PC-BASED MRP II SOFTWARE SELECTION FOR THE SMALL HI-TECH MANUFACTURING FIRM

by

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ABSTRACT

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PC-BASED MRP II SOFTWARE SELECTION FOR THE SMALL HI-TECH MANUFACTURING FIRM

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This research details those steps that are involved with choosing the appropriate MRP II software for a small hi-tech manufacturer located in the upper midwestern portion of Wisconsin. The literature reviews and defines the objectives of material requirements planning. It reveals why materials requirements planning is a key element of the strategic business plan. It states why small companies choose to hire a consultant to narrow down the selection of software available to a manageable field of potential software selections; and why the final selection should always be done by a team of users within the company.

The challenges associated with software selection in a small company are numerous, including overcoming internal fear of change and how to solicit the employees "buy-in." MRP II software is a considerable expense to any company. The transition of current policies and procedures, the implementation time, and the training are all

important elements of the cost and these elements are discussed in determining the appropriate software for a company.

A search for existing surveys and ratings on PC-based MRP II software packages was completed. These surveys and ratings were the instruments used to narrow down the preliminary software packages to seven. Suppliers of the seven packages were contacted and received a questionnaire regarding costs, implementation times, training and follow-up support. The response to these questions provided the information necessary to narrow down the field to five packages.

A “needs analysis” was done by creating a process chart of the manufacturing resource planning flow to indicate which departments should have representatives on the project team for software selection. The team members constructed a list of functions the software needs to perform and created a survey of qualitative questions using the quality tool training method called nominal group technique. The survey questions were asked of professionals within other organizations using the top software packages to help identify potential problem areas. These are negotiated in the request for quote phase of the project. This final step of the project results in the three software packages that the researcher will recommend.

The research benefits any small manufacturing company considering the purchase of MRP II software. It details why the selection is important, who should be involved, and what steps are necessary to do a good job. Choosing and implementing new MRP II software is a costly venture and a company needs to make the right decision. What a company does not know could cost them a great deal of money. This paper serves as a guide to the appropriate steps in MRP II software selection.

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Chapter I

Introduction

This research paper is entitled, "PC Based MRP II Software Selection for the Small Hi-Tech Manufacturing Firm." The paper represents an opportunity because it provides guidelines and benefits in establishing a methodology for MRP II software selection, which will lower the acquisition and implementation costs for a company. The scope of this paper is a small manufacturing firm in the upper midwestern part of Wisconsin. The company is a high technology manufacturer of electronic equipment with eighteen employees. Their annual sales are approximately 2.5 million dollars and their manufacturing planning processes have been created to facilitate an engineer-to-order and mixed mode environment. They do little master scheduling and materials are generally purchased to the order. This company will remain anonymous throughout this paper and is referred to as Company XYZ.

Purpose

The purpose of this study is to identify efficient, cost effective MRP II software for Company XYZ, a small high technology electronics manufacturing firm in midwestern Wisconsin. The final product will be a recommendation of three software packages and a list of users for networking and benchmarking purposes.

Scope of Research

MRP – An Element of the Strategic Business Plan

Material requirements planning is a process. MRP II (manufacturing resource planning) is a method for the effective planning of all resources of a manufacturing company. The software packages for MRP II include finances, sales, manufacturing

planning and control, including MRP, capacity planning, shop floor control, procurement, engineering, quality management, and cost accounting. Manufacturing resource planning is a direct outgrowth and extension of closed-loop MRP. The benefits of implementing the software and utilizing it effectively are numerous: reduced inventory investment, administrative costs, reduced scrap and improved customer relations.

Implementing a new MRP II software package is very expensive and time-consuming. Companies on average change their manufacturing software every seven to ten years. Twenty-five to fifty percent of new implementations end in failure and seventy-five percent of implementations are considered poor. To implement a MRP II system successfully, there must be commitment by all levels of management. Top management must be involved at the conceptual level. A project team and leader must be selected and a methodology for selection devised.

An Overview of PC based MRP II Software Selection

MRP II software programs when first developed needed the capacity of a mainframe and minicomputers to run, essentially eliminating the small companies from being able to afford the software tool. Since the 1980s, trends and storage capacity for PC applications have grown dramatically. Today, software for MRP implementations using the PC are full-fledged, powerful programs, which almost any small manufacturing company can afford. You can get MRP II software programs for the PC for as low as $695, but these will offer little support.

There are many challenges in MRP II software selection for the small company. Resource allocation is one of these. Small companies have found that hiring a consultant is one solution to solving this issue. The consultant has to work closely with the project

team identifying the critical business needs and incorporating details of the daily operation into the software analysis. A consultant can help you “think outside the box” and eliminate some of the shortcomings of the past.

The fear of change can be stronger and more difficult to overcome in small organizations. It is important for the consultant to convince the users of the new software that implementing the program successfully will enhance his or her job performance. Managers must budget for training. Studies have identified management support as one of the essential factors affecting system success.

It will be important to create an environment of respect with software suppliers. When suppliers look at small companies, they see a prospective sale that will range anywhere from $40,000 to $120,000. The market has never been greater for sales of MRP II software and suppliers choose who they want to have as their clients. If the small company appears unknowledgeable and inexperienced, this might be interpreted as a headache by the supplier, and they can choose not to work with the small company. For this reason alone, an experienced consultant can benefit the small company by helping them create methodical processes in the software selection process, that will minimize the time spent by both the software manufacturer and the manufacturing firm.

The Various Roles Involved with Software Selection

Many times software implementations have failed because of the lack of commitment by management and “users.” It is important that management show their support and that the “users” are very involved from the conception of the project through completion.

Management must set the scope, understand the objectives and stand behind the implementers. Management must subscribe to the scope of the project, but leave the key decisions to the people who will be implementing and using the software package.

Involving key employees in determining which features and functions are important is critical. When software falls short of expectations, the reason could be buy-in of the new system. When key people are not asked for their opinions they can feel resentment. Functional areas, processes and a study of the current information system is necessary. A project manager is elected. This person will be responsible for leading the project. The project manager must be respected for their leadership abilities because they will have to command respect from members of the users group and management. Everyone must know that implementation will take place and that support is critical to the success of the project. It will be important for the users to be involved in the demonstrations and on-site visits in the final round of selection.

Narrowing Down the Selection and Making a Final Choice

There are hundreds of MRP II software packages on the market today. What is the most effective way to come up with a short list of candidates? Directories and guides will help lead you to the appropriate systems. APICS publishes analysis reports on various MRP II software packages in their monthly magazine and on their website: www.apics.org.

Participating in benchmarking sessions with other small manufacturers can also be a great way to find out what others are using and how they maximize the effectiveness of their software. Finally, hiring a consultant to help guide the process may be your best

choice if human resources in the company are limited. If you choose a consultant, they should only guide you to the finalists.

The final selection of the software package is the responsibility of the project team. The first phase would be generating a RFQ. This document should be no longer than ten pages. The supplier will typically spend four to eight hours answering the documentation, so keep it precise and save time for all involved. The next phase will be a demonstration of the software for the selection team. Plan on at least at least four hours for this exercise.

Before negotiating the price of the software the project team should conduct a personal visit to other manufacturers using the software packages. If the need analysis and evaluation processes are followed, chances are good that the best software package will be acquired for the company.

Methodology

A review of the literature on the topic of MRP II software selection helps inform the reader why a process is necessary in software selection and reveals the logical steps to take. It also conveys who should be involved in the process, how to prepare and what to expect along the way. The literature review consisted of periodicals, books, and special editions of publications specifically related to the selection of MRP II software selection and expert opinions from consulting firms.

A questionnaire was prepared and sent to prospective suppliers asking them key points about their company's philosophies and guidelines. The questions were numbered and all software candidates received the same questionnaire. The questionnaire was

proofread by experts on MRP II software and revised accordingly. Responses were received and the field was narrowed down to five candidates.

The project team created a “punchlist” which was sent to the five software candidates and a demonstration of the software was conducted at each of their facilities. This process resulted in the elimination of one of the five candidates, because they were unwilling to reveal names of their clients for reference for a subsequent survey that would follow.

The project team at Company XYZ and the consultant created a list of important qualitative criteria, which in turn resulted in a survey form. This process was completed using a quality tool technique called nominal group technique using a variation of multiple voting to determine weight values for the criteria being measured. The survey answered sub-problems related to the opportunity through forced choice questions to desired qualifications in the area of customer service and support. Each participant was asked to grade questions. An example was “Please grade from A to F - User Friendliness.” The participants, who were employees of companies using the MRP II packages, worked in accounting, materials management and information systems and all had a minimum of five years using MRP II software packages. When the survey was completed the grades received a numerical value and a weight was assigned to each numerical as a result of the nominal group exercise. The category of “User Friendliness” was given a weight of .30. The grade values were added and averaged and then multiplied by the weight resulting in a numerical value for that category. All numerical values were added to establish a grade point for that software package. The researcher conducted the survey and was also the consultant for Company XYZ. Formulation,

polling and analyzing the survey took approximately 110 hours. The survey was pre-tested by two experts in the MRP II field. Both experts agreed that the survey was clear, ethical and free of any prejudice.

Reliability and Validity

There were approximately 15 respondents to the survey. Before the survey was given it passed a pretest that constituted a high degree of content validity. All questions asked in the survey were identical. All individuals involved in the survey had five or more years of experience using MRP II software packages. Face validity is established by the currency of the articles (all within the last two years).

Limitations

Because of time and money limitations all participants of the survey were references of the software companies being evaluated. The software manufacturers and their representatives are very guarded about giving out the name of their clients to protect them from spending too much time on good will efforts that benefit the software company. Because references were used, the responses could be skewed to a positive response, but the researcher feels confident that the respondents were speaking from experiences, honestly and without bias.

Protection of Human Subjects

All individuals and their respective companies participating in any survey or questionnaire for the purpose of this study are protected. No names are mentioned unless prior permission has been granted by that individual or company. The survey and questionnaire used in this study were reviewed by experts to prevent any prejudicial or unethical material.

Chapter II

Literature Review

Introduction

This research paper centers on the elements in relation to the recommendation of materials resource planning software for Company XYZ, a small high technology manufacturer located in the upper midwestern part of Wisconsin with sales of $2.5 million and 18 employees. Although the focus of this project is on the recommendation of MRP II software in relation to the processes and requirements of Company XYZ the findings and recommendations in this study can easily be used by other small companies with similar demographic characteristics.

