Strategic Information Management for a Dutch University Hospital

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Abstract. Strategic Information management in hospitals gives directives for the development of the hospital's information system. This paper discusses the specific situation of strategic information management for a university hospital that is subject to the Dutch healthcare environment. Central issues for the discussion are the involved internal and external stakeholders that have some direct or indirect interest with respect to information management in the hospital. The complexity and heterogeneity of the hospital requires the development of multiple strategic plans that reflect the specific requirements of the different stakeholders.

1. Introduction

Information management (IM) aims at determining the objectives for information systems and identifying potential Information Technology (IT) solutions that should be deployed by the organisation in order to achieve those objectives. Therefore, IM addresses implicit and explicit goals, guidelines, and plans with respect to the supply and demand of information for an organisation [1]. It should be approved by management and intended to support the organisation's goals in the long run, while being capable to adjust to changes in the environment when required.

IM in *hospitals* encompasses the management of information, the management of application systems, and the management of information technology whether computer supported or not. IM in hospitals needs to plan paper-based archives and other traditional media that carry information together with the computer-based information systems. Consequently, a hospital information system (HIS) is that subsystem of a hospital, which comprises all information-processing activities and the related human or technical actors in their respective information processing roles. IM should enable an orderly processing of information coherent with the goals of the hospital.

It is remarkable that within the Dutch high-tech healthcare system, the systematic and integrated IM still has not been fully realised [2,3]. In the past years, IM was focused on the automation of financial, accounting, and logistics business processes. Most hospitals still have no clear and explicit IM policies. Their policy is often fragmented, supporting IT development within isolated parts of the organisation only. The resulting lack of standardisation makes integration of information from dissimilar departments a difficult task. Often, there is insufficient adjustment between hardware and software policies. Education and training in IT applications are usually not guided by a policy. If in existence, the policy is usually restricted to the organisation itself and does not consider external parties such as other healthcare providers and healthcare insurance companies [4].

In this paper, the development of a strategic IM plan for the University Medical Centre (UMC) Utrecht is described and placed against a theoretical background of (hospital) IM planning. The UMC Utrecht is an academic hospital with a capacity of 1.100 clinical beds and employs an equivalent of 5.200 full-time staff. Their annual budget is 345 million Euro of which 63% is used for personnel, 22% for material and 15% for the total hospital infrastructure [5]. The purpose of this investigation is to learn how hospitals make plans with respect to the demand and supply of information, and how this relates to the planning of IT.

2. Stakeholders Involved in Strategic Information Management

The term stakeholder is used to refer to everyone who may have some direct or indirect influence on (or stake in) the IT requirements [6] and IM in general. The various internal and external stakeholders involved in the creation, approval and use of the strategic plan at UMC Utrecht are illustrated in Figure 1.
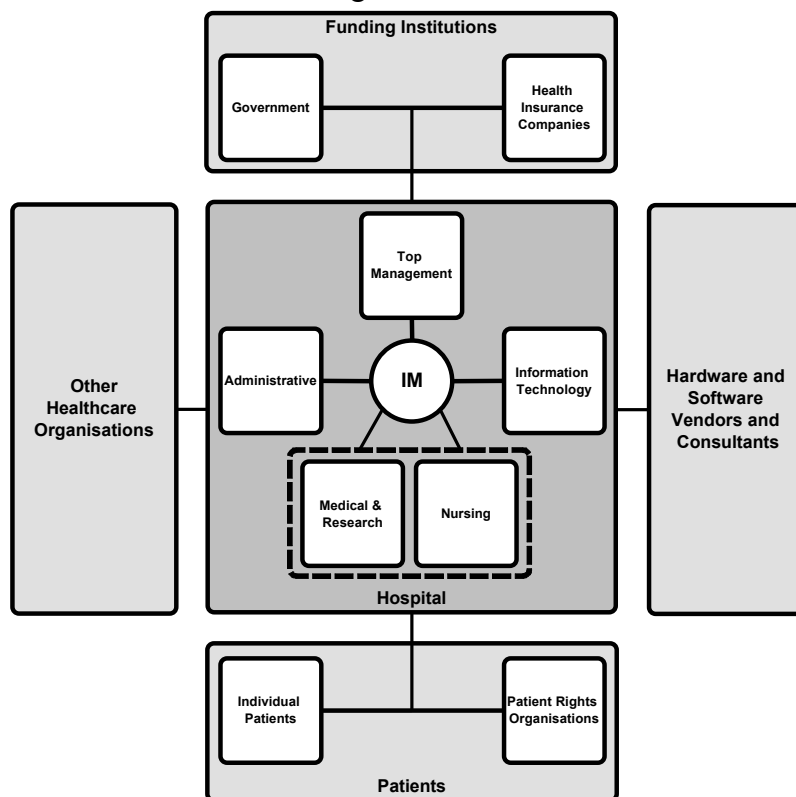

Figure 1: Stakeholders Strategic Information Management

Top management and hospital departments:

Top management, administrative, nursing, and medical departments may have principal differences in expectations towards information systems.

