INFORMATION SYSTEM DEVELOPMENT: ARE MANAGERS AVOIDING THE "TRAPS"?

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The present paper aims to outline some of the "traps" that might appear during the development and implementation of an information system. Managers, as promoters of change generated by the implementation of new information technologies, should know these traps, in order to be able to take quality decisions and to undertake timely the adequate measures when there are problems that might affect the quality of the information systems. In practice, these traps might come from different area: the feasibility study; the risks' analysis; the users' demands; the cooperation with the stakeholders.

Key Words: Information System, Feasibility Study, Risk, Manager, Stakeholder.
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Introduction

Under the circumstances generated by the transition from the industrial society to the information society, the development and implementation of a competitive information system – based on the new instruments provided by the information technology – may represent an important step for obtaining competitive advantage over the business rivals. Relying on the opportunities provided by the information technology, organizations may bring on the market more diversified, more qualitative products and services and in a shorter period of time.

As a results, there can be higher sales and profit increases. However, many voices claim that the development process of an information system has a number of "traps" that must be had in view both by the IT specialists and by managers, as promoters of change which is based on the new information technology, in order to be able to take the necessary measures in due time (it increases the probability of overcoming the problems).

The objective of this paper is to present some of the "traps" related to the information system development. Based both, on theoretical research and on long-term practice experience (as expert in information systems development), we can underline that these "traps" might come from the following areas: the feasibility study; the risks' analysis; the systems ability to meet the users' demands; the cooperation with stakeholders.

The information systems feasibility study

The development of an information system may cost – according to its complexity – from a few thousands of euro to hundreds of euro. As a consequence, it is necessary that managers do not start such a wide-spreading project until they have made some serious feasibility studies.

The feasibility study has as purpose to demonstrate whether a new project should or should not be started or whether an already-started project should or should not be continued. An operation system's feasibility study is made by a team which includes both specialists in the technical field and economists and experienced persons from the organization implementing this system. Moreover, to

make the most rigorous analysis, the team must have managers and representatives of the information system's final users.

To get the anticipated performances, before developing an information system, a proper attention should be given to the feasibility study. The feasibility studies related to the information system are various: organizational feasibility; technical feasibility; economic feasibility; exploitation feasibility or operational feasibility.

Organizational feasibility. The organizational feasibility examines how well the proposed information system supports the organization's objectives as a whole. Even from the beginning the systems that do not facilitate reaching the organizational objectives, which do not support the organization's mission and which do not comply with the established strategy, should be rejected.

Technical feasibility. The technical feasibility refers to the abilities related to hardware and software and to the system's ability to provide the users quality information. Can the managers get valuable information to support their decisions? Can the employees get the information they need to accomplish the tasks assigned to the job? Is this information available when is needed? If the answer to these questions is negative it means that the information system is not properly planned / designed / implemented. Other important questions are related to the existence of IT and necessary human resources: Can the information system be created, implemented and exploited using the existing IT in the company or should there be made any purchases? Can the hardware and software instruments support the established objectives? Does the company have the human resources capable of developing, implementing and using, with the desired performances, the information system? If it does not have these persons, the organization should – totally or partially - resort to external consultants and/or to specialized companies, therefore outsourcing the system.

Economic feasibility. Regarding the economic feasibility and Cost/Benefits Analysis there are some questions: Is the project possible, taking into account the resource constraints? What are the tangible and intangible benefits related to the information system? Are the benefits worth the costs? What are the tangible and intangible savings that will be obtain from the system? What are the development and operational costs? What are the hidden costs of ownership?

From the point of view of the economic feasibility there are two problems: whether the costs justify themselves (financial, human, material, time resources consumption); whether the organization has the necessary finances for the information system's development.

From the financial point of view, investing in an information system implies a very big capital expense (invested capital). This expense has to be compensated, in the future, by the positive cash flows, generated by the new information system. The investment's opportunity is established based on the initial expenses with the investment – called negative cash flow or cash outflow – and on payments and income that occur at regular periods (annual) as a result of the information system's exploitation.

