THE INTEGRATION OF INTELLIGENT SYSTEMS IN ORGANIZATIONS

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Abstract. The application of artificial intelligence materialized especially in expert systems, neuro-expert systems, connection systems, fussy systems, neuro-fuzzy systems, multi-agent systems, Petri neuronal networks and the evolutional calculus are recognized as major technologies for their applicable nature and the efficiency in all domains. In this way, the paper presents the informational architecture of the organization, which should include the informational technologies able to support the achievement of the organizational functions or objectives, as well as the interconnections between the systems of the organization.

1. Artificial intelligence in the third millennium

The applications of artificial intelligence materialized especially in expert systems, neuro-expert systems, connection systems, fussy systems, neuro-fuzzy systems, multi-agent systems, Petri neuronal networks and the evolutional calculus are recognized as major technologies which have evolved and have been taken into consideration by researchers for their applicable nature and the efficiency in all domains.

Artificial intelligence in on the verge of achieving some remarkable previsions without taking any risks:

   * The success in the application of intelligent technologies will increase due to the incorporation of software of this kind in the conventional informational products, for which artificial intelligence will become a main component.

   * The artificial neuronal systems together with other categories of intelligent systems tend to become more and more dynamic in the specific processing of base levels.

   * The neuronal systems together with the systems based on genetic algorithms will face a remarkable development, while the expert systems will become more and more the usual technology of nowadays.

   * Because the researchers have identified some limits of the intelligent system as a result of the complexity associated to problems which should be solved out of the economic reality, methods of hybridization of these technologies are and will be explored in the future too.
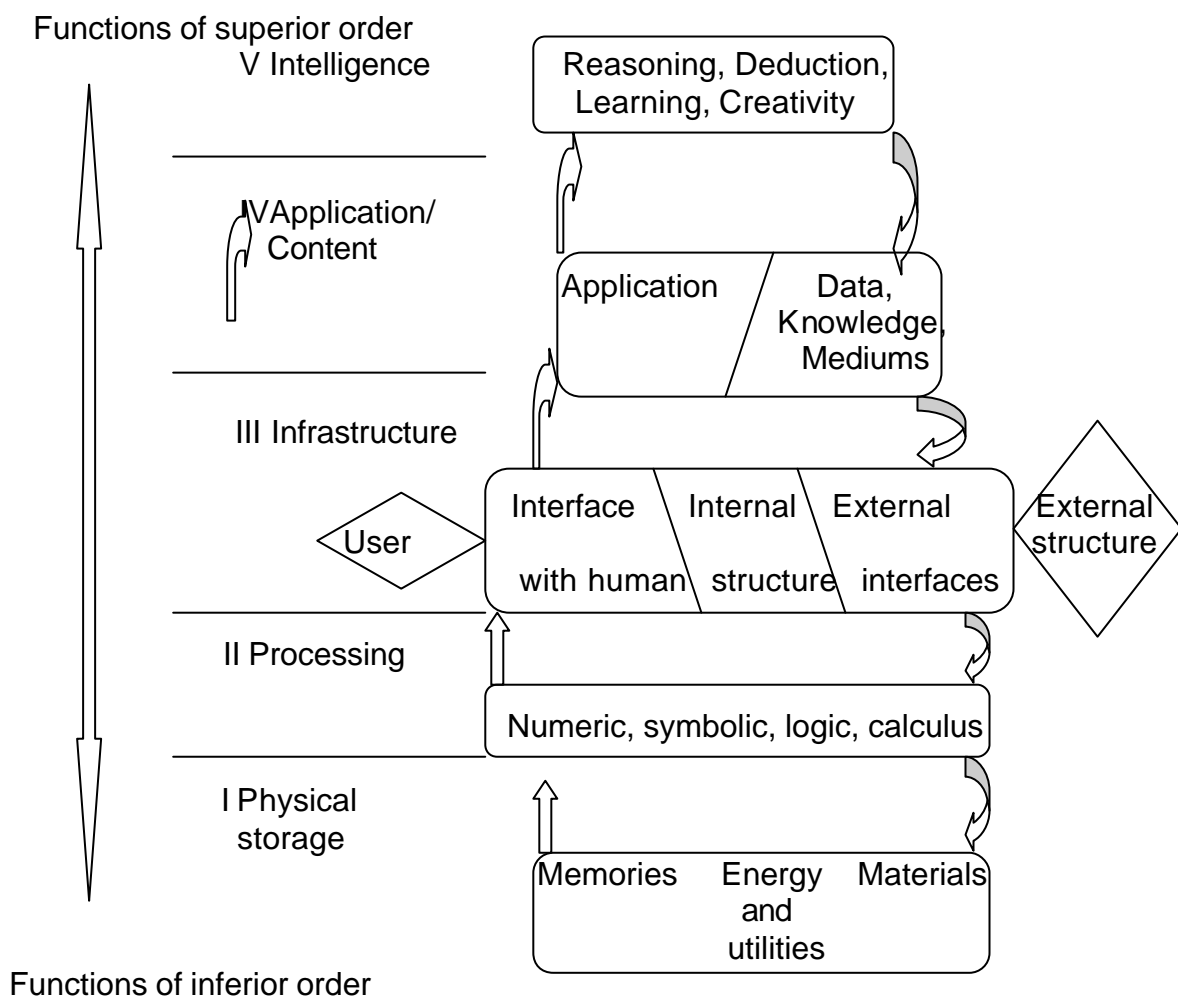
   * The specific hybrid approach will apply to the complex problems from real world according to the premise: it is impossible that a single intelligent technology could cover the whole specter of human knowledge and the processing of information, just the way it happens with conventional technologies.

