

10 Critical Questions to Ask a Manufacturing ERP Vendor

Must-Have Features and Functions, Architectural Issues, and Fit for Your Business Model



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A Google search for “manufacturing ERP” returns 2.3 million results, including hundreds of companies offering thousands of solutions in this area. The companies range from global giants offering legacy systems to smaller companies offering only point solutions (and still calling them ERP!) – and there are thousands of consultants and Systems Integrators with their own opinions and offerings.

Given this explosion of solution providers, how can an organization make an intelligent decision on whom to trust with this mission critical system? How do you sort out the companies with expertise in your area of manufacturing from the companies trying to force-fit their financial applications to your business model?

Plexus Systems suggests that many manufacturers are focusing on the wrong issues when considering ERP solutions. The ERP industry has earned such a poor reputation for delivery in the last 20 years that users has learned to live within a very narrow set of constraints – and those constraints have been in place for so long that the questions we hear are built with those constraints already assumed. Now is the time to break free of this mind-set and ask the more important questions.

Plexus Systems offers this guide to help you along your path to a decision. Our hope, of course, is that Plexus Systems will come out on top of your list – but even if we don't, we think these are issues that you **must** consider when choosing a partner for providing your core business operational system.

About Plexus

Plexus Systems provides Plexus Online, an on-demand software for manufacturing enterprises. That's it – it's all we do. Since the company's founding in 1995, we have focused 100% of our resources on the manufacturing market, and it shows in the feature-set and architectural model of our system, Plexus Online. We were the first company in the world to provide manufacturing ERP and related functions via the software-as-a-service model. We launched the product in 2001, and we continue to lead the way by providing functionality and services unmatched by even the largest companies in the world. In late 2006 and early 2007, some of these large legacy players have announced plans to offer solutions via the on-demand model, and we welcome them to the market.

We've learned important lessons every step of the way, and our software gets better each and every day. We firmly believe that we're the very best on-demand ERP solution for manufacturers in the world. But we leave that to you to judge.

Fit With Your Business Model

1. *How does the proposed solution support my style of manufacturing?*

There are dozens of “styles” of manufacturing, from job-shop to cell-type organizations to highly complex automated systems and robotics. Additionally, manufacturers utilize hundreds of manufacturing processes (e.g., stamping, forging, machining, coating, assembly, etc.) across dozens of industries (e.g., automotive, aerospace and defense, medical devices, food processing, etc.). Each combination of manufacturing style, process, and industry has a completely unique set of requirements.

For example, makers of complex, highly-configured machines cannot use the same interface as someone who runs high-speed automated equipment making thousands of pieces per hour; it simply isn't optimized for both businesses. The solution chosen to run your business must support your style of manufacturing and your business model.

Plexus Systems strongly recommends that a few plant floor people attend any system demonstration and/or reference visits. If the system is difficult to use, it will become “shelf-ware” and the ROI will be completely compromised. (In fact, we've seen worst-case scenarios where companies walk away from large investments they've made in software simply because their employees resist using the system.) If your workers won't use the software, the company will not get the accurate, timely data it requires to streamline operations and improve quality on an ongoing basis. Effective manufacturing software is all about adoption, about people wanting to use the software to make their jobs easier.

2. *Can a non-programmer develop a new business process in the system?*

Let's be blunt: billion dollar industries have been created in the follow-on market, where consultants and programmers charge hundreds of dollars per hour to program hard-to-use legacy systems. (Warning: you may get bad advice about software from someone in your IT department, for example, if he wants to get trained to be a DBA or programmer in one of the large legacy systems, just to increase his income in the future.) In most software systems, users can make minor changes to a selected subset of screens, but new screens and process flows must be designed and programmed by programmers – potentially adding tens of thousands of dollars to your deployment and maintenance costs.

A new alternative is available, however: software supporting a models-based application development environment enables normal business users to create entire new business processes tailored to their needs. Through a point-and-click and drag-and-drop interface, your advanced users should be able to create a new screen or report without writing any code.