Small manufacturing firms begin seriously thinking about budgeting for manufacturing software when the costs of keeping their accounting, inventory records, production schedule, and shipping records—usually kept on various spreadsheets—become time consuming and costly to manage. It is at this point that they start the process of looking for integrated business software. At first glance, the business periodicals may confuse them because they focus primarily on Enterprise Resource Planning (ERP) which is extremely costly for the small manufacturer. Large ERP software packages are priced by the quantity of modules purchased and can cost a business anywhere from $1 million - $180 million to implement (Dozbaba, 1998). Small manufacturing firms have neither the need nor the budget to justify this type of selection. When you compare Figure 2.1 – MRP II Model (Burt & Pinkerton, 1996) to Figure 2.2, an ERP Model, you have to question whether the extra cost of ERP software packages on the market are

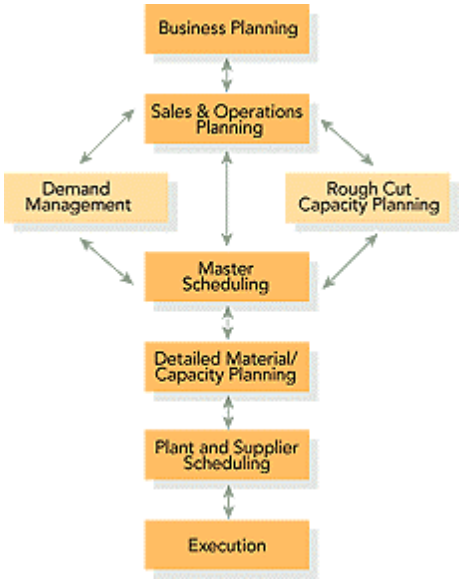

Figure 2.1 – MRP II Model

justified. In fact, many software companies are adding a human resource module and reclassifying their software programs as ERP software. The ERP revolution started in the 1990s and depicts the addition of asset/resource optimization and Y2K solutions. “While we knew we had outgrown our in-house system, we simply couldn't afford the big-ticket alternatives…” said Terry Clausen, Materials Manager of ICDA, a small US company with turnover under $5 million (Meikle, 1997, p. 14). Never fear, it does take a little more research, but there are several PC-based MRP software packages that will be more than adequate for the needs of the small manufacturing firm and can be implemented for $50,000 or less (Diamond, 1997).

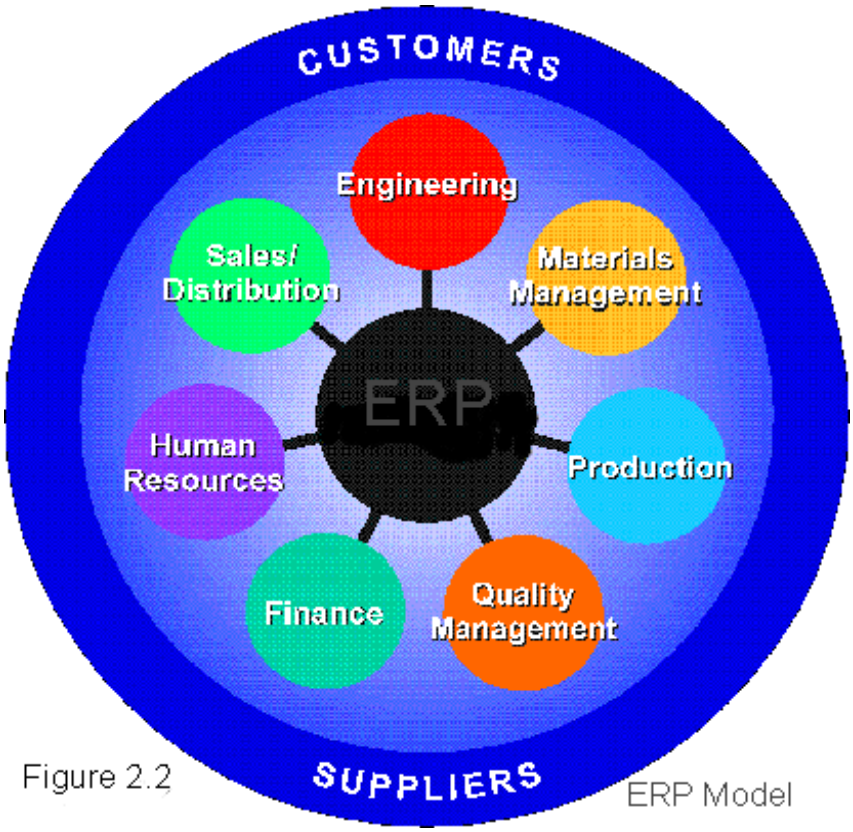

Figure 2.2 ERP Model

The goal of this research project is to find and recommend the best MRP II software package for Company XYZ. The topic areas of this chapter are listed below:

- Reviewing MRP II implementation as a key business strategy.
- Defining MRP and MRP II.
- The objectives of MRP.
- The results of successfully implementing a MRP II package.
- Why doing a thorough job in selecting your MRP II software is critical.
- PC-based MRP II software packages.
- Challenges of MRP II software selection for the small company.
- Where to look for the sources of supply when choosing MRP II software.

- A review of the sequential process necessary to be successful at software selection.

The Implementation of a Manufacturing Resource Planning System is an Element of the Strategic Business Plan

Although an MRP II system utilized in the proper manner has many benefits and rewards for a company, the implementation of a MRP II system can be very costly and time consuming. Therefore, the commitment to implement such a system must come from the very top of the organization. A formal scheduling system that really works becomes the cornerstone of the company game plan. There must be a new set of values and objectives (Wight, 1982). The chief executive officer (CEO) will have to establish line accountability for meeting stated objectives such as:

- Inventory records have to be 100% accurate.
- Bills of material must be a controlled document.
- The master schedule can not be a “wish list.”

Executive management also needs to understand the dynamics and importance of a MRP II system. Top management in some companies still believe in overstating the master schedule. This gives the same results as order launching and expediting. It causes parts shortages that are not reality and soon shortage lists are created to define the “real” shorts. The master schedule can no longer be a motivational tool, but must be operational information. After implementation, the CEO can still show commitment to the system by signing off on any master schedule changes. Top management understanding and commitment is so critical that Oliver Wight recommends that MRP implementation should not be considered until top management is educated (1982).

The Objectives of MRP Defined

MRP is a new name applied to an old established procedure. It is a program for production scheduling, inventory control, and the scheduling of purchase orders. MRP allows management to time efficiently the ordering and manufacturing of components and subassemblies that make up completed products of dependent demand (Burt & Pinkerton, 1996). The major objectives of MRP are:

- To ensure the availability of components and subassemblies for planned production to meet customer deliveries or build a stated amount of inventory.
- Minimize your inventory investment.
- Plan procurement and manufacturing activities.
- Reschedule procurement and manufacturing activities as required.

Three principal elements of MRP are:

- The production schedule is generated from the master schedule.
- An accurate bills of material file.
- The inventory status files: what is in stock, on order and allocated to production.

How MRP and MRP II Relate to Each Other

Material Requirements Planning is a process. MRP II is the computerized program that provides a comprehensive software package for manufacturing planning and control, including MRP, capacity planning, shop floor control, procurement, engineering, quality management, and cost accounting. The effectiveness of planning and control depends very little on the elegance of the computer program. Its ability to help the users

run their businesses well depends on *how well they use it, not on how well it has been designed technically* (Plossl, 1994).

The Definition of Class A, Class B, and Class C MRP II Users

During an APICS meeting, it would not be unusual to find members discussing whether their companies are Class A, B, or C users of their MRP II packages. Class A companies use their MRP II as a company game plan and can get along without a shortage list because they schedule well. Class B companies have a good closed loop MRP system, but don't really use it as a company game plan, and the Class C companies use it as an inventory control system. Even the Class C users can gain improved delivery performance from the use of their MRP II systems. A University of Minnesota survey done in 1979 included 326 companies using MRP II systems revealed that delivery performance improved from 64 to 81 percent (Wight, 1982). Today, companies are striving to reach on time delivery percentages in the high 90s with the ultimate goal being 100% on time delivery to customers or company stores.

The Benefits of MRP Applications

Without the MRP II software packages available businesses would not be able to manage the complexity of planning for and controlling many products and parts that interact with one another. Such complexity defies manual control procedures. MRP considers the time dimension in planning and the current and planned quantities of parts and products in inventories. MRP takes into account the dynamics of time and quantity for interrelated parts and products. With the significant reductions in the cost of high-speed computation we have gained in our computer hardware, MRP can now rapidly and inexpensively update order priorities weekly or daily as plans change and expectations

require. Rapid computation is required to explode component requirements from the master schedule while simultaneously referencing inventory records to check stock status and lead times to keep the plan sufficiently current (Burt & Pinkerton, 1996). The following benefits result from successful MRP applications:

- Reduced inventory investment. Inventories of purchased material and work in process will decrease by 10-30%.
- Reduced administrative effort. Scheduling, inventory control, and purchasing will become more efficient, leaving time for personnel to accomplish more productive tasks.
- Reduced manufacture of obsolete components. Through the use of product structure records that reflect planned engineering changes, manufacturers are able to schedule effectivity dates for changes. This ability will decrease scrap cost significantly.
- Improved customer relations. MRP can be used to determine delivery dates to customers before promises are made. If the promised delivery date goes off schedule and cannot be met, customers can be notified in a timely manner so they can revise their plans and minimize the inconvenience.

The companies that are choosing to utilize MRP II as an integrated management process are significantly improving their business performance and competitive positions. Some examples as stated in the article *MRP II in the Year 2000* are as follows (Correll & Goddard, 1994):

- Gallo Salame of San Lorenzo CA, cut the total cost of goods 10% and improved productivity more than 40%.
- Trendway Office Furniture of Holland MI, increased sales and market share by 20%.

- Brasscraft of Southfield MI, increased sales by 13%.
- ICI Pharmaceuticals Division of Australia, increased sales by 15% while reducing stock as a percent of sales by 38% and cutting cycle times by 50%. These improvements contributed to a savings of more than $2 million in working capital.

Doing a Thorough Job in Selecting Your MRP II Software is Critical

Implementing a new MRP II software package is a very expensive and time-consuming task. Companies on average change their software only every seven to ten years. Computer conversions that go astray can cost more to fix than the cost of the software. Failure rates are high. Twenty-five to fifty percent experience significant failure. Seventy-five percent of systems implemented are considered poor (Kuiper, 1996). Reasons for failure are:

- No organized methodology for implementation and users were not prepared for problems.
- Time lines were not kept.
- The project team became demotivated.
- Lack of commitment, training time and testing time.

To implement a MRP II system successfully, several prerequisites are essential:

- A commitment by *all* levels of management. Top management *must* be involved at the conceptual level and then step back to monitor and support. It is not advisable for top management to be involved at the "hands-on-level."
- You must define what type of manufacturing business you are: 1) make to order, 2) engineer to order, 3) make for stock, 4) mixed mode, or 5) batch or process.
- A project team needs to be selected and a project manager assigned.

- The project manager must be an insider, have authority to make decisions and stay cool under fire.
- Get a thorough evaluation of the software packages available. If you do not have the time or expertise, hire a consultant, but do not let the consultant make your final selection.
- There must be stable employment for those who will implement and use the system during its initial stages of operation.
- The availability of timely and accurate data such as bills of material, inventory records and stores counts.
- The active involvement of those who will use the system.
- Schedule stabilization (Burt & Pinkerton, 1996; Kuiper, 1996).

