# What really makes factories flexible

Business, Manufacturing

Introduction: In this literature, " What really makes factories flexible? " the writer brought out the topic for factory flexibility, which defines as a production facility organized to respond to customer orders quickly in order to provide a full and varied range of operations or services, across many product lines with very short changeover times and may introduce new products of similar range fairly easy. For example, most modern automobile plants are designed as flexible factories to build various models.

Having acknowledged the importance of flexibility, how would manufacturing managers in a broad array of industries find pathways to improve the process? What are the difficulties of defining flexibility of a plant and how do they measure flexibility in terms of plant productivity? What measurements are needed to show improvement of the process? The author performed a research in a study of sixty-one factories in North America that manufacture fine paper to find out the answer.

Define the problem: Unlike most other industries in which different plants make different products, the paper industry's products are more comparable across plants since paper are produced by very similar process. There are a few characteristics for the paper industries to be the right candidate. In paper industry, the qualities of products by grades are straightforward numbers which can be able to be measured by the author.

These numbers enabled the author to develop both the range of paper a plant could produce and how much time it needed for a plant to switch from making one kind of paper to making another. By using these numbers the

author was be able to define the operational flexibility for manufacturing plants needed to measure and find the ways to improve the processes. Defining the problem is the first thing needed by each manager. " What is flexibility? " Managers are having hard times to define as the term may mean very different for different people.

At plant level, it is about the ability to change over or adapt new system, however, specifying and characterizing this ability is not an easy task. As one manager may talk about the flexibility to produce the types of production from up and down depending on what the market needs; another manager may talks about the flexibility to change over from making one type of paper to another with less time andmoney. In the author's point of view, flexibility should be emphasized in determining by its competitiveenvironment.

The measurement of flexibility can be based on a) product range in different things as a plant can have the ability to produce a small number of products that are very different from one another b) mobility for a plant to change over from making one product to another and c) uniformity of performance as a flexible plant can perform comparably well to make any product within a specified range. Once managers have defined the different kinds of flexibility they are trying to develop, another set of issues had come up as how to measure the flexibility and improvement of flexibility.

Also it is often unclear in which general features of a plant must be changed in order to make its operations flexible. The depth and wisdom of experience managers have to be carefully assessing their strategies to define what kind of flexibility they are looking for before embarking on a flexibility program, or

otherwise the results can be disastrous. Implication and analysis to select best alternatives: By collecting production data, the author was able to measure the breadth of paper grades that each plant was capable of producing and the changeover time that each plant required to switch between grades.

There were additional measurements of flexibility such as workforce by length of service, the level of computer integration (CIM), the change and break frequency, etc. Each plant may emphasize in a whole range of factors from different quality and types of flexibility based on the managers, so end up there are large differences across plants. One major issue covered in this literature is that the degree of computer integration (CIM) does not really help on plant flexibility by increasing range of products produced or improving change over time even though large money was invested in it.

Managers often have difficulty justifying CIM projects on the basis of cost savings or quality improvements therefore justify them on basis of improved flexibility CIM will provide. In this case, only the engineers or a few trained employees understand how the system works; most of the plant operators are not trained to operate which create problems. Operators instead decide to perform manual-change over, which in a surprising findings the best manual change system operate much faster than computer.

This result shows the serious problem from operators as they have no interest to adapt the change to operate CIM. It hit hard on the managers with thoughts being reluctant that they are doing something right, but actually they are wrong. Implement decision to change the system: For successful

manager to figure out the issues of CIM before implementing it in a plant, they should consider building up skills for their operators. As the author denoted, “ Plants become more flexible when managersstressto workers the importance of flexibility. For example, a plant that wants to excel at customizing products will need to develop the capabilities to carry out large range of jobs in the plant. Managers then need to determine what type of workforce or equipment (ex CIM) needs to enhance flexibility. After that managers need to figure out different ways to measure the type of flexibility sought and emphasize the importance of the measures to the employees. Trainings should be added in the process to build up experienced workforce and eventually to see improvement in flexibility.

For example, continuous learning problem such as operational excellence may help management team in different level to control and maintain a flexible manufacturing plant. Evaluate the outcome: By integrating the appropriate steps to a) defining the problem of flexibility, b) implication and analysis to select best alternatives and c) implement decision to change the system, the next step is to evaluate the outcome to see if there is any improvement or if not, further alterations will need to be made. Outcomes that need to be evaluated are not limited to employee training in different level.

Employees training based on experience are critical for a manufacturing plant to increase flexibility. More experience workers are not willing to adapting the new systems such as CIM comparing to less experience workers who are more willing to change. Conclusion: A good manufacturing

management team designs what is best way for its plant to run, and plants that are flexible in terms of mobility (in terms of change over time) and range (in terms of various productivity) tended to have a clear measures of what flexibility should be developed.

Managers have to decide what benefits the plant, how the plant operate, what kind of flexibility they are looking for, select the right decision making tools such as CIM, training for the employees based on different levels of experience, analyzing the data and provide surveys for customers. Managers should provide people the support needed in order to achieve the goal for lower the cost, decreasing change over time, increasing throughput and eventually make more money.

Manager should never put too much faith in depending on CIM to complete the tasks in ease. CIM provides critical advantages to improve factory flexibility only if it can be implemented in the right way to fit the system. CIM generally needs experienced operators to control so trainings are critical for employees in different level. CIM could only be one of the alternative tools for managers to use. The flexibility of a plant depends much more on people (manager, field-supervisors, engineers and operators) than on any technical factor (automation, CIM).

Managers should never only embraced in CIM as the solution to the growing need to forge new capabilities, instead managers should put more faith in the day to day management of people. Extended Research: I read two other articles which were written within the last three years. It is obvious that both articles talk about how computer integration both software and hardware

can help to improve process flow and flexibility of a plant. This is because a more mature CIM system has been established through studies from field experts and universities.

In general, employees nowadays understand that continuous learning is the keys to maintain competitiveness in the job market. This doesn’t mean that managers’ job are easier to do, but flexibilities in all level from a plant, a team, or just individual are critical in order to maintain a competitive advantage. Reference: 1. Manufacturing Flexibility - Synchronizing the Shop Floor and Supply Chain by Aberdeen Group 2. Improving Plant Performance and Flexibility in Batch Process Manufacturing: With an Example from theFoodand Beverage Industry by Filippo Focacci