

THE CONNECTION BETWEEN MANAGEMENT AND TECHNOLOGY AND THE TECHNOLOGICAL MANAGEMENT

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ABSTRACT: *In a new approach, the technology is taken into consideration as a resource of the business, in addition to the four traditional resources: material resources, financial resources, human resources and informational resources. This makes important for the managers to have solid technological knowledge, in addition to the economics. The research regarding the technological management (or the management of technology - MOT) is lead by IAMOT (International Association in Management of Technology). There are a lot of connections between the technology on one side and the finances, the human resources, the marketing, the operational management on the other side. In our era the technology is more and more advanced and all the activities are strongly connected to it.*

KEY WORDS: *technological management; resources of a business; technological system, technology; organisational behaviour*

JEL CLASSIFICATION: *O33*

1. THE TECHNOLOGY IN THE FIRM AND THE TECHNOLOGICAL MANAGEMENT

The members of IAMOT (International Association in Management of Technology) have tried to clarify some concepts that become professional working instruments for the management and the educational systems for management. The professor Jean-Jacques Chanaron together with his colleagues, professor Dominique Jolly and professor Klas Soderquis from the ESC Group from Grenoble have offered an pertinent analysis of the way that the technology has a high impact on all the functions of the management (Chanaron&al, 2002). This impact is the reason to be for the technological management.

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The technological management is defined as the implication and the commitment of the technology for a corroborated, simultaneous action in all the functions of a firm. The moment we accept this concept, we must accept that the technology is an important resource and has a high impact on all the functions of management. The technological management implies that any function of management will use the technology and that the technology must be taken into consideration as an input, a resource at the strategical as well as at the operational level. In this context, the technology has as the objective to be coherent and compatible with all the activities of the departments in the short run as well as in the long run and to increase the performance according to the objectives of the firm.