It is important to do vendor reference checks and visit users' sites before making a final selection. Ask users qualitative questions on reliability, responsiveness and the quality of their support services. It is important to remember that "What you don't know can cost you a fortune" (Kuiper, 1996).

An Overview of PC-Based MRP Software Selection

PC-Based MRP II Software

MRP/MRP II has traditionally been associated exclusively with mainframes and minicomputers. Since the mid-80s, trends indicate that PC applications for manufacturing continue to evolve. Options include those supporting the Window's platform and a host of other different network operating systems. Today, software for MRP implementations using the PC are full-fledged, powerful programs and many of these programs have the ability to grow with the company. With these new planning and scheduling tools,

manufacturers are able to reduce manufacturing cycle times, reduce costs across the enterprise, and increase inventory turns (Diamond, 1997).

Challenges in MRP II Software Selection for the Small Company

Resource allocation.

Small companies do not have the budget or sizable information systems (IS) departments that the large corporations have to assist them in searching for the correct software packages. Employees in the company are already multitasking and can not afford to take the time or effort to search for the appropriate MRP II software package. In some cases, they just buy an off-the-shelf software package and end up paying for conversion time when they realize the inconvenience and secondary systems necessary to use the software are inefficient and costly. Hiring a consultant is one solution to solving the resource issue; for this solution to be successful the relationship between the company and the consultant has to be a two-way street (Taylor, 1998). The consultant will have to develop a “needs assessment” profile. This analysis is accomplished with the “users” of the software within the company.

A careful study of your information systems reveals logical paths for the flow of data, which help to define your requirements within your company, as well as to outside consultants. An experienced consultant is the best person to define and document these structures. He should have a solid understanding of your company, and the ability to incorporate the details of your daily operation into the software analysis (Needle, 1999).

Choosing your MRP II software without expertise is dangerous unless you have enough systems expertise and current knowledge of the software package marketplace. Few companies have this knowledge. An outside consultant can help you “think outside

of the box" as part of the planning for a new information system. Without an outsider's view you may find that you do little more than saddle the operation with the shortcomings of the past (Kuiper, 1996).

Overcoming the fear of change and "buy-in."

It is a factor in all companies, but fear of change can be stronger and more difficult to overcome in small organizations (Taylor, 1998). Four elements will help eliminate the fear of change and "buy-in" from the employees. They are 1) the direct impact on improving a person's performance, 2) the perceived "ease of use," 3) adequate training, and 4) management support.

The degree to which a person believes that using a particular system will enhance his or her job performance has a direct impact on acceptance of a new software package. Along with this, the ease of use is an important determinant of system usage and may actually be a causal antecedent to perceived usefulness (Cavaye, Cragg, Igbaria, & Zinatelli, 1997).

Training also has a direct effect on perceived usefulness. It promotes greater understanding, favorable attitudes and more frequent use. It is important for managers to budget for thorough user training; especially in smaller companies without internal IS resources.

Studies have identified management support as one of the essential recurring factors affecting system success. In small firms, the CEO has a greater influence on a company's performance than does the CEO of a larger firm. The next two sections of this report will focus on defining the roles of management and "users" in the software selection process.

Creating an environment of respect with software suppliers.

When suppliers look at small companies, they see a prospective sale that will range anywhere from $40,000 to $120,000. Sometimes suppliers assume that they will be dealing with unknowledgable and inexperienced users, which means implementation headaches. Suppliers typically address small manufacturers by:

- Not responding to detailed functional request for proposals (RFP) or request for quotes (RFQ).
- Sending literature in lieu of the RFP response
- Not giving demonstrations unless they are included on the buyer's short list.

Being treated with the same respect as large manufacturers is the goal of small businesses, but the buyer must accomplish this by creating an environment that induces vendors (Software selection, 1999). Listed below are a couple of "must do's" if a software supplier is going to grant you the same respect as a large potential customer:

- Narrow down the list of prospects to three or less.
- Develop a detailed systems specification.
- Weigh the importance of specific requirements.
- Select two or three key issues and describe them in a one-page summary.
- Conduct phone interviews.
- After receiving and reviewing literature, send a concise questionnaire of no more than 100 questions.

The Various Roles Involved with Software Selection

Too many times software implementations have failed because of the lack of commitment by management or the "users." MRP II software implementation is not only time consuming, but extremely costly and the software will generally take the company through seven to ten years of growth. It is vitally important that management show their support and that the "users" are very involved from the conception of the project through completion.

Management's role in the selection process.

During the early years of the software selection process, the established credo was that implementation of large-scale integrated manufacturing systems should not be started without the direct, knowledgeable support and involvement of upper management. Unfortunately, this policy often did little more than squander the valuable time of top managers (Management's role, 1994).

Management must set the scope, understand the objectives and stand behind the implementers. Management sets the bounds and framework through its vision, direction and policies. Management defines the business environment that includes organization, structure, industry, policy, scope and function. It is there to answer pertinent questions about business practices. Management must subscribe to the scope of the project, but leave the key decision-making answers to the people who will be implementing and using the software package. Management must answer the big questions, chart the course and monitor the progress (Management's role, 1994).

The role of the “users.”

Involve key employees in determining which features and functions are needed. When software falls short in meeting client expectations, one of the most common reasons is lack of buy-in to the new system (Needle, 1999, p. 3). When key people are not asked for their opinions during the decision process, they may feel left out and resentful. It is important to get the “users” involved in the steering committee and the selection committee. Prioritizing your requirements is a two-step process where the steering committee first establishes overall importance by functional area (in a small company however they may be one in the same). The selection committee then develops the detailed “needs analysis” (Selection committee, 1994). A careful study of your information systems reveals logical paths for the flow of data that will help you define your requirements within your company, as well as to outside consultants. A project manager must be selected. This person will be responsible for making things happen among diverse factions, each with its own agenda. For example, the finance people will be more concerned with costing and control than with production and sales, where customer service is so concerned. The project manager must command respect from members of both committees and have a proven record of accomplishment as a manager (Navigating departmental issues, 1998).

It will be up to the users to specify what they want the software to do. They could come up with a list of up to 700 items. It will be important for them to define the “must haves” from the “like to haves.” Everyone must know there is no alternative to implementation, and they have to understand that if the software works for the requirements they specified, they will not be able to withdraw their support. It will be

important for the users to be involved in the selection process and participate in the demonstrations given by the last round of software suppliers. The users should also go on site visits to other users so they can get a look at the software system in action. The involvement of the "users" is paramount to a successful software implementation.

Narrowing Down the Selection to Three or Less Choices

In most cases, an initial search for software packages will turn up anywhere from a dozen to hundreds of candidates. You will need to examine the packages closely to determine which are actually capable of meeting your needs.

Identifying Software Packages for Consideration.

Directories and guides can help save time and will help you make sure you include the appropriate systems in your evaluation. Among the most frequent questions often asked of the APICS National Research Committee are: "What are the top 10 MRP software packages?" and "What software do the most successful companies use?" APICS can neither endorse nor recommend software products, nor consultants, but it does have a list of useful sources of information about MRP II (Johnson & Malucci, 1998). They are:

- MRP II Software/Vendor Directory found in the September 1997 issue of *APICS – The Performance Advantage*
- BDO Seidman's *Comprehensive Guide to Manufacturing Software* - $400.00
- *Buysmart* – Available from Expert Buying Systems (800) 832-6434
- CTS, *Guide to PC-Based Software for the Manufacturing Industry* – (800) 433-8015 - $895
- *InfoROM* – (317) 815-0401 - $125.00 for one publication or $195 for an annual subscription of two publications.

After the “needs analysis” has been done within the company and a short list of potential suppliers has been identified, it will be important to narrow the list down to three or less suppliers for a selection team to investigate.

Steps Toward the Final Selection

Request for Quotation

A request for quotation must describe your company to the supplier with enough detail that he understands the full picture, promote an understanding of the needed software capabilities as it relates to functional requirements and solicit bids. The request for quote should contain the following:

Statement of confidentiality.

A statement of confidentiality prevents the supplier from making the RFP and its data available to any other company.

Creating an introduction.

Describe your company, the industry it serves, and the scope of the planned systems. Describe only what the supplier needs to ensure he understands the framework you need to run your system. This should be only a couple pages in length.

Creating department/function overviews.

Department or function overviews should describe the groups that will be impacted by the new system and a brief description of any important problems the system will address. One paragraph for each will suffice.

Stating the reason for change.

A summary, usually no more than one page, of why your company is looking for new software should be included.

Stating the key issues.

These are the requirements that are a must. These should be completely described. Ask for a narrative response and expect to address these key issues in the demonstration phase.

Designating the field and file sizes.

Include these only if they are out of the ordinary. An example would be if your part numbers are 25 characters long. Most software companies are approximately 6-8 characters in length.

Stating decision criteria and exhibiting a milestone chart.

Include the criteria that will be used to make the selection and a milestone chart so they understand your time line for implementation.

Stating the terms and conditions.

Include your boiler plate terms and conditions.

Your RFP should be no longer than 10 pages in length. The supplier will typically spend four to eight hours answering the documentation, so make it something that can effectively be dealt with in that timeframe. Keep it concise and focused and you will save time for all involved in the selection process (RFP-why, 1997).

Supplier Software Demonstration

Before a decision is made it will be important for you to have the supplier do a demo presentation for the selection team. This will last approximately half a day so plan appropriately. You should have a “punchlist” of systems functions that you want the supplier to demonstrate with the software. The supplier must not take control of the demo. This is your show and you must orchestrate it. Do not let the supplier come in and

dazzle you with his software. Keep the demonstration to the list of key issues. The agenda is also your demonstration scorecard, listing the capabilities stated by the supplier. Do not be afraid to ask questions throughout the demonstration.

Throughout the process of selection, you must remember you are making a major decision for the company. If you get it wrong, your company will not realize the benefits for which it has spent significant money and resources (Software demonstrations, 1997).

Visits to Other Manufacturers Using the Software Packages

With a list of your finalists in hand, schedule a personal visit to manufacturers who are using the software packages. It will be important to talk to the hands-on users, not MIS managers. Have them walk you through a typical day using the planning and execution systems. At this point, you should get honest answers. Following are vital questions to ask during your interviews of the users of the software:

- What changes have they made to the original package?
- How have they customized?
- Who owns the customized package in terms of support?

Suppliers typically support only their own packages – not those that have been customized. Supporting custom reports is usually an extra charge by the supplier whenever an upgrade is issued (Johnson & Malucci, 1998).

Ranking the Suppliers

It will be a good idea to come up with a method to rank your software suppliers. This will be a combination of objective scoring (hard facts) and subjective impressions (soft issues). The objective scores, at the detailed requirements level, measure how well

each supplier's software will meet your needs. The subjective issues concern opinions and feelings such as: user friendliness and best support (Ranking the vendors, 1994).

