

Manufacturing Business Technology

IT FOR MANUFACTURING EXECUTIVES

System selection: When - and how - to choose custom software applications

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As the economy slows to a crawl, manufacturers must continue to streamline operations, trim waste, and plan for the future. While it may be tempting to ruthlessly ratchet down costs across the board and hunker down until the market rebounds, companies should take a moment to consider their competitors' responses to the recession.

The current downturn may actually be the ideal opportunity to examine IT strategy and revamp it to gain competitive advantage. As companies look to evolve to a 'smarter' IT strategy, smaller, inexpensive, made-to-fit custom applications offer a great way to build lasting competitive advantage. Some important pointers and pitfalls to consider when implementing software applications:

1) Choices, choices

- Many organizations choose commercial off-the-shelf (COTS) technology solutions before they have completed a detailed exercise to identify core business requirements. Detailed business requirements must be identified to determine whether existing COTS applications are a good fit.

Here are questions that need to be asked:

- How much customization would be required for the product to really do what's needed?
- Would any business processes need to be changed to fit the application, and if so, is that good for your organization?
- What are the areas where your manufacturing process are unique—in a good way—and need to be preserved?

If you are like most companies, completing this exercise will lead you to one of the following conclusions:

1. A majority of the requirements can be met by a generic COTS application, but there are areas that need custom solutions to provide a competitive advantage; or
2. Your process and methodology are different enough that it makes more sense to build a custom system than to customize a COTS application.

DO:

- Put forth the time and effort to formally identify business requirements.
- Remember to think of "what-if?" scenarios when identifying core business requirements - not only looking at current pain areas, but also thinking about future opportunities to improve and outperform the competition.

- Carefully consider how good of a fit COTS applications are for your business and how much you are willing to adapt to fit the requirements of an off-the-shelf product.

DON'T:

- Rely on persuasive product demonstrations, analyst recommendations, or industry penetration data that seems to make a particular product an obvious choice. The path to competitive advantage is not found by following in the footsteps of every other player in the market.

2) Think Lean.

Custom applications usually are leaner and more efficient than commercial systems. Just like the Toyota Production System, which focused on identification and steady elimination of waste, these apps can provide a framework to continuously improve business processes. Small applications that optimize areas of production can provide significant improvement in quality or productivity and reduce overall waste.

For example, a composite manufacturer was having problems with part quality due to the variations in processing unstable, reactive raw materials. It was determined that atmospheric exposure of raw materials was a key factor in determining the defects introduced in the parts during processing. However, with a large and varied production environment it was difficult to manually schedule operations to reduce or eliminate these defects and the associated rework. The solution was a specialized scheduling application that allowed operators to tightly control the exposure to atmosphere of these materials, while providing adequate flexibility for changing priorities, product types, and process steps. Implementing this custom application on the shop floor resulted in significantly increased product quality, process capability, and overall yields.

DO:

- Focus on small, contained opportunities for optimization rather than plant-wide resource systems that can create significant overhead.
- Specifically outline which metrics you seek to improve and monitor results periodically. Did the system do what it was supposed to?

DON'T:

- Allow project boundaries to spiral out of control by looking for a solution that provides everything to everyone.

3) Bet smart.

Who hasn't heard horror stories surrounding large packaged application implementations? An ERP implementation project cost Hewlett-Packard an estimated \$160 million; Nike sank \$400 million in upgrading its supply chain systems, which led to lost sales; and FoxMeyer Drug went bankrupt in part due to an out-of-control ERP implementation project.

A U.S.-based manufacturer of custom metal products took a smarter approach. This aluminum rolling provider had developed flexible and adaptable manufacturing processes to meet the varied specifications for each order. Each customer order consisted of unique specifications that included chemical composition, physical dimensions, and material properties—which required specific processing and testing steps during manufacture. Operations were being managed using a paper-based process and disconnected legacy systems that were difficult to integrate and modify. After evaluating the standard commercially available materials requirements planning (MRP) systems, the company concluded that to fulfill its requirements with any COTS system, massive customization was required. The company decided to build a custom system, one module at a time. The custom MRP system was designed with central hub framework architecture consisting of integrated modules

that were tailored to the production process, including integrations with equipment, PLC devices, and third-party applications. The specialized modules were built one at a time for all operations, including receiving, inventory, manufacturing, tracking, shipping, and sales. The rollout took longer, but was done successfully and with minimum risk due to the iterative feedback process put in place.

DO:

- Minimize risk by using a piecemeal approach based on custom modules. Implementing a modular custom system establishes the flexibility needed to ensure a smooth and trouble-free transition.
- Prioritize and map out a logical strategy for which modules should be implemented, and in which order. It might make sense, for example, for sales to move to a custom system and offer feedback before the shipping & receiving module is designed.

DON'T:

- Lock yourself into a big-bang approach where all functional groups within the organization are committed to move onto the new system.
- Move on to additional custom modules until actionable feedback is available from early user groups.

4) Sweat the small stuff

Continuous improvement may not be trendy, but it's still an excellent method to enhance quality, productivity, and overall customer satisfaction. Consistent, incremental positive changes can have a profound and lasting impact on an organization—something that drastic reorganizations or reengineering usually fail to achieve. Custom applications can be similar in nature—small applications designed to be used at various places in the company's operations—such as procurement, logistics, or quality—can provide lasting benefits. They can accelerate business initiatives, and often unleash employee experience and creativity to improve both products and processes.

For example, an aircraft engine parts manufacturer developed a custom data acquisition and quality analysis system to implement continuous improvement for its growing manufacturing operation. The manufacturing intelligence system was designed with specific interfaces to shop-floor equipment, and provided real-time process monitoring for automated and manual equipment. It was designed to serve as an early-warning system to trigger automated notifications for process excursions before any manual process could identify them. Advanced statistical analysis techniques were used to identify and discover trends within large volumes of production data, allowing engineering groups to easily see process trends and variable correlations. The custom application was designed to integrate with the existing ERP system to establish single-source visibility and seamless data connectivity between inventory, billing, and operations.

DO:

- Identify trouble spots and examine them as areas for possible improvement with custom applications.
- Encourage employees to be involved at an early stage in the process. Being involved in identifying or designing a new application can stimulate creativity and create a sense of ownership.

DON'T:

- Neglect the details. While it is important to think about the big picture, don't forget that small steps can have a big impact.

5) Right-brain magic.

Ultimately the success or failure of a business application often depends on one critical factor: usability.

Whether it is a COTS application or a custom development, it is destined to become shelfware if a majority of users do not find it easy and convenient. To create software with great usability, you need to consider these questions during system design:

- Who are the users?
- What is their background and context of work?
- What do they know and need to do?
- How can the machine help?

In this regard, custom software applications offer a huge advantage. If done correctly, they are designed with specific users in mind and can offer excellent usability. They can simplify user interfaces, and provide smart shortcuts to most popular information and customized reports that save users valuable time.

DO:

- Carry out a usability analysis of any application that you are considering—packaged or custom. This should be an important part of your standard evaluation process.
- Work with the end users to understand their backgrounds, tasks, and needs before designing user-interface elements. Remember: Good usability can drive adoption and project success.

DON'T:

- Develop custom applications in a vacuum. Rather, involve users early to determine what works for them.

Custom applications do not need to be expensive or fancy to be effective; they just need to be focused on the core business problems or process requirements that make each business unique. Done right, they can provide a truly big bang for a relatively small buck.



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