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How to face Organizational Issues: Structuring Information Management in Hospitals

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ABSTRACT

Information management has to be a driving force in hospitals instead of being a reacting instrument. It needs not only proper management of projects but also an active preparation of circumstances that enable successful projects as well as successful operation of the hospital information system afterwards. So we can differentiate information management in hospitals into tactical, strategic, and operational information management. Since human beings are mayor success factors of hospitals and their information systems, we will define hospital information systems as sociotechnical (sub-) systems of their respective hospitals.

Keywords:

hospital information system, hospital information system management, information management, organizational issues, strategic plan

1. INTRODUCTION

Success of information systems implementations does not only depend on the quality of hard- and software used. BERG cites in [1] that some 75 to 98% of computer supported management information systems "should be considered as failures" and argues similarly as [2] that organizational issues are and have been the key factors for success, precisely unsuccessfulness. This 'success'-rates and the tremendous costs for information processing make obvious, that organizational issues in health informatics have to be matter of proper management.

The quality of information processing is an outstanding factor for hospitals to gain a competitive edge. In the USA for example, the JOINT COMMISSION ON ACCREDITATION OF HEALTHCARE ORGANIZATIONS (JCAHO)¹ includes 10 standards concerning information processing in its accreditation process to assess the quality of an organization as a whole [3]. Similarly, professional consultants on healthcare emphasize the importance of systematically managing information processing [4]. Whilst these institutions stress aspects, which reflect the

healthcare organization as a whole and for a longer period of time, authors like AARTS et al. in [5] or KNAUP et al. in [6] focus on separate projects for introducing information systems' components.

Information systems have to be a driving force in hospitals instead of being a reacting instrument. How else should the competitive edge be reached? So it needs not only proper management of projects but also an active preparation of circumstances that enable successful projects as well as successful operation of installed components afterwards. The respective methods are quite different and must not be confused.

So the aim of this paper is to assemble the above mentioned aspects of organizing and managing information processing by defining the term *information management in hospitals* and to differentiate it into *strategic*, *tactical*, and *operational information management*. This goes with a definition of *hospital information systems* as sociotechnical systems.

2. INFORMATION MANAGEMENT IN HOSPITALS

Interpreting the term management in a functional manner, management contains all leadership activities that determine the enterprise's goals, structures, and behavior. According to ([7], p. 21) we define:

Information management in hospitals is the sum of all management activities in a hospital that transpose the potential contribution of information processing to fulfill the strategic hospital goals into hospital's success.

The *result* of information management in a certain hospital is a system of human or technical actors together with the information processing they enable. That is a system of information processing. Obviously every hospital has and has had in the past such a system. This holds because even in medieval hospitals information about patients had to be stored, communicated, interpreted and so on.

Good information management ensures, that this system of information processing contributes significantly to the strategic hospital's goals and success and furthers its mission.

¹ <http://www.jcaho.org>

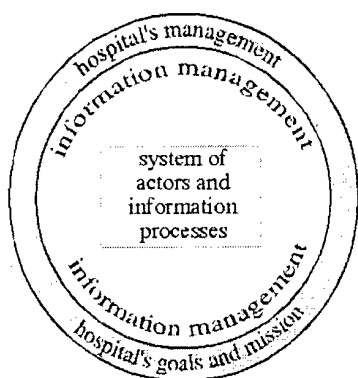


Figure 1: Information Management

So we can see, that information management is embedded in the hospital's overall management. And as illustrated in figure 1, information management acts as shell, which does not separate but link hospital's management and its goals and mission to the hospital's system of information processing.

3. HOSPITAL INFORMATION SYSTEMS

We want to call that sociotechnical subsystem of a hospital, which comprises all information processing actions as well as the associated human or technical actors in their respective information processing role a *hospital information system*.

Therefore a hospital information system is not only the hospital's ADT-system but comprises also the paper based patient record archives as well as the patient management system in the intensive care unit.

In order to further the hospital's missions of patient care and to support the associated administration, the tasks of hospital information systems are to provide:

- information, primarily about patients, in a way that it is correct, pertinent and up to date, accessible to the right persons at the right location in a usable format. It must be correctly collected, stored, processed, and documented;
- knowledge, primarily about diseases - but also for example about drug actions and adverse effects - to support diagnosis and therapy;
- information about the quality of patient care and about hospital performance and costs.