3. *How does the system support the “extended enterprise”?*

Your manufacturing operation doesn't exist as a standalone environment; you have suppliers and customers that require direct access to data from your company. And, of course, that data connection must be both reliable and highly secure.

For the ultimate flexibility, your system should be able to expose *any* transaction to a customer or supplier – without any programming, and without installing software at your trading partner. Additionally, the interface to the system should be intuitive enough that suppliers and customers will not need training to use it effectively.

Some uses of this with suppliers include:

- **Problem Reports** – also called Corrective Action Requests. Once the supplier is notified (e.g., with an automatically generated email), they should be able to log on to the system and follow your prescribed problem-solving approach, such as 8D, 5Why, 5P, etc.

- **Lean Replenishment** – rather than calculate orders based on forecasts and holding “just-in-case” inventory at both the supplier and customer, the software should support electronic kanban or pulls. An alert can be sent to the supplier as your manufacturing operations consume material in the production process.
- **Quality Management** – Can you get the details of your suppliers’ quality plans in electronic format - not a pdf file? Imagine receiving a FMEA (failure mode effects analysis) from a supplier and having it flagged immediately because the RPN (risk priority number) is too high, indicating that it is unlikely the supplier can reliably send you good parts.

Likewise, some organizations find it useful to allow customers to view their inventory (Finished and WIP), their quality checks, corrective actions and so on.

All of these applications should be accessible via a simple web browser, without the need to build a separate “portal” for your manufacturing partners. This not only simplifies access, it greatly accelerates deployment schedules – from weeks or months to just minutes. With a web-based system, adding a new vendor to your list of partners takes just minutes, and your partner can access the system as soon as you provide them with a logon and password.

4. ***How is the software licensed?***

Sadly, the enterprise software industry often plays games with software licensing, offering variable feature-sets on a “per user” basis.

For example, software vendors convince their customers that 20% of their workforce should be licensed. This keeps the initial price low and acceptable. Once the software is deployed throughout the enterprise, it becomes clear that to get full value from the software, many more people need to use it – and they all need full licenses, as opposed to the restricted functionality licenses often sold in initial implementations. Manufacturers, especially, are not accustomed to having so many people use the software and will underestimate the number of users.

Plexus Systems strongly believes that the plant floor is where the most important data in a company is created, and that any system utilized in manufacturing must treat plant floor workers as *knowledge workers*, capturing and validating this important data at the point of origin. This means that plant floor workers need access to the software as well.

Plexus Systems recommends that you search for a more flexible, open licensing model that will allow you to deploy the solution more completely throughout your enterprise. Everyone at your company adds value to the products and services you provide; the most effective system will capture important facts about everything going on as it happens.

Architecture & Development Approach

5. *How many ways of accessing the system are there? Is the user interface consistent throughout the application?*

This first part of this is actually a trick question. Many of the legacy ERP vendors will happily describe to you all of the different client applications they have developed – one for Windows XP, one for Mac, one for Linux, two or three for various mobile devices, etc. This is NOT an optimal situation. Each software package must be tested and deployed, and then maintained and upgraded according to its own schedule – and oftentimes features in one client package are not exactly duplicated in another application. The solution is simple: standardize on a web browser as an interface, accessible from virtually any PC or device with a web connection. (Warning: don't be fooled by so-called experts who try to convince you that a web browser limits your functionality!)

As for consistency of the interface throughout the application, a little background on this situation will help clarify the issue. Many of the larger “application suites” have become suites as the vendor acquired other software vendors and incorporated their technology. (Note that we did not say “integrated” their technology, as many are not well integrated.) When a company grows through acquisitions, there are many challenges – and the issue most obvious to users is the variability among the interface to different components of the software suite. Remember, these products were developed at different companies, and every software vendor takes a unique approach to how the user interacts with the software. As a result, the software suite can often be hopelessly complicated, with different interfaces (and different styles of interaction) from section to section. Note that this also makes it much more difficult for your IT department to support the solution.

Plexus Systems recommends that you look for consistency in navigating from screen to screen, in tabbing from field to field, in how you enter and update and find information in various parts of the system. A truly consistent interface across all sections of the software can greatly reduce training costs and increase adoption – and thus drive faster time to value for your investment.

