

# Understanding IS Management in Smaller Companies

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**Abstract**—Information systems management can be challenging in smaller organizations. Typically, it is a question of managing scarce resources. Money is a limited resource, but also expertise is important, especially in smaller organizations. Information systems management is often a question of understanding the key areas in the infrastructure. Managing and developing key processes and areas in the organization is needed so that robustness and flexibility can be built into information systems. The starting point is here that information systems and technologies should enable rather than restrict, and support business goals and targets in the best possible way.

In this article we argue that information systems should be managed, especially user support arrangements and backup procedures need to be well arranged. This is important in all organizations, also in smaller companies. The reliability and trustworthiness of technologies and systems are important, these are the elements that are the basis of successful information systems infrastructures.

**Keywords**—information systems, management, technology

## I. Introduction

It is clear, that information systems and technology are important in organizations. Computers, networks and applications are used in various roles across different fields and industries, in companies, businesses and in public organizations. There practically no organizations that would not use computers as even the smallest businesses use information technology in making orders, payments or answering customer email, for example. It has become common that organizations build their processes on information systems and technology, creating an infrastructure that acts as a backbone of the operations. Should there be interruptions or other, even minor technical malfunctions are consequences severe, having major impact on operations and processes in the organization. In many cases operating without working information systems and infrastructures is not possible at all.

The role of technology has become important, and it is ever increasing. Digitalization of processes and services continue as existing processes are being re-engineered and replaced. Electronic business has had a huge impact on value-chain, how selling and buying products and services has moved to internet. Internet has literally changed the rules of business game, now even small companies can compete with large enterprises, having access to customers from a distance. The reach and range of electronic business is unlimited and so are other possibilities, for example opening hours in a 24/7 environment where the customer can make purchases whenever is the best time for him. The result is that all businesses are challenged to innovate, develop new products and services to keep up with digital transformation in the economy. [1]

In this article we look at information systems management in organizations. The focus is on challenges of information systems management in smaller organizations, especially in small starting and growing companies. Clearly, there are several perspectives to information systems management and development, here we approach it from managers, end-user's and IS professional's viewpoints [2], [3]. Information systems management is approached with the idea that business understanding has a key role in successful information systems management. It involves more that selecting software and hardware and software to a given purpose. The importance of human element in information systems management needs to be understood. After all, the successfulness of information systems is result of cooperation between technologies, systems and the users of these. It is about how users can use systems and technologies for business purposes.

## II. Selective Approach

Successful information systems are robust, reliable and flexible to possible changes in future. Here both development and maintenance activities are important

### A. Development challenges

Information systems management is a challenging task. Information systems (IS) include a large amount of different technologies, systems and processes in organizations. IS developers need to have detailed expertise on technologies and understand how they are connected to other technologies already existing in the organization. However, the developers are also challenged to have understanding on how technology can be used in business processes and activities. In typical organization are developers mostly engineers, experts with long technical background. Their expertise is in technology, and business understanding can be quite limited. On the other hand, business managers are often not familiar with technical

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details and systems. It is clear, that both kinds of understanding are needed to apply technology in the best possible way, to support and enable business and bring added value to processes and eventually to customers. The solution is to bring people with different backgrounds together in IS development, involving business managers, IS experts and key people in business processes into information systems development.

In theory this should work fine – even though having people with different expertise and knowledge in same project is not an automatic solution to challenges in information systems development. In real life it may not be possible to have all key persons involved, it may even be hard to recognize who these persons are. And they may not speak the same language, people with business background may not understand people talking technical language, for example. On the other hand, it is not uncommon that IT staff members have very little business education or experience in other areas than information technology. Therefore, information systems project management and development become challenging [2], [3].

Another type of problem has to do with limited resources. It may not be possible to assign persons working to an IS project as these persons have other tasks. After all, other than IT staff members are primarily supposed to do other. Even IT experts can be busy with other assignments. This is the case especially in smaller organizations where there can be one or two persons in charge of information systems management and development. Technical expertise can be limited or too vague in the systems and technologies that are to be developed. It may be also be the case that there is too little time to develop a solution and implement it. Creating new systems and implementing it calls for project management, it is not only about selecting right technologies [3].

Having limited resources means that prioritizing and focusing are needed. Ideas, activities and projects should be evaluated one-by-one, against other activities so that the ones that are most potential could be chosen. Shortly, there is a need to prioritize to areas which are most promising, bringing added value to processes, products and services offered to the customers

### B. *Maintenance issues*

In maintenance activities the focus is on running information systems and technologies in a way that there are no interruptions. The goal is to create a platform for operations and business activities, making it as robust and reliable as possible.