As a consequence, the hybrid intelligent systems record a remarkable evolution and their applicability will increase tremendously. The most conspicuous present example is represented by the investigations done by organizations for some systems made up of expert systems and other categories of artificial systems, combined in such a way so that they can solve complex problems which could not be otherwise solved with the present informational systems or with the so-called decision back-up systems.

2. Modern approaches regarding the functional connection specific to total informational systems.

Regarding the organizations, the problem is raised in the larger context of informational technologies, the only ones which offer the real extern nervous system which, in its turn, links the individuals' ideas and actions into a total better coordinated, informed and corrected.

In this way are explained the modern approaches of some authors who display the functional connection characteristic for the total informational systems:

Functions of superior order

V Intelligence — Reasoning, Deduction, Learning, Creativity

IV Application/Content — Application / Data, Knowledge, Mediums

III Infrastructure — User — Interface with human \ Internal structure \ External interfaces — External structure

II Processing — Numeric, symbolic, logic, calculus

I Physical storage — Memories / Energy and utilities / Materials

Functions of inferior order

Figure 1. The functional connection characteristic for total informational systems

As we can see from the chart, the five levels of the functional connection specific for the informational systems play very important and unique roles, so that when there are good connections between them, the so-called total informational system is created, the only one with intelligent features, which are indispensable. The intelligent systems of the future are achieved in this way. The five levels and the 12 elements form together the fundamental construction components of any modern informational system.

By using this systematic approach, proposed by Kampas, as a conceptual framework, the role and the extraordinary implications of intelligent technologies can be much more easily assimilated and evaluated.

At the first level each informational system is materialized in a framework of atoms and electrons, in which all the applications unroll in a bits world, but all the functions achieved, even at the highest level of the system, depend on the accuracy of the phenomena's unrolling from here in many different ways. This level is linked to the way in which the data, the information and the knowledge is memorized, also to the system's capacity of charging electricity, but also to the materials' functionality out of which the computers and computers' networks are made.

