7 STEPS TO SELECTING **PROCESS MANUFACTURING ERP SOFTWARE**

Your guide to finding the right ERP software for your process manufacturing business

GUIDE **HIGHLIGHTS**

- Requirements analysis of key manufacturing processes
- Downloadable requirements template spreadsheet
- How to determine when to replace your ERP

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INTRODUCTION

As process manufacturing businesses grow, so do the pressures on key business processes.

Sometimes, these are general pressures. In other instances - such as slip ups in production scheduling or lapses in quality control - they can be directly mapped onto technological outdatedness or failure.

Continued expansion of these problems lead many businesses to re-evaluate their current IT systems and the way they use these to manage functional areas of their business.

When this evaluation concludes your process manufacturing ERP system is not up to scratch, **it is time to act fast** and begin the process of selecting a new ERP system. This system must not only match your existing requirements, but be able to support and encourage business growth.

In this guide you will learn about how to identify key requirements for a new process manufacturing ERP. We have laid out a few examples for you to follow - but the process is transferable to any other requirements you might have.

At the bottom of this guide you'll also find a process manufacturing ERP requirements template to help identify which features your new system needs, and how these can be provided.

1. IDENTIFY WHETHER YOU REALLY NEED A NEW ERP

The first step in your journey towards a new process manufacturing ERP is the identification and confirmation of a need for system change. While there are many well-established reasons for ERP change - from an end to vendor support for your product, to commonality of system workarounds - it is important, as a process manufacturer, to focus on those reasons which are identifiable and commonplace in your specific industry.

IS REGULATORY COMPLIANCE BECOMING BURDENSOME?

You may deal with cGMP and HACCP. You must comply with hazardous material and environmental management compliance. Your legacy ERP was once perfect, but the ever-accelerating development of new compliance requirements means your system has been left in the regulatory dust.

As a general rule of thumb, the newer the system, the more compliance requirements are met "out-of-the-box". You will also find today's process manufacturing ERP solutions have wonderful reporting capabilities that enable quick and easy preparation of data to meet a regulator's wildest desires.

IS DATED EQUIPMENT HOLDING YOUR BUSINESS BACK?

The equipment needed in a process manufacturing environment can be expensive. Your business depends on mixing, refining, and otherwise converting your recipe into finished products. You want that equipment running all day, every day, in order to provide a return on your investment.

You need to plan your jobs carefully - with maximum machinery up-time - to meet order deadlines. **Time between process cycles must be kept to a minimum.** Changeovers must be planned to delay costly clean outs between production runs. At the end of the day, you want to produce as much "grade A" product as possible to keep revenues high.

The past few years have seen great advances in planning and scheduling workflow. These advances have been driven by new ERP systems which can react to real-time data and ERP-to-machine communication. Without these advanced workflow and reporting channels, you risk losing equipment efficiency, something you can ill afford in such a competitive industry.

IS YOUR ERP CLUNKY AND OVER-CUSTOMIZED?

On the day you gave the green light on your legacy ERP, chances are the selection choices available were many factors smaller than those available in today's ERP market. You may have been forced to select a "catch-all" system that you have learned to work with over the years. You might have had to heavily customize the system to meet your industry requirements. If either of these scenarios rings true, it is time to consider your options.

Right out of the box, a new process manufacturing ERP system can provide features you will wish you had for years. Yesterday's workaround will become tomorrow's work through. Not only are you likely to find a strong ERP that was developed for your particular process manufacturing niche, but you will find that it can be conveniently and easily modified to meet department and users preferences.

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The real trick with a contemporary ERP selection is to conduct thorough requirements analysis within your business. The question is no longer, "which ERP system meets the greatest percentage of our needs?", but "which of our needs is likely to derive strategic advantages, and how can our ERP support this derivation?"

2. MAP OUT YOUR PRODUCT DEVELOPMENT NEEDS

Like any business, process manufacturers need to continually develop new and existing products to meet customers demands. So where better to start your process manufacturing ERP requirements analysis than at the top of the funnel - new product development (NPD).

