

PART I

Introduction

Enterprise Resource Planning

This is not a book about software. One more time: This is not a book about how to select software and install it on your computers. Rather, it's a book about how to implement superior business processes in your company—processes that yield a competitive advantage.

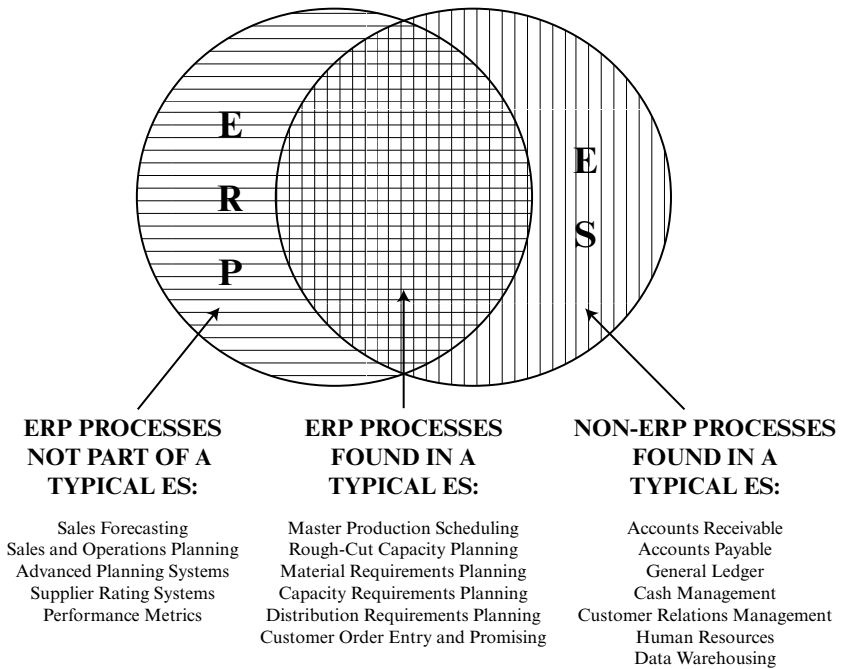
Right now you might be thinking: “Wait a minute. The name of this book is ERP. How can it not be about software?”

The answer is that Enterprise Resource Planning (ERP) is not software. One more time: ERP is not software. There's a lot of sloppy terminology flying around today in the business press, and one misnomer is to label enterprise-wide transaction processing software systems as ERP. These software packages support effective resource planning and make much of it feasible, but they don't truly do it. Plus these packages contain many business processes other than resource planning.

Therefore, we need to trot out another acronym that does refer to software: ES. This stands for Enterprise System or Enterprise Software. In his book *Mission Critical*,¹ author Thomas H. Davenport describes enterprise systems as “packages of computer applications that support many, even most, aspects of a company's information needs.”

That makes sense to us. Now for another distinction: Not all ERP business functions are contained in the typical Enterprise Software

**Figure 1-1
ERP Processes**



(ES) suite. Similarly, the typical ES contains software support for business processes that are not a part of ERP. In Figure 1-1, we can see that distinction graphically. Please note the three areas on that diagram. The rightmost part of the figure refers to those functions contained within a typical ES that are not part of ERP; the leftmost area is for those ERP functions not normally supported by an ES; the area of overlap in the center references those ERP functions typically supported by Enterprise Software.

Now let’s take a look at just what this ERP thing is all about.

WHAT IS ENTERPRISE RESOURCE PLANNING AND WHAT DOES IT DO?

Enterprise Resource Planning (ERP)—and its predecessor, Manufacturing Resource Planning (MRP II)—is helping to transform our industrial landscape. It’s making possible profound improvements in

the way manufacturing companies are managed. It is a strong contributor to America's amazing economic performance of the 1990s and the emergence of the New Economy. A half century from now, when the definitive industrial history of the twentieth century is written, the evolution of ERP will be viewed as a watershed event. Let's describe Enterprise Resource Planning 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.

Here are some descriptions of ERP, not definitions but certainly good examples.

Enterprise Resource Planning is a company increasing its sales by 20 percent in the face of an overall industry decline. Discussing how this happened, the vice president of sales explained: "We're capturing lots of business from our competitors. We can out-deliver 'em. Thanks to (ERP), we can now ship quicker than our competition, and we ship on time."

