

**TECHNOLOGY AND ENGINEERING – MODERN FACTORS OF  
PROGRESS**

**Prof.dr.eng. Vasile ȚIPLEA, North University of Baia Mare**

***Abstract:** The paper discusses the importance of some future technologies as decisive factors of the interaction between science and civilization.*

*It also deals with the resulting technological intercourse between technology and civilization.*

*Engineering and technology stand out as an issue of great importance and the paper contributes to settle their scientific definition.*

***Keywords:** engineering, technology, software, diagnosis, personnel, material endowments*

The contemporary global technology is now confronted with important issues such as:

- environment protection;
- a diversity of crises as: basic resources crisis, food crisis, raw materials crisis, energy crisis, etc.

From an insightful analysis of the phenomena presented above results the lack of correlation of the resource needs requested by traditional technologies, as compared to the limited possibilities to satisfy them.

By analyzing global problems, specialists have concluded that the technologies being used at the moment in many fields and in many geographical areas of the planet are not adapted to the actual environmental realities, to ensuring a technical and a material foundation and to the contexts of culture and civilization. This is why future technologies are intended to substantially contribute to solving the major problems that humankind is now confronted with.

Specialists look upon technology as a decisive factor between science and civilization. Science provides technological information needed for production purposes while production and consumption generate the civilization framework and stand as the spring of various correlation and progress issues in the field of science it supports by offering evaluated material means for investigation and development.

The interaction between science and civilization in the field of technology is displayed in figure 1.

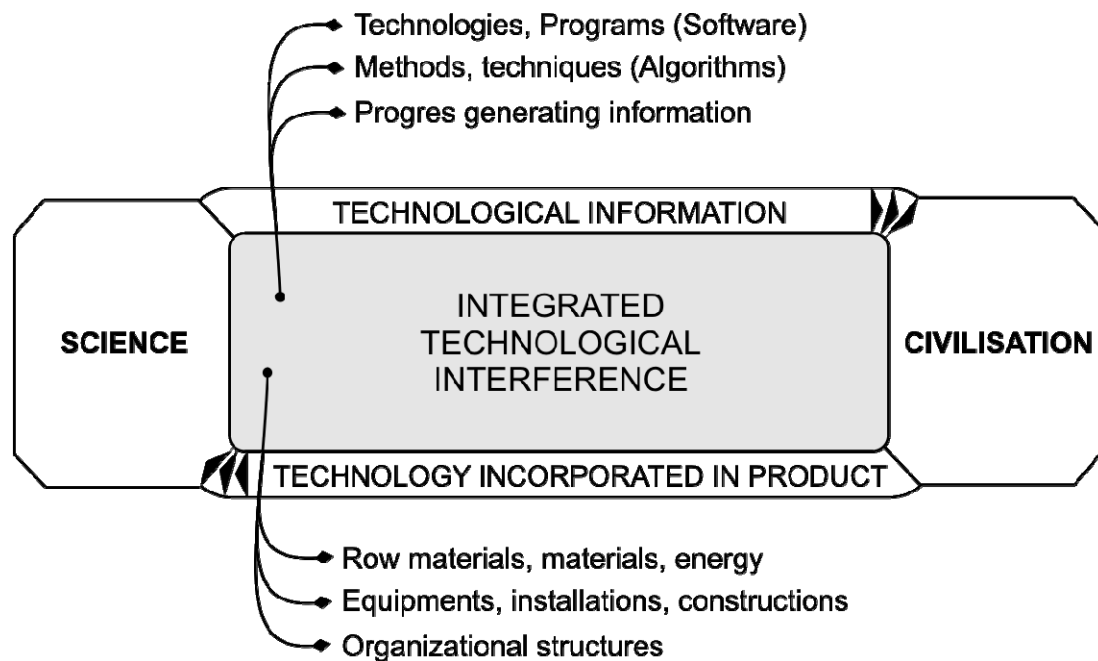


Fig.1. Interaction between science and civilization

From a historical standpoint, each age is distinguished by its own lifestyle, production and work methods and means, all conditioned by specific levels of science, civilization and technology.

With respect to what was presented so far it may be concluded that there is an interdependence between the social and economical needs of a specific age and the progress of technology.

By delivering a diagnosis of the technology level, of the correlation between present and future technological, environmental, economical or social issues, a series of non-adaptation symptoms as well as lack of preparation to face the present and the future is being noticed.

As regards the conclusions and the solution proposals presented, the following are to be synthetically noticed:

- the distinction between technology and engineering,
- the progress and refitting of technology,
- engineering diagnosis,
- the concept of utility bearer and the manifestation of the useful, etc.
- the hypothesis of engineering and of synchronic technological architecture, etc.

The progress and the adaptation of technology must be presented and materialized as compared to the actual technical progress and to the social and economic progress requirements.

Presently, intelligence production programming is a priority confronted to all other kinds of production, circumstance in which technology modernizing plays a great role. The shaping of scientific and technological progress and the improvement of technologies correlated with production lead to the evolution of technology and to the increase of the contribution to general progress with the following outcomes:

- the evolution of technology must aim at progress and adaptation to the manifold realities,
- the development of technology must be prepared and organized in accordance with the development of science.

