



## **THE PROCESS OF DESIGN OF AN EFFICIENT INFORMATION SYSTEM FOR A COMPANY**

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### **1. INTRODUCTION**

The main condition of efficient functioning of companies is to take advantage and know modern management techniques. Companies with good management, mostly the middle and highest level one, are prosperous. The leading employees need information. Information is the basic source of information about control. However to keep the information usable, it is necessary to collect, store, analyze and share them systematically. The term "information systems of control" is an expression of such systematic approach. The main aim of this article is explanation of the core of information systems, definition of its elements, definition of demands that efficient information systems have to fulfill together with the process of design and creation of an efficient information system for a company.

### **2. FOUNDATIONS OF INFORMATION SYSTEMS**

The term information system can be understood in two basic ways. In the narrow sense it is a designation of a system of programs for operations with data and in broader sense the term information system represents a system that secures information needed for control.

In the first case, the main task of the system is processing of data that appeared in the company, while the given system doesn't solve question for whom and for which decisions the data actually are. From this fact, we can deduce that the system of data processing is just one of the subsystems of any information system. In the second case, it is not only about processing of data, but we also deal with gathering, transfer, storage, selection and distribution of data for the needs of control subject. Information system cannot be only equal to a system of data processing.

It is a system consisting of people, technical and program means to secure gathering, transfer, storage, selection, processing, distribution and presentation of information for needs of decision making in a way that the control employees could execute their functions in all elements of the control system. Its basic task is to secure enough of relevant, correct and accurate information in needed time and in needed form to prepare decisions.

### **3. ELEMENTS OF INFORMATION SYSTEMS**

Information system consists of these basic elements:

- ✚ subsystem of data gathering,
- ✚ subsystem for data transfers,
- ✚ subsystem of memory and storage of data,
- ✚ subsystem of data selection
- ✚ subsystem of data processing
- ✚ subsystem for presentation and distribution of information.

The subsystem of data gathering includes gathering of data using different devices and means; it also stores data on appropriate data medium and executes verification of data.

The subsystem for data transfers represents physical or electronic transfer of stored data to the place of storage or processing.

The subsystem of memory and storage of data secures storing of data that entered the system and will be processed.

The subsystem of data processing secures functional processing of data set by the aim of processing. Data processing includes actualization of data, their aggregation and computations needed to obtain the desired result. The results of processing are shown in the form of input information. The subsystem for presentation and distribution secures presentation of information in appropriate form and their distribution to according control places in selected terminals.

#### 4. DEMANDS ON EFFICIENT INFORMATION SYSTEM OF A COMPANY

Information systems have to fulfill certain basic demands reflecting their quality. These ones belong among them:

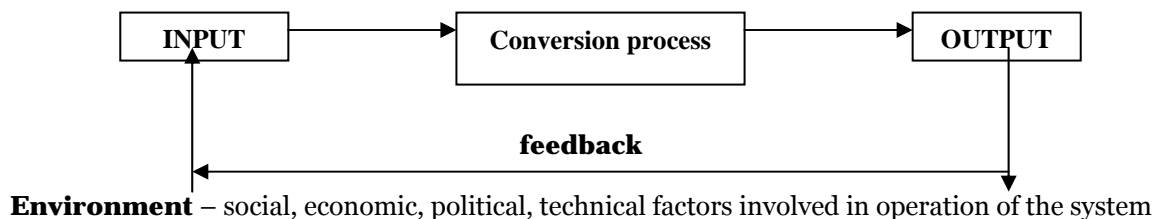
- ✚ information have to be representative of substance and needs on individual levels of control,
- ✚ frequency and speed of data obtaining have to allow their efficient use by decision making,
- ✚ channels of delivery have to be modified towards the organizational structure taking in account the need of shortest path between sender and receiver,
- ✚ by delivery of data it is necessary to avoid middle elements, which deform and disturb information,
- ✚ forms of data presentation have to be communicative and flexible to possibilities of their understanding by their recipients,
- ✚ information system has to fulfill integrative function and integrate mutually or units of the company and secure feedback,
- ✚ information system has to be able to adapt to changing conditions in inner and outer environment of a company.

For any information system to fulfill its task and obtain selected aims, it has to be secured from the following sides:

- ✚ personal – qualified employees
- ✚ technical – information and other technologies,
- ✚ software
- ✚ organizational – means of practical use of the information system.

#### 5. DESIGN OF AN INFORMATION SYSTEM

By design of an efficient information system, it is inevitable to have information about every important element of the system. In this case the system is the given organization – company. Every system has three basic elements: inputs, conversion process and outputs as shown in the figure 1.



**Fig. 1** Scheme of an open system

In the process of design of information system it is necessary to take in account that some systems are deterministic, what means that their elements operate in foreseeable or definable relations like clock. Problems in such deterministic system can be easily diagnosed. However, most of systems involving human factor are hard to describe and hard to solve problems in. Such more complex systems are known as stochastic and succumb to high deviations in quantity and quality of their output. All organizations, like all companies are based on human factor and are stochastic in their character.