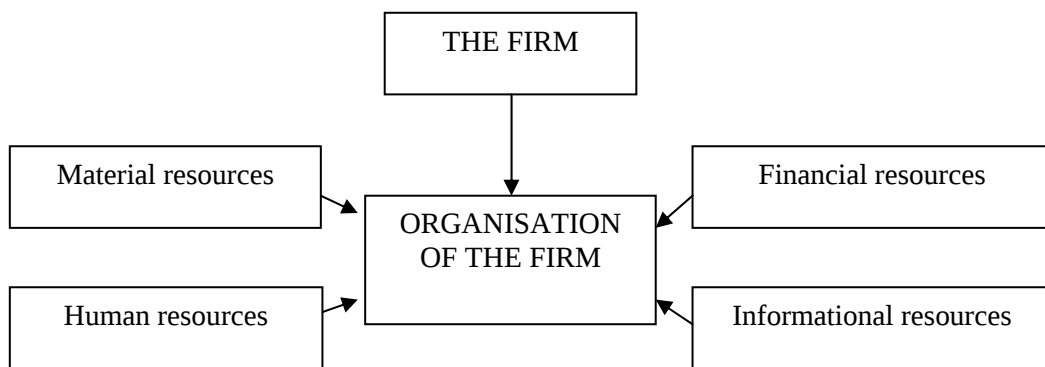


Figure 1. The resources of a firm in the classical approach

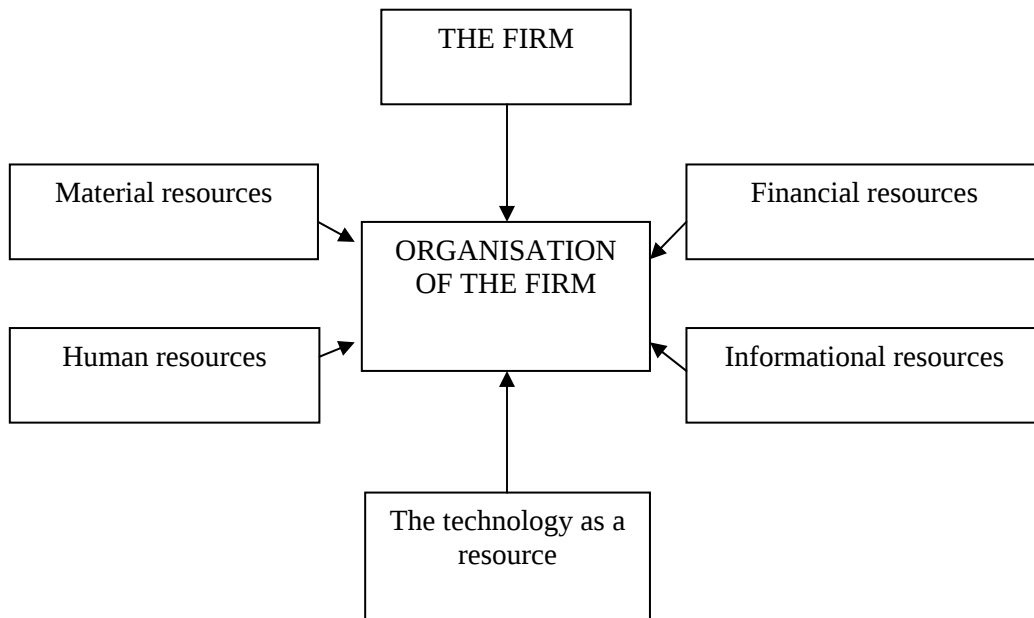


Figure 2. The resources of a business in a new, modern approach

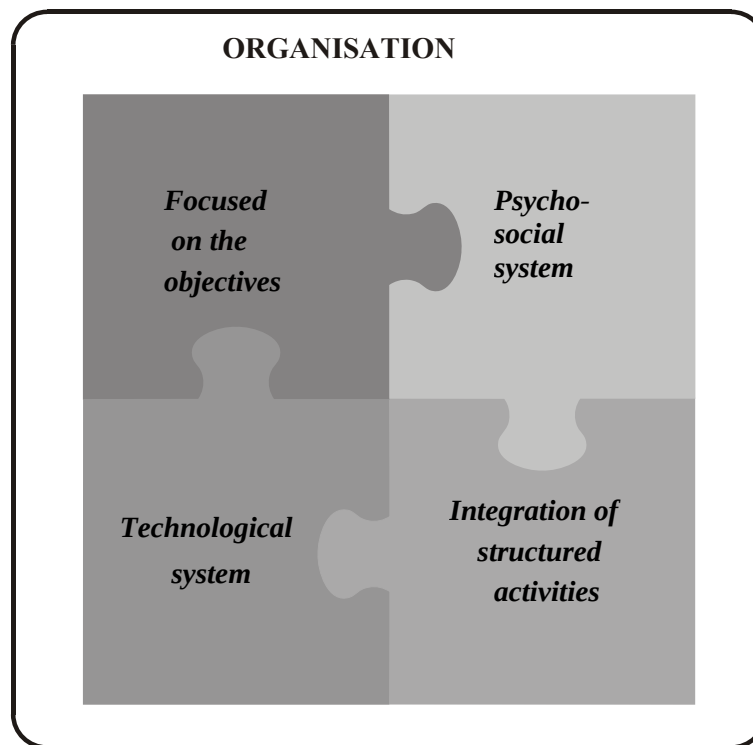


Figure 3. The relations of interdependence within the organisation (Abrudan&al, 2002)

There are more approaches of the term *technology*, depending on the area of knowledge where the definition is made.

The economists approach the technology from the point of view of the productivity and the utility. This means it is focused on the output from an economic system.

The sociologists approach the technology as a phenomenon that causes relations between people, welfare, creates opportunities, expectations and threats to the society.

The engineers and the system design experts associate the technology with the skills, facilities, methods and tools which allow the ideas to become usefull products, processes and systems.

A body of knowledge is a technology only if:

- it is compatible with the science and controllable by the scientific method and
- it can be used in order to control, transform and create natural or social things or processes, with a practical, useful purpose.

2. A CREDO FOR THE MANAGEMENT OF TECHNOLOGY

The IAMOT (International Association in Management of Technology) suggested a *credo* for the management of technology, as follows:

- Technology is a large and growing part of every manager's daily experience. Managers develop technology, use technology, buy technology and sell technology. To provide the necessary skill base in this area, it is appropriate that educators develop a field of teaching and research that we may call management of technology (MOT). The term management is broadly used to include the work of corporations, not-for-profit institutions and public bodies.
- Academic programs should offer three components: (i) The first component is the accepted range of management specialties such as the corporate functions of marketing, operations, MIS, and finance, as well as overall strategy. (ii) The second component is knowledge of technology itself and of technology related management procedures. Topics would include: A core theory of technology, technology foresight and forecasting, emerging technologies, innovation management, project management, science and technology policy, and many more. The second component distinguishes MOT programs from general management programs. (iii) The third component covers the contextual setting of MOT. It stresses the more holistic view and addresses topics of ethics, environment, evolution, macro-economics and politics. In the further evolution of the field, Program Directors will work towards an integration of the various components and possibly towards a new theory of innovation driven enterprise.
- A core theory could include such basic concepts as: (i) A definition of technology and a description of its manifestations. (ii) The anatomy of technology - diagnosing unique features of a given technology. (iii) The taxonomy of technology - systems of classification. (iv) The evolution of technology - major trends in technology and how to track them. (v) The ecology of technology - the interaction of technology with other systems.
- MOT programs should address technology at an operational, at a strategic and at a policy level. The operational level focuses on the internal technology base of the organization. The strategic level includes mapping the future, external, technological landscape; identifying technology based opportunities, and aligning overall strategy to harvest these opportunities. Foresight is a key ingredient. The policy level addresses the interaction between MOT and national and international policy.
- To contribute to MOT as a profession, we need to work towards (i) a community of practitioners, (ii) a body of knowledge, and (iii) the clearer positioning of the field in the mind of the public (The body of knowledge would reflect the academic program as mentioned in 2.).

Background: Management of Technology (MOT) is a highly diversified activity. This observation is borne out by a recent census of 148 academic programs. (A further 121 programs were identified, but details about them were not available.) [Source: Kocaoglu, D.F., Sarihan, H.I., Sudrajat, I., and Hernandez, I.P., 2003, "Educational Trends in Engineering and Technology Management", in Kocaoglu, D.F., Anderson, T.R. et al, Editors; Technology Management for Reshaping the World, IEEE, Piscataway, NJ, pp.153 - 159]

Titles of academic programs vary. Examples include: Management of Technology (or Technology Management); Engineering Management, Engineering and Technology Management; MBA Management of Technology; Systems Engineering Management; and others. Program contents vary significantly, and are made up from a variety of courses. About thirty courses were identified, and there are many more. Professional affiliations vary - about twenty associations were identified. In addition to dedicated programs, aspects of MOT are taught as individual courses in other programs as well.

Given this diversity, a group of academics and professionals launched an initiative in 2001 to find common ground for MOT. The starting point was a debate on the joint Network: Management of Innovation and New Technology (MINT)/Technology and Innovation Management (TIM). This was supplemented by comments on the Network of the International Association for the Management of Technology (IAMOT). This debate led to the formulation of A Credo for MOT. Network participants commented on the Credo and a second version was formulated. In 2003 the second version was discussed on panels during the Twelfth International Conference of the International Association for Management of Technology (IAMOT) in Nancy, France; and the 2003 Portland International Conference on the Management of Engineering and Technology (PICMET), Portland, Oregon, USA. In the light of these discussions a third version of the Credo has now been formulated.

3. THE TECHNOLOGY AND OTHER DISCIPLINES

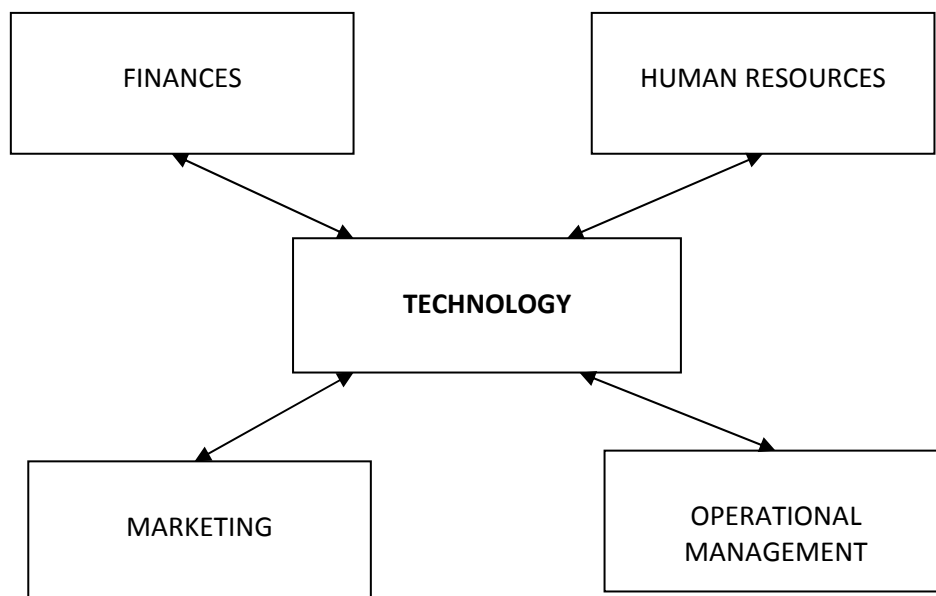


Figure 4. The technology and other disciplines

3.1. The technology and the finances

The financing technology involves:

- the technology of information and communication in finances;
- the decision theory for financial estimations;
- financing schemes;
- financing the research, development and innovations;
- financial fusions and acquisitions in the high tech industries;
- credit cards.