Concerning the future cash flows' estimation, a delicate problem appears: while the initial expenses are relatively simple to be estimated – based on the general estimate – the future cash flow estimation is relatively difficult to be realized because of the following reasons: there always is an estimations' uncertainty; It is difficult to separate the information system's effective contribution to the organization's future total cash flows.

It is always necessary to check, before starting the effective design of an information system, if the expected benefits will exceed the anticipated costs. The information systems for which benefits - quantifiable and non-quantifiable – do not exceed initial costs, and operating costs, must not be approved unless there are other reasons (such as, for example, legal regulations).

In practice, managers have to decide whether or not, economically speaking, the development of an information system is feasible. Sometimes they have to choose between various information system projects. For solving these aspects, managers have various methods of capital allocation, respectively of investments' choice; Payback Period – PBP; Net Present Value – NPV; Internal Rate of Return - IRR; Modified Internal Rate of Return – MIRR.

Operational feasibility. The operational feasibility or the exploitation feasibility focuses on the behavior, knowledge and ability of all those involved in operating and using the information system. To get the anticipated performances, it is important that the ones involved support the information system's development at all stages: from proposal to effective implementation and exploitation. Even from the beginning it is necessary to establish the stakeholders – persons/groups that are interested in the information system's development and utilization. If the relevant stakeholders – managers, employees, clients, suppliers – do not support the system's usage, it is very likely that it will fail. For example, if the system is too difficult to be used by the employees, they will avoid it, reject it or even sabotage it or will resort to other methods to do their tasks.

Moreover, the negative consequences will spread and affect the ones situated along the informational circuit. Every employee, in his/her job, is an information receiver and sender. If somewhere along the track an employee refuses to use the implemented information system, his/her decision may affect everyone who should get information from him/her. As a consequence, opportunities may be lost or problems may occur due to the fact that information is not at all received, is received too late and/or is of poor quality.

Risk analysis in information system development

In the new era, information systems and their operation medium become more and more complex. Consequently, the projects for these information systems' development also become more and more difficult to control. Under this context, it is important that anyone involved in the development of an information system be aware of the risks that might occur.

Risk management encompasses three processes: risk assessment, risk mitigation, and evaluation and assessment. Risk management is the process that allows IT managers to balance the operational and economic costs of protective measures and achieve gains in mission capability by protecting the IT systems and data that support their organizations' missions[102]

In practice, any investment in an information system or information technology system is risky. Unfortunately, however, risk management is frequently ignored, although it should represent an essential step in the development process of an information system or of the informational technology implementation. The absence of such a study may seriously affect the results and may have as an effect the project's failure. The failure of an adequate risk management leaves the effects of a software project into the hands of luck or irrelevant optimism. The systematic risk management offers the frame, the perspective and the necessary techniques for replacing luck with engineering discipline.

The first step in the risk management is to identify and analyze risks, and the second is to establish the strategies to overcome these risks. The risk analysis was the subject for studies made by various specialists, who tried to identify a list of the most common risk factors[103]. Based on the specialists' experience in information systems, the list containing the risk factors and their analysis may be a highly important guidebook for the project managers. It would be interesting and at the same time useful to have such a research in Romania as well. To collect the risk factors one may use the Delphi method, and for establishing the panel project management, experts may be used. The study might emphasize the risk factors mentioned by the experts and it might realize a comparison of these factors with others got from theory or from researches in other countries.

Investments in projects concerning the information systems always raise difficult problems. The investment decision is, within its nature, risky and uncertain; it is based on a number of

102 Stoneburner, G., Goguen, A., Feringa, A. (2002), Risk Management Guide for Information Technology Systems, National Institute of Standards and Technology Special Publication 800-30, available at: http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf Accessed: (2008/11/29).

