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APPROACH METHOD OF CURRENT COMPETITIVE MARKET - AGILE INDUSTRIAL CORPORATION

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Abstract: *The term "agility" - agile enterprise - was introduced by a group of American researchers led by R.Dove as a result of some studies in a program sponsored by the US government, a program that primarily aimed at exploring the possibilities of making up production systems which could compete with the efficient production system "lean", introduced in most Japanese companies. Researchers involved in this program have formed Agility Forum, which aims to develop the concepts introduced. In 2001 appears the first paper, by R. Dove, entitled "Response Ability - Understanding the Agile Enterprise", John Wiley and Sons Editors, in which was synthesized the phase of research field.*
Agility can be defined as "the ability with which an organization manages to develop successfully in a business environment whose changes are unpredictable." Being agile means to control change, to notice market opportunities and by being continuously innovating, to succed on the market. The purpose of this paper is to support the idea that agility is a feature derived from the design and also to show that by applying the principles of RRS, which characterize agile systems, it is confirmed the fact that any industrial production system which wishes to be agile it should be designed.

Key words: *agile enterprise, production system, market, ability.*

1. INTRODUCTION

The level of agility of a company, or of the component parts of its structure is a function whose variables are represented by the opportunistic management - offering reliability, on one hand and innovation management - leadership, on the other hand. [1], [2].

Which of the variables is decisive is a relative question regarding the dynamic competitive environment in which the organization operates. The fact that we can speak of a degree of agility leads us to the need to quantify conceptually, so that later we can have the possibility to compare similar items according to their degree of agility. [3], [4], [5].

2. INDUSTRIAL CORPORATION AGILITY AND ITS DESIGN

Being "agile" requires an amplification of a company's leadership or its "reliability". Figure 1 shows a quadrant of agility, whose coordinates are given by "reliability" (reactive) and leadership (proactive): [6], [7], [8].

- Leadership is crucial when leaders are systematically choosing the optimal solutions and any misstep leads to the advantage of competitors, positioning leaders in reactive situations. Any opportunistic competitor, with good reliability, will do nothing else but to wait for the other's mistake, actually ceasing to innovate, to be proactive.
- Choosing an area of the quadrant agility actually represents for any enterprise, a fundamental strategic option to differentiate it from its competitors. [9]. At this point it is necessary to find answers to the following questions:

a. How innovative, opportunistic corporate management must be, regarding the needs of the competitive environment in which it operates?

b. At what speed are the market rules of corporate products changing?
c. Is the corporation able to respond quickly enough to market evolution?
d. What are the principles and methods that allow the design of an agile enterprise?
The last question is perhaps the most important of all, and the management of a modern enterprise is forced to respond. [10].

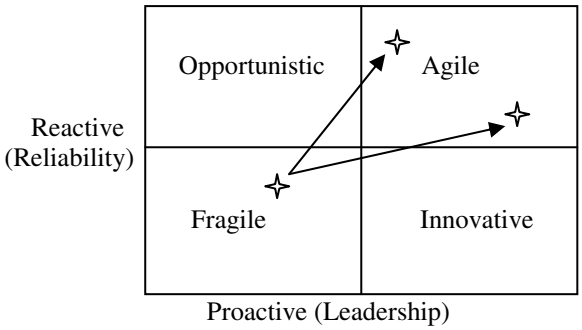

Fig. 1: *Agility quadrant*

The interpretation of coordinates and business elements is as follows:

Reliability: It permanently looks for answers from consumers' needs and responding quickly to the emergence of market opportunities, opportunistic, reactive, robust attitude;

Leadership: It introduces a new way of seeing business, it discovers new meanings in the existing status, it changes rules, it captures a new perception, and it has an atypical thinking;

Business elements: The position of the market enterprise, technological level of production, supply strategy, operating modes, human resources strategy, new product development, innovation level.

For a better understanding of the approach, the definition of specific terms is necessary:

- System – a group of modules that interact within a common structure that serves a unique purpose.
- Framework structure – a set of standard procedures governing interactions between the modules of a system compatible.
- Module – a subunit of a system that has intrinsic: identity, purpose and capability in its interaction with other modules of the system considered.