At the second level the real engine of the informational system is found – the processor or the computers' processors. Any new technologies related to the increase of the processing power (numerical, symbolical or logical) has a major impact on the ability of achieving the functions found at the superior levels, referring to the unrolling of the artificial intelligence applications, which have become step by step more and more visible in the economic domain.

At the third level, the infrastructure represents the central function extremely critical for any informational system. It offers the vital control and the command of connectivity which links between them many components in a single, unified and very well tuned and adapted system. In this infrastructure we find all the interfaces types (internal and external), the proper infrastructure and the external structure.

At the fourth level the most visible activity for the user is developed, the current activity, in which all the applicable programming products operate on the data, information and the existent facts under the form of the most diverse mediums and which generates the results suitable for the users' requirements.

At the fifth level the real function of the artificial intelligence is operating in order to highlight the human capacity of solving the problems and taking decisions. They are suitable with nowadays technologies: *the artificial reasoning, interference (deduction), learning* and *creativity.*

The artificial intelligence makes no exception from the five principles of informational revolution:

* The ever ascending development;
* A multitude of small discoveries;
* Relatively few fundamental discoveries;
* One function will control the other;
* The progress rate is very fast.

Dematerializing the organization will create several opportunities but also serious discontinuities. At this stage we can notice the six zones of interest strongly interchanged:

- E-commerce;
- All interactive types of media;
- Distance learning;
- Knowledge management;
- Steelworkers teams;
- On-line communications.

3. Development and Integration of Intelligent Systems in Organizations

As the organization processes are trying to take the best decisions, the aim of all organizations, in the present competitive medium, is **to work more efficiently**, if not they will not be able to develop efficiently in this globally more and more competitive medium which is characteristic for the informational societies. In the best situations the organizations have difficulties with the abundant information, which triggers the acceleration of the decisional process, considering that more and more analyses are

required, more and more complex about the information available, in order to be able to attain directly ***the improvement of the decision's quality.***

In this way, the informational architecture of the organization should include the informational technologies able to support the achievement of the organizational functions or objectives:
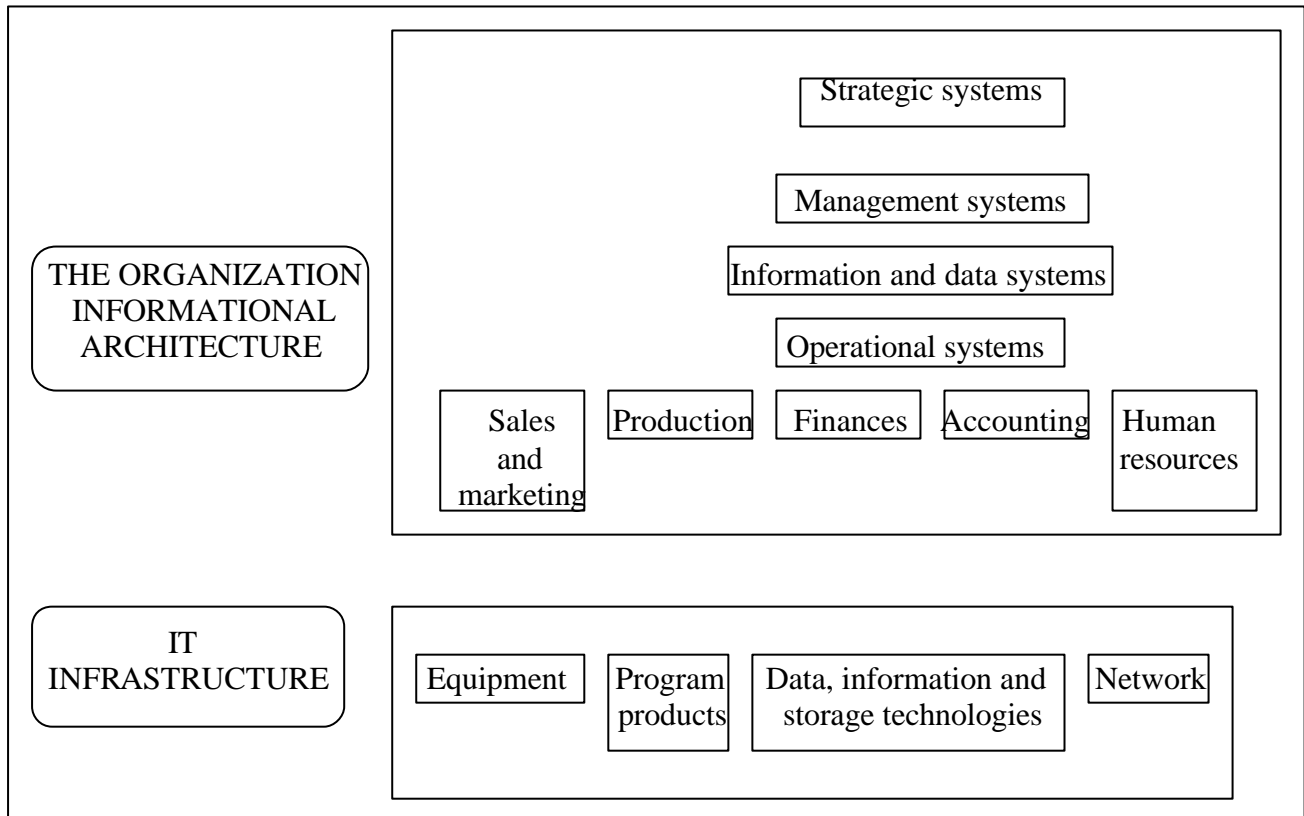
Figure 2. The informational architecture of the organization
(After Laudon K.C.)