Making the Final Selection

The final step will be selecting the best choice of MRP II software for your company. Before all the *i's* are dotted and the *t's* are crossed, it is important to make a visit to the software supplier's facility to meet the people who you will be working with as a strategic business partner for the next several years. If you have followed the needs analysis and evaluation process, you are far more likely to choose the best software package for your situation.

Conclusion

The literature covered in this review laid the groundwork for the design of the questionnaire, punchlist and survey that were used in this study. It is clear that with the appropriate research and a planned methodology, the chances for success at choosing the right MRP II software package can be achieved.

Definitions

APICS	American Production and Inventory Control Society
ASP	Automated Service Provider
CEO	Chief Executive Officer
ERP	Enterprise Resource Planning
IS	Information Systems
ISO 9000	International Standards Organization 1987 Standards on Quality
MRP	Material Requirements Planning
MRP II	Manufacturing Resource Planning
PC	Personal Computer
Punchlist	A list of requirements a customer wants the software to be able to perform.
RFP	Request for Proposal
RFQ	Request for Quote

Chapter III

Research Methodology

Research Opportunity

This paper represents the research that was conducted to narrow down the selection of MRP II software packages, and recommending three packages that would provide the best fit for Company XYZ, a small high technology electronics manufacturing company in midwestern Wisconsin. Along with the three recommendations a list of companies using the software will be documented for benchmarking. This chapter details the design of the research, validity and reliability of findings, limitations of the study and ethical considerations.

Research Design

Nature of Study

This research project is a case study, descriptive in design. Company XYZ is a growing company that is in the investigation phase of acquiring the best manufacturing resource planning software available for their immediate needs and growth potential. The steps that were taken to accomplish the objectives for this project are:

1. Conduct a “needs assessment” and documenting processes.
2. Define any limitations.
3. A literature search for methodologies for selection of software and available MRP II PC based software.
4. Design a questionnaire, punchlist and survey to provide a tool for collecting pertinent data.

Sources of Data

The literature review provided the researcher with a list of references that documented methodologies on selecting appropriate MRP II software packages. These references resulted in choosing The Guide to Accounting Software for Microcomputers, a review done by Computer Training Services in Rockville, Maryland to narrow the field of appropriate software packages to seven, and also aided in developing the questionnaire that was sent to the seven candidates.

The "needs assessment" and resulting processes done at Company XYZ were the source of the punchlist that would be used for the demonstration by four of the software candidates. The researcher conducted a meeting with the project team at Company XYZ to develop qualitative questions for an assessment tool or survey using a quality training tool: Nominal Group Technique.

Data Collection Procedures

The "needs assessment" conducted at Company XYZ resulted in defining which modules are appropriate for the needs and growth of the company. Analyzing and flow charting their processes determined these needs. For example, we found that there is a need within their system for a production control module, but the necessity for job tracking or routings is not necessary immediately.

The nominal group technique was used to identify a list of important qualitative criteria (i.e. "user friendly," adequate training and support, etc.). Once this list was developed, the importance of each area was determined by using a variant of the "multiple voting" process which allowed the participants to rank the importance of items on the list. Every participant got 100 points to divide amongst the different areas

according to what they felt were most important. The numerical values given for each category were added and they translated into percentages of the whole to establish weights to the different elements of the survey results. The results of the exercise were the foundation for creating a survey using the comparative scaling approach.

This survey was pilot tested or pre-tested by personally interviewing two professionals who had several years of experience using MRP II software programs. Once the pilot test was complete, and any necessary modifications to the instrument were completed, representatives of the three finalists gave references and "users" within those companies participated in the survey. The individuals polled were chosen by a non-probability sampling technique called judgment sampling. This sample is appropriate because the researcher requested only a list of references that were demographically comparable to Company XYZ and were using the three software packages selected.

Reliability and Validity

It would be extremely time consuming and costly to research the elements of all of the PC-based software available today for materials requirement applications. Only one source will be used to narrow down the field into three suitable software candidates; the Guide to Accounting Software for Microcomputers, a compilation of results from a yearly review done by Computer Training Services in Rockville, Maryland. Computer Training Services (CTS), founded in 1983, is one of the few companies which does independent research, evaluation and reviews on PC-based accounting software in a wide range of vertical markets including small manufacturing businesses. The review is comparative and covers these areas:

- Inventory management
- Bill of materials and product costing
- Purchasing
- Customer orders and sales analysis
- Manufacturing execution
- Manufacturing planning
- General ledger
- Accounts payable
- Accounts receivable
- Systems Features: Capacity, Searching Functions, Client Server Support

Two methods were used for cross validating the recommendations:

1) Recognition of the software in a 1997 survey done by Plant-Wide Research Corporation of North Billerica, Maine ranking the top 100 software vendors for manufacturing.
2) A survey measuring qualitative attributes of the three finalists was conducted by the researcher on customer service related issues.

Limitations

Company XYZ did not want money or time spent on this project, nor did they feel any research was necessary to investigate hardware requirements for the software. The only request is that the researcher made sure that all finalists' software would run on Windows NT.

The company also recognized that their weakest area of expertise and the one with the greatest opportunity is materials management. Therefore, this research paper focuses mainly on materials management requirements.

Ethical Considerations

All individuals and their respective companies participating in the survey or poll for the purpose of this research are protected. No names are mentioned unless that individual or company granted prior permission. The survey and questionnaire were reviewed by experts to prevent any prejudicial or unethical material.

Chapter IV

Findings of Analysis of Results

The Needs Assessment

A needs assessment is the first step in the process of defining the modules in an MRP II software package the company needs to perform at desired efficiency. One of the easiest ways to do this is to map out all processes and procedures involved. Company XYZ completed this process and Appendix A – Non Applications Order Process Flow and Appendix B – Applications Order Process Flow are examples of this investigative procedure utilizing the construction of flow charts for processes. All potential users of the new MRP II software should be involved in this activity. If a company is ISO 9000 approved, many of these processes and procedures can be found documented in the ISO Quality Manual for the company and this process can be used for review and update. If ISO 9000 policies and procedures are in place, this saves time and money in the needs assessment portion of the research.

Company XYZ identified the following MRP modules that they need in their new software package:

- Inventory Management
- Purchasing
- Bill of Material & Product Costing
- Purchasing
- Customer Order & Sales Analysis
- Manufacturing Execution
- General Ledger

- Accounts Payable
- Accounts Receivable
- System Features

The efficiency and effectiveness of these available software programs and their associated modules were reviewed via two different approaches:

1. A comprehensive survey done by Computer Training Services on PC-Based MRP II software packages and;
2. A demonstration of the software package using a "punchlist" of criteria the users deem are important to maximize the efficiency of the software.

Both of these approaches are discussed later in this chapter.

Computer Training Services Analysis

Computer Training Services is a company that does a very comprehensive analysis on PC-Based software for manufacturing. The CTS guide was the tool that was used to proceed with the second phase of the selection. The CTS guide contains 350 pages of detailed information about 23 different software packages used for MRP applications. The following modules are addressed:

General Ledger	Accounts Payable
Inventory Control	Accounts Receivable
Order Processing	Purchase Orders
Bill of Materials	Master Scheduling
Shop Floor Control	MRP
Capacity Planning	Job Cost

CTS has several charts featuring over 1600 different software capabilities that companies can pick and choose from in their analysis in choosing the right product for their company. All of the characteristics are rated from 0 (not available), 1 (difficult work around) to 4 (full credit). An example pulled out of the Inventory Management section is shown below in Figure 4.1

Software Company	#1	#2	#3	#4	#5	#6	#7	#8	#9
Drawing number	4	3	0	4	3	4	4	4	4
Consignment inventories	4	4	3	0	0	2	4	3	0
Obsolete item identifier	3	3	4	0	0	4	4	4	4
Product line	4	4	4	4	4	4	4	4	4
Commodity code	4	3	4	3	4	4	4	4	4
Price codes	4	4	4	4	4	4	4	4	4
Inspection code and instructions	3	4	4	4	4	4	4	4	4
Receiving tolerance	0	4	0	0	0	4	0	4	3
Planner	4	4	4	3	3	4	4	4	4
Buyer	4	4	4	4	3	4	4	4	4
Units of measure - purchase to/stock to/selling	4	4	4	3	4	4	4	4	4
Substitution item numbers	0	4	4	4	3	4	4	4	4
Revision level	4	4	0	4	4	4	4	4	4
Maintain multiple revisions-same item	2	4	4	4	3	4	4	3	0
ECN	0	4	0	4	3	4	0	4	4

Figure 4.1 - CTS rating example

Taking the eight categories that are significant to Company XYZ, and identifying those capabilities the MRP II software must have, the field of potential candidates were narrowed down to seven. This was done by adding up all the points in the capability fields that were identified as important. The total scores ranged from 2,826 to 3,589 and the top seven candidates are listed in Figure 4.2.

Top seven software packages	
Candidates	Score
ROI	3,589
Made2Manage	3,502
EMS	3,481
Visual	3,469
Fourth Shift	3,453
MRP9000	3,448
Impact/Encore	3,442

Figure 4.2 – Top seven selected MRP II software candidates

Questionnaire Results

The next step in the research was the development of a questionnaire to be sent out to the seven preliminary software candidate suppliers listed above. The development of this questionnaire was accomplished using the important points for choosing software listed in Chapter 2 of this research project. It was then sent out to two MRP II software experts for proofreading, modified per their recommendations, and forwarded to our seven candidates. The researcher was looking for expedient, comprehensive answers to the questionnaires and an approach to comparing the costs and customer service of the seven candidates. The final draft of the questionnaire is found in Appendix C – Supplier Questionnaire. A comparison of the answers given from the suppliers is found in Appendix D – Supplier Questionnaire Responses. Summaries of the findings follow.

Costs

The costs associated with an MRP II software purchase are for each individual module, the implementation and education, and the associated help line and upgrade costs. When combining the total costs of the software excluding the annual fee (which

ranges from 12% to 18% of the initial software cost) the software of choice will range anywhere from $60,965 to $100,000. The education costs can be lowered depending on the expertise of the people actually using the software. It is noted that all of the companies do lease their software which could cut down considerably on the immediate cost of the software.

Availability of Help and Education

The client is billed anywhere from $95.00 to $125.00 per hour for help line calls. Only two companies did *not* have 800 lines, but they call you back to help cut down on the costs, and only a couple of the software representatives would commit to a certain time frame in which they would get back to you in regard to your questions.

Two of the corporations, ROI Systems and Fourth Shift are located in Minnesota, which is convenient and all of the companies offer education on-site, at their representative's facility, or at their headquarters. There is an additional charge for this service. Only Fourth Shift offers night and weekend technical support.

All of the companies have representatives in Minneapolis or St. Paul, Minnesota except Syspro (Impact/Encore). The Impact/Encore representatives are located in St. Cloud, Minnesota.