The distinction between technology and engineering is a critical issue whose definition is to be made from the very beginning of the decipherment of technology perspectives. The definition is critical because in the education process, in the social and economical processes and in the literature of the two fields many terms are erroneously being confused or taken as synonymous. A concise research of the significance of these specific notions and of the realities they define makes a clear distinction:

Technology represents the totality of knowledge about methods and techniques of structure processing. In the above-mentioned formula, the definition of technology is not limited to material processing. It is also referred to structures in general as lately has been noted a migration of the term technology towards other applications as: education technology, organizing technology, research technology, data processing technology, technological management, etc. It becomes obvious that the nature of processing procedures, other than

materials, has ceased to be a barrier in expressing processing procedures with the help of the notion of technology.

Engineering, as defined by James A. Richardson, deals with the design, the improvement and the implementation of integrated systems, made by specialists, of materials and installations. Engineering is based on the principles of engineering design, with the purpose to specify, forecast and evaluate the results to be obtained.

Industrial engineering also designates the activity of specialists with graduate studies in various fields of technical sciences, activity through which this category of personnel provides design, implementation and functioning for social, economic and technological industrial production systems in companies and units associated to them.

The semantics of the technology and engineering notions show a common trait consisting of their attribute to schedule human activity, to provide schedule models for the achievement of certain transformations; they also have distinctive characteristics originating in the structures they operate. While technology has as object a single type of structure, materials, energy, information or some of their subcategories: material specialization according to technology, types of energy, welding technology, chipping technology, clothes manufacturing technology, engineering is referred to a certain assembly of structures whose participation produces transformation at the desired magnitude.

The separation presented above shows that what makes technology and engineering different is their final purpose. Technology aims at organizing an operation or a group of operations making it possible for engineering to have a product, a system of products or their development as its final purpose.

Unlike technology, engineering provides solutions with a broader and more definite finality as its schedules are those effectively applied to production.

Engineering involves and correlates technologies that by putting together products of any kind establish themselves as a convergence of technologies.

The development of engineering and technology must be achieved through an integrating vision.

The improvement of technologies is achieved by engineering diagnosis. A first remark is that there is a distinction between **formal engineering**, the one taught during graduate studies and published in books, in which prevails the specific of technologies that act, according to the case, upon substance, energy and information and **real engineering** performed during production processes where the following are to be added: leadership

engineering, social engineering, environment engineering, economic engineering, information engineering, etc. .

Another cause of the discrepancy between real engineering and formal engineering is the neglect of the need for technologies that render effective all resources that contribute to the production process in order to provide the congruity and efficiency of transformations requested by their prediction. Taking into account that a production system works with the resources designated in fig.2, it comes that formal engineering is compelled to betake improvisations especially in its relationship with human resources, information resources, (software) and purpose settlement and achievement management.

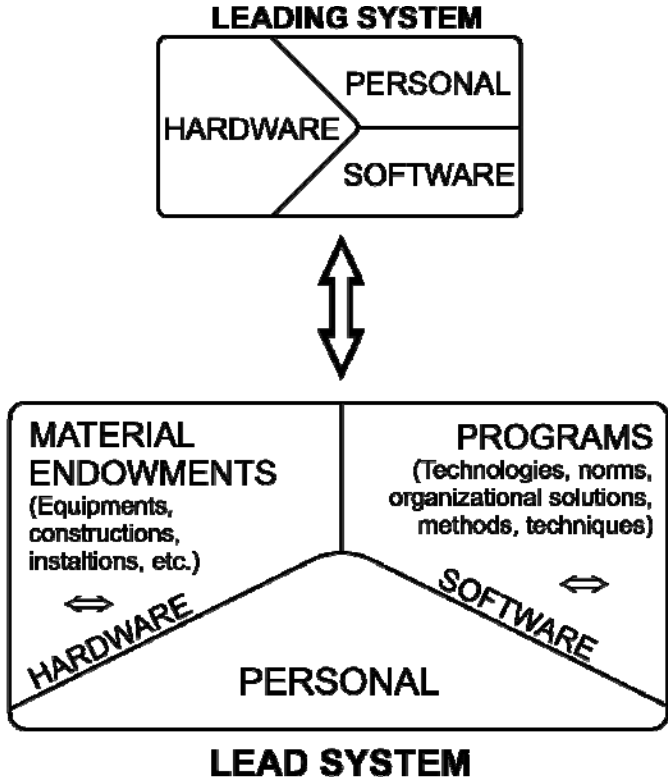


Fig.2. The production system: structure, components

The qualitative interpretation of difference between real and formal engineering unveils new and interesting aspects. It has been noted an insufficient saturation with technology of production processes due to the limited meanings attributed to engineering, especially for what concerns the specialist, the information and management, for what is referred to the most important resources, those that stand at the basis of programming and result evaluation as they are the only one with a capacity to evaluate, reevaluate and to increase the value of production.

The conclusions of the diagnosis presented above, corroborated with the optimist forecast of technologies and engineering that uses them as technology architectures, invites us to a substantial and quick reshaping of engineering and component technologies. The main objective of the required resettlements is represented by the loading of production systems with more information and intelligence and for this social, informational and management technologies are needed more often.

Another aspect of engineering that needs to be investigated is the extension of systems it operates. According to this criterion engineering is divided in: product engineering (consumer goods, computing technology, metal manufacturing, chemical products, food, agricultural products, etc.), production engineering, engineering of organized systems for a wider or narrower range of products (machine engineering units, energy production units, information processing units, etc.) and product distribution and consumption engineering that act as a physical bond between all the above.

## **REFERENCES**

1. Amza, GH. ș.a. **Tehnologia Materialelor**. – Editura tehnică București 1997;
2. Maynard, H.B. **Manual de inginerie industrială**, vol. III, București, 1977.
3. Țiplea, V. **Materiale Calitate Tehnologie** – Risoprint Cluj Napoca 2002;