The top management is interested in seamless and cost-effective operation of the hospital. Departments are involved in eliciting the requirements, since they will use the resulting information systems. The administrative departments expect quantitative information for billing and reports. The medical department expects an electronic medical record holding information on medical care and cure, such as prescription and diagnosis, with the possibility to conduct medical research. The nursing department expects an electronic nursing record and a system for planning the resources such as operating theatres and beds. The dotted line indicates that the medical and nursing expectations are intertwined to a great extend. The IT department in its role as enabler assists in creating and deploying the plan. They are interested in clearly defined requirements for their work, which is highly concerned with tactical management issues.

Other healthcare organisations: More and more healthcare organisations, such as general practitioners, hospitals, and almshouses have the need to exchange information with each other in order to achieve a shared care for their patients. In theory, laboratory results, admissions and release notification all can be easily exchanged using electronic messages. What is needed to realise effective and meaningful interchange of information are standards such as HL7 and UN/EDIFACT in order to allow the integration of the involved information systems [7]. However, the semantics of existing standards is not always detailed enough such that users often create dialects.

Funding institutions: Funding institutions such as the government and health insurance companies aim at an effective and efficient use of healthcare resources through deployment of new technologies. The insurance companies monitor the use of healthcare resources on behalf of the Dutch government. To accomplish that, hospitals have to manage statistical data on different levels of detail, which are not relevant to the primary hospital processes. This can influence and hinder long term information planning and cause potential legacy problems, and consequently delay required changes in the IT infrastructure.

IT vendors and Consultants: In a complex IT environment, such as a hospital, the make-or-buy decision often is in favour of buying. Given the high degree of concentration in the Dutch HIS market, buying existing IT solutions and hiring knowledge through consultants implicates restrictions in terms of the ideal 'planned state' (see below). HISCOM is the biggest provider of HIS in the Netherlands with more than 50% of the market share [8].

Patients: More and more patients are getting involved in their own treatment. For instance, the growing number of requested second opinions for diagnoses and the use of the legal right for Dutch patients to obtain information considering their own treatment increase the need for involving patient organisations into IM in hospitals. The growing demand for privacy and data security for individual patients also has a large influence on IM in hospitals [9].

3. Structure and Content of the Strategic IM Plan

A strategic plan encompasses the hospital strategic goals, the current state of the HIS and an analysis on how far the current information system fits the goals. The planned architecture can be derived as a conclusion of this analysis [10]. The strategic plan also deals with the resources needed to realise the planned architecture, and can include a strategy for the operation of the resulting HIS and a description of appropriate organisational structures. Examples for resources are money, personnel, soft- and hardware, energy, rooms for servers and archives, and for training. The basic structure of the strategic plans for UMC Utrecht follows the general structure for a strategic IM plan as suggested in the paper [11].

Strategic goals of the hospital: Hospitals aim at providing healthcare. However, these goals may be further refined. Goals of the hospital can be found in their mission statement and the vision that is expressed by it. The mission statement of the UMC Utrecht can be summarised as "Offering high-quality, patient-oriented healthcare in a number of selected medical areas. This should be connected to the main medical research themes and the provision of high-quality, student-oriented education, in which university and executive teaching are integrated. Research aims at breaking new ground in the areas of the five research institutes. The overall goal is patient-oriented healthcare" [12]. For patient management, IT contributes to achieving an optimal use of the hospital's resources, and in this way IT makes a significant contribution to the high-quality, patient-oriented care. IT is an enabler to achieve the goals set in the mission statement [13].

Description of the current state of the HIS: The description of the current state is the basis for identifying those functions of the hospital that are supported well – e.g., by IT – and those functions that are not (yet) well supported. Thus, application systems as well as existing information and communication technology are described including their contribution to the hospital's functions. The functions that are considered here are derived from the goals of the hospital. It is possible to describe the current state after the planned state, but it should be described in any case.

Analysis and assessment of the current state of the HIS: The current state is analysed with respect to the achievement of the IM strategies. Note that missing computer support for a certain function is not in all cases assessed as being a bad support for that function. For example missing computers in patient rooms and in consequence a paper-based documentation of clinical findings may be much more in line with the goal of being a friendly hospital than the use of (portable) computers in that area.

Description of the planned state of the HIS: Based on the analysis of the current state, a new state is described that achieves the goals better than it is the case in the current state.