6. *When and how was the original code base developed?*

Many well-known ERP products have not been rewritten since the late 70's or early 80's. There have been dramatic and important improvements in software development tools over the past several decades. A modern, supportable system should have a code base developed in the new millennium.

Be careful to differentiate between the “front-end” and the business logic. The front-end or user interface can be enhanced or modified quickly, giving users the impression that it belongs to a modern application, while the original (spaghetti) code is still in place underneath the interface. Such a system is difficult and expensive to maintain and enhance.

Likewise, the data structure supporting many older applications were based on inefficient ‘flat file’ structures, not modern relational databases. Transaction control and reporting can be very difficult with such outdated architectures.

7. *How many customers are on the latest release of the software and when was the latest release?*

When Plexus Systems executives ask a variation on this question during meetings, (“How many of your enterprise systems are on the latest version of the software?”), we're often met with chuckles and headshakes as a response. Most analysts estimate that fewer than 50% of enterprises are within two releases of the current version of their enterprise software packages.

This is especially important because the traditional method of delivering software is fraught with waste and delays. Makers of on-premise solutions provide software updates, at best, every six months or so. Commonly the cadence is more like every 12 months. Customers then evaluate whether the enhancements are meaningful to them and whether the updates will conflict with any customizations they have done. After the planning, hardware upgrades, operating systems patches, migration, testing, retraining and bug-fixing, more time has passed and the customer wonders whether it was worth the work and the disruption to their business. The end result is that most

enterprises are two to five years behind the current state of technology, putting them at a disadvantage at a time where the industry is demanding they be more agile. Meanwhile, the vendor has to support multiple versions out in the field, multiple databases, operating systems and hardware types. It is a nightmare that slows the innovation process and adds *muda* (waste) and cost to the whole process.

With modern software development techniques and delivery over the Internet, software vendors can release changes very frequently – even on a daily basis.

SaaS or Software as a Service is becoming extremely popular. SaaS is a model where the software is accessed over the Internet from anywhere at any time. Users need only a web browser to run their entire organization. Companies don't need to invest in and upgrade servers, operating systems, databases, backup equipment and complex programming environments. Organizations can deploy the application very rapidly since they don't have the lead time and hassles associated with configuring their local environments. Their software provider is contractually obligated to provide acceptable availability and response time. Software changes and system software upgrades are done without the customer having to lift a finger.

From the vendor's perspective, SaaS takes time and waste out of the whole process so they can focus on delivering new features and capabilities to their customers. They don't need to:

- Batch the software changes
- Test the enhancements on several different platforms
- Write and test migration instructions for customers
- Distribute the software and instructions
- Answer questions from customers about how to do the upgrade
- Support multiple older versions for customers who choose not to upgrade.

Changes can be released much more rapidly. The software is always up to date. All customer enhancements are part of the same code base so they don't get trampled.

Manufacturing Functions

8. ***How are lean principles supported in the system?***

First, a conundrum: “enterprise” software systems are generally considered to be counter to lean principles. The standard approach to software when implementing a lean program is to allow individual departments or functions to select the application that best meets their individual needs. This department empowerment is core to any lean program.

However, many companies embracing lean principles still choose to implement enterprise solutions simply because the advantages offered by a system that spans multiple departments are too big to pass up – IF they are real. The more important issue for manufacturers is: does the system help take *muda* (waste) out of the entire system both internally and up and down the supply chain?

Many vendors tout standalone solutions to perform certain *lean planning* functions. These are highly specialized, periodic analytical functions. Once the value streams are optimized, be sure to find out how the system supports *lean execution*. Is electronic kanban available? Are pull systems part of the core solution? Are transactions poka yoke'd (mistake-proofed) at the point of origination? Is heijunka (demand leveling) available? And are these functions supported across the supply chain – with customers and suppliers?

Plexus Online was designed from the ground up to embrace lean principles, and all of these are supported within the system.