Implementation and Administration of Software

Implementation time does vary. The software representatives who responded to our questionnaire quoted anywhere from 14 to 180 days depending on the difficulty, extent and training necessary to implement. Only three companies said that the administration of the software could be handled on a part time basis. They were Visual, Impact/Encore and Fourth Shift. During a later survey, these findings were validated for

only two of the companies, Visual and Impact/Encore. All companies using Fourth Shift had a full time IS manager.

Cooperation

Only one company, ROI Systems, was willing to give a list of their customers highlighting those who were manufacturing firms less than $10 million in sales. All the software companies responded to the questionnaires in a timely manner.

Benchmarking Software Package Capabilities

The fourth step in the process was to create a list of characteristics which the users would want the software to perform proficiently: this is called a “punchlist” in MRP software language. The users at Company XYZ created a punchlist which was used in interviews and demonstrations conducted by the researcher at five out of the seven software companies (Appendix E). EMS and MRP 9000 did not respond to requests for a software demonstration with the researcher at this point. It was the decision of the consultant and the president of Company XYZ to eliminate them from the possible list of potential software candidates. The results of the demonstration of the characteristics desired on the punchlist are found in Appendix F.

Summary of Demonstration Results

The demonstration results are imperative to not only choosing the appropriate MRP software package, but will also aid in negotiations to purchase the software. The packages available for small - medium sized companies rarely will be able to replicate everything that a company desires, but these requirements can be negotiated if the customer is aware of them during the negotiation process.

ROI Systems.

ROI's *Manage 2000* performed impeccably on all criteria on the punchlist. The points that stood out in the Manage 2000 software are:

- The software stands alone in its capability of report writing. Its dictionary for the report writer is very comprehensive. This point was validated by the subsequent reference checks with users of the software. Manage 2000 was the only software package where report writers were not using Crystal reports or another package to help write custom reports.
- Manage 2000 was one of only two of the software packages that could classify parts as free stock, bin or floor stock.
- Manage 2000 was the only package that could generate a user designated list of purchase requisitions.
- Manage 2000 was the only software that could compare several bills of materials, reporting only the differences in the bills.
- Manage 2000 was the only package that separated independent demand usage (those not pegging to a bill of material and driven by MRP) and dependent demand usage.

Made2Manage.

Only 52% of the requirements listed on the punchlist were demonstrated during the review of the Made2Manage software presentation. This software proved to be the least capable of performing to the level desired by the customer. The response to four of the questions being asked during the demonstration could not be answered and a response was promised by the representative of the software company. There was no follow-up to

these unanswered questions. The representatives for Made2Manage were also unwilling to give a list of references to contact. It was the decision of the consultant and the project team of Company XYZ to eliminate Made2Manage after this phase of the project due to lack of cooperation. It was felt that if they were not interested enough in the potential business during the "sale" that they could not be depended on to follow up with good customer service after the software was purchased.

Lilly Software.

Visual software by Lilly was the only package that comes with all the modules tied into the purchase price. The capabilities of the software were demonstrated in all but six of the twenty-nine punchlist requirements. The six areas that were not demonstrated are:

- The ability to generate a standard report to measure the percentage of defects received from suppliers.
- A quality module that tracks the history of parts received.
- The ability to classify parts as free stock, bin or floor stock.
- The ability to generate a user designated list of purchase requisitions.
- Running bills of materials with a substitute part number. (None of the software packages could do this.)
- The ability to compare several bills of materials for differences.

The ability to do unit of measure conversions is very easy to do with Visual compared to the other packages.

Syspro.

Impact/Encore by Syspro was definitely the easiest software to understand and work with. The fact that this software was the only package other than Manage 2000 that could classify parts as free stock, bin and floor stock was impressive and a "must" for ease of use by Company XYZ. Another key point is that the representatives supporting the software after the sale, RT Enterprises, only quoted $95.00 per hour for their assistance, where all other companies charged $125.00 per hour. The one drawback and an additional anticipated cost was the closest hands-on support is in St. Cloud, Minnesota, three hours from Company XYZ's facility. All other software companies had representatives in the Minneapolis, St. Paul, Minnesota area, 1½ hours away from the manufacturing facility.

Below are listed the criteria that the representatives from Impact/Encore could not demonstrate:

- A quality module that tracks quality history on a part.
- A list of purchase requisitions designated by the user.
- Bills of materials that can accommodate substitute part numbers.
- The ability to generate a comparison of different bills of materials to identify only the differences.
- Obsolete reports.
- Reports that segregate independent demand from dependent demand.

Fourth Shift.

Fourth Shift's software is impressive and very sophisticated. If you have a good understanding of what your job is and some familiarity with MRP software, maneuvering

around in this MRP II software will not be a problem. Their corporate facility is located in Bloomington, Minnesota so when dealing with them, Company XYZ could do so directly through the corporate office, not a representative. The base price on their software package starts at $75,000 and can go as high as $140,000 after implementation. This would make Fourth Shift the highest total cost software package reviewed. Fourth Shift also had several items from the punchlist they could not demonstrate. They are:

- Parts *can not* be classified as free stock, bin or floor stock.
- Usage reports do not indicate whether demand was dependent or independent.
- There are no obsolete reports. (This was unusual considering the salesman reported having over 400 canned reports that come with the purchase of the software).
- The software is unable to compare bills of materials for differences.
- Bills of materials do not reference substitute parts as alternatives.
- A user-designated list can not be generated for purchase requisitions.

It should be noted that because of the total cost of the software and its sophistication, the president of the company and the consultant decided that the purchase of this software would be a hardship for the company, so it was eliminated from consideration. However, the President of Fourth Shift shared with the consultant that Fourth Shift was interested in finding a beta sight for a new process called ASP or Automated Service Provider. In this instance, Fourth Shift would bear the burden of the hardware and assist Company XYZ in their conversion efforts. Company XYZ would use the Fourth Shift software by tapping into Fourth Shift's mainframe via internet access. This cost now for using the software is only $1000-$1500 per month depending on the number of modules you would use. The issue with this process is one of security. Fourth

Shift is confident that they can convince the customers of their ASP services that they can provide absolute security. Participating as a beta sight usually entails excellent customer service from the supplier because they want to proudly exhibit the successful model to other companies. For this reason, we included Fourth Shift in our final step of the process.

Results of Survey

The final step in the process was two-fold: 1) using the nominal group technique, (a quality tool), users at Company XYZ defined what they felt were the important qualitative characteristics. These results were used to 2) conduct a telephone survey of users at companies utilizing the four remaining software packages still being evaluated outside of Company XYZ.

The nominal group technique was used to identify a list of important qualitative criteria. Multiple voting allowed the participants to rank the importance of the items on the list. This resulted in a weight for the different elements of the survey and the participants of the survey were asked to grade each category from A to F. A point value was assigned to each grade: A being assigned a point value of 12 and F being assigned a point value of 1. The researcher surveyed three individuals in materials management, accounting or information services in three different companies. The grade point values given by the survey participants were added together and then averaged and multiplied by the weight for each category. The category scores were added. This resulted in an accumulative grade for each software package. The results of the nominal group technique exercise and the survey are found in Figure 4.3.

	Average Grade	Weight	Grade X Weight	
ROI Systems				
User Friendliness	9.40	30%	2.820	
Ease of Report Building	7.75	20%	1.550	
Training Support	7.25	20%	1.450	
Help Line Efficiency & Effectiveness	6.00	20%	1.200	
Accounting & RMA Compatibility	8.25	10%	0.825	
Final Grade			**7.845**	**B-**
Fourth Shift				
User Friendliness	6.67	30%	2.00	
Ease of Report Building	6.00	20%	1.20	
Training Support	7.00	20%	1.40	
Help Line Efficiency & Effectiveness	7.00	20%	1.40	
Accounting & RMA Compatibility	6.00	10%	0.60	
Final Grade			**6.60**	**C+**
Impact/Encore				
User Friendliness	11.33	30%	3.40	
Ease of Report Building	10.00	20%	2.00	
Training Support	8.00	20%	1.60	
Help Line Efficiency & Effectiveness	4.75	20%	0.95	
Accounting & RMA Compatibility	11.33	10%	1.13	
Final Grade			**9.08**	**B**
Visual				
User Friendliness	11.33	30%	3.40	
Ease of Report Building	8.00	20%	1.60	
Training Support	10.00	20%	2.00	
Help Line Efficiency & Effectiveness	8.00	20%	1.60	
Accounting & RMA Compatibility	12.00	10%	1.20	
Final Grade			**9.80**	**B+**

Figure 4.3 – Measurement criteria / survey results

Recommendation of Three MRP II Software Packages

The three highest grades received and the resulting three finalists are listed below:

Choice #1 Lilly Software Associates – Visual

Lilly Software Associates, a $61 million company, is rated #51 out of the top 100 ERP/MRP II software packages in *ManufacturingSystems* July, 1999 issue. This company was established in 1992 and its corporate facility is located in New Hampton, New Hampshire. The local representative for this software package is ProCon Solutions located at 14000 25th Avenue in Plymouth, Minnesota. Visual scored a B+ in our qualitative survey and the approximate total cost of implementation $68,000. Lilly offers a money-back guarantee on its software if a company is dissatisfied with results after 40 consecutive working days of implementation. To date, no company has asked for its money back. The web address for Lilly Software Associates is www.visualmfg.com.

Choice #2 Syspro Group – Impact/Encore

Syspro Group, located in Costa Mesa, California is rated #55 out of the top 100 ERP/MRP II software packages in *ManufacturingSystems* July 1999 issue. The company has been in business for over 20 years and has implemented software in over 5,000 sites. The local representative for this software package is RT Enterprises located at 411 Third Street North in Waite Park, Minnesota. Impact/Encore scored a B in our qualitative survey and the approximate cost of implementation of this software will be $55,000. The web address for Syspro Group is www.sysprousa.com.

Choice #3 ROI Systems – Manage 2000

ROI Systems, located in Minneapolis, Minnesota is rated #82 out of the top 100 ERP/MRP II software packages in *ManufacturingSystems* July, 1999 issue. This 21 year

old company focuses on the electronics industry. ROI Systems scored a B- in our qualitative survey and the approximate cost of implementation will be $64,000. ROI Systems is the only company in the top three recommendations whose headquarters is within a two-hour driving distance from Company XYZ. They were also the only supplier willing to forward a total client listing in the Minneapolis area, and focus primarily in the electronic industry. The web address for ROI Systems is www.roisys.com.

A list of the companies who participated in our qualitative survey are found in Appendix G.

Chapter V

Recommendations and Conclusion

Costs of a Manufacturing Resource Planning Software Acquisition

There will be five types of costs associated with an MRP II software purchase:

- The purchase price of the software
- The implementation cost
- The training cost
- The yearly maintenance fee
- Major upgrade charges

The rule of thumb is that a company will spend about 3% of their annual sales volume for purchasing, implementing and training their employees for the acquisition of a new MRP II or ERP software package. Company XYZ, a 2.5 million-dollar company should spend no more than $75,000 on this acquisition.