103 Schmidt, R., Lyytinen, K., Keil, M., Cule, P., (2001), Identifying Software Project Risk: An International Delphi Study", Journal of Management Information Systems, Vol. 17, No. 4, pp. 5-36.

predictions and these may or may not accomplish. Under this circumstances, it is necessary that project risks are always properly evaluated and their analysis be based on quality information.

The information systems ability to meet the end-users' demands

Another aspect that the specialists should have in view when they get involved in the design of information systems is related to their ability to meet the end-users' demands. The information systems' investigation, analysis and design processes may be time-consuming and very expensive. Often, time and costs generate pressures upon designers and make them resort to "shortcuts", which may lead to the development of less qualitative information systems, full of "cracks" and which do not meet the users' demands. Failure in meeting the users' needs and demands may also occur because users do not always properly describe what they want from the informational point of view.

This issue may be aggravated when information system experts have little or at all experience in this matter. Therefore, the situation when the designed information system can not handle the users' needs and demands may occur. Another possible problem might be generated by the fact that, as users become more familiar to the system, their needs and demands may grow, change. Therefore, the designed system must be flexible, adaptable and this change possibility – even from the beginning - be foreseen.

Another aspect that the senior managers, the project managers and the information systems' specialists should have in view is the resistance to change. This situation often occurs when, for different reasons, end-users fear that: (a) the new information system, based on new IT, might make certain jobs useless; (b) they will not be able to learn how to handle the IT, and how to use the new IS; (c) they will lose the position, power, status within the company. Generally, the resistance towards using the new information system is higher when the end-users are excluded from its design. Excluding the users from the information system's design may lead not only to an incomplete and incorrect analysis and an incomplete IS project, but it may also generate resentments towards the new information system.

Cooperation with stakeholders

Knowing, understanding and fulfilling, as possible, the interested parts' needs, expectations and demands is of vital importance for the success of any investment, especially the ones related to information technology and information system. Under these circumstances, it is very important to identify all interested parts, known as stakeholders.

For the success of an information system it is important that network era managers understand the importance of having collaboration relationships with all the people or groups that might affect or be affected by the projects regarding the information system. It is essential for companies to build long-term relationships – based on trust and mutual respect – with the stakeholders: managers, shareholders, employees, clients, suppliers etc[104]. To facilitate the successful introduction of new IT applications, issues of project risk must be addressed, and the expectations of multiple stakeholders must be managed appropriately[105].

Organisations and their managers should understand that information system specialists, no matter how professional they are, can not insure the success of an investment in information technology or information system. They must be team players, communicate and cooperate with the other interested parts: managers and users.

In many cases, the managers' and other stakeholders' expectations from the information technology or other types of implemented information systems are too high. Some authors capture the importance of reaching the expectations of the parts interested in the success of an

104 Svendsen, A., (1998), The Stakeholder Strategy: Profiting from Collaborative Business Relationships, Berrett-Koehler Publishers, San Francisco.

105 Keil, M., Tiwana, A., Bush, A. (2002), Reconciling user and project manager perceptions of IT project risk: a Delphi study, Information Systems Journal, Vol. 12, No. 2, pp. 103 – 119.

information system[106]. They claim that an information system's failure is actually a gap between the interested parts' expectations, expressed through an ideal or a standard and the real performances.

Conclusions

In practice, during an information system's development, a series of risks may occur, which might have negative consequences on the subsequent implementation and usage of the information system and, implicitly, on its performances and success.

Managers, as new-information-technology change promoters, must know these risks, in order to take the necessary measures in time (it increases the probability of avoiding/overcoming them).

In practice the information system's development traps might occur from the following fields: the feasibility study; the risks' analysis; the system's ability to meet the users' demands; the cooperation with stakeholders.

Often, the information technology is regarded as a "saviour" for the organization, although, in practice, in many cases, the results have been far beyond the ones expected. In reality, not the information technology is the key problem. After all, its success or failure is independent of the way in which the organization, the specialists, the managers and the employees know to comply with the information technology's abilities, to the organization's strategy and to the users' and organizations' real needs.

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