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The Data Challenge for Healthcare IT: Strategic vs. Tactical Information

As hospital information systems become more and more complex, the need for effective and efficient information processing increases. A precondition for systematic information management is a Strategic Information Management plan (SIM plan).

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Introduction

SIM plans are a result of enterprise architecture planning. As this, they describe the goals of information management aligned to the hospital's business goals. From the goals, the optimal future architecture of the hospital information system is derived, and a migration strategy is described that contains the projects that have to be realised to build the future architecture.

Since 1996 the project group "Management of health information systems" of the Institute for Medical Informatics, Statistics and Epidemiology (IMISE) is responsible for developing the SIM plan of the Leipzig University Medical Center. Past plans have usually been valid for a three-year period. Only paper copies were published. Although the strategic planning in general paid off well, the publishing process turned out to have some disadvantages:

Ó In a validity period of three years the plan's contents like planned projects or sometimes even strategic goals, are subject to change. In a paper document this cannot be taken into account without a revised version, which in turn is costly and time-consuming. Therefore the document is left as it is and thus goes out of date fast, which reduces the acceptance among the users (CIO, IT project managers) even faster.

Ó In the majority of cases no systematic monitoring of whether the goals described in the SIM plan are achieved takes place during the validity period of the plan. This is, of course, also due to the fact that a paper document does not allow for updating key figures needed for continuous monitoring (like an automatically generated electronic document would) but it involves the risk of missing goals or at least parts of them.

Publishing the SIM plan as an interactive document and in parallel offering a possibility to monitor the plan's goals would avoid these disadvantages and harbors the chance of making the SIM plan the Central Information Management application.

Information Management

Information management can be differentiated into strategic, tactical, and operational information management. Objects of information management are information, application systems and information technology. These objects have to be planned, directed and monitored.

Strategic information management deals with the information system as a whole. Its goal is to enhance the hospital information system in a way that it supports the hospital's business goals. Tactical information management deals with single components of the hospital information system that have to be introduced, enhanced or replaced for strategic purposes. The realization takes place in terms of projects that are defined in the SIM plan and initiated by strategic information management. Operational information management is responsible for the provision of resources that are necessary for the smooth operation of the hospital information system. It provides not only hardware like PCs, printers or network components, but also personnel for maintenance and user support.

The relation between strategic, tactical and operational information management can be described that way: the success of strategic information management depends on tactical and operational information management. Strategic information management defines orders that have to be executed according to their types either by tactical or operational information management. After the completion of the order the tactical or the operational information management reports the results to the strategic information management, more precisely, the strategic monitoring, where this information is used for updating the strategic planning or initiating new projects (see Figure 1).

Strategic Information Management Planning

The first and most creative step of strategic planning is the development of the information management goals. These goals have to be formulated in consensus with the hospital's top management, i.e. they should base upon the hospital's business goals. As a next step, the current state of the hospital information system has to be described and assessed regarding how far it fits to the strategies. Conveniently, a description of the hospital information system's current state already exists, because such a documentation is useful for other information management tasks too. An expressive modeling technique for such a purpose is the Three-layer Graph-based Meta Model 3LGM (www.3lgm2.de), which describes the enterprise functions of a hospital, the application components used to support the enterprise functions as well as the hardware components necessary for the operation of the application components on three linked layers. As a result of the assessment the future architecture should be derived. To close the gap between the current and the future architecture, a project portfolio including assigned resources like personnel, investments and future operation costs as well as deadlines have to be defined.

The result of this planning process is the SIM plan. The validity period of a SIM plan is limited. It has to be rewritten or updated after 3 to 5 years.

Strategic Monitoring

Monitoring of hospital information systems means to examine continuously if the goals defined within the planning process are achieved, and if the hospital information system supports the business functions efficiently. The information management should be able to assess the state of the information system by means of key performance indicators regarding costs, quality, and productivity. Monitoring takes place on each information management level (strategic, tactical and operational). It is part of a control cycle, that corresponds to PDCA (Plan, Do, Check, Act) also known as the Deming Cycle. The fourth step (Act) is represented by the feedback mechanism of the control cycle. But information gathered by tactical and operational monitoring is reported not only within the respective level but also to the strategic monitoring. This means strategic monitoring plays a superordinate role. It has to collect all information and use it, for example, to revise the SIM plan or to initiate additional IT projects.

