ERP Systems In Hospitals: A Case Study

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Abstract- Purpose In this study, the process of implementation of ERP systems in hospitals is analysed, as an organisation with divided and heterogeneous functional areas. The purpose is to identify the principal technological objectives that were set in the process of implementation, which of those objectives were achieved, and the deficiencies that have subsequently become evident.

Design/methodology/approach – A case study approach is used. The primary form of data collection was interviews with managers participating in the implementation and internal documentation.

Findings – In a hospital, different groups of individuals (basically the clinicians and the managers) co-exist, and each group has the capacity and authority to exert pressures during the process of implementation of an ERP system.

Practical implications – The results may provide guidance to solve problems during ERP systems implementation in organisations in which highly differentiated functional areas exist.

Originality/value – ERP systems have demonstrated their efficacy in a good number of companies, the more notable among which are companies with a large geographic spread. However, there isn’t much evidence in organisations with differentiated functional areas. Often such areas have traditionally had independent information systems and control over the interests of their area, such as, for example, hospitals.

Keywords-ERP, hospitals, integration.

I. INTRODUCTION

Among the factors that have been characterising the business environment in recent years are increased competitiveness between companies, the rapidity of technological change, shortened product life cycles, increasing use of subcontracting, the flattening of traditional bureaucratic structures in organisations, and the growing importance of the communications media as a result of the globalisation of markets. Largely as a result of this situation many companies have decided to implement ERP systems as one means of confronting the new challenges and threats they face. (Robinson and Wilson, 2001; Fan et al., 2000).

The reasoning behind this decision is that ERP is considered particularly appropriate since it brings together three properties essential for adapting to a business environment of this type (Chen, 2001):

- ERP systems provide a multifunctional perspective that encompasses the various different areas of the company (Finance, Inventory, Sales, etc.)
- Since they are integrated systems, the same items of data can be shared by different areas.

ERP systems have a modular structure, which means that different combinations of modules can be utilized in function of the needs of the company. These properties, together with the evolution of the technologies of information and communication, and the need for integration, have led to increasing interest in ERP as a tool for coordinating the management of different organisational units (Sikora and Shaw, 1998; Al-Mashari, 2001).

For Newell et al. (2002), ERP systems represent a new class of information system designed to help integrate all the key areas of activity of a company, particularly the financial, productive and human resources functions. Thus, from the point of view of companies, ERP systems could be considered the most important development of the 1990's: according to some authors, even more significant than the Internet and electronic commerce (Davenport, 1998). The appearance of ERP marked a trend towards the acquisition of standardised information systems, rather than tailor-made systems designed to meet the specific needs of a particular organisation (Scheer and Habermann, 2000).

As a consequence of the division in functional areas, traditional information systems were focused on supporting each functional area, and only rarely did they ensure that data flowed smoothly between the different functional areas. This was aggravated by the fact of that the information systems of each area had, in many cases, been developed independently, with data formats that were incompatible or did not meet the information needs of the rest of the processes of the business (Scheer and Habermann, 2000).

An ERP system overcomes these disadvantages by integrating the information from the different departments and subsidiaries of the company in one single database accessible to the whole organisation (Shang and Seddon, 2002). When a datum is entered in the ERP system by any organisational unit, it is immediately available for use by the rest of company's organisational units. In respect of this key feature, Gattiker and Goodhue (2000) state that this integration brings about an improvement in the flows of information between the various organisational units and reduces administrative costs, since fewer tasks have to be performed to obtain any particular piece of information.

Thus, for a large multinational firm, an ERP system essentially represents a means of homogenising the work procedures utilised by its units, which should lead to greater agility in responding to market demands and reduced inventory levels (Davenport, 1998).

Botta-Genoulaz et al. (2005) carried out a review of the literature on ERP systems during the period 1996-2004, in
which they reported an increased number of studies published in recent years, and identified different categories in function of the area of interest of these studies:

Implementation of ERP systems. This category includes those studies associated with the various stages in the implementation of an ERP system, the problems associated with the process of implementation, the conditions necessary for the process to be successful, and the reasons why the process sometimes ends in failure.

Optimisation of ERP systems. The idea underlying this type of study is that the process of implementation does not end when the system is first put into effective operation; in the post-implementation period it is essential to analyse the activities that the system is intended to support, in order to optimise the system and thus obtain the expected competitive advantages.

Management by means of the ERP system. These studies focus on considering the ERP system as a management tool, describing the changes that take place in the management of companies that install an ERP system, against other aspects that do not change as expected.

