QUALITY MANAGEMENT APPLIED IN INFORMATION SYSTEMS

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Abstract: The paper aims to present in a pragmatic way several theoretical and practical aspects regarding the place and role of managerial evolutions of integrated information systems in information systems within a public organization providing services to citizens. This scientific paper presents a possibility of the managerial evolutions of the quality regarding the information systems in the public organizations based on knowledge. For an overview, general aspects of the computer system versus the information system were presented, trying to point out the place of each one within an organization. Next, a brief presentation was made about the IT system in a public organization. In the last part, a point of view was presented on the typology of information systems within public organizations providing services to citizens, making a classification of information systems implemented in organizations by grouping into two categories: support systems for operational processes and support systems for management. This classification highlighted the main roles of each category of information systems in the management of an organization.
Key words: information system, computer system, management, technologies, quality management.

1. INTRODUCTION

In recent years, we are witnessing in society a rapid development of the technological side, especially in the field of information technology. The fast development of this technology brings an important change, in which industrial values with an emphasis on machines and energy, are moving towards information values with an emphasis on information and robotics. In this context, for new machines and in all human activities, information technology is becoming essential based on modern electronics, computing, and communications.

The decrease in hardware costs is obvious, more and more high-performance equipment is becoming more and more affordable. The development of computer systems, increasingly based on high-level software platforms, contain basic software functions and functions specific to the organization's applications. The basic software functions define and solve common problems in a large proportion, and the specific software defines the additional functions, specific to the organization. In this way, unique, customized software is no longer designed for a single organization. Such a system, with basic software functions and specific functions, can be implemented in several organizations, leading to a reduction in costs for each implementation.

The growing supply of IT equipment, applications, the lower price for their purchase has led to the connection of computers through networks, which helps to process data for use in an organization. Increasingly, interconnected computer systems based on computer networks are being used. An important factor in this direction of network development was the development of the Internet, which allows access to information and communication at any point in the world connected to the Internet. The development and emergence of new protocols and communication media have led to the development of networks, which allows more and more device connections at data transfer speeds of the order of gigabits per second, the use of wireless data transmission media, connections via satellites, etc.

Object-oriented databases have developed greatly due to the need to store information with a complex structure, with data types that cannot be represented in classical systems, of drawings

consisting of groups of complex elements that must be combined, separate, overlapping, and modified. Multimedia brings new elements, graphics, photographic images, video images, sound can not be treated in a tabular system, with names and numbers. Classic or relational databases provide too little support for unconventional data types. Object-oriented databases allow the creation of complex objects from simple components, each with its attributes and its behavior, so they manage to provide solutions to the problems and applications mentioned.

2. COMPUTER SYSTEM VERSUS INFORMATION SYSTEM

The development of society, the emergence of multiple and varied forms of activities and work processes, increase the complexity and amount of information. The high complexity of activities can block the decision-making system. The computer system, in this situation, can streamline and unlock the information system and the decision system. The computer system efficiently processes information and thus takes over the tasks of the economic system by developing techniques, methods, models, and concepts. Computer science can be defined as a science that, with the help of the computer system, studies and creates methods of information processing.

An information system, in a knowledge-based public organization, is considered as a functional model that aims to increase efficiency in quality management.

The functioning of an information system in a public organization providing services to citizens involves processes of collecting, processing, and storing information. These processes can be done using the help of means of information transmission. This information is then processed and stored. All these processes can only be performed with qualified personnel.

The quality of services in organizations has increased through the use of computer systems. The activities and processes within the organizations can be organized and controlled more efficiently with the help of computer applications thus, the management of the entire organization becomes more efficient.

Today, in organizations, computers are increasingly used in current activities. Increasingly, the collection, processing, transmission, and storage of information in an information system is done with the help of computers. The use of computing technologies in an information system presupposes the existence of a computer system.

There is a tendency to confuse the information system with the computer system. The computer system is a part of the information system that ensures the processing according to certain rules and efficient data with the help of electronic computing equipment, most of it being part of electronic computers.

Lately, automation has included a large part of the information system both in the part of data collection and processing and in the part of capitalizing on the information. In this way, the computer system is getting closer to an information system but it is still not possible to equate the two because there are still important manual tasks such as data retrieval and there are non-computer tools that perform functions within the information system.

In the literature the computer system is often defined referring to the difference between it and the information system:

- O. Nicolescu starts from the idea that most of the time, computer scientists consider that the computer system is identified with the information system, it claims that the computer system is that part of the information system that comes down to collection, transmission, and processing by automated means of information [5].
- C. Russu defines a computer system as a system of mechanized or automated information processing, built of equipment, programs, and files that must meet rigorously specified requirements [10].

The Romanian concept makes a clear distinction between the two systems but does not emphasize the fact that human resources are of great importance in the development and efficient operation of information systems.

