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HIS Purchase Project: Preliminary Report

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Abstract. The KAGes (Krankenanstaltenges.m.b.H) is a company, owned by the state of Styria in Austria, which operates 20 hospitals with about 8.000 beds and 14.000 employees, serving a population of ca. 1.2 million people. KAGes is on its way to purchase a new hospital information system (HIS) for it's hospitals.. Within the strategic IT plan and the "System Structure New" (SSN) project a methodology was developed, for making an effective HIS purchase. Several steps of this project are described in the paper: request for product information, evaluation of vendor proposals, product presentations, test site evaluation, reference site visits and selection of vendor finalists. The authors present the internal project management methodology, including the structure of the project team, project information management through intranet, criteria for different steps of the evaluation and evaluation site organization. Four major HIS vendors with leading HIS products qualified for this stage of the project (evaluation site). About 60 teams with 400 members (end users and IT-experts) have assessed all the products installed, during one or more, repeated, test sessions. The decision on which new HIS to purchase will be based on the recommendations derived from this evaluation. Two pilot installations (one general hospital and one teaching hospital department) are planned for implementation in the year 1999/2000 and subsequent roll-out (including substitution of the legacy system) is scheduled until the year 2003.

1. Introduction

The SSN project is aimed at defining the future structure of information systems in KAGes, together with its joint venture partner – the Faculty of Medicine of the University of Graz. Consequently this development emphasizes IT support for medicine, nursing and research. It is based on KAGes strategic information management plan, that suggests the implementation of standard software systems, rather then new developments. Within the SSN project standard software in the HIS field is defined as follows:

- substantial market presence (especially in German language areas)
- positive references (especially in complex hospital institutions and teaching hospitals)
- modern technology implemented
- originating from major producer/vendor

The project officially started in spring 1998 with a kick-off meeting, where the project work plan was accepted.

2. Project highlights

The selection of the new information system that involves, at the end, almost 10.000 end users and links 20 hospitals is a strategic decision and a major investment. Therefore the project analyses the global HIS market and involves the broadest possible user representation. The first step in the project was a marketplace screening (a European request for information about products and related services), that yielded 15 bids. After preliminary meetings conducted through the project "core"

team 6 vendors that fitted our strategic constraints ("standard software") were selected. These vendors were invited to perform product presentations based upon representative procedures from our functional requirements.
Within the project structure three functional task force groups were defined for basic systems, standard subsystems, and for scientific and special subsystems.
All of these three groups together form the so called "integration project team". The group heads and deputies form the so-called "core project team".

2.1. Functional requirements

Based on our experiences in developing specifications for new and modified information systems in the medical field, we did not design detailed system requirements. Instead, we defined a systematic list of the processes, that should be supported by an information system. This list has the following structure: core processes (e.g.: ancillary services), process fields (e.g.: medical chemical labs), processess (e.g.: communication of findings) and sub-process or function (e.g.: presentation of cumulative findings).
Due to this approach we avoided huge expenditures for the development of detailed requirements (that always turn out to be incomplete in production!) and gave to the vendors enough information about the systems functions that should be implemented. Supplementary to this "end users functionality" our functional requirements encompass some standard electronic data processing (EDP)-features, such as data protection, communication standards etc., as well as the general quality issues, such as functionality, applicability, reliability, performance and maintainability.
To obtain comparable results during the product presentation, we also developed two "sample" medical processes: Angina Pectoris. and Oncological Surgery. These two "sample" processes showed the behavior of the products at work and were substantially used to select four finalists for a further phase of assessment.

2.2. Assessment criteria

This selection procedure was based upon criteria that were defined in advance by the integration project group and are derived from our strategic definition of "standard software":

Vendor and bid:
- Size
- Reputation
- References
- Bid quality

Bid scope and qualifications:
- Project management
- Implementation in production (incl. legacy systems)
- User and EDP-personnel training and support
- Product maintenance

Product - general:
- Technical state-of-the-art
- Compatibility to EDP-standards
- Flexibility
- General quality criteria
- Standard interfaces
- System components availability
- Data protection

Product - functionality
- (according to functional requirements)

According to the evaluation of the integration project team the steering committee decided to keep the following four products (and vendors) for final evaluation (alphabetically ordered):

- HNA-Millennium (Siemens/Systema), USA
- IS-H/IS-H*Med (EDVg), Austria/Germany
- Orbis/ClinicWare (GWI), Germany

- PATIDOK (PCS), Austria

2.3. Evaluation site organization

According to accessible sources, this part of our project methodology seems to be unprecedented in HIS purchase procedures on this scale. All 4 qualified vendors installed their systems in SSN project rooms, with 3-5 workstations, 2-3 printers and all supplementary peripheral devices (scanners, digital cameras, bar code devices, voice recording facilities, etc). All the systems installed were to be fully functional for production and remain, for three months (February to April 1999), at the disposition of assessment teams and other KAGes visitors. KAGes will reimburse the vendors (whose bid will not be accepted) the evaluation site expenditures, given the test-system functionality.

