IT Outsourcing in the Healthcare Sector: the Case of a State General Hospital

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ABSTRACT
This paper discusses the outsource solution that was selected during the deployment of an Information Technology (IT) project concerning the introduction of a Clinical Information System (CIS) in a Greek state hospital. During the early stages of the project, it was realized that the Management Information Systems (MIS) department was unable to satisfy the unexpectedly increased users' needs and provide to them the adequate supporting services. Also, it was noticed the rather negative reaction of the users to the newly computerized working environment. Certain corrective actions and measures had to be taken in order to protect the investment and to end the project successfully. The decision focused on two issues, first, the outsourcing of the entire CIS operation, and second, the outsourcing of the data entry operations. A year later that decision proved to be adequate having a Clinical Information system operating in an acceptable manner and at the same time having users who are performing a number of the CIS operations without the assistance of the outsource personnel.

Categories and Subject Descriptors
K.6.1 [**Management of Computing and Information Systems**]: Project and People Management – *staffing, training.*

General Terms
Management, Human Factors.

Keywords
IT outsourcing, Health Information System, Medical Informatics.

1. INTRODUCTION
Information Technology (IT) outsourcing is one of the major issues facing organizations today. Outsourcing is defined as the transferring of internal functions of the information systems department to an external organization [3]. According to the

Outsourcing Institute (www.outsoursing.com), IT is the business function most likely to be outsourced. The main outsourcing decision factors concern cost savings, improvement of customer care, improvement of performance, knowledge sharing, better control of IT, etc.

In Greece, IT outsourcing in the public healthcare sector had never been engaged before. Hence, the choice of receiving outsourcing services embraced a number of factors known from the relative literature and the ambition to carry the project out successfully in order to support the IT investment of our hospital regarding a Clinical Information System (CIS) and simultaneously to accelerate the starting of the project, outsourcing services were deployed.

In this paper, we describe the IT infrastructure of the hospital and the activities that took place in order to introduce a Clinical Information System (CIS). Next, we refer to the problems faced deploying the CIS into a number of clinics and the need for immediate actions that led to the decision to outsource IT services. A year later, the earned experiences are positive which are presented in the last part of the paper along with the discussion of specific aspects of the project.

2. IT INFRASTRACTURE IN "G. GENNIMATAS" HOSPITAL
The "G. Gennimatas" hospital is one of the largest regional state hospitals in Greece serving more than 1,5 million people. The hospital's campus is extended in a space of 64,000 square meters and it is based on eight buildings. The buildings are connected by the installed fiber optics computer network thus allowing the users of the various departments to communicate with the main servers where the databases and the software application are installed. The Hospital's Information System is consisted of two major fully interconnected information systems: the administrative IS and the clinical IS.

The administrative IS was introduced in the early 90's and since then it has been evolved covering most of the administrative services of the Hospital. The Ministry of Health and Welfare employed a public serving organization, KHYKY, to develop the associated software. The application software for the Pharmacy's Department was launched in 1993. In less than a year later, the applications for the Patients' Admissions Office and the External Patients' Appointments Office were delivered. Then, the following sequence of software applications were delivered by the KHYKY to the Hospital for use: the Patients' Billing Department's

application, the Warehouse, the Supply, the Dietary and last the Accounting Department's application which interconnected all the previous ones. All the installed applications accepted and used productively by the Hospital's personnel due to the significant fact that the personnel participated in the design, development and testing of all software applications assisting the KHYKY analysts and programmers in their work since they did not have any previous experience in the flow of work of a typical software. Since 1998, the system is used productively by the employees assisting in the efforts to improve both the working conditions for the hospital's staff and the services the hospital offers to the patients too.

3. INTRODUCTION OF A CLINICAL INFORMATION SYSTEM

After the successful implementation of the administrative IS, the next step was obviously the introduction of a Clinical Information System to support the clinical departments [4]. A project management committee was formed in order to design as well as to supervise the implementation of the project. The committee consisted by members of the hospital's Administration and MIS department, a senior IT manager from C.T.I. (Computer Technology Institute – C.T.I., is since 1997 the technical consultant of the Greek Ministry of Health and Welfare regarding IT projects) as well as a representative of the company which was assigned the work as an advising - consulting member. (a local S/W vendor which has already developed a CIS).

The project management committee, designed an implementation plan with the following discrete phases:

3.1 First Phase: Introduction of the CIS in two pilot clinics

Two clinics were chosen to be the pilot ones. Training offered to the personnel of both clinics and it was agreed with the developer of the CIS to satisfy all customization demands that would be asked by these two clinics in order to succeed the greatest acceptance and usage of the CIS.