Be thorough about this. Discuss both what your key requirements are for NPD and how new technology could potentially meet them.

Your NPD team are ready to put their thinking caps on and transform a market opportunity into a product available for sale. How can your new process manufacturing ERP help this process along?

MANAGING MATERIALS DURING NPD

In a process manufacturing environment, your NPD efforts often begin with new materials. You will bring in samples and might open a project in your ERP system. This project is primarily a vehicle to capture costs and record the steps toward development of the product. But how can these NPD steps vary between industries and **what can this mean for ERP requirements analysis?**

Pharmaceutical manufacturers must investigate material purity and the impact that this has on the drug during a lengthy R&D phase. The production processes and formulations for each development batch must be recorded and combined with quality control data to identify the highest quality final product. This NPD process relies heavily on integration between each component and this requirement will likely apply to the ERP used to manage these processes.

"Discuss both what your key requirements are for NPD and how new technology could potentially meet them"

Chemical manufacturer NPD, on the other hand, may focus on material sourcing. They need an in-depth overview of their supplier landscape during product development. Because of this, the emphasis may be on an ERP with a well-integrated purchasing module. This will allow requests for quotes and eventually the placement of a purchase order from within the development project. The *ERP can also track the incoming order, record the receipt in a transaction and the movement to inventory when the materials arrive. With supplier relationships being paramount, we may want the ability to set up an alert to let us know when the bill is due and we need to make payments on the bill.

OTHER REQUIREMENTS FOR NPD

ERP can also help with your packaging requirements during development. Can you use existing pallet boxes? If you are producing flour and your customers are bakeries, this might be your situation. Is this a consumer product like cake icing that requires parts in inventory such as dispenser tubes and blister packaging? If so, you may need inventory management data to be fed into your project in your product development module.

Either way, ERP can help you ensure the right packaging is on hand when you are ready to ship to our market.

Finally, you will need to test and document the stability and shelf life of the new product. Your process manufacturing ERP is ready. If you already monitor temperature and humidity in the warehouse, you can track the conditions on exactly the shelf where the product is stored. Over time, you will move samples of the product to the lab for testing and record the results in your ERP. For food manufacturers, it may be a case of slapping a date on the packaging.

For pharmaceuticals, you may have to cross reference the shelf-life with regulatory requirements and move back into the testing phase once more. Your industry niche heavily informs the process flow during NPD, so it should also heavily inform your ERP product development requirements.

3. ESTABLISH KEY REQUIREMENTS FOR RECIPES & FORMULAS

Managing and maintaining recipes and formulas is **one of the most important ongoing activities** for many process manufacturers.

Management never stops as new ingredients become available or existing ones become unavailable. Food processors continually need to reduce costs. Pharmaceutical businesses must deal with changes to compliance rules. Chemical producers must manage environmental concerns. So what do you need from your ERP systems to manage these changes efficiently and meticulously?

A requirement common to all process manufacturers is the need for configurability in the formulation management module. ERP must be able to use both volume and weight for recipe ingredient management and reporting. In food production, for instance, the ingredients might be in weight as they are added to the process, but nutritional information regulations require reporting of the same ingredients on the label by volume. This configurability is also vital in global manufacturers who must switch between units of measurement to accommodate local expectations.

SHORTAGES & SUBSTITUTIONS

Your formulations are often based on nominal quantities that will yield a standard output. If your industry is particularly susceptible to material shortages, your ERP should be able to work backwards starting with the available amount of the short material and calculate a revised formulation and expected yield. This yield would then need to be fed into your inventory and sales module in real-time to avoid any backorders.

"your ERP should be able to work backwards starting with the available amount of the short material"

Along a similar line to material shortages, many **recipes and formulations stored in ERP must also cope with material substitutions**. A drug might not permit substitutions for a component that must come from a certain manufacturer. Another chemical could be switched between two or three different suppliers with no change to the formulation. Still another might allow a substitution, but only if the quantity required is increased and another reagent is substituted.