C. Parker considers that information system that includes computers are called computer-based information systems [9].

We can consider that the computer system is a subsystem of the information system. The computer system uses hardware computing techniques and software applications to perform the functions of the information system. The functions of the information system are the decision function, the documentation function, and the operational function.

In large organizations, it is possible to operate several computer systems, working independently, to perform the tasks of the information system. They can be associated with different departments, such as human resources, financial service, production, etc.

Information systems do not necessarily involve the use of computer technology. But manually managing a large amount of data and information that can be complex can lead to decreased efficiency and errors. Using computing technology can be an effective solution in this case.

The computer system efficiently collects, securely transmits, and processes data and information quickly, but the computer system is only a subsystem of the information system. Computing technology has become more accessible and more efficient, the use of this technology brings an increase in efficiency, which leads to increasing the importance of the information system in the information system. An important aspect in obtaining a high quality of results is the use of specialized human personnel.

Thus, within organizations, there is a tendency to use more and more computing techniques in more and more activities. Computing technology cannot completely replace the human component, but the use of this technology makes the human activity more efficient and productive.

3. THE COMPUTER SYSTEM IN A PUBLIC ORGANIZATION PROVIDING SERVICES TO CITIZENS. OVERVIEW

We consider a system as a set of interconnected elements that operate according to their laws and that interact from a material, energetic or informational point of view to achieve a common goal.

By public organization or institution is meant the set of organized structures for the management of public affairs. The state, through the system of the social-economic organization represented by public institutions, can cope with the complex and diverse needs of citizens.
According to Max Weber, public institutions can handle a large number of demands, focus on setting discrete values, operate predictably, use standards, focus on controlling employees in the system of institutions.[13].

The role of a public organization is the preparation and adoption of normative acts, the enforcement of laws, the supervision of the enforcement of decisions taken at the political level, the public service.

Public organizations provide goods and services. They can provide gas supply, water supply, telecommunications services, electricity, transport, urban public transport, financial services (banks, insurance companies). The goal of a public organization is to serve the public interest.

The public administrative services refer to activities oriented towards the accomplishment of the state attributions in the field of law enforcement, court decisions, ensuring public order, guarding the borders and state security, satisfying the interests of education, culture, population health, etc. The public service satisfies a social need, it is exposed to a legal regime regulated by principles of public law that differentiates it from the services of private organizations. The public service is in a permanent legal relationship with the public administration that established and leads it, is established and disbanded by administrative decision, provides goods and services that meet the interests of a group or society, is done through public establishments.

Management system

The management system is a set of decision-making, informational, methodological, and operational elements. Between these elements, there are causal relationships that act interdependently to ensure the processes and management relationships at the level of an organization.

The management system consists of several components, which differ depending on the nature, and the specific characteristics of the organization: organizational subsystem, decision subsystem, information subsystem, other management elements, represented in Figure 1 [5].
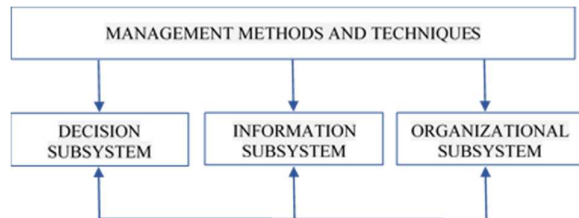

Fig. 1. Management system [5]

The organizational subsystem

The organizational subsystem includes two main categories of an organization existing in any company: formal organization and informal organization.

Formal organization means all the organizational elements within the organization, they are established by management through the rules of organization and operation, organization charts, descriptions, and positions.

Formal organization means all the organizational elements within the organization. These elements are established by the management of the organization by adopting rules of organization and operation, preparation of organization charts, different descriptions, and positions. The organizational structure is made up of all the persons and organizational subdivisions so constituted as to ensure the organizational premises achieve the planned objectives. The main components of the organizational structure are position, function, hierarchical weight, compartment, hierarchical level, informal role, etc.

Informal organization means all the elements and human interactions of an organizational nature, which manifest themselves naturally and without anticipation between the components of the organization. Within an informal organization, we have the informal group, the norm of conduct, the informal relationships and roles, etc.

The organizational subsystem of an organization fulfills several functions:

- establishes the main organizational components of the company - depending on resources and the size and nature of objectives;
- interconnects the organizational subdivisions, to ensure the functioning of the organization;
- combines the company's resources to increase efficiency while meeting certain requirements;
- ensures the organizational framework for the execution of the organization's activities taking into account structural-organizational and informational-decision criteria.

Through its characteristics and functions, the organizational structure contributes to the efficiency and nature of the activities within an organization.