ERP Software. These are studies that approach the topic from the systems perspective, in which various analyses are made of the aspects associated with the processing of information, the inter-operativity of the ERP system with the other systems in use in the organisation, and the adaptation of standard systems to the individual needs of the company.

ERP and the management of the supply chain. These studies analyse the use of ERP systems in the context of companies that form an integral part of an existing supply chain.

Of the five categories of study identified, we consider the aspects associated with the process of implementing the ERP system, particularly in a large complex organisation, to be crucial. Serious problems can arise in organisations in which highly differentiated functional areas exist; often such areas have traditionally had a high degree of autonomy, with independent information systems and independent control over the interests of their area. Hospitals are one example of such organisations. In these sectors, the success of the implementation process depends largely on the top management giving continuous active support to the project, and on the commitment of managers to the concept of integrating functions and improving operating processes (Berchet and Habchi, 2005).

Achieving the participation, collaboration and acceptance of all the members of the organisation is, without doubt, one of the principal factors that are critical for the successful implementation of an ERP system. Akkermans and Van Helden (2002) state that, during the process of implementation, interdepartmental collaboration and communication will be reinforced if the top managers, the project managers and software suppliers all demonstrate a positive attitude. In many cases the tasks of leadership are really important and delicate, because the introduction of the ERP system in the company will modify procedures within the company and the job functions of some of the employees, at all levels, will change.

Thus, if the likely re-structuring that will be required is not properly taken into account in the process of design of the ERP (Molla and Bhalla, 2006), when the time comes to carry out the campaign of awareness and training needed the process of implementation could lead employees to adopt postures of resistance to the change, for fear of the unknown or simply due to the sensation of displacement that some members of the organisation will feel.

Experiences of the implementation of ERP systems in the public sector have also been described (Gulledge and Simon, 2005). Watson et al. (2003) describe the implementation of ERP systems in the State Government of Louisiana. They conclude that the management and collaboration of the diverse groups involved were perhaps the most difficult aspects of this implementation. Within the public sector, hospitals are especially interesting given their particular characteristics. In this area, several studies have already been conducted, such as those of Trimmer et al. (2002) and of McGinnis et al. (2004). Rubin (1999) analysed the use of ERP systems for improving the process of materials management in hospitals, and described the success represented by the integration of the whole supply chain in one single system.

However, difficulties arise when the management wishes to extend the scope of the information system to include all the information that is generated in the hospital. In effect, a hospital needs an integral system of analysis, planning and control that allows the procedures that have to be applied to the patients to be planned and executed in parallel with the provision of the capacity required (Merodea et al., 2004). On this point, according to Khoubati et al. (2006), studies have to be carried out to analyse how to increase the capacity of the existing information systems at the same time as reducing the costs of integration of the information.

In addition to the complexity of the services that are provided, a hospital will contain groups of people with the capacity and power to exert pressures during the process of implementation of the ERP system. This makes it important to investigate the effects that the decision to adopt an ERP system will have on the hospital as an organisation, and on such groups in particular. In this study an analysis is made of the process of implementation of an ERP system in a hospital, as an example of an organisation with divided and heterogeneous functional areas. The method used is the case study. The purpose of the study is to identify the repercussions of the influence of the different functional areas that coexist in a hospital, basically the clinical area and the administrative management, whose personnel have traditionally employed information and control systems independently of each other. By employing this strategy of qualitative research, an analysis is made of the principal objectives that were set in the process of ERP implementation, the successes that were achieved and the deficiencies that have subsequently been demonstrated.

Specifically, the following sub-objectives are established:

To determine what were the prior expectations of those responsible for the hospital in respect of the implementation of the ERP system.
To analyse the system design and subsequent process of implementation to determine if the terms, objectives and initial expectations were met.

To check whether the heterogeneity of the various pressure groups that coexist in every hospital, with their different visions in respect of the hospital’s role, has had some influence on the implementation of the system, and how that influence affected it.

II. THE CASE STUDY APPROACH

It was decided to use the case study as our research method because the design, development and implementation of an ERP cannot be fully understood in isolation of its context, and therefore a contextual approach is necessary. Unlike other empirical research methods, the case study permits the analysis of a contemporaneous phenomenon in its real-life context, when the boundaries between the phenomenon and the context are not clearly differentiated, and when numerous sources of evidence are utilised with the object of bringing the research work into closer contact with the organisational reality (Hopwood, 1983; Otley and Berry, 1994; Scapens, 1990; Tomkins and Groves, 1983; Yin, 1993, 1994). Further, the case study has been recommended as the ideal research methodology for gaining a better understanding of complex phenomena (Flynn et al., 1990; McCutcheon and Meredith, 1993; Yin, 1993, 1994), and the implementation of an ERP system in an organisation with sharply divided functional areas and professional cultures is a very complex phenomenon. We have opted to analyse the implementation of ERP in a hospital since it is an example of an organisation with heterogeneous functional areas that are markedly divided, basically, between clinical personnel and administrative managers, who have traditionally been employing information systems designed, implemented and operated in a deliberately independent way.

