So You Want to Buy a New ERP System?
A White Paper by Peter and Eric Green

Introduction

As P.T. Barnum is reputed to have said "There's a sucker born every minute". Also, "A fool and his money are soon parted", is attributed to Dr. John Bridges in 1587 and often repeated since.

Both are highly applicable to manufacturing and industrial distribution organizations that purchase a new ERP system in the fond hope that it will solve all their operations management problems. But, according to Gartner Research, nearly 75% of these systems fail to meet their original objectives, most take at least two years of organizational disruption to implement, and 17% fail outright.

In this white paper, we look at what, in reality, is an ERP system, what they do well and where they fail to meet expectations for manufacturers and industrial distributors. Finally, we look at a better solution, which is to interconnect best-of-breed systems so they work as a cohesive solution to an organization's operations management problems.

What is an ERP System?

Let us start out by stating what a shiny new ERP system is not.

- It is not "Magic Pixie Dust" that will solve all the organization's operations management problems or even all their financial problems just by spending large amounts of money on a new ERP system.

- It is also not the one-system that will handle all the IT needs of an organization in the "Cloud" without needing any expensive IT support people; but more of that later.

That is not to say that an ERP system does not perform useful functions. But, before expending large amounts of time and money implementing one, it is worthwhile to examine what they are, what they can do, and what they cannot.

Some 40 years ago, ERP systems started out as accounting systems, typically for a single manufacturing plant or distribution warehouse. They also played a major role in preparing information related to taxes, which required that they also track inventory.

Then some expanded to handle accounting for multiple plants and warehouses, sometimes located in different countries, with different tax structures, in different currencies.

Also, these accounting systems quickly added accounts receivable and accounts payable functionality, requiring the addition of features such as customer orders, receipts, shipments, and invoices. Some, but not all, added payroll capability as well.

The next expansion, driven by organizations such as Toyota, was to add Materials Requirements Planning (MRP) which are algorithms to compute what materials to buy and make, and when to make them based on a demand forecast for the organizations products. These were then extended to multiple plants in the enterprise, hence the name Enterprise Resource Planning (ERP) systems.

This required the addition of some capabilities to the accounting systems, such as:

- Sales Forecasts for finished products – typically for next quarter

- Bills of Materials (BOMs) for making products

- Routes of Operations for making products

- Work Orders, consisting of routes of operations, often linked to a BOM

From the sales forecasts, the MRP algorithms are able to compute what materials to order and what materials to make, and when. Their model uses a base assumption of make-to-stock where a small number of standard products are made in advance of customer orders, according to sales forecasts, and placed in a warehouse from which customer orders were shipped.

Unfortunately, most manufacturing plants in the USA run on a just-in-time basis, where a wide range of semi-custom products are made to order, often with a turn around time of a few days. In most cases the MRP algorithms are of no value in this type of manufacturing. This is due to the "Amazon Effect" where there is no visibility as to which of thousands of different product variants will be required next week, let alone next quarter.

As a result, most ERP systems are used as the basis of manually issuing work orders, to make customer orders and purchase orders to buy needed materials but they are not used for automated materials planning. The resultant work orders are then often tracked through production using paper forms and Excel spreadsheets until finished products are placed in inventory or immediately shipped to customers.

ERP system typically do not track the consumption of raw materials to make products but instead "backflush" (reduce the quantity) of raw materials inventory according to the BOM of the products made or shipped. As explained in our companion white paper "Why is the Inventory

in My ERP system always wrong?" this often results in major errors in inventory counts and value.

As explained in the same white paper, beyond rudimentary tracking of inventory counts by Item Master Part Numbers (sometimes by location – such as which warehouse they are in) ERP systems do a poor job of tracking materials. For this reason, many ERP systems are used with Warehouse Management Systems to accurately track the quantity of materials in each warehouse.

These Warehouse Management Systems (WMS), however, are typically item locator systems which track the quantity of materials at each location. They are unable to track containers of material, such as work-in-process or multiple products on a pallet or in a tote. They are also incapable of capturing materials traceability data, such as is required for manufacturing processes regulated by government agencies such as the FDA, DoD, and FAA. For these capabilities you need to add a container-based tracking system, such as BellHawk.

Given that an ERP system does not accurately track materials or production operations in real-time or does materials requirements planning or production scheduling, what does it do well?