The decisional subsystem

The decision-making subsystem represents the set of decisions adopted and applied within the organization, being specific to management. It is a control system that regulates the activities involved. Through it, the functions of management are exercised, a pronounced emphasis being placed on forecasting. The decision-making subsystem is one of the most active parts of the management system with a strong role in achieving high efficiency.

The main component of the decision-making subsystem is the leadership or management decision which represents the course of an action chosen to achieve an objective within the organization. This action directly influences at least one person through actions and behavior.

The main functions of the decision-making subsystem within the management system of a public organization are:

- directing the overall development of the organization and its components;
- triggering the actions of the staff at the level of the organization and its components;
- harmonization of staff activities.

These functions are not exercised individually, there are interdependencies, they provide the necessary commands for the proper functioning of the organization.

The information subsystem

The information system represents the totality of data and information, the information flows and circuits, all the procedures, and the ways of processing the information within an organization. The purpose of the information system is to support within the organization, from an information point of view, the establishment and achievement of the planned objectives. The basic components of the information system are the date, the information, the information flow, the information procedure, the means of processing the information.

The computer subsystem

The computer system is an essential component of the information system. The notion of the computer system is related to the computerization of the organization's activity, the use of computer resources for organizing and managing information. Computerization processes transform manual information systems into computer systems by:

- substitution of working means, automation of tasks;
- reducing working hours, eliminating errors, processing a large volume of data, and efficiently distributing information;
- improving performance by introducing interactive systems;
- quality of information presentation.

In general, the computer system is positioned between the decision-making system and the operational system. We consider that it can be represented graphically as seen in figure 2.
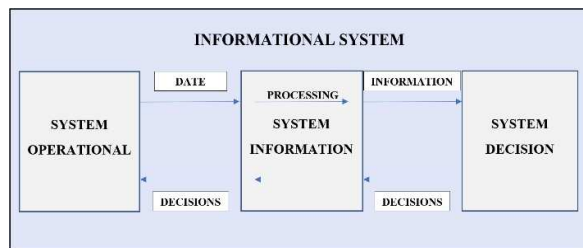

Fig. 2. System Information

The computer system, with the help of computer technologies, collects the data, processes it, transmits the data, and stores it. We consider that the components of the computer system consist of the resources and techniques

that ensure the automatic processing of data. The components of an IT system within an organization are:

- data used in the information system;
- all hardware equipment used for the acquisition, processing, and transmission of data and information;
- the necessary software programs within the computer system;
- databases;
- the human resource that includes the specialized staff that serves it but also the beneficiaries of the information system.

Computer system resources consist of hardware components, software applications, databases, data transmission components. An essential resource is a human resource that serves the computer system.

4. TYPOLOGY OF INFORMATION SYSTEMS IN PUBLIC ORGANIZATIONS PROVIDING SERVICES TO CITIZENS

Information systems implemented in organizations can be grouped into two categories: support systems for operational processes and support systems for management. This classification highlights the main roles of each category of information systems in the management of an organization.

Support systems for operational processes

The computer system is used to process data and information in the organization. These systems respond to the needs of information processing in the organization. The organization produces a wide range of data and information that is used within the organization but also outside it. At this time, this data and information cannot be used by managers in the decision-making system. At this point, there is a need for information processing by the information system.

The role of business process support systems is to ensure the efficient processing of the organization's transactions, to control industrial processes, to support communication within the organization, and to update its databases as follows: z

- Transaction Processing Systems (PTS) process and record data resulting from the

organization's operations and activities. The information resulting from these processes is used to update customers, stocks, and other databases. All these processing systems produce data and information that will be used by the management systems. It also generates some products used by the organization, such as invoices, receipts, payment statements, orders, payment orders, financial statements;

- Process control systems (SCP) monitor and control the physical processes, and within them, the routine decisions by which the production system is regulated, are taken over automatically by computers;
- Organizational collaboration systems (SCO). To help people work together, various information technologies are used, which include applications for automation of office work, office automation (Office Automation Systems). These systems support employees to collaborate through communication, resource sharing, action coordination, project team building, and other working groups. These systems use computing technology to increase efficiency and productivity as well as collaboration between members of the organization. For efficient communication, various computer tools can be used, such as the Internet, company intranets and extranets, e-mail, discussion forums, video conferences, chat, etc.

Management support systems are information systems that aim to provide information and support for managers to make informed and effective decisions. These systems appeared with the concept of management information systems (SIM) in the 1960s. The name SIM is used for systems that want to make a connection between computing technology and the theory of data processing systems in organizations. This SIM concept has tried to provide efficient use of computing technology. The concept of SIM is still recognized for the efficiency and effectiveness of organizations' information systems for two main reasons:

- highlights the management orientation of information technology within organizations. One of the major purposes of IT systems should be to support the management

decision-making process and not just the processing of data generated by the organization's activities;

- emphasizes that the notions of systems theory must be used to organize the applications of information systems. Information technology applications within an organization should be seen as integrated and interconnected information systems and not just as independent data processing activities.

