

Food and Beverage Industry Positioning Paper

Introduction

Food and beverage companies operate today in an environment very different to that of a few years ago. Some of the old paradigms, such as producing inventory to forecast, long production runs, and limited number of product categories, are no longer viable. The changing demands and fashions of the consumer market mean that food and beverage processors cannot plan on the basis of a long product life, and innovation has become a critical factor for survival.

The role of dictating price and delivery has been taken over by big customers, like the major retail chains. For consumers, price and quality have a significant impact on the decision to buy.

Increasingly, the consumer market is fragmenting into numerous, specialised market segments defined by their lifestyles, aspirations and choice of products. To satisfy this complex market, food and beverage companies have to produce a large variety within a single product (or category).

Standard conditions under which the food and beverage industry operates are:

- low inventory levels,
- high stock turnovers,
- low profit margins.

Quality and the problem of perishability, the demand for faster inventory turns and deliveries, and a dynamic market means that time-to-market is also important.

Added to this, food manufacturers in a number of countries are beginning to experience an increased level of government regulation. This is not just confined to aspects like expiry dates and packaging, but also traceability of the product through the entire chain from raw material through production to shipment and final store delivery - this is to ensure food safety.

The food and beverage industry forms part of the “process manufacturing” environment. The industry has not been as well served by ERP vendors as certain large-scale process industries (e.g., chemicals) or the “discrete manufacturing” environment (the origin of ERP solutions). There are major differences between discrete and process industries.

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- Common terms in process manufacturing are ingredients, rather than parts as in discrete manufacturing; also formulas or recipes, rather than bill of materials.
- There are often different units of measure in process manufacturing – litres, pounds, packets, boxes – which are all applicable but in different stages of the production and distribution chain. Discrete manufacturing measures single items and does not change the unit of measure.
- Process materials are more difficult to measure accurately, the quality can be inconsistent, and they can change over time.
- Once through production, the finished process goods cannot be broken back down to their basic ingredients, unlike discrete manufacturing.

Transferring terminology, procedures and application knowledge from discrete to process manufacturing is not straightforward, and the differences between the two should not be simplified when dealing with companies in this space.

For the food and beverage industry, critical business issues are:

- Quality
- Production process
- Costs
- Route to market (the distribution chain)
- Customer relationships and service

The overriding goal for these companies is to be able to make better products with greater variety at better prices and delivered faster.

Quality

Consumers take food quality for granted and are alarmed when something goes wrong, and so food and beverage companies go to great lengths to ensure quality. Consider that for many input raw materials, consistent quality cannot be guaranteed; e.g., an orange concentrate may vary in acidity from one batch to another.

Quality management and control has to be carried out at all stages of the production process – from initial ingredients, through the manufacturing formulas to finished goods. This can only be achieved if tracking of each batch is enabled throughout the production process. Potentially there can be a large number of quality attributes that have to be tracked in each batch. For certain types of products, temperature monitoring and control

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needs to be done in production as well as in the warehouse. All food and beverage products at some time start to perish, so setting and checking of expiry dates is required.

As for safety standards, like HACCP*, and those mandated by government, companies can only implement these standards if there is complete traceability. Complete traceability enables tracking of individual raw material inputs, into lots and sub-lots, and down to packing units, so that recalls can be initiated if required.

Production

Food and beverage manufacturing is a complex environment. Production runs are also shorter, so flexibility and agility of production plans and schedules is required. Changes to a product can be demanded quickly, due to quality problems or market conditions. New products invariably require new processes or modifications to existing ones.

For discrete manufacturing operations, every part has to be available before an item can be made; there is no way to scale production if quantities are not exactly to requirements. However in process manufacturing, if quantities are not exactly correct it is possible to scale production by making what you can with what you currently have.

Process industries have to contend with the problem that the standards of ingredients can vary from batch to batch – termed variability – and this can require adjustments to the formulas and recipes used in production. In order to ensure consistent quality at the output end, lot control is needed to segregate batches according to variability and adjustment criteria.

Production plans, therefore, have to be dynamic to handle not only changes to ingredients but also their proportions, and this may all happen quickly.

The management of recipes, or formulas, in process manufacturing does not necessarily work on the 'A' shape that is traditional for a bill of materials in discrete manufacturing. From one raw material it is possible to produce a number of different end items in food and beverage operations – in this instance the shape is inverted to a 'V'. For example, a single animal carcass can be processed into different parts. A recipe is not static either, as the decision on what is produced from the raw material can change dynamically depending on

* HACCP (Hazard Analysis and Critical Control Points) is a safety standard, similar to ISO standards. HACCP definition: a system for analysing production or product handling processes to detect hazards and risks of contamination in those processes.

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the quality of the raw material and the product yield required. The nature of the ingredients can also require changes to the timing of different stages of the production process.

An additional complication in formula management is that not all end items are the final product – some may be by-products, co-products or waste.

Because production in process manufacturing can be so dynamic and potentially complex, a simple scheduling process will not be realistic or accurate enough. Scheduling should be able to handle short-term production runs and change ingredients or routings depending on differing objectives, i.e. end items required, units of input available, processing time, and cost. For ingredients in inventory, the scheduler needs to manage the complexities of volume-constrained resources like tanks and silos. After the finished product is made, the packaging recipe may need to be changed, depending on last minute conditions or requirements.