In an ideal case the model organization system should be self regulative, with embedded methodology of output monitoring with feedback signaling results so any needed modifications could be executed – something like a thermostat that automatically turns on a furnace when temperature gets below desired point. But taking in account the reality that every organization has stochastic nature, design of self regulative system of control represents a very complex task.

To be able to progress further in solution, it is necessary to install sensors into every element of the system: into input, into the conversion process and also into output. These sensors are part of the data – so called “indicators”, which record the course of operations and allow to compare results to standard output.

The input data have to be gathered continuously, so the demand and resources utilized in services could be observed. Operational algorithms have to be monitored continuously because of

obtaining of information about exceptions, errors count and errors in operation of the system. Output information about amount and quality of services is needed to be harmonized with according processes. Except this, there is inevitable need of observation of external environment of organization – data like demographic characteristics of population, which the organization offers it services, services offered by other organization – development of competition, newest changes in ladder of values. These data indicators offer the leading employees a key that can help them in further study of situation and give them means to correct current state.

To develop a real self regulative information system is not achievable aim. It is however possible to design a system with following qualities:

- ✚ Information system of control has to produce information, not data. It is necessary to process data and analyze them according to set plans and only then the data can become information usable for leading employees.
- ✚ The gathered data have to be relevant to a purpose of their use. Data have to be sensitive and must supply leading employees with differential and sensible comparisons.
- ✚ Information has to be without bias. It should not be gathered and analyzed only for the purpose of acknowledgment of prophecies of ambitious and egoistic leading employees.
- ✚ The system should be understandable and synoptic. The employees doing decision making should get all important element of the system.
- ✚ Information has to be prepared in time and be to disposal before execution of needed decisions and steps.
- ✚ Information should be oriented on activities and should be in the form of such synthesis, which will make decisions easier, it shouldn't present only passive facts about present operations.
- ✚ It is important to have data unified and precise, it should give indicators that can be compared in time internally with previous output and externally with experiences nad results of other institutions.
- ✚ Data folders should be gathered with regard to aims set before.
- ✚ Expected advantages that can be obtained by using information should be higher than costs needed to get an process it.

## **6. ALGORITHM OF EFFICIENT COMPANY INFORMATION SYSTEM DESIGN**

Creation of control information system with needed afore mentioned features can be achieved by utilizing the following steps:

1. Diagnostics  
Do not star with computers or software, but with survey of data you need. Set the information needs of the company. Analyze aims of the company, its strategic plan, program demands, existing control system and its necessity to give messages.
  2. Planning  
Work out a plan and installation of the system. Include a time table, need of financial and other resources. Set which steps will be responsible for individual parts of the development process and in what way will every part of the company participate on it. This plan should be submitted to high level management for endorsement.
  3. Inventory of the existing information  
Find out which information is to disposal, what are its sources and usability for needs found in diagnostics of the company.
  4. Conception  
Decide what informative content will be included in the system. Which information is going to be gathered, where it will be gather how it will be organized, stored and presented.
  5. Computers and software.  
Specify the level of automation and which kinds of software and hardware are going to be needed. You should allow the need of information dictate demands on hardware and software and not in the opposite way.
  6. Testing.  
Test the proposed systems and approaches, ideally in one part of the company. Testing allows early recognition of deficiencies and will offer a particular example, which will help to set the system in the whole company and by training of future users of the system
  7. Education  
Work out and realize educational program for users of the system.
  8. Realization  
Install the system in a set progression of steps, always aiming on particular application or division. If possible, start the whole system or its part with the existing system and as soon as possible switch of the dated parts of the existing system
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9. Documentation and evaluation.

Work out operational procedures and document the whole flow of the system and computer programs. Evaluate the conditions of function of the whole system in a ways so that new upgrades could be planned.

It is very important to realize that design and installation of a new or modified information will disturb balance of the whole system by moving different forces, which will disintegrate equilibrium of the whole company. On the other hand, the accessibility of new more relevant information can increase quality of decision making. On the other hand it can put doubts on existence of present authorities of traditional methods. These are however natural consequences of every organizational change and as such need to be managed sensitively.

## 7. CONCLUSIONS

Like very other organizational tool, information also needs control. Information system of control supplies an organized mean to gather, store, analyze and present data in a way they would help by planning, decision making and activities regarding quality control.

Setting which information is needed is the basic step by conception of information system of control, while it is necessary to be guided by questions needed to be answered by the leading employees. Conception of a complex information system of control demands a gradual process that prefers data needs in front of demands on hardware and software.

Building of information system of a company is not just object of information technologies, computer networks or rebuilding of accounting system. It is object of motivation of people and organizational units in the company, communication between them, their creativity and ability to adapt to changes in environment.

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