This highlights, that hospital information systems have to provide high quality communication between the various hospital sectors in terms of both information and knowledge related functions [8].

In the setting of university hospitals, which in addition to patient care undertake research and teaching to gain medical knowledge and deepen understanding, more tasks for hospital information systems have to be considered.

That part of the hospital information system in which computer systems are used as tools for information processing is referred to as the computer-supported part of the hospital information system; the remaining part is referred to as the non-computer-supported part.

4. CLASSIFICATION OF INFORMATION MANAGEMENT TASKS IN HOSPITALS

Because each hospital has a hospital information system from its very beginning we must not question whether a hospital should be equipped with a hospital information system or not. The question of information management rather focuses on the issue, whether the performance should be enhanced, for example by using computer-supported information processing tools. Accordingly, information management engages in the following objects ([9], p. 1):

- information,
- application systems,
- computer-supported and non-computer-supported information and communication techniques.

This means that information managers in hospitals have to understand not only the functioning of networks, computer hardware and software. Especially the information processes in hospitals have to be understood. Information managers have to be able to assess the needs of health and administration professionals and have to provide solutions for their informational needs.

The general tasks of management are planning, directing, and monitoring. For information management in hospitals this means

- *planning* the hospital information system, respectively its architecture,
- *directing* its establishment and its operation, and
- *monitoring* its development and operation with respect to the planned objectives.

With respect to its scope information management can be differentiated into strategic, tactical, and operational management [7]. The corresponding activities will be specified in the next sections.

In summary, activities of information management can be classified by a three dimensional classification as depicted in figure 2.

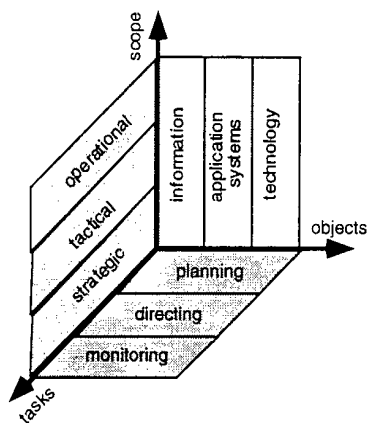


Figure 2: Three-dimensional classification of information management activities

5. STRATEGIC INFORMATION MANAGEMENT IN HOSPITALS

Strategic information management deals with the hospital's information processing as a whole. It depends strictly on the hospital's business strategy and strategic goals and has to translate these into a well fitting information strategy.

The result of strategic information management *planning* activities in a certain hospital is a strategic information management plan [10]. The plan includes the direction and strategy of information management and gives directives for the construction and development of the hospital information system by describing its intended architecture. It contains also a description of the organizational structures for information management in the hospital.

The strategic plan is the basis for strategic project portfolios. They contain concrete projects, which implement the objectives of the strategy. Since a strategic plan may remain for say four years, the project portfolio should be updated at least every year. The portfolio is the basis for annual budget decisions.

Directing a hospital information system as part of strategic information management means to transform the strategic plan into action, i. e. to systematically manipulate the hospital information system in order to make it conform to the strategic plan. The system's manipulation is done by the initiation of the projects of the strategic project portfolio.

The projects deal with the construction or further development and the maintenance of components of the hospital information system. Planning, directing and monitoring these projects are the tasks of tactical information management. Operational management will be responsible for the proper operation of the components. Both topics will be discussed below in more detail.

Monitoring a hospital information system as part of the strategic information management means continuously auditing its quality as defined by means of its strategic plan's directives and goals. It should be audited, whether the hospital information

system is able to fulfill its tasks. In order to be able to audit the information system's quality the management task is to install 'sensors'. They have to receive information from the projects running, from operational management, from users and from the various stakeholders. Additional information can be gained by evaluation projects (e.g.[11]).

Strategic information management does not only initiate projects and supervise the operation of the hospital information system. It also has to implement appropriate organizational structures, which are needed for tactical and operational information management. Especially a clear distinction between operational and tactical information management is needed. Otherwise day-to-day duties in operating a hospital information system tend to absorb resources needed to uplift the information system and to introduce new components.