3.2 Second Phase: Interconnection with the administrative system

In parallel with the introduction of the CIS in the two pilot clinics it was requested to the CIS developer and to IIASH (administrative system) developer to work together in order to interconnect the two systems. This task appeared to be easier than what it was initially expected and its was completed successfully on time.

3.3 Third Phase: Customization of the CIS

After the introduction of the CIS in the two pilot clinics, the CIS developer collected the users' requirements from the rest of the hospital's clinics and then customised the S/W in order to meet these requirements. This phase was successfully completed on time.

3.4 Fourth Phase: Step by step introduction of the CIS to the rest of the clinical departments

After the completion of the customisation, the next step in the plan referred to the activation of discrete procedures in a number of clinical departments simultaneously. Thus, eight clinics were selected and the following operations were first introduced: sending drug orders to Pharmacy, sending clinical orders to the hospital's laboratories, keeping records on patients' follow up and issuing discharge documents.

Prior to the introduction of those procedures, a training program was applied in order to let the users get familiar on the operation of the system. The most of the provided training was given in a classroom and a smaller, and thus inefficient portion of it, was "on the job". It is worth mentioning that most of the users had already been trained within the means of other projects on introductory computer operation courses.

4. PROBLEMS TO OVERCOME

Right after the completion of the third phase and as soon as the fourth phase of the project was started the following facts were realised:

- The personnel of the clinical department although they had already taken all the agreed training, they did not accept and utilise the system, the way they were expected to.

- The MIS department proved to be unable to provide support to both unexpected and increasing needs that was demanded by the users in the operation of the newly introduced system.

Thus, being at a critical stage for the success of the entire project, the committee had to overcome the problems regarding the MIS understaffing as well as the negative reaction of the users.

4.1 The MIS department understaffing

The mission of the MIS department is related to assist the Hospital to obtain its organizational vision. The MIS department is obliged to participate in all phases of the Hospital's IT developments adopting itself to face effectively each one of the formed situations from stating the terms of a contract to the maintenance of all installed IT systems and the users' support. The employees of the MIS department are called to participate in a number of activities that require special skills, experience and act as systems, database, and network administrators and applications' specialists. In order to satisfy such specialized demands, all levels of academic education are required from the personnel's qualifications. The number of employees of the MIS department must have an acceptable analogy to the medical professionals and the installed IT systems that it is called to provide reliable support services around the clock during all seven days of each week.

The "G. Gennimatas" Hospital has an availability of 750 beds and personnel of 2,300 to support it. Meanwhile, the MIS Department is consisted of five employees, which is a very poor proportion to the total volume of personnel[1].

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[1] The same situation stands in most of the Greek state hospitals: in a recent survey that was contacted by CTI in 2001, it was realized that in 120 state hospitals there were only 45 IT

The existing legislation in the state sector rises obstacles in the employment of additional personnel, posing bureaucratic and time consuming procedures which in combination with the lack of Information Technology professionals, sets the situation even more difficult to expand the staff of the MIS department. In addition, the formed situation is even worse taking under consideration the fact that the average salary in the public sector of the IT expert is far less than the corresponding salary of the private sector.

4.2 The negative reaction of the users

Clinical Information Systems (CIS) contribute major benefits in the direct support of patient care, providing great advantages over the paper record in reporting, organising and locating clinical information. At the same time, CIS can assist physicians' decisions by providing protocols, reminders and alerts. Despite of that fact, CIS have not been successfully implemented in many cases. In these cases, the physicians react negatively with respect to the CIS causing the failure of the productive use of the system. In some instances, the lack of physicians' acceptance led to the discontinuation of the implementation of the entire project.

In the case of "G. Gennimatas" Hospital, we experienced analogous behaviour. The clinical departments are in most of the cases understaffed and the clinical personnel is most of the times occupied with its regular duties and it is proved that it is rather difficult to obliged them to use computer terminals too. To a certain degree, the flow of work in the clinical departments is changed due to the introduction of the CIS, altering traditional medical procedures followed for many years, making it, especially for the older physicians, more difficult to accept the use of the system.

Those were the main reasons that apart from the pilot clinics, which were treated in a different way, the other clinical departments were not really positive regarding the utilisation of the system.

5. DECIDING TO OUTSOURCE

In order to overcome the above-mentioned problems various solutions were discussed within the management committee. The only viable one seemed to be the outsourcing of certain functions regarding the CIS and this was finally chosen.

5.1 IT outsourcing

Since a new Information System is introduced in the hospital, this means a new computer server, possibly a new operating system and a database, tens of personal computers as well as various peripherals. All this equipment must somehow be maintained especially after the completion of the development phase of the project, when the vendor's people are leaving the place. Since, as it was described earlier, the MIS Department's staff was already overloaded, the only effective solution was to outsource some part of the work. And the only part of the work that was appropriate at this stage was the operation of the newly installed system.