The answer is that an ERP system handles the financial operations of most manufacturing and industrial distribution operations really well, especially if they are fed real-time information about changes in inventory and the cost of the materials, labor, and machine time needed to make each product.

Unlike pure accounting systems, ERP system have database structures suitable for storing and integrating cost accounting data, especially if they are integrated with a system that can accurately track the value of work-in-process, as materials are consumed and produced in each operation, as explained in our companion paper "Solving the Work-in-Process "Black Hole" Problem in Manufacturing ERP System Deployments".

From this, a picture emerges that ERP systems are great accounting systems for manufacturing and industrial distribution organizations but do a poor job of tracking, scheduling and planning manufacturing and industrial distribution operations.

As a result, we often see ERP systems relegated to the role of a glorified accounting systems with the job of tracking and managing operations delegated to other systems that may or may not be integrated with the ERP system. This completely destroys one of the major reasons for buying a new ERP system in the first place, which was to replace all these "best-of-breed" systems with one system that does it all.

As explained in our companion white paper "Organizational Conflicts in Implementing New Manufacturing ERP Systems" the concept of having one system, which will meet all the IT needs of thousands of different industrial systems is doomed to fail.

The primary reason for this is that the developers of the ERP system insist that organizations using their ERP system change all their operating and manufacturing processes to fit the models built into the software. This requires years to accomplish, at a high cost for expensive consultants, who often know little or nothing about the organization's business, and sometimes results in completely destroying the competitive advantages of the organization.

Meeting the Goals of a new ERP System without Destroying the Organization

Some of the Goals for a new ERP system are:

1. Have a better accounting system that will handle roll-ups and drill-downs across multiple P&L centers or subsidiary companies, make month-end closing really easy, and handle tax accounting easily and accurately (keep the CFO happy).

2. Give customer support and sales people better visibility of the status of customer orders (keep sales happy). Also provide support for quoting and delivery estimation.

3. Track the status of many customer orders through production operations and automate their scheduling so that customer orders get shipped on time (keep the production manager happy).

4. Track the status of raw, intermediate, and finished materials in real-time, as well as that of materials on order or being made. Provide decision support tools that automate incremental materials planning in response to incoming customer orders (keep the materials manager happy).

5. Incrementally capture the cost of making products as well as work-in-process (keep the cost accountant happy).

6. Capture materials traceability data including preventing the use of materials that have not passed inspection from being used (keep the QC manager happy).

7. Eliminate duplicate date entry and prevent operational mistakes (keep everyone happy).

8. Provide a single resource where senior managers can easily see the status of their operations across multiple plants and warehouses. (keep CEO happy).

9. Minimize level of IT support needed for implementation and ongoing support (keep CIO happy).

10. Alert managers when situations arise that they need to pay attention to (keep all managers happy).

These are laudable goals which cannot be achieved even with the most expensive million-dollar ERP systems. Instead we can achieve these goals at much lower cost by integrating best-of-breed systems for each department into an operational ecosystem, as explained in the next section.

Integrating Best of Breed
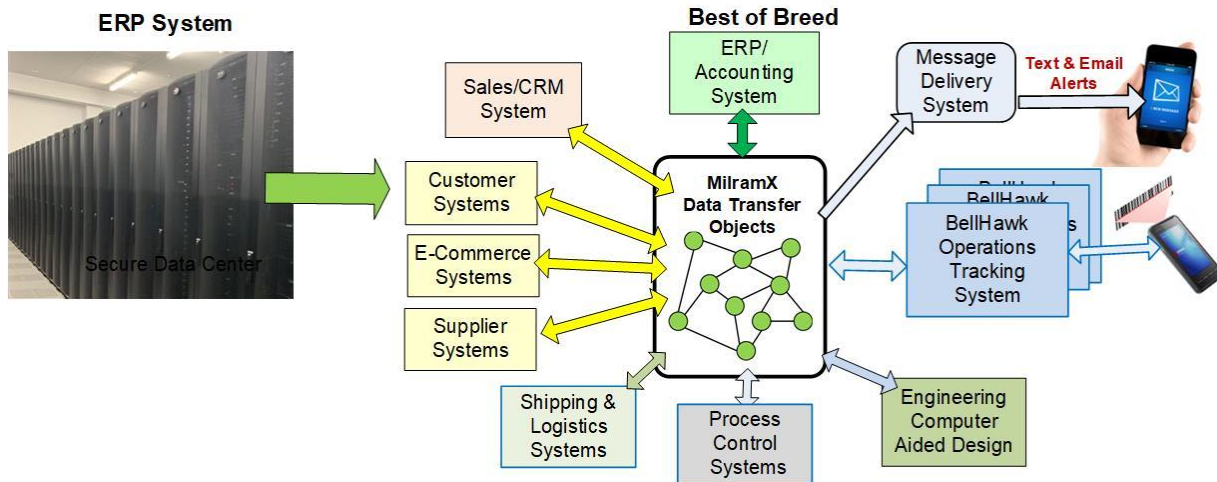
Here we enable each department to use systems that meet their needs, without changing their operations to meet the dictates of some ERP system. We do this by using a middleware product such as MilramX, from KnarrTek, to automatically exchange data between all the different best of breed systems used by each department, thus avoiding the need for duplicate data entry.