Enterprise Resource Planning is a Fortune 50 corporation achieving enormous cost savings and acquiring a significant competitive advantage. The vice president of logistics stated: "ERP has provided the key to becoming a truly global company. Decisions can be made with accurate data and with a process that connects demand and supply across borders and oceans. This change is worth billions to us in sales worldwide."

Enterprise Resource Planning is a purchasing department gen-

erating enormous cost reductions while at the same time increasing its ability to truly partner with its suppliers. The director of purchasing claimed: “For the first time ever, we have a good handle on our future requirements for components raw and materials. When our customer demand changes, we—ourselves and our suppliers—can manage changes to our schedules on a very coordinated and controlled basis. I don’t see how any company can do effective supply chain management without ERP.”

That’s ERP. Here’s how it came to be.

THE EVOLUTION OF ENTERPRISE RESOURCE PLANNING

Step One—Material Requirements Planning (MRP)

ERP began life in the 1960s as Material Requirements Planning (MRP), an outgrowth of early efforts in bill of material processing. MRP’s inventors were looking for a better method of ordering material and components, and they found it in this technique. The logic of material requirements planning asks the following questions:

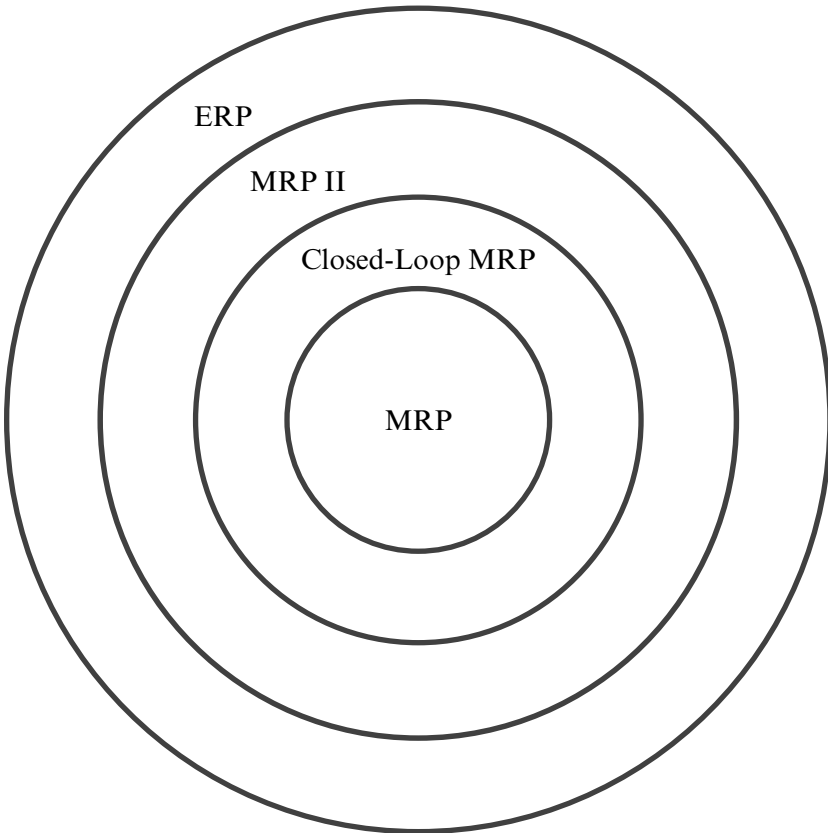
- What are we going to make?
- What does it take to make it?
- What do we have?
- What do we have to get?

This is called the universal manufacturing equation. Its logic applies wherever things are being produced whether they be jet aircraft, tin cans, machine tools, chemicals, cosmetics . . . or Thanksgiving dinner.

Material Requirements Planning simulates the universal manufacturing equation. It uses the master schedule (What are we going to make?), the bill of material (What does it take to make it?), and inventory records (What do we have?) to determine future requirements (What do we have to get?).

For a visual depiction of this and the subsequent evolutionary steps, please see Figure 1-2, a modified version of a diagram in Carol Ptak’s recent book on ERP.ⁱⁱ

Figure 1-2
EVOLUTION OF ERP



Step Two—Closed-Loop MRP

MRP quickly evolved, however, into something more than merely a better way to order. Early users soon found that Material Requirements Planning contained capabilities far greater than merely giving better signals for reordering. They learned this technique could help to *keep* order due dates valid *after* the orders had been released to production or to suppliers. MRP could detect when the *due date* of an order (when it's scheduled to arrive) was out of phase with its *need date* (when it's required).

