	94.6%	100.0%	90.3%	88.2%
Sales Forecasting	88.2%	97.1%	85.3%	80.9%	70.6%	83.8%	47.1%	80.9%	95.6%	94.1%
Warranty Tracking/Service	50.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	75.0%	100.0%	100.0%
Workcenters and Routings	93.8%	100.0%	100.0%	100.0%	100.0%	96.9%	96.9%	93.8%	93.8%	100.0%
Overall Product Diagnostics (ratio of Yes/No):	97.8%	97.5%	97.3%	95.8%	94.4%	93.7%	92.9%	92.8%	91.2%	90.3%

Product Key:	1 EnterpriseIQ / IQMS	6 ERP For Extended Systems / MAPICS Corporation
	2 MANAGE 2000® / ROI Systems, Inc.	7 Vantage / Epicor Software Corporation
	3 Imprimis™ / Tangible Vision, Inc.	8 Fourth Shift 7 / SoftBrands (formerly AremisSoft)
	4 Adonix X3 / Adonix Transcomm, Inc.	9 PRONTO / PRONTO Software Inc.
	5 INFIMACS II / Relevant Business Systems, Inc.	10 Best Enterprise Suite / Best Software, Inc. (formerly Sage)

Appendix F

Alphabetical List of the 18 ERP Software Candidates and

Vendor Information

Vendor Name: Adonix Transcomm, Inc.
Address / Phone: 2200 Georgetown Drive
Sewickley, PA 15143
USA
724-933-1300
Web Site: www.adonix.com
Product Name: Adonix X3
Current Revision Level: 1.2.5
Date of Release: 6/1/2001

Vendor Name: Best Software, Inc. (formerly Sage)
Address / Phone: 56 Technology Drive
Irvine, CA 92618-2301
USA
800-854-3415
Web Site: www.bestsoftware.com
Product Name: Best Enterprise Suite
Current Revision Level: 6.0a
Date of Release: 12/17/2001

Vendor Name: Epicor Software Corporation
Address / Phone: 600 South Hwy 169
Suite 2000
Minneapolis, MN 55426
USA
800-449-6772
Web Site: www.emfg.epicor.com
Product Name: Vantage
Current Revision Level: 5.1
Date of Release: 9/15/2001

Vendor Name: IQMS
Address / Phone: 4250 Aerotech Ctr. Way
Suite A
Paso Robles, CA 93446
USA
805-227-1122
Web Site: www.iqms.com
Product Name: EnterpriseIQ
Current Revision Level: 4.0.2
Date of Release: 8/9/2001

Vendor Name: Kewill ERP, Inc.
 Address / Phone: 7701 York Ave S.
 Suite 350
 Minneapolis, MN 55435
 USA
 800-777-4334
 Web Site: www.kewill.com/jobboss
 Product Name: MAX-Dynamics
 Current Revision Level: 3.5
 Date of Release: 3/31/2000

Vendor Name: Lilly Software Associates, Inc.
 Address / Phone: 500 Lafayette Road
 Hampton, NH 03842-1804
 USA
 603-926-9696
 Web Site: www.lillysoftware.com
 Product Name: VISUAL Manufacturing
 Current Revision Level: 6.1
 Date of Release: 1/1/2000

Vendor Name: Made2Manage Systems, Inc.
 Address / Phone: 9002 Purdue Rd., Suite 200
 Indianapolis, IN 46268
 USA
 800-626-0220
 Web Site: www.made2manage.com
 Product Name: Made2Manage
 Current Revision Level: 5.0
 Date of Release: 4/1/2001

Vendor Name: Manufacturing Action Group, Inc. (MAGI)
 Address / Phone: 4695 44th Street, SE
 Suite B-130
 Grand Rapids, MI 49512
 USA
 616-956-5345
 Web Site: www.magimfg.com
 Product Name: WinMAGI
 Current Revision Level: 1.7
 Date of Release: 5/1/2001

Vendor Name: MAPICS, Inc.
 Address / Phone: Head Quarter in Alpharetta, Georgia
 USA
 678-319-8057
 Web Site: www.mapics.com
 Product Name: ERP For Extended Systems

Vendor Name: Metasystems, Inc.
 Address / Phone: 6 Corporation Center Drive
 Broadview Hts, OH 44147
 USA
 440-526-1454
 Web Site: www.metasystems.com
 Product Name: ICIM (Interactive Computer Integrated Mfg.)
 Current Revision Level: 6.2
 Date of Release: 8/1/2001

Vendor Name: Powercerv Corporation
 Address / Phone: 400 North Ashley Drive, Suite 2700
 Tampa, FL 33602
 USA
 813-226-2378
 Web Site: www.powercerv.com
 Product Name: ERP Plus
 Current Revision Level: 9.0.02-B47
 Date of Release: 4/15/2001

Vendor Name: PRONTO Software Inc.
 Address / Phone: 6500 Citywest Parkway
 Suite 310
 Eden Prairie, MN 55344
 USA
 952-942-5858
 Web Site: www.prontoerp.com
 Product Name: PRONTO
 Current Revision Level: 402.0
 Date of Release: 5/1/2001

Vendor Name: Relevant Business Systems, Inc.
 Address / Phone: Two Annabel Lane, Suite 215
 San Ramon, CA 94583
 USA
 800-473-5382
 Web Site: www.relevant.com
 Product Name: INFIMACS II
 Current Revision Level: 2.5
 Date of Release: 1/15/2001

Vendor Name: ROI Systems, Inc.
 Address / Phone: 435 Ford Road, Suite 700
 Minneapolis, MN 55425-4913
 USA
 800-544-7849
 Web Site: www.roisysinc.com
 Product Name: MANAGE 2000®
 Current Revision Level: 7.0
 Date of Release: 5/1/2001

Vendor Name: Rover Data Systems, Inc.
 Address / Phone: 1385 -C Warner Ave.
 Tustin, CA 92780
 USA
 714-258-8444
 Web Site: www.roverdata.com
 Product Name: MILLENIUM III

Vendor Name: SoftBrands (formally AremisSoft)
 Address / Phone: Two Meridian Crossings
 Minneapolis, MN 55423
 USA
 800-232-4563
 Web Site: www.fs.com
 Product Name: Fourth Shift 7
 Current Revision Level: 7.1
 Date of Release: 6/1/2001

Vendor Name: Tangible Vision, Inc.
 Address / Phone: P.O. Box 579
 Downers Grove, IL 60515
 USA
 630-969-7517
 Web Site: <http://home.xnet.com/~tvi-dial/>
 Product Name: Imprimis™
 Current Revision Level: 4.00
 Date of Release: 10/1/2001

Vendor Name: TTW Incorporated
 Address / Phone: 2138 Owls Cove Lane
 Reston, VA 20191-4303
 USA
 703-860-0004
 Web Site: www.winman.com
 Product Name: WinMan