OPTIMIZED INGREDIENT USAGE

Any process manufacturer worth their salt knows the importance of optimizing ingredient usage. How do you achieve this optimization? Maybe your suppliers offer a reduced price on the remaining quantity of a lot about to expire. Can a profitable batch be made up and sold? Can your legacy ERP give you this information?

Maybe you buy and sell materials semi-independently of production due to ingredient value or availability fluctuations. A drought in the area where an ingredient is grown or political strife in the country where a mineral used in a drug compound is sourced. How do you currently manage this procurement?

One thing is for certain, it should be informed by data from your ERP system.

4. UNDERSTAND YOUR PRODUCTION SCHEDULING NEEDS

Food manufacturers must get their product on the grocery store shelf at just the same time as a consumer wants to put the product in their basket. The product margins are usually low and most **products will often have an extremely limited shelf life**.

Pharmaceutical manufacturers continuously develop new products that must be tested and approved by compliance agencies. The development cycle can be decades and the period of high ROI might be very short due to competition in the market.

Efficient and comprehensive production scheduling is one way an ERP can help both of these businesses. **Your schedule should be a result of equipment and resource capacities balanced with the need for those resources to produce your products**.

SIMPLE PRODUCTION SCHEDULING

A baker may bake only white bread, all day every day, and their cost per loaf may be very low. What is stopping him from expanding his production range to include wheat, rye, sourdough, and other varieties where there's consumer demand? A simple ERP could record the recipes and production times allowing users to create simple production schedules for their small bakery.

FULLY-AUTOMATED PRODUCTION SCHEDULING

At the other end of the spectrum, a complex production scheduling module may provide automated production scheduling which can be driven by real-time data from order management, quality control, machine-to-ERP communication and a whole host of other disciplines.

RULE-BASED PRODUCTION SCHEDULING

If, as is often the case, your requirements fall in the middle of these two extremes, a rule-based production scheduling system may be best for you.

Rule-based ERP scheduling could schedule batches which require similar or identical environmental conditions back-to-back to eradicate time lost in adjustment. It could also be used to reduce the inefficiencies associated with intensive equipment cleaning by assigning the batches that require this work to the end of the day.

In a pharmaceutical environment, rule-based production scheduling may be used to ensure new drug development only takes place using smaller, slower equipment to allow profitable products to use the more efficient production equipment. Alternatively, the irregular nature of this R&D work may mean that utilizing rule-based or automated ERP production scheduling is impractical and unlikely to produce a return on the investment required to obtain these systems.

As you can see, **requirements analysis for production scheduling is likely to turn up more questions than answers**. But it is these questions which will allow you to make crucial decisions between the varied options in this functional area of process manufacturing ERP.

5. CHECK LOT TRACEABILITY & COMPLIANCE REQUIREMENTS

The process of selecting an ERP system will always include discussions about the goals, objectives and requirements within the business.

Yet equally as important are those requirements which come from external sources, many of which will carry even more weight than internal considerations.

Paint manufacturing is a business that might seem little affected by regulatory compliance compared, for example, to pharmaceuticals. Manufacturers in this industry want to create products that are profitable while retaining a competitive shelf life and product quality. But they must also publish MSDS documents for their paints and make these readily available for customers.

It may be difficult to spot from the outside, but every process manufacturer will have their own regulatory requirements which they can identify and use to inform their ERP selection decision.

COMPLIANCE PROVIDES A FOUNDATION FOR LOT TRACEABILITY

One of the areas of process manufacturing ERP requirements that regulation can inform is lot traceability. **You cannot ask for a more clear base marker for lot traceability requirements** in your industry than that which is provided by regulatory legislation.

Once this foundation for lot traceability requirements has been established, businesses must analyze other external pressure points and align their ERP requirements with solutions to these. Food processors must deal with these external demands all the time. We see in the news almost every day that someone somewhere has become ill due to salmonella or e-coli outbreaks.