In other words, finances sustain the technology and the technology sustains the finances. There is technology in the finance activity, as there is in any other domain, because technology means the body of methods, processes, operations applied on raw materials *as well as on the data*.

3.2. The technology and the human resource

The human resources management (HRM) and the organisational behaviour in the high technologised firms (Chanaron&al, 2005) are connected with the technology due to the fact that in these companies there are scientists, researchers, engineers, technical staff and the HRM must adapt to their specificity.

The use of the technology for the HRM and the organisational behaviour regards the Enterprise Resource Planning (ERP), the performance monitoring systems etc. These systems give the impression of a rational leading of the employees, but can omit the subjective aspects.

The impact of the technology on the performance of the employees - the new technologies can have a huge impact on the working environment and on the working place. The mechanisation, the automation and the computerisation have a high impact on the individuals and on the organisations.

3.3. The technology and the marketing

The technological content of a product has a significant impact on the marketing methods. It is very important to approach simultaneously the market and the evolution of the technology and the marketing staff of the high tech companies must have a lot of specific knowledge.

The study of the behaviour of the client using the new technologies has a fast expansion. Some of the most provocative topics are (Chanaron, et al., 2005):

- the impact of the e-commerce on the traditional selling personnel;
- the internet as a threat to the traditional commerce networks;
- the future of the traditional distribution networks;
- the use of the technology to enrich the products, the services and the delivery.

3.4. The technology and the operational management

The operational management is closely related to some essential factors of the competitive strategy of a company, such as: productivity, quality, cost, effective time and flexibility. In the global environment we live nowadays, these are important factors for any firm producing goods or services and the research carried out to enhance the performances is using the technology in various ways.

Areas of special interest are:

- introducing new technologies in the production processes, related to the production systems design;
- the increase of the use of the informational technology in the operations of the production system (simulating processes, optimisation of the technological regime etc.)

4. THE TECHNOLOGY DIFFUSION

Another aspect of the technology in connection with the management is the technology diffusion, meaning to benefit from new developed technologies and/or new products based on the copyright.

Once issued on the market, a product can be developed in order to be produced easier or to make it more efficient and safe. This makes the difference between the invention - the original conception - and the innovation - the development and change of an existing product.

Another stage in the life of a product is the diffusion. According to Rogers (Rogers, 2003) the diffusion is the process by which an innovation is communicated by certain means to the members of a social system.

The four stages of the innovation process are:

- the invention,
- the innovation,
- the design,
- the diffusion (see fig. 5).

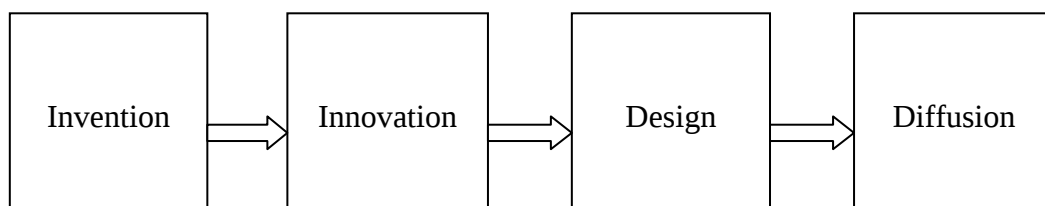


Figure 5. The succession of the stages within the innovation process

The idea of *adequate* technology was developed in the 20th century in order to describe those situations in which the use of the very new technologies or of the technologies requiring access to central infrastructures, spare parts or abilities imported from elsewhere was not desired.

The movement of the ecovillage has evolved partly due to these preoccupations. The semi advanced technology, mostly in an economic approach, refers to the compromise between the top and expansive technologies of the developed countries and the technologies of the developing countries which are more efficient in order to harmonise the surplus of labour with the shortage of financial resources. Generally speaking, an adequate technology can be an semi advanced one.

5. CONCLUSIONS

As we can see, the technology is involved without doubt in the functions of the firm as well as in the functions of the management. This determines the two main directions of approach for the technology by the science of management:

- the technological management as an activity;
- the technological management as a resource.

It is obvious that the technology is deeply involved in the management. All the great successful businesses have been fundamentally based on technology.

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