The fulfillment of a goal in general depends on two premises. In most cases a goal is interrelated to projects. This means that first of all these associated projects have to be completed successfully, for which tactical information management is responsible. Not until then can it be measured if the project would yield the desired success, e.g. by measuring if the implemented application system is actually used or the reorganisation of a process improved the quality of care.

As mentioned in the introduction in the majority of cases no systematic monitoring takes place. This is not only due to deficient technical assistance. Frequent reasons are lacking awareness of the problem, missing knowledge about appropriate methods, limited financial and organisational resources as well as fear of negative results or transparency on the part of the information managers. Publishing the SIM plan electronically, including monitoring aspects and integrating the whole tool in the daily work of information management staff, can solve some of these problems, because it raises the awareness for systematic monitoring and limits the additional effort. Nevertheless, it is indispensable to sensitise information managers to that effect and to provide them with convenient methods.

An Interactive Strategic SIM Plan

To make the SIM plan central for an information management application the strategic planning and monitoring have to be integrated. That means, not only strategic goals and associated projects should be displayed, but at least also project management data that can be derived from the tactical information management. In summary, the SIM plan should become a management dashboard that provides different views for the different users. Beyond that, not only the management but also the hospital's employees should have access to these information, because they are affected by a great number of projects, namely those regarding the infrastructure of the hospital information system.

Most of the data, needed to be included in the SIM plan, already exists. To avoid double documentation this data should be integrated from the application where it is documented originally. This predominantly concerns the project management application. The integration of project management data possibly also has positive effects on the project documentation's quality. Usually, only the information management staff has access to the documented information. An interactive strategic SIM plan allows every employee to see the goals' statuses and the project data. This should be an incentive to document a project's progress promptly, because otherwise it looks like the project is in delay and therewith the goal is in danger.

As mentioned above, strategic monitoring should also include the monitoring of the operation and usage of the information system and its components. For this purpose, during the strategic planning process, key performance indicators have to be defined for each strategic goal. These would measure the fulfillment of the respective goals. Such metrics can not be chosen from a school book. Anyway, scientific and practical approaches like CobiT or the Balances Scorecard offer methodical assistance for the formulation of metrics.

How can such an interactive strategic SIM plan technically be implemented?

In today's working and everyday life we have to deal with a lot of software applications, memorize a lot of login data and become acquainted with new processes steadily. Therefore the introduction of a new tool is always difficult, even if the future users are skilled computer personnel.

Hence, the challenge is to satisfy the information need (SIM plan, monitoring data) from within the well-established working environment.

Many organizations use Microsoft's server-based applications like MS Sharepoint Portal Server and MS Project Server. Within this environment it is quite easy to implement a SIM plan as described above. Both the static and the dynamic contents can be managed using data lists that are realized by Sharepoint Custom Lists. To connect goals and projects, ID mapping lists can be created. To retrieve the project data from MS Project Server, the XML based interfaces PDS (Project Data Service) and SOAP (Simple Object Access Protocol) can be used. To present the content of the SIM plan and the monitoring data to the hospital staff, Sharepoint Web Part sites can be used. Similar to HTML pages, Web Parts allow the configuration of a website with free definable zones (see Figure 2).

For organizations that do not already use these Microsoft server-based applications, the investment costs and the effort to implement interfaces to existing tools would be so high that an in-house development would be more economical. That can be easily done using the web scripting language PHP and a MySQL database, that stores the dynamic parts like goals, projects and monitoring data (see Figure 3).

Create Awareness

Creating awareness for the necessity of the integration of strategic planning and monitoring among the responsible persons has to be the first step. Like mentioned above, the need for systematic monitoring is not respected it should be. Furthermore, existing monitoring methods have to be adapted to meet the demands of information management in hospitals. By now, there exist different initiatives for benchmarking hospital information systems, both in science and practice.

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