All costs are negotiable. For example, the survey clearly indicates that help line effectiveness and efficiency grade lower with users in every software package. This is clearly an area for negotiation. The software companies will either charge a flat rate of $95 to $125 for this service, or fold the cost into an annual maintenance charge, which runs anywhere from 10 to 15 percent of the base price of the software purchase.

Education is readily available with all of the software packages. Detailed manuals come with every software purchase. On-site training and seminars are available. This type of training can be more than $1,000 per person and can be very costly for a small company. A recommendation would be to create an expert within the company who can go to the seminars and then utilize their expertise to train others within the company. It is

suggested the expert get involved with user groups. They are prevalent in the Minneapolis-St. Paul area and peer groups benchmark and help each other with improvements in processes and software education. Every MRP II software company offers general education and upgrade information via the internet.

Once or twice a year MRP II software companies do a major upgrade to their software. It is the client's choice whether to upgrade. It will be important to gather a project group to study the changes being offered to see if they will benefit the company or hinder efficiency. There is usually a significant charge for this type of upgrade. Another cost of these major upgrades is the maintenance of custom reports that the client has created. It could cost up to $100 to upgrade each report.

Users of all software packages interviewed, except those working with Manage 2000 software, said that the report writer that came with the software package was not user friendly and that they purchased Crystal Reports to complement the software. This report writer package is easy to learn and only costs about $379.00.

Taking all costs into consideration, Company XYZ can purchase and implement MRP II software for $75,000 or less.

Demonstration of Software

After the selection choice had been narrowed down to three or less, the consultant submitted the list to the project group. It is their responsibility to create the formal request for quotation. The recommendation of the researcher/consultant is to follow the steps listed in Chapter II, sub-heading "Selecting the Finalist." Another excellent recommendation is to create a case study that emulates your company's processes and have the person doing the software demonstration show you all the steps involved in

completing the case study. During the survey, the Materials Manager at Lexel Imaging was willing to give the consultant a copy of a case study that Lexel presented to its potential software suppliers while going through their request for quotation process. This is an example of the type of benefit that networking can result in.

The demonstration of software by the supplier should be in the control of the client. Do not let it be a sales presentation, but a presentation of how the software will help you achieve your objectives and goals with the least amount of effort and maximum amount of efficiency. The presenters may suggest ways for you to re-engineer your process. This should be viewed as a positive, not a negative. The software packages presented in this paper have thousands of implementations in place, and the presenters of the demonstration may share how other companies have benefited from changing their processes. It is up to the customer however to decide on the re-engineering efforts that will result.

Final Words of Advice

Any MRP II software's capability to help the users run their business depends on how well it is utilized, not on how it has been designed technically. A company should not let their software dictate how their process flows. It should help them maximize their efficiency and effectiveness involved in accomplishing their processes and procedures, resulting in reduced total costs for the corporation.

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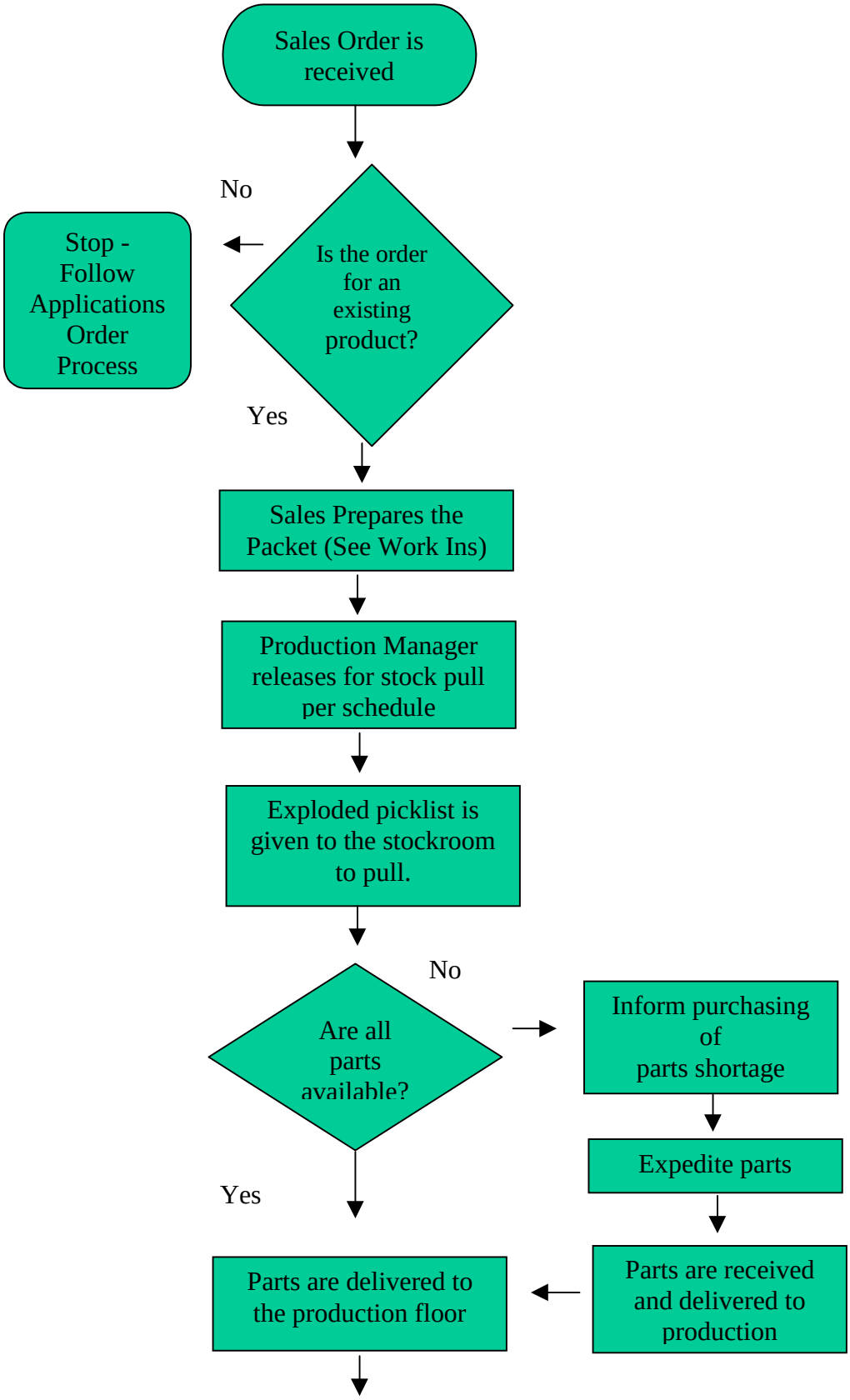
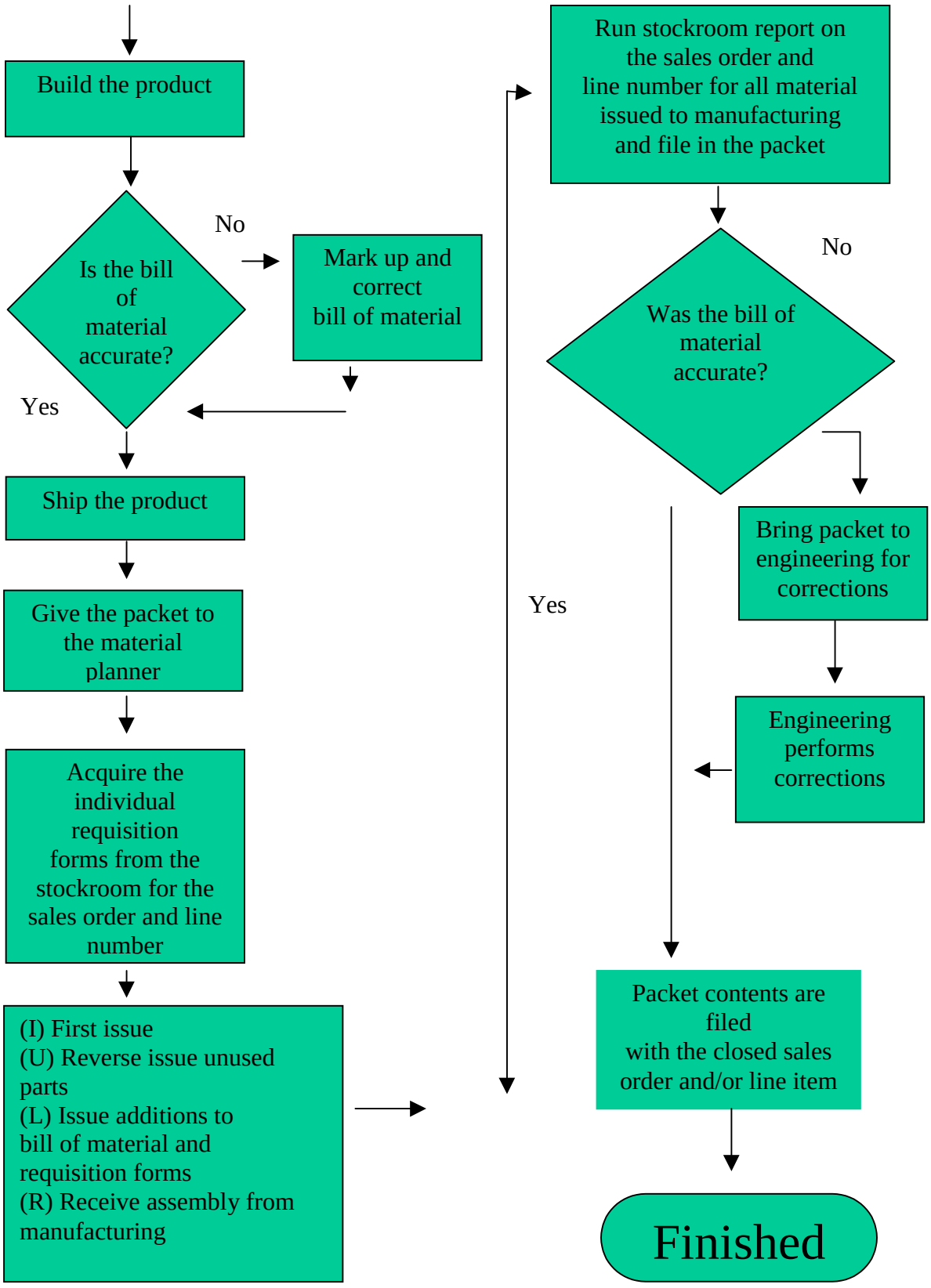
Appendix A