But first of all, the hospital's top management has to implement the proper organizational structure and the responsible for strategic information management. The responsible for information management is the Chief Information Officer (CIO). The CIO has to align the information management to the hospital's mission and goals and has to care for a fitting hospital information system, which is embedded as in figure 1. She or he reports directly to the hospital's top management [12] if not being its member [13]. In the middle of the eighties some people asked "Is there a CIO in your future?... The answer could be 'no'" [14]). The only question today is "How to hire the right CIO" [15].

Since strategic information management and as a person the CIO are responsible for information management in hospitals, one important question is still open: how are the projects performed and how shall the information system be operated? To manage the corresponding tasks we additionally need tactical and operational information management in a hospital.

6. TACTICAL INFORMATION MANAGEMENT IN HOSPITALS

Tactical management deals with certain enterprise functions [16], i. e. with hospital functions as for example the planning and documentation of operations. It aims to construct or to maintain components of the hospital information system. According to the example above, this could be an application system for planning and documentation of operations. Related activities are usually executed as projects; they have to be initiated as part of an information strategy, which is formulated in the project portfolio of a strategic plan as drawn up by the information management.

Planning in tactical information management means planning of projects and all resources needed. Even though projects of tactical information management are based on the strategic plan they need a specific i.e. tactical project plan. This plan has to describe the project's subject and motivation, the problems to be solved, the aims to be achieved, the tasks to be performed, and the activities to be undertaken to reach the aims [6]. Based on that *directing* in tactical management means the execution of such projects of tactical information management in hospitals. Therefore, it includes typical tasks of project management like

resource allocation and coordination, motivation and training of the personnel etc. *Monitoring* means continuously checking, whether the initiated projects are running as planned and whether they will still produce the expected results.

It is the task of tactical information management to examine the users' requirements concerning a new application like a operation planning and documentation system, to involve users in the selection of software products and the realization of their application, to ensure proper user education and so on. So many organizational issues discussed in literature have to be considered here.

7. OPERATIONAL INFORMATION MANAGEMENT IN HOSPITALS

Operational information management is responsible for maintaining the installed hospital information system and its components. It has to care for its operation in accordance with the strategic plan.

Planning in operational information management means planning of all resources like organizational structures, finance, personnel, rooms, buildings that are necessary to ensure the faultless operation of all components of the hospital information system. These resources need to be available for a longer period of time. Therefore, they should be allocated as part of a strategic plan. Moreover, planning in this context concerns the allocation of personnel resources on a day-to-day basis (e.g. planning of shifts).

Directing means the sum of all management activities, which are necessary to ensure proper reactions to operating faults of components of the hospital information system i. e. to provide back-up facilities, to operate a helpdesk, to maintain servers, to keep ready task forces for repairing of network components, servers, personal computers, printers etc.. Directing in this context deals with engaging the resources planned by the strategic plan in such a way that faultless operation of the hospital information system is ensured.

Monitoring deals with verifying the proper working and effectiveness of all components of the hospital information system. For example, a messaging infrastructure must be installed, which enables a quick transmission of users' error notes to the responsible services.

8. SUMMARY

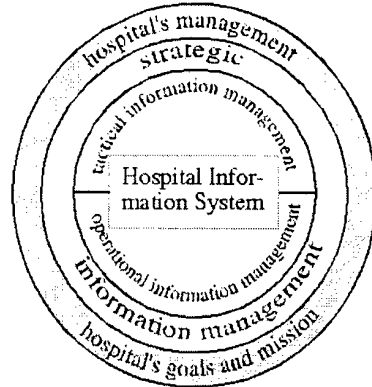


Figure 3: Hospital information systems are embedded in tactical, operational, and strategic information management

A hospital is itself a system, precisely a sociotechnical system, in which human beings and machines carry out specific actions following established rules. In this context, it is not surprising, that introducing components of a hospital information system needs a sociotechnical approach [1]. Therefore, we should consider a hospital information system as a sociotechnical subsystem of a hospital [17], [18]. Hospital information systems are embedded into a systematic information management. Tactical and operational management do have the information system as their subject of work. Strategic information management provides the framework and appropriate circumstances for tactical and operational information management. Especially the strategic plan has to ensure, that a hospital information is maintained and created, which fits to the hospitals goals and mission.

9. ACKNOWLEDGMENTS

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