4. Conclusions

The intelligent systems create in the organizational medium the opportunity and they entail the necessity of integration with the informational systems which are exploited in all the functional compartments. Only with their help the access to the database and the capacities of implemented calculus can be obtained. As a result, there is a number of stimulants which influence positively the integration of intelligent systems with classic informational systems. These two categories of systems can be linked for all the beneficial situations of the organization.

O'Leary and Kingston show that there are two fundamental types of integrating the intelligent systems with the classic informational systems:

1- An intelligent system incorporated in a conventional system with the purpose of supporting some activities characteristic for it;

2- A conventional system especially designed for assisting an intelligent system.

The integration approaches are much more complex. From the user's perspective they consist in:

- Intelligent system assisted/aided by a classic system,
- Classic system assisted by an intelligent system,

- Complementary integration of the two system categories.

The advantages of integration of such informational technologies depend practically on the approaches and the functionality of projecting the integrated system.

Besides the problems of system integration with the informational systems, a special aspect is represented by the integration of intelligent systems with the informational research, one of the main competitors of intelligent applications in organizations. The operational research is considered to be a branch of applied mathematics for identifying a solution to a set of economic problems. Among its specific approaches we notice the mathematical programming (linear), the network analysis and the expect/awaiting theory. The operational research has several advantages and weakness different from those of artificial intelligence: the specific algorithms are usually expensive and calculus time consuming; they require a substantial expertise incorporated in their own software; the specific methods offer a single value or a set of values as solution, many times they are too simple for the complex problems. This is how the investigations regarding the applications' integration of the intelligent systems with operational research are explained.

At the same time we notice the advent of many informational instruments for reengineering the organization processes, among which the intelligent systems are the first, especially due to their use in the conditions of an economical medium in a continuous change.

One of the up-to-date strategies of the organization consists in using those approaches which generate value (are important). In this sense, the use of intelligent systems can be extended for all the processes which favor the creation of value/importance/significance. The value, in general, is considered to be the difference between the cost and the profit of a system.

The intelligent systems can support the management in minimizing the costs, maximizing the profit, separating the products and insuring unique services compared to their competition, reducing the risk due to the increase of the consistency of problems solution and the quality, informing about the decisional processes and the permanent innovation in organizations.

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