NON APPLICATIONS ORDER PROCESS FLOW

Non Applications Order Process Flow

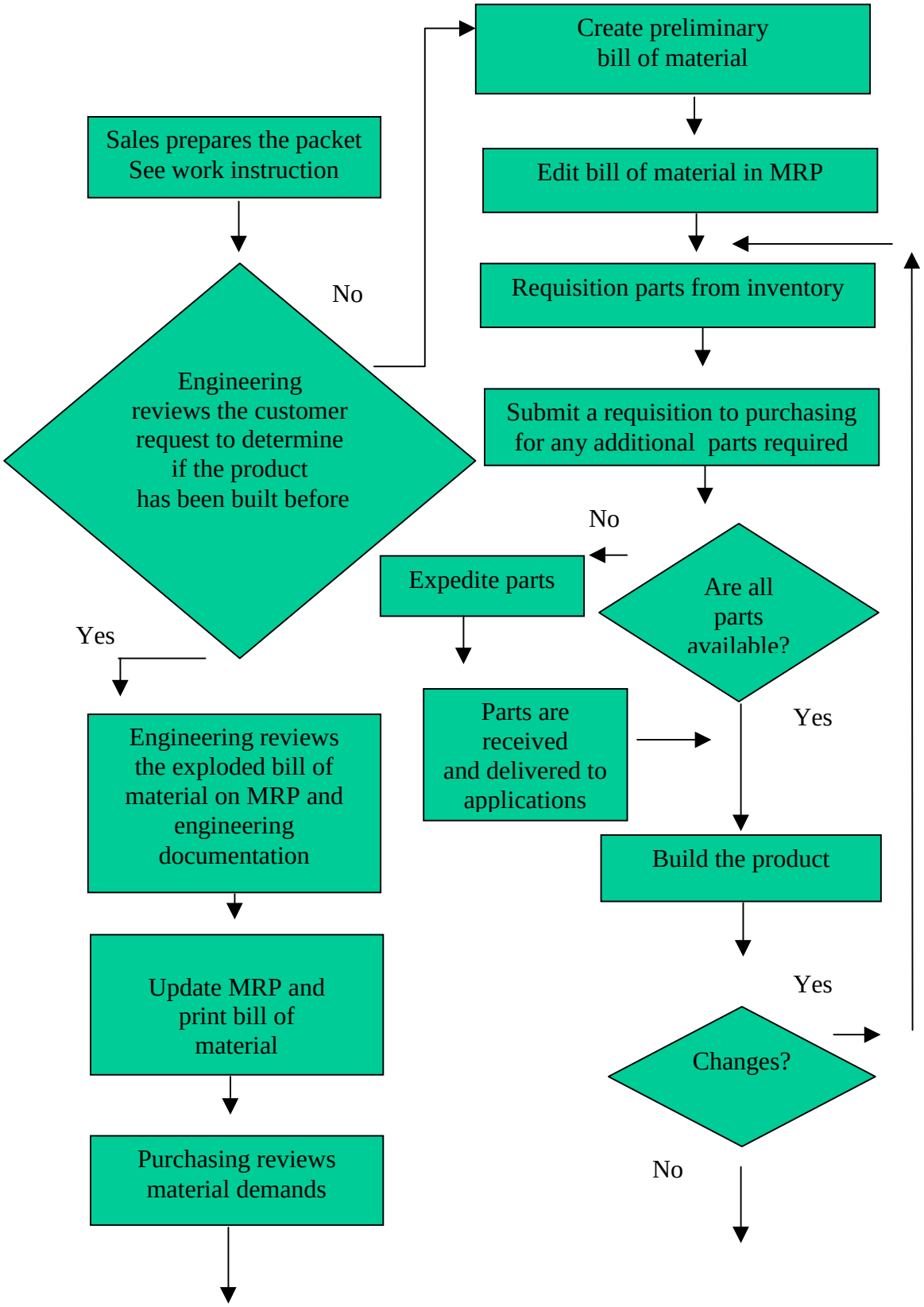


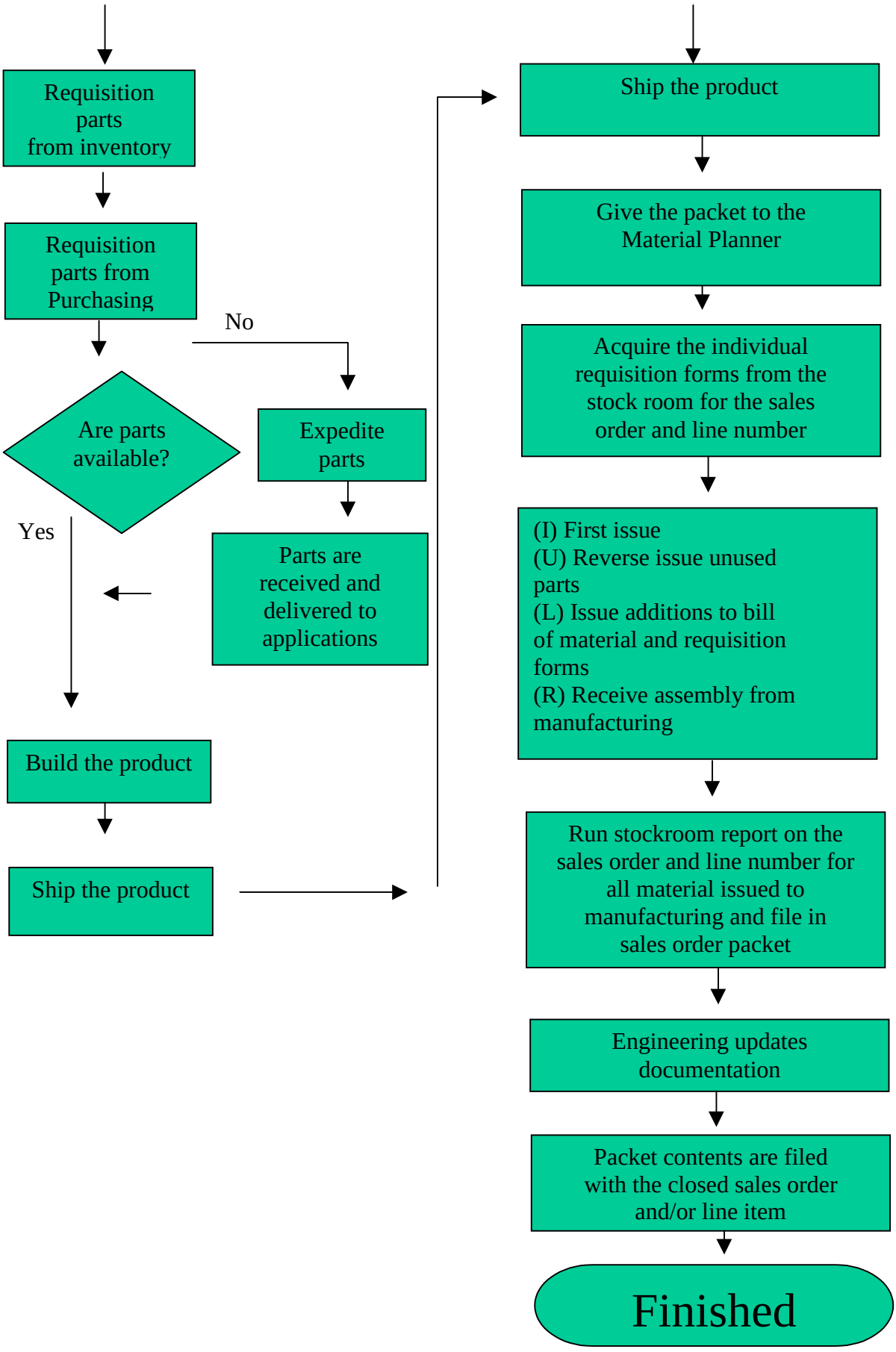

Build the product
Is the bill of material accurate?
No
Mark up and correct bill of material
Yes
Ship the product
Give the packet to the material planner
Acquire the individual requisition forms from the stockroom for the sales order and line number
(I) First issue
(U) Reverse issue unused parts
(L) Issue additions to bill of material and requisition forms
(R) Receive assembly from manufacturing
Run stockroom report on the sales order and line number for all material issued to manufacturing and file in the packet
Was the bill of material accurate?
No
Bring packet to engineering for corrections
Engineering performs corrections
Yes
Packet contents are filed with the closed sales order and/or line item
Finished

Appendix B

APPLICATIONS ORDER PROCESS FLOW

Applications Order Process Flow




Requisition parts from inventory
Requisition parts from Purchasing
No
Are parts available?
Expedite parts
Yes
Parts are received and delivered to applications
Build the product
Ship the product
Ship the product
Give the packet to the Material Planner
Acquire the individual requisition forms from the stock room for the sales order and line number
(I) First issue
(U) Reverse issue unused parts
(L) Issue additions to bill of material and requisition forms
(R) Receive assembly from manufacturing
Run stockroom report on the sales order and line number for all material issued to manufacturing and file in sales order packet
Engineering updates documentation
Packet contents are filed with the closed sales order and/or line item
Finished

Appendix C

SUPPLIER QUESTIONNAIRE

Questions for:

ROI Systems (Manage 2000)
Made2Manage
Effective Management Systems (EMS)
Intuitive Manufacturing Systems (MRP 9000)
Syspro Group (Impact/Encore)
Lilly Software Associates (Visual)
Fourth Shift

1. Is your ERP/MRPII software appropriate for a small electronics manufacturing business (20-50) employees, 2-10 million dollars in sales?

2. In days, what is the implementation time?

3. Do you include initial on-site training with installation? If so, please describe.

4. What on going training programs do you offer?

5. Do you hold a users conference?

6. What hours are your help lines manned? What is the annual cost for this service? What is your response time policy?

7. Is there an 800 telephone line to your help line?

8. What type of system administration skills are needed to keep the system running?

9. For budgeting purposes, what % of the total sale should we expect for services (upgrades & help line)?

10. Do you have local representation and technical support for the Eau Claire WI area (60 miles from St. Paul-Minneapolis MN)?

11. Please supply a list of companies using your ERP/MRP II software in the Eau Claire WI and St. Paul-Minneapolis area. Please circle those that are small (2-10 million) and are manufacturing electronics equipment.

12. Can you do the installation and test the software? If so, is there an additional cost?

13. Do you offer a payment plan for the procurement of this software package?

14. Can we lease the software with a buy-out clause?

15. We need to budget for this acquisition and implementation in the year 2000. Can you give us an approximate dollar amount for budgeting?

Appendix D

SUPPLIER QUESTIONNAIRE RESPONSES

Question	Company	Response
Question #1 Is your MRP software appropriate for a small electronics business 2-10 million in sales?	Visual	Yes
	ROI	Yes
	EMS	2.5MM and higher
	Made2Manage	Yes
	Impact/Encore	5MM and higher
	Fourth Shift	Yes
Question #2 How many days does it take to implement?	Visual	90 days install - 90 days follow-up
	ROI	35 days
	EMS	40-180 days
	Made2Manage	90-120 days
	Impact/Encore	45 days
	Fourth Shift	14-70 days
Question #3 Do you include initial on-site training with installation?	Visual	Yes
	ROI	Yes
	EMS	Yes
	Made2Manage	Yes
	Impact/Encore	Yes
	Fourth Shift	Yes
Question #4 What training programs do you offer?	Visual	Classes are offered once per month at Minneapolis and Lilly in New Hampshire.
	ROI	There are generic classes for each module, but we prefer to structure to the clients needs.
	EMS	Classes are offered continuously and can be taken at any time.
	Made2Manage	Module training in Minneapolis or at your facility
	Impact/Encore	No regularly scheduled classes in Minnesota at the representatives. You can take classes on modules at Syspro.
	Fourth Shift	Classes can be customized or per module either at Minneapolis or at your facility.
Question #5 Do you hold a "users" conference?	Visual	Yes, an annual users group and also a Midwest users group conference.