Path from the current to the planned state: A path from the current to the planned state describes a step-by-step working plan, which includes assigned resources and concrete deadlines for partial results. This path also assigns priorities to individual tasks, as well as

dependencies between tasks. Because of the diversity and number of involved stakeholders, defining the planned state is the hardest part.

4. The current state (1999) of the Strategic Information Management for UMC Utrecht

To cope with the problems imposed by the former IM, the Board of Directors decided that a strategic IM plan has to be defined in correspondence with the mission statement, and clear guidelines for the departments on those activities that are controlled on a central or local level [14]. The IM portfolio of the UMC Utrecht is of such a size and variety that a stakeholder-oriented approach to defining multiple plans is appropriate. Taking the different internal stakeholders in consideration, four workgroups are formed to develop individual plans for:

- Patient information (including nursing information)
- Research information
- Management information (including administrative information)
- Information Technology

A joint policy group is installed to co-ordinate these four workgroups and their plans. Each workgroup defines an IM policy within their area of responsibility, prioritises project proposals, allocates budgets, monitors and evaluates projects. The policy group is responsible for the overall policy and budget [12]. It should be noted, that in many hospitals, only the IT department defines plans related to IM. The spread of the budgeted hours by the policy group is shown in Table 1.

Department	Patient Information	Research Information	Management Information	Information Technology	General Reserve
Applications	35%	10%	25%	20%	10%
Systems & Networks	20%	0%*	10%	60%	10%

* The former automation department of the medical faculty is not (yet) integrated into the Systems & Networks.

Table 1: Spread of budgeted hours over the IM workgroups

Currently, the IM policies of the four workgroups are in different stages of their development. The patient information workgroup has already defined a clear policy and assigned most of their budget (the largest for the four workgroups) on the development and implementation of the electronic patient record. Currently pilot projects evaluate the new HISCOM system 'MIRADOR'. However, the way to the complete electronic patient record is still a long one. The research information workgroup has recently been formed, delayed by the recent merger of the Medical Faculty and the hospital. The management information workgroup has some problems deciding on a formal policy. Partly this is caused by difficulties in defining what 'management information' actually means, and due to unsolved questions concerning the controlling approach. Interestingly, this has not hindered decision making yet, because most of the project proposals in their area are mandatory (for example the implementation of the Euro and the financial integration of the Medical Faculty with the hospital). These projects consume almost the entire budget in that area. The IT workgroup has defined a clear policy and has allocated budgets to different proposals. Because of the enabling role of IT, their allocation of funds is, to a great extent, determined by the budget allocations of the other three workgroups.

The policy group has clearly stated to the top management that the current overall budget is far too small for a policy that aims at a strategic advantage in the long run [15]. Partly driven by the strategic importance of IM, the Board of Directors started an ambitious program of strategic re-orientation of the hospital's activities in order to acquire the financial funds for realising the tasks of the patient-information workgroup. The new program that is called 'making choices' must lead to the re-allocation of 23 million Euro in the coming four years.

5. Concluding Remarks

In general, strategic IM in hospitals deals with the hospital's information processing as a whole and refers to the hospital's strategic goals. However, these directives are only valid for a limited period of time. Because of the temporal limited validity of the strategic plan, planning is a permanent task of strategic IM. In hospitals, IM should include not only the policy makers and systems designers, but also the future users of HIS applications for increased acceptance and success [16].

In the medical field, the UMC Utrecht is generally considered one of the largest and most progressive hospitals in the Netherlands. Being one of the largest and most progressive hospitals in the Dutch healthcare system does not mean that there is no room for some self-criticism for its own IM. As stated in the strategic hospital plan for the coming five years [12]: "In the UMC Utrecht, over and over again it shows that employees find the available IM and IT insufficient and restrictive for their work. The general feeling is that the current IM policy often is dogmatic and prescribed in a top-down manner. Many employees are only able to use a part of the potential resources available in existing information. It seems that there is an immense gap between the requirements of the workforce and the available facilities. To be able to enable the employees with improving their work, the existing problems have to be solved. The board of directors is reserved in promising solutions; the complexity and years of under-estimating problems demands modesty. Initiatives of employees that address high-quality topics and aim at a better internal and external communication will have a high priority. An example is the realisation of the electronic patient record." The further development of IT supporting the hospital's working processes is considered as a main goal in the UMC Utrecht. It will not be possible to completely change and upgrade the current HIS. Legacy problems with historical patient data cause this restrain. Short-term opportunities are applications that plan parts of the primary processes concerning patient streams and provide management information. Long-term opportunities are applications focused on efficiency and effectiveness of the primary business processes with an electronic patient record as a core and external information exchange [4].

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