"Whatever process manufacturing industry you work in, ERP must satisfy both internal and external needs"

When someone in Canada becomes ill due to a product manufactured in the US, the manufacturer can trace the beef to a ranch in Argentina and the cattle feed to a plant in South Africa where the scheduled cleaning of equipment was not logged as completed. The product tracing laws identified

in the EU (EC) No 178/2002 legislation are prime examples of how the ERP requirements outlined above can be driven by an external source, but these requirements could equally have been derived from an internal risk analysis.

CLIENT-DRIVEN TRACEABILITY

As well as an internal risk analysis, lot traceability requirements may be driven from other internal sources. Going back to our paint manufacturer, their business will have have a well established reputation with clients to uphold and the long-term consistency of their products is part of that reputation. So they would also have a need to track the lots and batches of all their ingredients as well as for each of their own production batches. If the paint fades or peels from a wall, they can trace backwards to the source of the problem and determine the best resolution.

This is an example of lot traceability requirements driven by a client response to products. If dealing with this sort of client response is a top priority for your business, it may be worth looking into integration with the CRM module of prospective ERP systems.

Whatever process manufacturing industry you work in, ERP must satisfy both internal and external needs. Rather than seeing this as doubling the pressure on your system, use these sources to drive your requirements analysis - for lot traceability and other ERP functions - and it will lead you to the best ERP for your business.

6. DRAW UP A LIST OF ESSENTIAL QUALITY CONTROL FEATURES

Quality control is important for any business and that certainly includes those in process manufacturing. Even if your particular needs do not fit perfectly with these examples, you should be able to infer how ERP can help you and your business based on the processes outlined below and throughout this document.

CORRECTIVE AND PREVENTATIVE ACTION

Process manufacturers all have production problems to solve at one point or another. One of the first steps to solving said problems is to determine the root cause. How can your process manufacturing ERP help this process?

Your ERP should contain a record of every transaction and data update that occurs in your business.

If your business is one which requires corrective action to be rapid and effective, you will need advanced query capabilities to allow you to slice and dice the data. Couple this with real-time reporting, and you may have the tools necessary to work through to the root cause. If preventative action is necessary to stop the problem recurring, your ERP could help control the situation in a number of ways. An example would be the verification of a user's training through integration with an HRM module - is it up to date and adequate for the transactions they are performing?

RECEIVING INSPECTION

Another aspect of QC your business may wish to manage in your ERP is material inspection management.

Step one is to identify which materials require an inspection upon receipt. In some businesses like pharmaceuticals, this could be every receipt. Then document a plan defining what measurements to take and where to record the results.

This plan could be set up within your ERP and integrated with production scheduling to prevent materials entering the production process before the necessary checks have been carried out. At the same time, the inspector themselves can be verified to ensure they are qualified to carry out the inspection.

SUPPLIER MANAGEMENT

Supplier management is a vital part of quality control.

As a food processor, that chain of supplier QC must go all the way back to the field or pasture where the materials were grown. You may only require basic data such as supplier name and address which will allow you to submit QC queries to suppliers. Higher level data such as a record of the suppliers' certifications and the date of the certifications may also be required so internal certification reports can be produced.

Identify your own criteria for supplier QC and develop a database blueprint which you can use to inform any ERP Request For Proposal (RFP) or ERP demos that you conduct.

REGULATORY COMPLIANCE

The governmental and industry agencies a business must report to will heavily dictate any QC requirements analysis for process manufacturing ERP. Whether you are a chemical refiner or produce a line of cosmetics, these requests are the bread and butter of any QC processes.

Fail to meet regulations set out for your industry, and any amount of supplier, inspection and fault management won't mean a thing.

Although aligning these regulations with your ERP requirements may seem like a daunting task, remember that regulatory bodies and industry ERP vendors have done most of the heavy lifting for you. Your job is to play matchmaker between the two.