3. PRINCIPLES OF RRS (REUSABLE, RECONFIGURABLE, SCALABLE) SYSTEMS AND THEIR USE IN AGILITY DESIGN

The principles underlying the RRS system resulted both from observations on the characteristics of such systems and the observation of the characteristics of systems built by people. RRS systems principles are listed in the following table:

Table 1: *The principles of RRS systems*

Modules existence	The system is composed of distinct, separable modules, which are not integrated into the assembly
Compatibility when connected	The systems' modules contain standard interface, which facilitate their connection or disconnection, within the actions taking place in the system
Facilities for reusability	Management of modules assembly includes tools that allow its reconfiguration and maintenance
Non-hierarchical interactions	There are interactions between system's modules, direct communication and negotiation on non-hierarchical basis
Dissemination of capacity for decision	The decision is distributed to the modules, but it can be rapidly recentralised if the neccessity arises
The distribution of control tasks	Control for fulfilling the objectives of

and information	the module is performed at the modul level, information is circulating locally, but is globally accessible
Establishing their own relations	The existence of some relations and common action programs established between modules, with its own dynamic
Flexible capacity	Changes in capacity at the module level, without restriction set globally, including feature referring to the number of staff
Modules redundancy	The ability to decide fluctuations of capacity and decide tolerances of errors and also their correction mode
Evolutive structure	The existence of open structures, able to adopt and create new module, identical or different from the existing ones

Application of RRS principles in designing the agility of production systems leads to safety regarding the approach to current competitive market. [11].

Table 2: *Using the RRS principles when designing the agility*

RRS designing principles	**Production equipment (cluster type machines)**	**Production processes (flexible manufacturing cell)**	**Production enterprises**
Modules existence	Transfer encapsulated modules, storage modules, utility modules, transfer boxes	Flexible equipment, modulated workstations, pallet telehandlers, servers on rails	Design, engineering, manufacturing, assembly, distribution of resources, made modularly
Compatibility on connection	Human, mechanical, electrical and also standard and common control interfaces	System interfaces: mechanical, electrical, human systems	Procedures informational system, interfaces with the exterior
Facilities for re-use	Extension / modernization of equipment by adding new modules, their standard maintenance	Equipment without massive foundations, light, simple and fast to move in other production configurations	Flexible departments of supply / sale, which have many external sources, flexible in their turn
Non-hierarchical interactions	The modules in the process decide on actions to be taken in order to achieve their own targets, low control for module level	Equipment which act autonomously solving problems including the interface level	Management systems that allow free allocation of resources, both inside and outside the organization
Disseminating the capacity for decision making	The equipment can be quickly reconfigured at the process modules level, if the situation requires it; reconfiguration is done with maximum speed	Reprogramming production is done in real time and is instantly transmitted to cells or modules, if the necessity arises	Opportunities offered by the market are seized and distributed quickly at the modules level. The decision is taken at the level where lies the problem that needs to be decided
The distribution of control tasks and information	"Smart" process modules that keep their own records which build and evaluate their characteristic operating curves	Operational programs and their history are contained in the equipment; tasks requirements are addressed to the interface when necessary	Integrated information system at organization level, a system that uses autonomous online databases from the process when necessary
Establishing their	Real-time control system	The software at the level	Integrated command in

own relations	that makes modules being available anytime for reconfiguration and reprogramming if needed	of control cells allows dynamic changes of processes that are performed at the working cells level	production flows level, allowing their rapid modification
Flexible capacity	Equipment that can be easily interconnected in extended assemblies in order to perform similar tasks	Manufacturing cells that allow easy incorporation of similar modules	The existence of unrestricted resources available anytime for multiplying the number of productive modules
Modules redundancy	The identical utilities basis of equipment, which allows the processes duplication on the same base or different basis	Cells containing multiples of the same type of modules, which allow for capacity fluctuations	The system contains duplicate of capabilities, for example in resources allocated to the production
Evolutive structure	The basic structure of the equipment allows the assimilation of new types of modules and introduction of new technologies	The various utilities or transport equipment can be extended without restriction imposed by cells or modules from the composition	The enterprise information system consists of an open architecture based on server-client relationship.

4. CONCLUSIONS

1. When designing agile systems, which could be understood as either the whole enterprise or its critical components such as operating procedures on the market, strategies of supply-sale or production processes as a whole, means to include in the inner structure of the system the power to react anytime and to any type of change.

2. Any manager is interested in both the static, but especially in the dynamic aspects of the enterprise system; considering the static aspect being the architecture of the ensemble and the dynamic one, the perpetual effort daily to reconfigure the architecture in order to make it operational in the competitive environment offered by the market.

Sustaining an opportunistic/innovative profile, which equals being agile, means, first of all, to possess a type of architecture composed of easily reconfigurable, reusable and scalable systems.

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