9. ***How does the detailed data about production, scrap, downtime, labor and quality inspections get into the system?***

These are the most important factors affecting profitability and success at a manufacturer - this is what manufacturing is all about. If this data is captured and validated as the activities are occurring, virtually everyone in the organization will have accurate, timely information for decision-making. Plexus Systems recommends that you look for a single, logical portal to capture and validate this information as it is happening on the production floor and the shipping/receiving docks.

Beware of software that requires “front-office” workers to key in transactions. This creates delay, and offers myriad opportunities to introduce errors. In the end, this approach creates too much *muda* (waste) in the process. Ideally, the system will be integrated “from the shop floor to the top floor”. Data will be captured and validated in real time, summarized and instantly available to decision-makers throughout the organization, wherever they may be and whatever role they may play.

Today’s manufacturing solutions should enable shop floor workers to be knowledge workers. Imagine a worker having everything needed at his fingertips to set up the work center quickly and accurately and to make, count and measure parts or assemblies. Drawings, setup instructions, material requirements, customer alerts, inspection specifications and more should be available in electronic form on the shop floor.

Alerts can be triggered immediately if a dimension or operating parameter is out of spec. An operator finds out right away if he is making bad parts – and corrective actions can be taken immediately.

10. *Are inventory records directly tied to physical reality?*

Many software solutions treat inventory as a dollar amount or, at best, several dollar amounts – Raw Material, WIP, Finished Goods. They focus on the accounting transactions. There can be a big disconnect between the physical reality and the dollars in the general ledger.

Plexus Systems recommends that you strongly consider a system that tracks inventory at the container level – whether it is a box of purchased parts, a galvneel of resin, an expensive end product with its own serial number, or a coil of steel. The inventory listing would show each ‘container’ of inventory, the stage of production that has been completed and the accumulated cost up to that point.

If your manufacturing operations are in a high-precision/high-liability industry such as aerospace, automotive, medical devices or food you will need to be able to track the genealogy (e-pedigree) of your products. Be sure to see how the traceability function works in any system you consider. Is it automated and streamlined or does it rely on an operator to key in the lot number of the source material? The latter case will bury your people in busy work.

Plexus Online tracks serialized inventory at the container level, and tracks it at each step of the production process. The traceability features within Plexus Online enable any user to quickly trace a defective product back to its point of origin, and then quickly track forward to any other parts that include the same defective material or incorrect manufacturing step.

Summary

Choosing the right ERP solution for your manufacturing operations is a very important decision, one that you will be forced to live with for years to come. It is essential to evaluate the key elements that will make the choice a success.

- **Usability** – Adoption, or use, by a large percentage of employees is critical to capturing the data you need accurately and in a timely fashion. Is the software simple to use? Does it complement the user's job and make it easier or does the software “get in the way” or seem cumbersome? Does it make good use of technology such as handhelds, barcodes, RFID, touchscreens, etc.?
- **Fit for Your Type of Business** – Make sure you see how the data would get into the system. Is it easy? Is it captured and validated at the point of origination? Will it work for your highly-automated lines or your machine-building shop or your engineer to order operation, whichever you may have?
- **Ease of Change** – Can a non-programmer create new screens and reports? Are your changes carried forward automatically as new features are provided by the software vendor? How often is new functionality released?
- **Total Cost of Ownership** – Be sure to add up the hidden costs, especially if you are comparing SaaS to on-premise solutions. Some costs you avoid with the SaaS model include:
 - **Servers** – primary, test and failover
 - **Operating Systems** – and the ongoing software maintenance
 - **Database Management Software** - and the ongoing software maintenance
 - **Backup Equipment** – tape backup devices, tapes, offsite storage
 - **Labor** – Database Administrator (DBA), application programmers, system managers (the people doing the patches, backups, restores, restarts, etc.),
 - **Other** – the cost of planning, hardware upgrades, migration, testing, retraining and bug-fixing associated with on-premise solutions.

Software expenditures often compete with spending on new production equipment. The thinking is that “software doesn't make parts”. In truth, the right software can help you make more parts with the same equipment. But that's another whitepaper.

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