Figure 1-3
Priority vs. Capacity

<i>Priority</i>	<i>Capacity</i>
Which ones?	Enough?
Sequence	Volume
Scheduling	Loading

This was a breakthrough. For the first time ever in manufacturing, there was a formal mechanism for keeping priorities valid in a constantly changing environment. This is important, because in a manufacturing enterprise, change is not simply a possibility or even a probability. It's a certainty, the only constant, the only sure thing. The function of keeping order due dates valid and synchronized with these changes is known as *priority planning*.

So, did this breakthrough regarding priorities solve all the problems? Was this all that was needed? Hardly. The issue of priority is only half the battle. Another factor—capacity—represents an equally challenging problem. (See Figure 1-3.)

Techniques for helping plan capacity requirements were tied in with Material Requirements Planning. Further, tools were developed to support the planning of aggregate sales and production levels (Sales & Operations Planning); the development of the specific build schedule (master scheduling); forecasting, sales planning, and customer-order promising (demand management); and high-level resource analysis (Rough-Cut Capacity Planning). Systems to aid in executing the plan were tied in: various plant scheduling techniques for the inside factory and supplier scheduling for the outside factory — the suppliers. These developments resulted in the second step in this evolution: closed-loop MRP. (See Figure 1-4.)

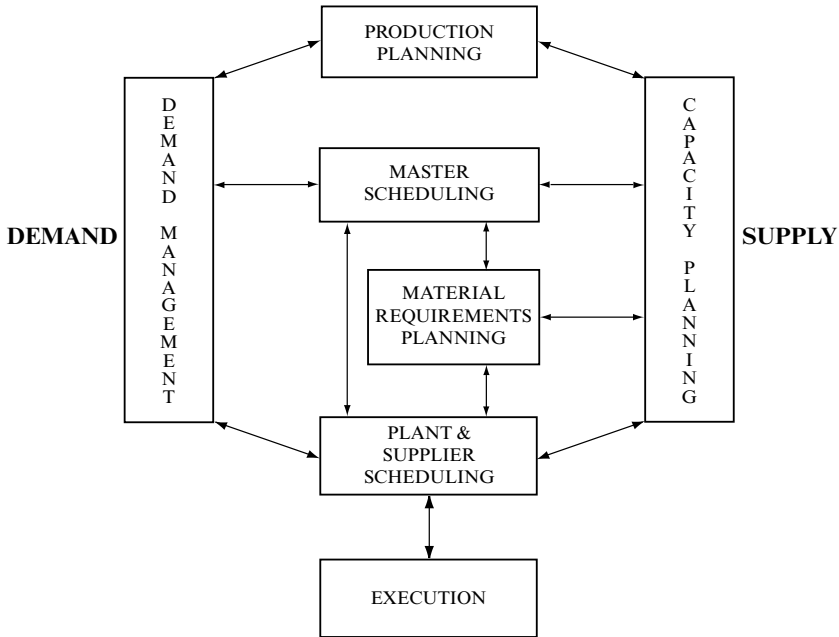
Closed-loop MRP has a number of important characteristics:

It's a series of functions, not merely material requirements planning.

It contains tools to address both priority and capacity, and to support both planning and execution.

It has provisions for feedback from the execution functions back to the planning functions. Plans can then be altered when necessary, thereby keeping priorities valid as conditions change.

Figure 1-4
CLOSED-LOOP MRP



Step Three—Manufacturing Resource Planning (MRP II)

The next step in this evolution is called Manufacturing Resource Planning or MRP II (to distinguish it from Material Requirements Planning, MRP). A direct outgrowth and extension of closed-loop MRP, it involves three additional elements:

1. Sales & Operations Planning—a powerful process to balance demand and supply at the volume level, thereby providing top management with far greater control over operational aspects of the business.
2. Financial interface—the ability to translate the operating plan (in pieces, pounds, gallons, or other units) into financial terms (dollars).
3. Simulation—the ability to ask “what-if” questions and to obtain actionable answers—in both units and dollars. Initially