This particular case has been chosen because it is a hospital (hereinafter referred to as the HPT) that possesses both administrative and financial management autonomy; in effect this means that the management is responsible for obtaining optimum effectiveness and efficiency in the decisions taken. In addition, the opening of the hospital has coincided in time with the implementation of the system, and so it does not represent a change from previously-established procedures to which the personnel of the centre might put up resistance.

To obtain the information required for the study, diverse sources of evidence (Yin, 1994) have been utilised: Analysis of internal documentation containing the information utilised for the management of the centre. The analysis of this documentation has enabled us to define and delimit the requirements that were specified for implementing the ERP system. Interviews with the centre’s most senior managers responsible for Human Resources and Financial Accounting, and with the General Management and personnel of the Area of Financial Administration. The interviews, conducted both with individuals and with groups, have enabled us to clarify the goals and objectives of the hospital and identify the flows of information that should be included in the ERP system. The interviews have also enabled us to seek and obtain the opinions of a representative of each of the groups involved in the process of implementation.

Direct observation of the management and operating behaviour in the different areas during the implementation of the ERP and once the process had been completed. Participative observation in the working meetings held with the managers responsible for the various different areas of the hospital. Here we were able to identify the needs, problems, concerns, etc., related to the utilisation of the ERP system.

III. DESCRIPTION OF THE HSP

The HSP was constituted in 1990 under the juridical form of a Hospital Foundation. The project plan for the construction of the hospital was approved in June 1992. However, the building work did not begin until June 1993. In December 1996 the legal basis of the constitution of the HSP was changed, and it was brought under a new normative framework dealing with the creation of new forms of management of the Spanish National Health system.

The HSP has its own juridical personality, which gives it considerable autonomy in decision-making. Under this autonomy it is allowed to have its own budget which it can administer itself independently. In accordance with its degree of autonomy, it can therefore not only meet its own currents costs, including those for its personnel, but it can also make fixed investments, contract personnel and set their salaries.

Once constituted, the HSP’s governing body authorised the preparation of a Business Plan, which was approved for implementation in September 1997. When the HSP started operating as a hospital, one of the basic principles established was that the specification and installation of technological equipment should be carried out in a properly planned way in accordance with agreed criteria of safety, efficacy and efficiency. Thus, in its Business Plan, in the part describing the Organisational Model of the HSP, there is considerable reference to information technologies and systems. Among the general objectives established, it is stated that information systems constitute the key factor in this process of strategic development; in fact, the viability of the hospital model to be put into operation, particularly in respect of its internal relationships, at both the functional and strategic levels, is crucially dependent on the development and implementation of information systems. As an unalterable objective the Plan stipulates that the nucleus of information must be the interaction of the patient with the organisation and, following from this, the integration of the clinical with the financial and cost information.

Thus, in the HSP it is understood that the management of information is one of the bases of how the organisation operates (in addition to the human and financial resources), and that the incorporation of technology is essential in
order to handle the information adequately, not only on the strategic and tactical levels, to serve as the support for decision-making, but also on the operating level, to facilitate the daily clinical activity.

For those responsible for managing the HSP, the information systems are a set of procedures and functions directed towards the collection, production, assessment, storage, recovery and distribution of items of information within the organisation, orientated to promoting the flow of these items from the points where they are generated to the final intended recipients. Therefore, the information systems should be an integral part of the corporate strategy, since today all organisations are based on information.

A series of criteria were set for the management of the information systems, such as:
The systems will be managed by contracting the services required from an external company (i.e. by outsourcing).

To avoid technological incompatibilities and obsolescence, and to avoid the outlay of funds without being able to take full advantage of resources, the HSP will not invest in either hardware or software. The supply contract will specify the services to be provided and the results to be obtained. By this means the technology and the personnel will at all times be appropriate for the needs of the HSP.

