

FLEXIBILITY AND EFFICIENCY ANALYSIS OF A FLEXIBLE MANUFACTURING SYSTEM

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Abstract: Flexibility increases the ability of a flexible manufacturing system to auto-organize, coordinate their production activities, all of them leading to its efficiency. In the present paper all of factors analysis will be quantitative but also qualitative type, raporting to flexibility and efficiency. In this sense, the analysis of the efficiency and the flexibility to an flexible manufacturing system will be able to respond quickly with a wide range of external stimulus. Flexibility aimed itself refers to the degree of satisfaction of customers demand.

Keywords: flexible manufacturing system, flexibility, efficiency, optimization.

INTRODUCTION

Current interpretations of the notion of flexible system are: [3]

- system able to perform various tasks with little expense of upgrading-flexibility of use;
- system with the ability to adapt to the demands of the various tasks without specialized adaption elements manufacturing-flexibility;
- system with the possibility of enlargement regarding to the qualitative and quantitative ability;
- system with the ability to be programmed for automatic operation in terms of variation of production load;
- system with the possibility of egalization rhythms of different workstations (system storage capacity).

Flexibility is a new quality of manufacture, which involved radical changes, both in the field of technology of manufacture, as well as in the field of management, leadership and organization of production. [1].

The primary role of flexibility consists in maintaining his success within the organizations and a default flexible fabrication, in an environment where the demands are increasingly larger, feature image belongs to new trends on national and international levels.

In the industrial production system, "flexibility is the ability of the system to bring it into line with the minimum expenses of production variables, so that a longer period of economic system to function with minimal changes in its structure". [4]

The flexibility of the system is determined by the flexibility of each subsystem within the production system, and how to integrate all the subsystems within the system, the relationship between these. [1]

Flexible manufacturing system structure has quality of integrability, possesses the adaptability to a range of tasks, it is technically and economically properly each task separately and is built based on a dynamic concept, all of them leading to efficiency. [1] Regarding [2], tell about a production system that is flexible, if it corresponds to the characteristics described in Fig. 1, below:

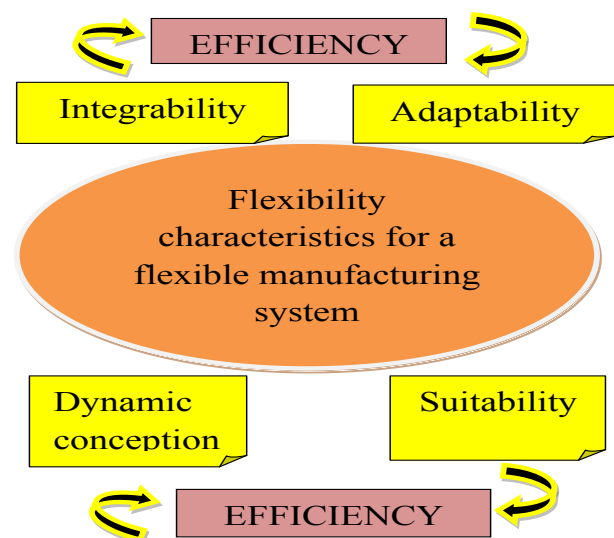


Fig. 1 The report between the features of the flexible manufacturing system and efficiency.

2. METHOD

In the industrial production system, flexibility is the ability of the system to bring it into line with the minimum expenses of production variables, so that a longer period of economic system to function with minimal changes in its structure". [1]

The flexibility of the system is determined by the flexibility of each subsystem within the production system, and how to integrate all the subsystems within the system and the relationship between these. [1]

The relationship between flexibility and efficiency is closely related to depending on several factors: price, quality, professionalism, security, commercial, technical, programming and control cooperation.

Optimum flexibility of a flexible manufacturing system, which could lead to system efficiency, consists in optimizing the number of modules that forms the system.

According to [1], the process consists in identifying the number "n", as the number of cases of the use of a module, optimally use cases of a mode that reduces the amount of costs arising from diversity, on the one hand and overcapacities with costs which have to be fitted to reduce product diversity, on the other hand.