The vendors had to provide: hardware installation, pre-installation of software, local users support, remote support for KAGes EDP-personnel, system modifications through customization and system de-installation.

KAGes provides an infrastructure with one evaluation site co-ordinator (general organization, co-ordination, infrastructure issues, communication), four evaluation site organizers - "product sponsors" (thorough training in products assessed, customization evaluation, contact persons for expertise with vendors, product reviewers) and contact persons for specific issues (subsystem connecting, network infrastructure, legacy issues).

The assessment procedure is performed through assessment teams, representing different professions (doctors, nurses, secretaries, EDP-experts etc.) and medical specialities. Every team is obliged to assess and review all four sites, usually within two days. If some major problems, missing or inappropriately customized functions are noticed, the team may repeat the site inspection after the deficiency was fixed through vendor support. The team should plan their visit in advance and use evaluation plans with functional specifications, sample processes, real medical records and real nursing documentation for the evaluation process, recording their results with standardised assessment forms with the following evaliuation criteria:

- functionality
- flexibility
- user friendliness
- support (at the test site)
- general issues (such as: data protection, performance, system stability etc.)

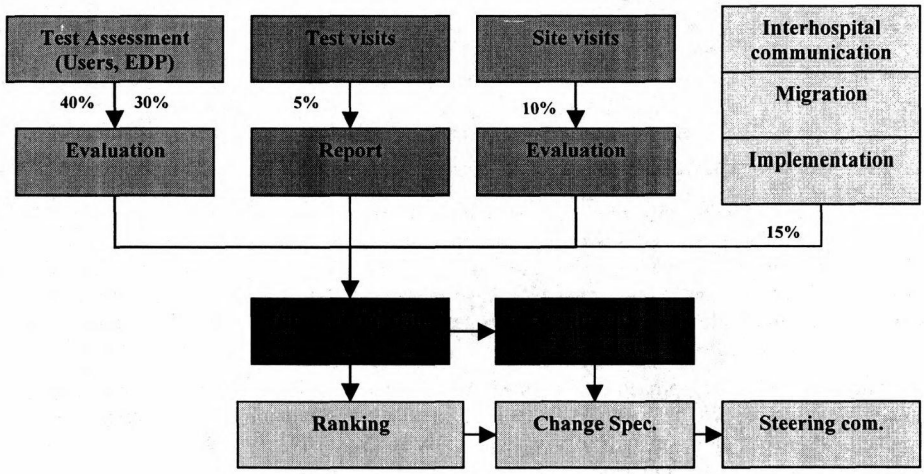

Fig 1: Assessment flow

The condensed product assessments were the basis for the final evaluation meeting (whole integration project team and assessment team heads), a two-day conference at the end of April 1999 where the final expert recommendation ti the steering commitee for the best products were formulated.

2.4. Documentation and communication: intranet-based project library

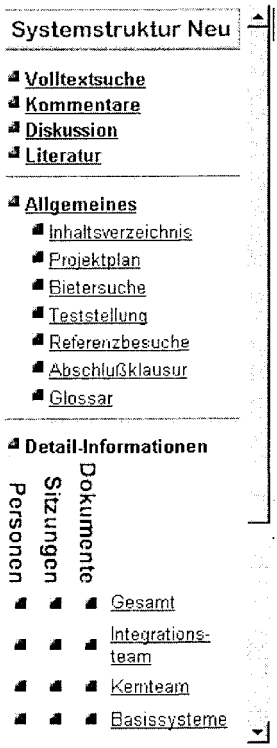

Fig. 2: Navigation frame for intranet presentation of SSN project library

A project of this scale cannot be successfully performed without proper documentation and communication. Due to the fact, that KAGes infrastructure allows the corporate-wide access to the Intranet services (LAN and WAN), an SSN-Project intranet-site was developed. All employees of KAGes and Faculty of Medicine that have access to the network can browse all relevant documents and other project information. This Intranet site is organized in a similar manner to the project itself (see fig 2).

It has been proved, during numerous project meetings, that applying this technology in combination with LCD-projection for broader auditorium improves the conference efficiency substantially, due to momentary accessibility to relevant documents and its presentation to all discussion participants. The accessibility of several hundreds of documents is especially improved through the introduction of web site search features (with natural text search syntax).