In cases, such as in production and materials tracking, where extensive use is being made of paper forms and Excel spreadsheets, we introduce systems such a BellHawk, which uses technology such as barcode and RFID scanning, to automate tracking of materials, work-in-process, and production operations.

Note that we do not replace the ERP system but simply treat it as one system amongst equals to meet the needs of the accounting and finance department and not to dominate the needs of all other departments.

A middleware such a MilramX can significantly ease the task of integrating many different systems by typically providing or automatically generating over 90% of the code needed. For more details, please see the Data Sheets link at the bottom of www.KnarrTek.com.

The cost of integrating best-of-breed systems using middleware like MilramX is not inexpensive but is certainly less that the cost of buying an expensive new ERP system and disrupting your operations for two years or more.

Advice about Buying a new ERP System

If you have an existing ERP or accounting system, and it is not costing you anything and your accounting staff are happy with it, then keep it and integrate other best-of-breed systems that meet the needs of your other departments.

But what if the computer operating system on which it runs has been obsoleted (such as by Microsoft declaring the operating system is no longer being supported)?

Then, here are some choices to think about:

1. If you are a small single P&L plant or industrial distributor, then use QuickBooks Enterprise but do not buy their manufacturing add-ons, as a container-based tracking system like BellHawk which will do a much better job of tracking your operations.

2. If you have multiple P&L Centers then the accounting system that comes with Microsoft's Dynamics 365 Business Central or NetSuite Accounting can be inexpensive solutions when combined with BellHawk.

With these solutions, as with many ERP systems, there are many add-ons available at additional cost to the basic accounting system. Do not buy them, at least until you have talked to the experts at KnarrTek.

Commentary

Selling ERP systems has become like selling cars. You now have to pay an extra monthly subscription if you want the heated seats to work in your new BMW. Often, after the sale, the sales person is long gone, after depositing his commission check in the bank, and handing the customer over to an implementation team. In the case of many ERP systems this often consists of expensive, freshly-minted MBAs, who know nothing about manufacturing and distribution, but graduated from some fine Ivy-League colleges.

So, Buyer Beware. Do not be a Sucker or a Fool! Talk to the experts at KnarrTek first.

Authors

Peter Green

Dr. Peter Green serves as the Technical Director of KnarrTek Inc. Dr Green obtained his BSC (Hons) in Electrical Engineering and his Ph.D. Degrees in Electronics and Computer Science from Leeds University in England. Subsequently Dr. Green was a senior member of technical staff at Massachusetts Institute of Technology and a Professor of Computer Engineering at Worcester Polytechnic Institute.

Dr Green is a Systems Architect who is an expert in using real-time artificial intelligence methods to implement real-time Inventory Tracking and Operations Management systems for Industrial Organizations. He has led the implementation of over 100 such systems over the past decade. Dr Green also led the team which developed the BellHawk job and materials tracking software, the MilramX intelligent information integration software platform, and the KnarrOps EDS software platform.

Eric Green

Eric Green serves as the Director of Support of KnarrTek Inc. Eric Green obtained is bachelor's degree from UMASS Dartmouth in Operations Management and Management Information Systems. Eric has been a part of 40 plus implementations of operations management systems over his 8 years of experience in this field. This includes receiving, production, inventory management, shipping, order management, as well as integrations with a number of ERP systems and a range of different manufacturing equipment.

For further discussion, or to send comments, please contact peter.green@KnarrTek.com or eric.green@knarrTek.com.

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