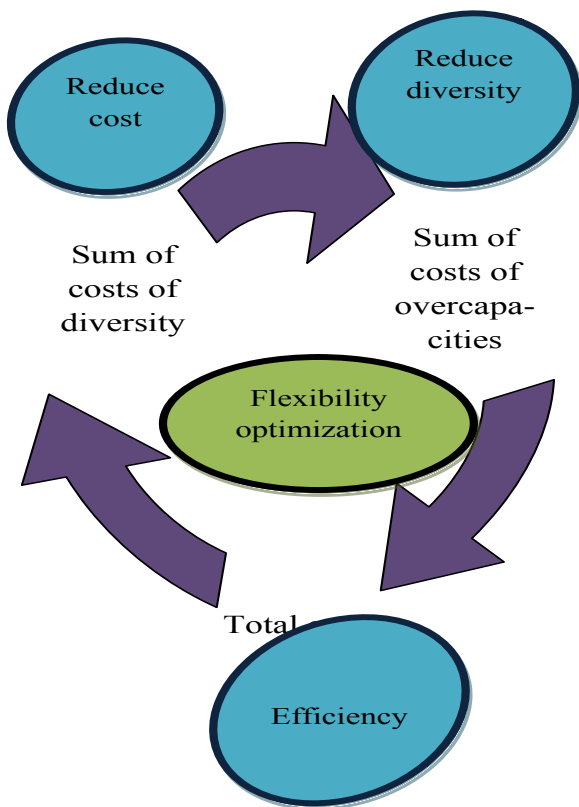


Fig. 2 Graph optimization for a flexible manufacturing system.

Flexibility has to be gained in terms of acceptable economic. [1]

A product is flexible if you meet many needs through a unique product. [1]

A flexible manufacturing system produces some finished products with multiple uses.

In the case of the finished product, flexibility is even greater as it can satisfy many needs. [1]

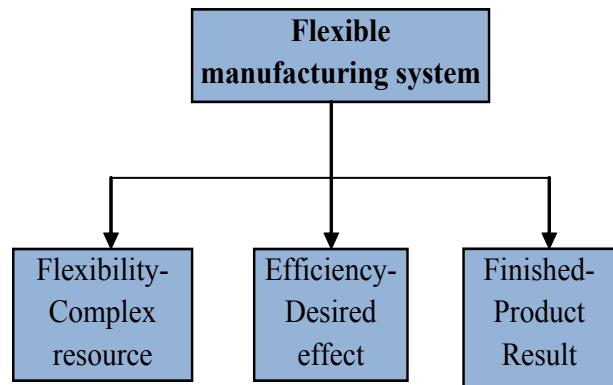


Fig. 3 Comparative analysis

According to [1], determining the best pair medium-technology is the problem of planning flexibility. At the same time they conceive the idea that manufacturing system should be flexible so as to fit the environment, and technology should be the environment that provides a competitive advantage to the organization.

It is imperative to find a balance between flexibility and efficiency, a balance in succession, at a higher level.

Sometimes the absence of flexibility is due to big time to adjust the flexible manufacturing system or demand the customer wants delivery periods increasingly shorter.

3. STUDY CASE

Flexibility is in close touch with other concepts such as

- innovation;
- risk;
- strategy;
- change;
- organizational conditions;
- profit;
- adaptation;
- integrability.

The methodology for evaluating the flexibility and for the efficiency for an flexible manufacturing system, it can be described as follows:

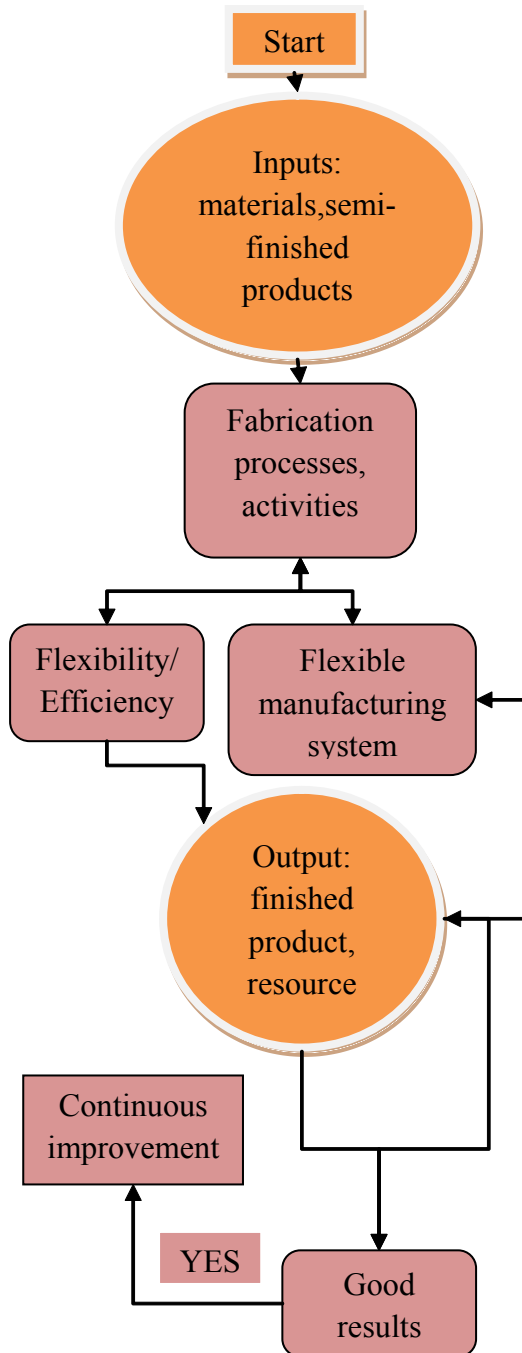


Fig.4 Schema of flexibility/efficiency methodology

Essential in the calculation of the total optimization enter the flexibility as a hierarchical concept plus efficiency resulted:

$$O = F + E \tag{1}$$

Where:

O= optimization;

F= flexibility;

E= efficiency.

When the flexibility and efficiency is higher optimization grows.

If you want to measure the flexibility of a product belonging to a flexible manufacturing system, you will need to show you first of all, the possibility of flexible manufacturing system, making a variety of products with the same equipment. This shows the flexibility and efficiency of the product.

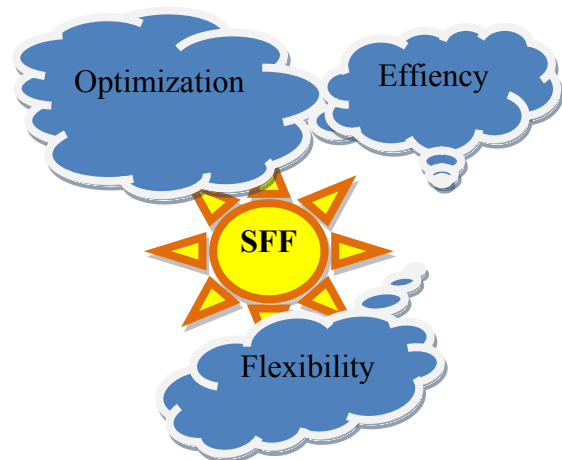


Fig. 5 Flexible manufacturing system resources.

CONCLUSIONS

Flexibility and efficiency analysis of the flexible manufacturing system is designed to ensure the proper functioning of it in optimal conditions during a manufacturing process, is also able to respond to changes in demand.

The current socio-political context and economic multilateral approach has led to the concept of flexibility, which has resulted in efficient products.

Training of personnel and the establishment is a condition indispensable for the optimization of the entire process.

This fact raises a concern for the increase in present paper, the efficiency of flexible manufacturing systems. Thus for flexibility on the system performance analysis, it has been shown that it is necessary for the whole process to be flexible.

It can be assumed that the flexible manufacturing system, will be equipped with a last generation method by which it assesses the flexible fabrication system analytic from a system of measurement.

Evaluation system of flexibility and efficiency of flexible manufacturing system will be based on the management of all the activities.

Now requests and needs are becoming greater. Surviving enterprises must have: a response time shorter and at all levels of activity (design, purchasing, manufacturing, distribution, product, process, etc.), products with increasingly shorter, very good quality, which will become the main condition of maintenance of the products on the market, a "service" for the increasingly personalized customer. [1]

Acknowledgment:

This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD), ID134378 financed from the European Social Fund and by the Romanian Government.

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