There are several tasks in maintenance, ranging from keeping systems updated to monitoring performance of key resources. The focus should be on those areas which are critical for operations and managing them so that systems runs as smoothly as possible. In the organization there are several decisions to be made, depending on the competitive environment, geographic location, strategy and goals that impact management decisions. In this article we suggest that

maintenance tasks should be chosen selectively, based on their importance in the organization.

## III. **Essential Management Tasks**

There are several tasks and activities in information systems management. Part of these activities are visible to users while many are not. Nevertheless, all are important, and some are even critical. Those working in IT department need to prioritize and focus their resources into tasks that are most important and secure the continuous operations of information systems.

### A. *Background Factors*

These tasks are different in different organizations, depending on the role of technologies and information systems in the organization. It is notable that the resources impact the way information systems development and management tasks can be organized. The most relevant background factors include the strategic importance of IT [4] [5] [6], information intensity [7] [6], human IT skills [8] [9] [10] [11] and financial resources focused to information systems [6] [12].



Figure 1. Background factors

In different fields the role of information is different, here referred to as information intensity. Furthermore, the amount of data and number of transactions processed differs (for example in a working day). The more dependent the organization is on information the more critical it becomes for operations. This also impacts the strategic importance of information systems, together with a future perspective, ie. what the organization will be doing in the future.

Clearly, financial resources are important in information systems management. Development tends to involve considerable investments, with a payback that is not easy to calculate. Information systems cause also ongoing costs in form of license fees and other yearly costs from the systems providers.

Human resources are one of the most important resources in information systems management [13]. This is here referred to information systems related knowledge, skills and capabilities. It covers all staff members, those in IS department and other employees working in different tasks, processes and functions in different positions in the

organizational hierarchy. The difference is that where employees in IS departments are experts are other users who that use computers, technologies and information systems as a tool for their work [14]. Clearly, personal educational background affects IT related skills and capabilities, as well as earlier work experience. Training and support at the workplace help by increasing person’s capabilities, skills and confidence working with information systems [15] and affects user attitudes [16] [17]. They impact also attitudes towards information systems and help to lower resistance to changes [18] [19] [16].

It is here argued that background factors have impact on information systems management activities [13] [3]. They are also often interconnected. As an example, if the organization has high information intensity and information systems, technology and information are having high strategic role, these do directly affect the way information systems management is resourced in the organization. The same connection can be found with financial resources, and IT expertise. When information is in a critical role in the organization resources will be focused on information systems management, and it is understood that having IT expertise in key areas is critical success factor. The criticality of information, and processes that rely on information systems will lead to development and management that maximizes the robustness and reliability of information systems infrastructure [4] [20] [21] [3]. It is necessary to understand the role of information systems management in developing a reliable infrastructure that functions as a backbone of operations and processes in the organization.

### B. Key management activities

There are several activities and tasks that need to be managed to create an information systems infrastructure that serves as a reliable basis for business processes. In these activities and tasks there are both development-related activities with the eye on future. On the other hand, information systems management is also filled with maintenance tasks, trying to fix problems as they occur, and helping users of different information systems to have their work done.

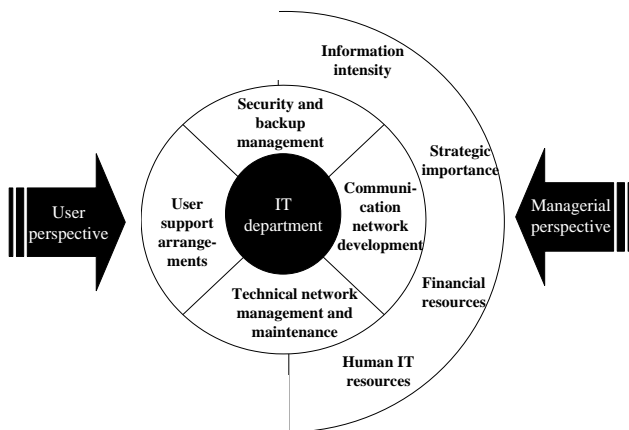


Figure 2. Key management activities

The most important management tasks are related to developing the infrastructure (selected systems, areas and processes) and maintenance of existing systems and technologies. Other essential management tasks include security and backup management. We also want to highlight the importance of user support arrangements. The background factors, information intensity, strategic importance and resources, have a direct impact on how seriously resources are focused on information systems management tasks. It is here understood that the importance of these tasks depends on who you are asking, ie. people tend to view things from their own perspective. Here we approach information systems management from user’s and management perspectives, together with viewpoint of IT staff and experts. [22] [3]

The framework for information systems infrastructure management and development maps the background factors and key management tasks (Figure 2). The framework illustrates the viewpoints, user, management and IT-staff members perspectives to information systems management. The framework functions as a tool in information systems management, highlighting the key management tasks and their role in management of information systems infrastructure in the organization [22] [3]. Among the most essential information systems management activities are