Management information systems (SIM) are some of the most popular forms of management support. Provides managers with information products that support current decision-making needs, generating a variety of reports. These information products have content previously requested by the managers in such a way as to contain the information that they can use later in making decisions. The information gathered by management systems is information from internal processes and activities. These information products are exposures, situations, reports that can be provided on request or periodically, according to a predefined schedule, or whenever they are needed.

Decision support systems (SSDs) are a breakthrough of transaction processing systems and management information systems. These decision support systems are interactive systems that support managers decision-making processes. They are different from transaction processing systems that are focused on processing the data generated by the company's operations and activities, although they extract their data from the organization's databases. They differ from management information systems, which are focused on providing information (reports) previously specified by managers, information that is needed to help them make more effective decisions. Decision support systems provide managers with information in interactive sessions when needed. An SSD provides managers with facilities for analytical modeling, simulation, data extraction, and information presentation. In interactive, simulation-based processes for semi-structured or unstructured decision types, managers generate the information they need. Thus, spreadsheet software and other software applications allow a manager to find a series of

answers to questions, "what-if?" simulating and exploring different possible scenarios based on alternative sets of hypotheses.

The information systems for the top executive are adapted to the information requests of the management. The managers of the organization receive the necessary information from various sources, which can be communications, letters, e-mail, messages, notes, and others, generated both manually and by computer systems. An important part of a manager's information sources are non-digital, so phone calls or various meetings and other interpersonal activities are also other sources of information.

The purpose of these systems is to provide selective and fast information on important issues so that the strategic objectives of the organization can be met more easily and quickly.

Thus, graphical representations are often used, which can be easily understood, and through them, one can easily interact with existing databases. You can view information about the current status, but you can also get an overview of trends for important parameters selected by the general manager. For example, touch screen terminals can be used for quick viewing of text and graphics that highlight key areas of organizational performance and competitive advantage.

5. CONCLUSIONS AND DIRECTIONS FOR APPROACHING THE PROPOSED ISSUE

Decreasing the cost of hardware components makes it easier to purchase more and more high-performance equipment. The development of the market for the design of modular platforms, with a wide range of possibilities of use, which can be adapted to most organizations, also leads to lower acquisition costs.

The development of the Internet and cloud technologies determines the development of interconnected information systems technologies, based on computer networks. Quality management is increasingly based on a developed information system, with an information system that can use new technologies with increasingly obvious porting to cloud technologies.

The development of object-oriented databases can solve problems related to the representation of elements with a more complex structure or even multimedia. Thus, management methods can be developed based on information systems on platforms for integrated management of activities in an organization. Using these IT tools, quality management applied in IT systems in knowledge-based public organizations brings considerable improvements to the quality of services provided to citizens.

It is often considered that the information system is the same as the computer system. The computer system is integrated into the information system. The computer system is a subsystem of the information system. With the help of computer technologies, the computer system computerizes the activities of the organization.

Within a public organization, the management system is composed of the organizational subsystem, the decision subsystem, the information subsystem, other management elements. Information systems can be grouped into two categories: support systems for operational processes and support systems for management. The computer subsystem is part of the information system. The computer subsystem makes it possible to computerize and digitize the organization's activities.

Views were expressed on how to operationalize and implement an IT system, with quality management policies effectively applied in an appropriate way in a functional information system within an organization providing services to citizens.

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Managementul calităţii aplicat în sisteme informaţionale

Rezumat: *Lucrarea ştiinţifică propune o perspectivă pragmatică de prezentare a unor aspecte teoretice şi practice privind locul şi rolul evoluţiilor manageriale ale sistemelor informatice integrate în sistemele informaţionale din cadrul unei organizaţii publice care furnizează servicii cetăţenilor. Punctul de vedere prezentat este o mică parte din posibilităţile de evoluţii manageriale ale calităţii privind sistemele informaţionale în organizaţiile publice bazate pe cunoaştere. Pentru o imagine de ansamblu au fost prezentate aspecte generale ale sistemului informatic versus sistemul informaţional, încercând să se evidenţieze locul fiecăruia în cadrul unei organizaţii. În continuare, a fost făcută o scurtă prezentare despre sistemul informatic într-o organizaţie publică care oferă servicii cetăţenilor. În ultima parte a fost prezentat un punct de vedere asupra tipologiei sistemelor informaţionale din cadrul organizaţiilor publice care prestează servicii cetăţenilor, realizând o clasificare a sistemelor informaţionale implementate în organizaţii prin gruparea în două categorii: sisteme suport pentru procesele operaţionale şi sisteme suport pentru management. Această clasificare a evidenţiat principalele roluri ale fiecărei categorii de sisteme informaţionale în managementul unei organizaţii.*

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