3. Preliminary experiences

At the time of finalizing this paper our SSN project was not yet completed, but some relevant experiences could be presented. First of all, the technique of organizing the project library proved to be of major benefit for both the project teams and other hospital employees that are to be informed about project contents and it's progress, avoiding the "paper-flood" usually related to projects of this scale. About 150 of site visitors monthly approve this preliminary appraisal of the intranet project library.

Secondly, the very new approach used in this project - evaluation sites - is a major challenge to both vendors and KAGes. We decided to give the priority to the evaluation sites in preference to vendor presentations and vendor site visits for numerous reasons. Some of them are:

- both presentations and vendor site visits are restricted in time
- there is little chance to show flexibility features of the product
- there is no possibility to appoint numerous assessment teams

- customization in other hospitals is fitted to local needs

there is no possibility to enter and browse the data without interfering with actual production.

Of course, our approach of evaluation sites also brings some risks, especially in high expenditures for both parties.

The experiences concerning the products are also very indicative:

- none of the HIS products inspected complies fully with our definition of "standard software"
- all of the products are in "development", "integration" or "translation" phase
- the products aimed primarily to medical documentation have to be coupled to some administrative system, without clear solution of integration issues
- integration of system components is based exclusively on data level; user interface and functional integration are yet to be solved
- on preliminary inspection all of the products showed major problems e.g.: lack of on-line help, lack of user guidance and straightforward navigation, complex customizing, errors by referential integrity, poor coverage of hospital data protection requirements etc.

All of the systems offered in our project show absolutely the same strategic architectural concept: they are highly customizable. The systems usually use classical programming (3- or 4GL) of HIS administrative part and widely flexible design of medical documentation and presentation features through customizing. During first inspections we detected following problems in this field:

- a considerable part of classical programming has been shifted to customizing (parameters); the tools used in classical programming languages (formal checks, x-references) are not used in the parameterized part of "development", so customizing errors (especially due to lack of referential integrity) are detected as late as in the HIS production;
- the customizing tools often do not provide a user friendly development environment (no assistants, on-line help, tutorials or samples)
- with the customizing approach the investor actually buys the "HIS development tool" and has to adapt the standard or "base line" hospital system to local needs
- all products offer the use of user-defined documents, additional data structures and reports; their functionality however is in some instances very poor and the possibility of implementation is to be tested in detail

In addition to the evaluation of the test installations, selected sites with installed and operational HIS from the four vendors have been visited to answer questions that naturally can't be inspected through evaluation sites: overall performance in production, system stability, support quality and costs. General conclusion after this vendor site visits is, that the end users get less that the system could offer - due to expensive customization.
Differences in evaluation are significant through the project phases:

	vendor ranking after:		
vendor	bid, hearing	presen-tation	test site
A	3	1	4
B	8		
C	1	2	3
D	4		
E	5	3	1
F	7	4	
G	9		
H	1	5	2
I	6	6	

Our comment of this outcome is, that both vendor hearings and presentations suffer from the substantial credibility deficit. We believe that the basis for such a major decision could be gained only through extensive evaluation in production-like environment (test site or a pilot installation).

This evaluation of vendor test sites was accepted through the project steering comitee and two vendors were invited to the contract negotiations. KAGes intent to conduct the contract negotiations within seven weeks, aiming to get detailed bids from two vendor finalists and to issue the letter of intent for implementing two pilot installations and further planning of roll-out for other KAGes hospitals. The major issues for the contract negotiations are:

- extending the existing users' requirements through:
  - repairing the major product definiciencies recorded during the evaluation of test sites
  - implementing some excellent features of products not qualified for the final round
  - defining so called far-reaching "paper-less" hospital (that includes also the substantial reduction of telephone communication) as general system requirement to be achieved
- defining of so called "exclusion list" of deliverables, that are not covered through the bid
- vendor linkage to the the system's success (license, implementing and maintaining fees depending on users' acceptance and the depth of the system usage).

4. Outlook

- Condensing the results of the evaluation of the test installations and the findings of the visits to operational HIS-sites the integration team will produce a technical report with a ranking and a list of highlights and deficiencies of the different products
- This report serves as the basis for the selection of probably two companies for technical and commercial negotations for a contract, including a list of change specifications etc.
- The product chosen will be implemented in two pilot institutions of KAGes until mid 2000; these pilots are not to be considered as the beta-test installations, but as the first phase of the roll-out. However, if the system or the support is found to be inadequate, there is an option to step back from the contract.
- Roll-out in about 20 KAGes hospitals is planned until year 2003-2004; after completing the pilot phase further change specification will be made aimed to fix the problems detected as well as to implement new technologies.

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