Therefore it was agreed with the S/W company to provide to the hospital two fulltime IT operators. These operators would be

responsible for the operation of the CIS. More specifically these engineers were responsible for everyday, ongoing work as well as maintenance of the system. Additionally it was agreed by both sides that they should also be responsible for evaluating and implementing certain changes on the user interface of the system, which the clinicians would ask for and the project committee would agree on.

5.2 Data Entry Outsourcing

As it was explained earlier, the introduction of an IS at the Clinical Departments of any hospital, change to a certain degree, the flow of work, altering traditional medical procedures followed for many years, making it, especially for the older physicians, more difficult to accept the use of the system. At the same time the clinical departments are usually understaffed and the clinical personnel is most of the time occupied with its regular duties and it proved rather difficult to oblige them to use computer terminals too.

For this reason and in order to overcome the initial denial of the medical and the nursing personnel to use the system the management committee decided to offered as outsourcing a number of data-entry operators to assist the physicians and the rest of the personnel to enter medical data into the system. In this way medical data will be given by the nurses and the medical doctors to the data entry operators to enter the data into the Clinical Information System. At the same time they could learn to use the system under the directions of the outsource personnel.

The vision was that in the near future, medical doctors as well as nursing personnel should start to use CIS when they will have adequate training.

This was as well a kind of "on the job training" for the clinical departments' personnel, who were learning to use the system through the interaction with the data entry operators.

5.3 Training Outsourcing

Apart from the problems mentioned above, it was realized that more training that was originally estimated was needed for the actual users to be in the position to use the system by themselves. This education could be offered either from the S/W company or from the MIS department's staff. For the reasons that were explained earlier it was decided to the training outsource as well.

6. OUTSOURCING CONSIDERATIONS

The decision for the reception of outsourcing services made a year ago. A year later, the main goals of the project have been succeeded: first, the clinical departments are using the CIS, and second, the clinics' personnel is gradually using independently the system under the supervision of the data-entry personnel. Nevertheless, there is a number of aspects that have to be stressed out regarding the entire project.

6.1 Data-entry versus training services

The initial time period of one year for outsourcing services seemed to be adequate at the planning stage but it proves to be insufficient for some clinics. The data-entry operators were directed to act as on the job trainers in order to get the personnel used on applying the system on the every-day operations and it happened in most of the clinics. Nevertheless, in some clinics, the

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employees with a higher academic degree, 37 employees with technical degree and 141 with a technical diploma.

personnel considered the data-entry operators as secretaries and not as "on the job" trainers ending up with indifferent users, unable to use the system functions by themselves. Therefore, it must be insisted to the data-entry operators to behave more like trainers and less as secretaries, since the outsourcing services will be extended.

6.2 Contract
The needs were figured to be centred on the facts of the users' support, users' training and the operation of the CIS. In the chase of finding a vendor to provide precisely all the above-mentioned services were focused on the software vendor as the only possible choice since they were the only to have expertise on the particular software system. So, a one-year contract was signed after the relative negotiations.

After the expiration of the contract, criticism can be applied to the services provided by the CIS operators for the software maintenance and clinicians' queries about the implementation of alterations to the user interface. The reason was that the contract did not specify in appropriate detail the obligations of the CIS operators to satisfy the users' demands regarding software alterations.

Nevertheless, due to the fact that the vendor of the CIS is supposed to deal with the hospital for a decade (e.g. through the maintenance contract, new versions of the system, etc.), it is better to establish a different type of relationship with the vendor, similar to that of a partner. At the same time, the vendor must have analogous intentions and perception about the future co-operation. Hence, the vendor must be prepared and present adequate arrangements for a long-term business plan regarding the support of the CIS.

6.3 Investment Support
A major factor that is always considered when deciding to outsource is "cost reduction": through IT outsourcing most organisations expect to take advantage of the economies of scale enjoyed by outside IT suppliers. In our case, outsourcing was decided in order to support the initial investment placing the CIS into productive use the soonest possible. The support of the initial investment was the main argument of the project committee to convince the administration to approve the outsource expenditure.

7. CONCLUSIONS
The engagement of the outsourcing model in the healthcare sector seems to be a viable solution because it offers a reliable and quick starting of the productive use of the IT systems for the following reasons. The outsourcing personnel, under certain circumstances, will substitute or fill in the usually understaffed MIS department of the hospital. The data-entry services will certainly assist the delivered IT system to be set productively in the shortest period of time saving resources supporting and securing the initial IT investment. At the same time, the permanent medical personnel has the chance to be trained in their working environment.

Outsourcing remains to be applied in other healthcare sites in order to obtain the required trustiness. Moreover, additional applications of the outsourcing model will provide the means to develop effective procedures to apply the method and evaluate its outcome.

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