Sophisticated planning, scheduling and monitoring systems need accurate data in order to function optimally, and this data has to come from the shop floor. Consequently, there needs to be integration between the business system and plant process control systems.

Costs

For an industry that operates within the constraints mentioned earlier – low inventory levels, high stock turnover, low profit margin – cost control and monitoring is a primary concern.

Certain raw materials are priced on the open market, some are affected by currency fluctuations, so input costs can be difficult to control and tend to fluctuate. Not having complete control over input costs means companies have to rely on other parts of the business, production and distribution, to mitigate the variable costs.

Low-cost manufacturing can be achieved more effectively by making only what is needed and when, i.e. adopting the “lean manufacturing” approach. This is an approach that emphasises issues such as reduced inventory, shorter lead times, and faster cycle times, and focuses on simplifying operations, eliminating waste, and reducing inventory throughout the entire production system.

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While input costs can vary, it may not be possible to change prices as most large retail chains set the price they are prepared to pay for goods. So for a food or beverage company to reduce the effect of variable input costs, they need to include cost factors in the production and scheduling process; rather than just using inventory levels and production capacity as is more common in planning and scheduling systems.

Keeping inventory as low as possible and moving goods out as soon as possible is enabled through demand and inventory planning. Food and beverage processors need to have the ability to predict and plan the quantities and timing of goods to be produced and sold.

Pricing flexibility is important to optimise the margins that a producer can make from a product, depending on what is available, who wants it, and where the product needs to go.

Information is obviously important in managing costs. Data from production and other operational processes is needed to analyse how factors such as raw material use and wastage can be optimised.

Route to market – the distribution chain

Making sure that the final product is manufactured on-time is just the first phase. Delivery, purchase and consumption are major concerns as well. After all, this is an industry where perishability can render goods in inventory or in transit completely useless in one day. The process of getting goods to the ultimate consumer is the “route to market.”

Inventory management is important to ensure proper stock rotation, especially for products with a short-shelf life, as the picking and shipping process should use expiry dates to ensure that older products are shipped first.

With the major chains measuring supplier performance on delivery time, stock availability and quick cycle times, food and beverage manufacturers have to keep late deliveries and stock-outs to a minimum, and to respond more quickly to customers’ demands.

For some process manufacturers, there is an issue that discrete manufacturers do not encounter – that of multiple units of measure, also called “catch weight.” For example, 0.25 kg packages of bacon are put into a box that has 20 packages, each box therefore weighs 5 kg. Ten boxes are put onto a pallet, total weight 50 kg. The need to track all these units at once becomes a requirement when pallets and boxes are broken down in distribution to

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fulfill the differing requests of customers. The need to track batches as well is required to maintain the chain of quality and safety.

Distribution and logistics management has become a major focus in recent years. The ability to schedule truck arrival times at a depot, to plan truck loads to maximise deliveries to one or multiple customers, and to allocate routes that optimise delivery times and costs is increasingly necessary to improve service and efficiency.

Producers must also be able to track and ensure that the correct products and quantities get delivered to the right customers. Two new developments in tagging and tracking, RFID (Radio Frequency Identification) and EPC (Electronic Product Code), will allow producers and customers monitor how products are moving in more detail.

Customer relationships & service

The market that food and beverage manufacturers serve is moving rapidly away from one of providing basic, stable and utilitarian products to one where products are determined by fashion, taste and timing.

In order to anticipate consumer demand, manufacturers need to communicate more with customers and consumers to gain insight, identify new product avenues and manage product lead times better. This can only be achieved if the manufacturer has access to information from suppliers, customers and the market, as well as data from internal systems. To make better business decisions, companies need to have information repositories containing appropriate data from different sources that can be used in conjunction with analytical tools.

Some companies are adopting collaborative strategies such as CPFR (Collaborative Planning, Forecasting and Replenishment) which allows trading partners to collaborate on building consensus forecasts for customer orders and replenishment orders. This improves demand management and planning capabilities. These strategies make stock visibility and availability more obvious, so making it possible to provide better customer service; it also allows price management to be carried out more effectively.

Taking collaboration further, strategies like VMI (Vendor Managed Inventory) require that the producer's manufacturing and distribution systems are linked to the retailer's inventory system in order to provide stock visibility throughout the entire supply chain.



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Product promotions are a major aspect of doing business, as a visit to a local super-market will show. Consequently, promotions have become a significant management issue for food and beverage companies – how do they get the most out of different pricing for different customers at different times based on different conditions. Management of trade terms and the complex pricing associated with promotions means there is a need to assess the full impact and value of promotions on the business through so-called “closed loop” promotion management.

In summary, food and beverage manufacturers, especially mid-size companies, are finding that they need to be more efficient, effective and sophisticated in order to survive. Business systems adopted in the past are not good enough tools anymore to assist in the increasing complexity the industry is encountering. The modern food and beverage company needs to be easier to do business with and be more responsive. In order to create, produce and deliver better products, these companies need not only to innovate in business processes, equipment and infra-structure, but also in systems, information and knowledge.