7. IDENTIFY THE ERP THAT BEST MATCHES YOUR REQUIREMENTS

Before reading this guide, this may have seemed like a simple quest. Open any trade magazine. If you are a food processor, there will be several ads declaring they have the right ERP software for your business. Pharma manufacturer? Same thing, open your trade sheet and your ideal system will be there. **By now, you have hopefully realized that things are not that simple.**

ASSIGNING PRIORITIES

From your requirements analysis, start by assigning priorities for each of your business needs. If you make a commodity such as an agricultural fertilizer or baking flour, lowest cost production may be one of your primary needs. From this analysis, you may look for an ERP that will help you operate equipment for long-running batches of production.

Another business such as gasoline production might have very tightly controlled formulations. Therefore, they may look for an ERP that includes the ability to communicate directly with the production equipment and monitor and adjust the processes with little or no human decision making.

Maybe your ingredients vary with available prices anywhere in the world. Wheat from Russia might be cheaper than wheat from Australia today but it requires a slightly different recipe and milling cycle. In this case, a top priority for your business may be an ERP which can accommodate material variations either through automated production scheduling or rapid product development.

"Your requirements analysis will also open up the possibility of shortlisting industry-independent systems which may have been discarded on account of their lack of 'process' branding"

All these examples follow the process of analyzing industry conditions, identifying the ways in which these conditions affect your business and prioritizing requirements for your new ERP system based on these facts.

REPEAT THE PROCESS FOR EACH OF YOUR KEY REQUIREMENTS

Repeat this process for each aspect of your business and you will be able to develop a complete picture of your current processes and business goals. This will be crucial when completing the ERP

selection process, whether it is shortlisting vendors, developing an ERP RFP document or conducting ERP demonstration sessions.

Your selection journey will almost inevitably lead you back to those same systems which clutter your trade magazines with adverts. But your requirements analysis will also open up the possibility of shortlisting industry-independent systems which may have been discarded on account of their lack of "process" branding. You may just find that these highly configurable systems are exactly what your business needs.