- user support arrangements
- security and backup management
- technical network management and maintenance tasks and
- communication network development

User support is important part of information systems management. If the systems are not working they should be repaired as soon as possible. In this case user should know what should be done so that the problem would be solved. User support arrangements can be organized in different forms, depending on the organization. In larger organizations this means contacting user support or help desk, whether inhouse or support provided by external partner. In help desks there are several experts on duty, so that user support is available also during lunch hours, for example. However, in smaller organizations it is common that each person who works in IT department fixes problems and helps users. This type of user support is relatively personal, users know support staff by name and what they are capable of. As an example, you might contact Joe as he is an IT expert who knows how to fix printing problems. It is also important to notice that users tend to rely on colleagues if help is needed in using information systems. Whatever the arrangements are, it is important that the problem will be notified and identified, and the service activities start as soon as possible so that normal operations can be resumed. [23] [24]

Security has become a very important domain in all organizations [25] [26] [27]. Security is closely connected with privacy, referring to the idea of securing important and private information so that unauthorized users have no access to it. There is a need to understand the risks in information

systems, and so mapping and categorizing different threads and risks in different technologies, systems and infrastructures in the organization are important parts of information systems management. The range of risks is wide ranging from intentional intruders and hacking attacks to breakdowns and disasters caused by power shortage, fire and earthquake, for example. Security planning and preparations are needed, they help in recovery and make it possible to continue operations should there be an unwanted incident. Security is often connected with backup, as backup procedures make it possible to continue operations after a disaster [25].

Information systems maintenance refers to daily support and maintenance activities, often carried out by IT technicians and experts. Installation of new hardware, devices and applications to the infrastructure helps aims to keep the systems up and running. This type of preventive maintenance aims to prevent and avoid interruptions and malfunctions [28]. All incidents cannot be prevented, and therefore there is a need for support arrangements and technicians that can help. In some organizations the systems are considered so critical that support must be available at all times. At the same time there may be only few persons working in the IT department, especially in smaller organizations. Here being available around the clock can be impossible in practice. Furthermore, there are often many different technologies, applications and systems, and no single person can master them all. Having technologies and systems from several manufacturers and providers increase the complexity of the infrastructure, making maintenance challenging [29]. These have prompted many organizations to rely on external service providers and their expertise in information systems maintenance and related services.

Reliability is one of the most important elements in information systems management [30] [26]. It requires management of existing technologies and systems, and planning of infrastructure development. New systems and technologies need to fit existing infrastructures. Therefore, standards and standards compliance are important elements in technology, they are foundation of information systems development. The development activities, replacing legacy systems and technologies calls for careful planning so that reliability and flexibility could be as good as possible [31] [2] [3]. New devices and systems need to fit seamlessly into existing infrastructure. Furthermore, it is also important that they are flexible, referring to the idea that making changes is possible in the future.

#### iv. Discussion

Information systems management is a continuous process, there are always issues that need to be solved and systems that could be modified to better meet the changing business needs. Compatibility is an important element, all new systems and technologies need to fit to existing systems and infrastructures. Standards compliance is an important guideline in information systems development and management activities. [32]

The role of information systems management can vary across different organizations and industries. This is because

there are background factors such as information intensity and strategic importance of technology, and different resources. Especially financial and human resources impact information systems management and development. Typically, when information systems have a critical role in the organization the relative amount of resources, concern and focus will be in this domain [13] [33]. In opposite cases where the role of information systems is not that central, resources can also be more limited. Consequently, background factors explain allocation of resources in the organization. Furthermore, background factors can also explain partnerships and outsourcing arrangements in the information systems domain. In many organizations limited resources push managers to finding alternative solutions in information systems management. When there is not enough expertise to have everything done in-house, it has become common to rely on external providers. Partnerships and outsourcing arrangements can help in information systems management, development and maintenance activities. However, they require careful planning and management [3].

In this article we highlight the most important information systems management activities. They include user support arrangements, security and backup management, technical network management and maintenance, and communication network development. The goal of management and development is here to provide an infrastructure that acts as a solid basis for business operations. It is understandable that information systems management deals often with technical specifications and compatibility of technologies and systems. Similarly, maintenance and development call for continuous monitoring and management. For example, in security management is monitoring and exception reporting are in a central role.

Information systems management is interlinked with business strategy, goals and targets. Therefore, management should make it possible and enable processes and activities in the organization. Bhatt [34] refers to this with the term IS capabilities, seeing technology as a resource. In smaller organizations are resources often relatively limited, careful information systems management can provide business a solid basis for operations, and makes it possible to survive in changing environment.

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