Question	Company	Response
	ROI	Yes, an annual international group and a local Minneapolis user group that meets bi-monthly.
	EMS	Yes, Annually - in different locations
	Made2Manage	Yes, a National Users Group and a Midwest Users group.
	Impact/Encore	Have only recently organized a users group.
	Fourth Shift	Internationally - 2 times a year Regionally - every 9 months Minneapolis and Chicago - every 9 months.
Question #6 What hours are your help lines manned? What is the annual cost? What is your response time policy?	Visual	8 a.m. to 8 p.m. Monday-Friday at a cost of 15% of the software annually. There was no response to what their response time was.
	ROI	same as above except ROI help lines are manned from 6:00 a.m. to 6:00 p.m.
	EMS	Help lines are manned 7:00 a.m. to 6:00 p.m. No response to other two questions.
	Made2Manage	Help line is manned from 8:00 a.m. to 8:00 p.m. Annual cost depends on concurrent users and we try to get back to you within 5-15 minutes
	Impact/Encore	Help line is available from 8:00 a.m. to 5:00 p.m. The cost is $95.00 per hour and we try to answer all calls within 2 hours.
	Fourth Shift	Help lines are manned 7:00 a.m. to 7:00 p.m. You can reach technical help from 7:00 p.m. to 11:00 p.m. and on weekends and holidays from 8:00 a.m. to 5:00 p.m. The cost is 15% of the software cost annually. No answer on response time.
Question #7 Is there an 800 number to the help line?	Visual	No, but we call you back so cost is low.
	ROI	Yes
	EMS	Yes
	Made2Manage	Yes
	Impact/Encore	No
	Fourth Shift	Yes

Question	Company	Response
Question #8 What type of administrative skills are needed to keep the system maintained?	Visual	Minimal, many small users have someone doing the systems administration part time.
	ROI	Most companies have a full-time administrator
	EMS	No response
	Made2Manage	None
	Impact/Encore	Minimal, part time.
	Fourth Shift	Minimal, part time.
Question #9 For budgeting purposes, what % of the total sales should we expect for service?	Visual	15% of the software investment, annually
	ROI	15% of the software investment, annually
	EMS	17% of the software investment, annually
	Made2Manage	15 - 18% of the software investment, annually
	Impact/Encore	12% of the software investment, annually
	Fourth Shift	Negotiable, but education and implementation costs will be from .40 - .75 of each $ spent for the software. This will be a one time charge.
Question #10 Do you have local representation and technical support close to Eau Claire, WI?	Visual	Yes, Minneapolis, St. Paul, MN
	ROI	Yes, our corporate headquarters is in St. Louis Park, MN
	EMS	Yes, Burnsville, MN and Milwaukee, WI
	Made2Manage	Yes, Bloomington
	Impact/Encore	Representatives are located in St. Cloud, MN.
	Fourth Shift	Yes, our corporate headquarters is in Bloomington, MN
Question #11 Please supply a list of companies using your ERP/MRP II software in Eau Claire, WI. and Minneapolis, MN and circle the ones that are manufactures ranging from $2-10 million in sales.		Only ROI Systems was willing to supply a list.

Question	Company	Response
Question #12 Can you do the install and test the software? Is there a separate installation cost?		All companies install and test the software. Implementation cost for all companies are negotiable, but the rule of thumb is 70% of the cost of the software.
Question #13 Can you offer a payment plan for the procurement of this software package?	Visual	Yes
	ROI	Yes
	EMS	Yes
	Made2Manage	Yes
	Impact/Encore	No
	Fourth Shift	Yes
Question #14 Can we lease the software with a buyout clause?		All companies will lease software through their company or help you arrange a lease through a local bank.
Question #15 How much should we budget for the software, installation and education?	Visual	$68,000
	ROI	$64,000
	EMS	$75,000-$85,000
	Made2Manage	$60,965
	Impact/Encore	$55,000
	Fourth Shift	$75,000-$100,000

Appendix E

SOFTWARE DEMONSTRATION PUNCHLIST

PUNCHLIST
When receiving parts, can you key data into inspection (II) or reject (RMA) status?
Is there a screen that shows both supply and demand for each part number with a column that shows the “remaining on-hand total?”
Can you do “first issues” to work orders at every level of the bill of material?
Does the software have the ability to peg demands from a master schedule?
Can you backflush at various levels of the bill of material?
Can you program security by group? By person?
How often does the software manufacture upgrade?
Can you classify parts as free stock, bin, or floor stock? If yes, can you flag the system not to relieve these parts from stock when a picklist is issued or backflushed?
Is there a report that is incorporated in the software package to measure on-time deliveries from suppliers?
Is there a report that is incorporated in the software package to measure % defects per part number received from supplier?
Can you issue parts to general ledger accounts?
Is there a good quality module included that will track quality history on a part?
Is another software package necessary in order to do report building with ease?
Is there a cost for each custom report to be maintained when an upgrade occurs? If yes, how much does it cost?

Can you create: costed bill of material? last actual purchase cost bill of material? bill of materials using FIFO? bill of materials using LIFO?
Can you generate a user-designated list of purchase requisitions?
Can you run a bill of material with a substitute part number?
Can you manually generate purchase order and work order numbers?
Can purchase order and work order numbers be alphanumeric?
Is your planning module able to plan: lot for lot? minimum/maximum? EOQ?
Can you create different units of measure for purchasing and stocking?
Can the software do a multi-level where used?
Can the software compare several bills of materials and tell you only the differences?
Are there canned obsolete reports available with the software package?
Does the usage reporting tell you which demands were dependent and independent?

Appendix F

SOFTWARE DEMONSTRATION PUNCHLIST RESPONSES

PUNCHLIST RESPONSES	ROI SYSTEMS	MADE2MANAGE	FOURTH SHIFT	IMPACT/ENCORE	VISUAL
When receiving parts, can you key data into inspection (II) or reject (RMA)? Status?	YES	YES	YES	YES	YES
Is there a screen that shows both supply and demand for each part number? With a column that shows the "remaining on-hand total?"	YES	NO	YES	YES	YES
Can you do "first issues" to work orders at every level of the bill of material?	YES	YES	YES	YES	YES
Does the software have the ability to peg demands from a master schedule?	YES	YES	YES	YES	YES
Can you backflush at various levels of the bill of material?	YES	YES	YES	YES	YES
Can you program security by group? By person?	YES YES	YES	YES YES	YES YES	YES
How often does the software manufacture upgrade?	Approx once every 18 months	Minor-every six months, Major-once a year	Every 9 months	Every 6 months	Often, we view it as improving the product, could be 3 times per month.

PUNCHLIST RESPONSES	ROI SYSTEMS	MADE2MANAGE	FOURTH SHIFT	IMPACT/ENCORE	VISUAL
Can you classify parts as free stock, bin, or floor stock? If yes, can you flag the system not to relieve these parts from stock when a picklist is issued or backflushed?	YES YES	NO	NO	YES YES	NO
Is there a report that is incorporated in the software package to measure on-time deliveries from suppliers?	YES	WCB	YES	YES	YES
Is there a report that is incorporated in the software package to measure % defects per part number received from supplier?	YES	YES	YES	YES	NO
Can you issue parts to general ledger accounts?	YES	WCB	YES	YES	YES
Is there a good quality module included that will track quality history on a part?	YES	WCB	YES	NO	NO
Is another software package necessary in order to do report building with ease?	No, we have a good Report Writer	NO	We have 400 standard Reports, but some of our Customers use Crystal Report Writer	No, we recommend Crystal Reports	We use Crystal Reports

PUNCHLIST RESPONSES	ROI SYSTEMS	MADE2MANAGE	FOURTH SHIFT	IMPACT/ENCORE	VISUAL
Is there a cost for each custom report to be maintained when an upgrade occurs? If yes, how much does it cost?	Yes, about $100, depending on complexity	Only on major changes	Yes, around $200	Yes, billed at $95.00 per hour	Yes about $100 per custom report
Can you create: Costed bill of material? Last Actual purchase cost bill of material? Bill of materials using FIFO? Bill of materials using LIFO?	 YES YES YES YES	 YES YES NO NO	 YES YES YES YES	 YES YES YES YES	 YES YES YES YES
Can you generate a user-designated list of purchase requisitions?	YES	WCB	No	NO	NO
Can you run a bill of material with a substitute part number?	NO	NO	No, we would recommend phantoming a level.	NO	NO
Can you manually generate purchase order and work order numbers?	YES	NO	YES	YES	YES
Can purchase order and work order numbers be alphanumeric?	YES	NO	YES	YES	YES

PUNCHLIST RESPONSES	ROI SYSTEMS	MADE2MANAGE	FOURTH SHIFT	IMPACT/ENCORE	VISUAL
Is your planning module able to plan:					
Lot for lot?	YES	YES	YES	YES	YES
Minimum/maximum?	YES	NO	YES	YES	YES
EOQ?	YES		YES	YES	YES
Can you create different units of measure for purchasing and stocking?	YES	YES	YES	YES	YES
Can the software do a multi-level where used?	YES	YES	YES	YES	YES
Can the software compare several bills of materials and tell only the differences?	YES	NO	NO	NO	NO
Are there canned obsolete reports available with the software package?	YES	YES	NO	NO	YES
Does the usage reporting tell you which demands were dependent and independent?	YES	NO	NO	NO	NO

Appendix G

COMPANIES WHO PARTICIPATED IN

THE QUALITATIVE CHARACTERISTIC SURVEY

Lilly Software – Visual

Lexel Imaging
1501 Newtown Pike
Lexington KY 40511

Nortech Imaging
4050 Norris Court N.E.
Bemidji MN 56601

Thern Corporation
6712 Industrial Park Road
Winona MN 55987

Syspro – Impact/Encore

Seeyle Plastics
9700 Newton Avenue South
Bloomington MN 55431

National Checking
1381 Marshall Avenue
St. Paul MN 55104

Hansen Silo
11587 County Road 8
Lake Lillian MN 56253

ROI Systems – Manage 2000

Aetrium, Inc.
2350 Helen Street
N. St. Paul MN 55112

Plasmon, Inc
9625 West 76th Street
Eden Prairie MN 55344

Hypro, Inc
375 5th Avenue N.W.
St. Paul MN 55112

Fourth Shift

Dotronix, Inc.
160 First Street S.E.
St. Paul MN 55112

Silent Knight
5816 West 36th Street
Minneapolis MN 55416

Turck Corporation
3000 Capis Drive
Plymouth MN 55441