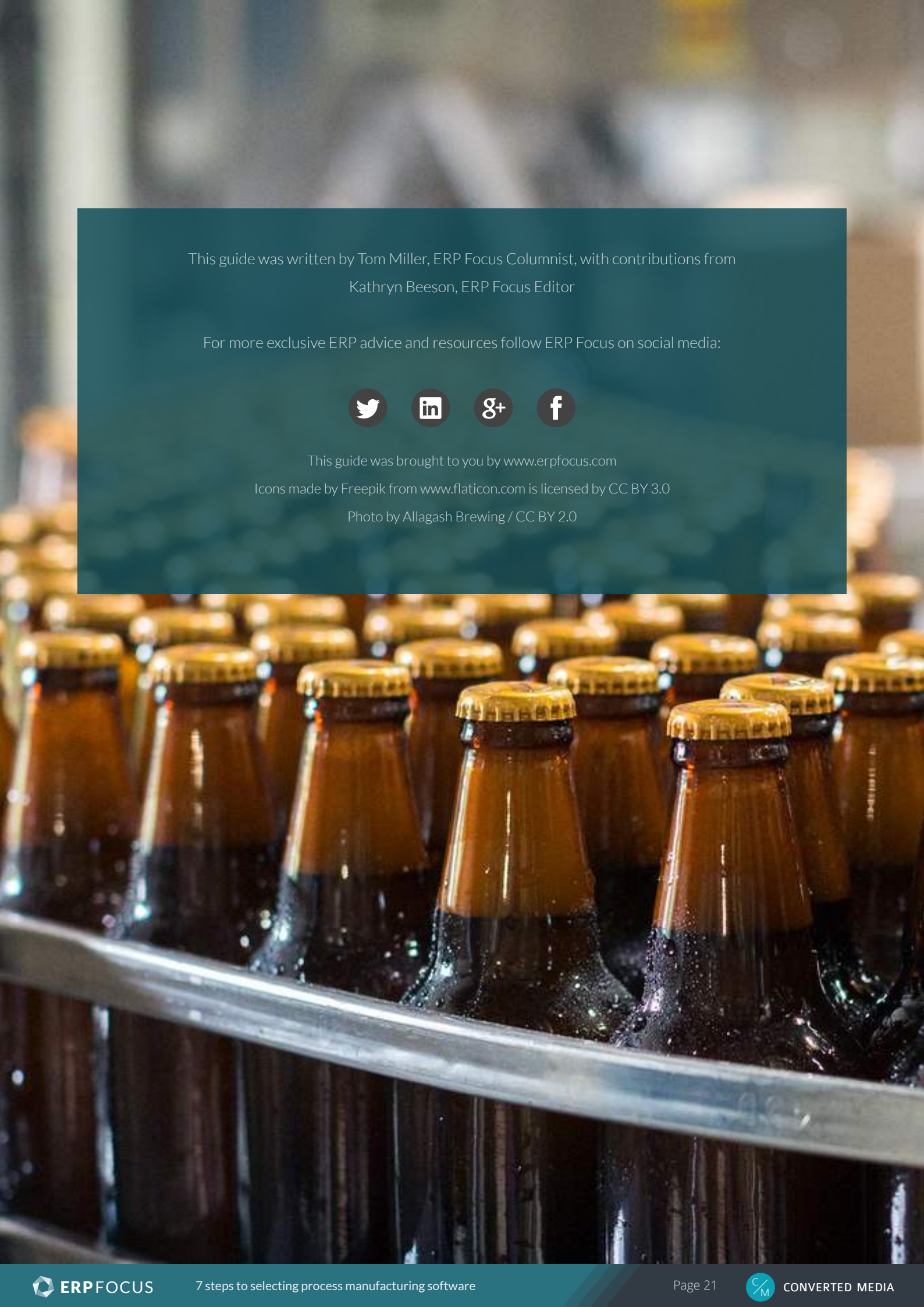
ERP REQUIREMENTS ANALYSIS TEMPLATE

This template is also available to download as a spreadsheet

Feature Requirement	Priority	Timeline	Vendor Response					
			OOB	CUS	BOL	3RD	FUT	NA
Production Management								
Recipe and formulation database								
Ingredient shortage management and substitution suggestions								
Batch traceability								
Machine-to-ERP communication including completed unit reports								
Machinery maintenance plans								
Allergen management								
Nutritional labelling								
Quality Control								
Documented training for employees at certain operations								
Traceability to specific ingredients								
Traceability to specific customer deliveries								
In-process quality control								
cGMP compliance								
HACCP compliance								
Inspection plans at operations or materials								

Non-conformance tracking and management								
Operations Management								
Fulfilment								
Lot numbers / serial numbers								
Plant and equipment maintenance tracking								
Shelf life and expiration dates								
Planning & Scheduling								
Real-time inventory availability								
Production schedule								
Production schedule compliance								
Real-time updates to production schedule								
Batch ticket tracking and rescheduling								
Order Management								
Projected on time delivery based on remaining operations								
Ability to track milestones from order acceptance through production								
Verification of supplied ingredient against initial order								
Procurement								
Supplier directory with categorization								
New supplier compliance audits								
Supplier relationship management (SRM)								
Integration with recipe/formula management for material requirements								
Inventory Management								
On hand inventory								

Nettable and non-nettable inventory locations								
Inventory turnover by subsets								
Surplus inventory management								
Consigned inventory (VMI support)								
Quality control on existing inventory including shelf life								
Pre-receipt inventory quality control								
Inventory valuation								
Materials Management								
Revised recipes.formulations for ingredient shortages								
Alerts when production is behind schedule								
On time delivery reports of materials required for jobs								
Warehouse slotting								
Cycle counting capability								
Cross docking								
Documented storage environment for shelf life materials								
Documented training for employees handling restricted/dangeious materials								
Supply Chain								
Integration with supplier ERP systems								
Advance shipping notification from suppliers								
Link to carriers websites for real-time tracking								
Suppliers capacity for future orders								
VMI capability								
Delivery appointments for dock schedule and needed equipment								



This guide was written by Tom Miller, ERP Focus Columnist, with contributions from Kathryn Beeson, ERP Focus Editor

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