IV. CONTRACTING AND IMPLEMENTATION OF THE ERP SYSTEM IN THE HSP

The management of the HSP prepared detailed technical specifications for the contract to provide the ERP system, based on the requirements stipulated in the Business Plan. Given the imminent entry into operation of the HSP, the fundamental premise was the need for it to be equipped with an integrated system that would enable all the appropriate health-care functions to be carried out, and that would constitute the principal tool for the financial and administrative management of the hospital.

Competitive tenders were invited with the object of selecting a single systems integrator capable of providing a solution for managing the information needs of the HSP. The successful bidder would be constituted as the only interlocutor of the HSP for all matters related to its ERP system, and should present its offer with the following requirements:

Listing of all the subcontracted suppliers and the products that they are supplying, including the bidder if it will be providing any product that would form part of the global solution.

Details of the way in which the various modules are going to be integrated.

Any additional programming that will be needed to ensure the complete adaptation to the needs of the HSP. Human and material resources necessary, and the delivery terms to be met.

Detailed plan of implementation: phases and timetable, with terms linked to the achievement of levels of operability.

On a complementary basis, the systems integrator will provide a contingency solution during the transition stage, complying with the minimum coverage required and as a step towards the definitive integral solution.

The competitive bids must take into account explicitly the following criteria, all of them essential:
Uniqueness of data. The capture of each datum will be unique, as will its storage. The design should be relational.

Total integration of all the modules.

Operative solutions must be provided. The adaptations required to meet the special requirements of the HSP should be kept to a minimum.

There must be uniformity in the operating environments.

The winning bid was selected in September 1997. The decision went in favour of a centralised solution for the implementation of the ERP system, presented by the company “OFFER”, who would be responsible for its management and integration. The contract specified, among other matters, the final product to be supplied, comprising the implementation of 3 modules and 11 applications (all included under the name of the GENESIS Program):

- Module 1 (META 4 products and implementation): Module for Payroll, Personnel Management (Meta4 Mind) and Management of Shifts (Meta4 Shifts).
- Module 2 (SAP and HP products and OFFER implementation):
  - Modules for Financial & Cost Management (SAP R/3): Supplies (MM), General Accounting (FI), Analytical Management and Management of Costs (AM and CO), Payment of Suppliers’ Invoices (MM), Inventory Management (MM) and Maintenance (PM).
  - Executive Information System: Balanced Scorecard EIS (SAP R/3 EIS and HP-HIS).
- Module 3 (HP-HIS products and HP implementation):
  - Module for Healthcare Management (HP-HIS): Admission of in-patients, Waiting lists, Emergencies and Emergency Boxes, and External Consultations. Also included are Electronic Clinical History (HP) and Invoicing to the Customer (SAP R/3).
  - Modules for Clinical Management (HP-HIS):
    - Management of Operating Theatres, Radiology, Outpatients, Ward Control Points, Control Infrastructure, Generation of Medical Reports, Unidose Pharmacy, Pathology and Nursing Units. Also included are Document Manager (HP), Medical Protocols (KPMG) and Laboratory (Behring) applications.
    - Applications: Laboratory, Dietetics, DOCtor, Gacela, Carevue, GPC, Invoicing, Library, Balanced Scorecard, Pharmacy and Pathology.

In the standard version of each module there is a set of interfaces for the exchange of information between them. However, this is not the case with the different applications acquired; for this reason it was necessary to incorporate up to 11 interfaces, which are described below:

Interface I-1: This is the interface between the Personnel Module and the Library Management. Its objective is to load onto the database of the Library the data of the hospital personnel that are considered necessary for managing borrowings of publications.
Interface I-2: This interface exchanges data between the Payroll Module and the Financial Accounting Module, with the object of recording the accounting details necessary for each Payroll payment.

Interface I-3: This is similar to the previously described interface; its purpose is to exchange data between the Payroll Module and the Analytical Accounting Module, assigning the costs of each payroll item to its corresponding cost centre.

Interfaces I-4 and I-7: The Patient Care Module is generated in function of the data obtained when the patient is admitted to hospital. Therefore, it is necessary to transfer information corresponding to each patient.

Interface I-5: From the data of the invoices, which reflect the cost of all the services and products that each patient has consumed during their hospitalisation, the total costs of each hospitalisation are determined and these costs are assigned to the corresponding units.

Interface I-6: In the same way as in the previous interface, the costs of each period of hospitalisation are assigned the corresponding units; the interface of Invoicing with Financial Accounting allows the invoicing to be assigned to the account of each unit.

Interfaces I-8 and I-9: Among their functions, the Nursing and Pharmacy Modules support the control of the ward sub-stores and orders for supplies placed on the central warehouse; therefore interfaces are created that enable both the completion of orders placed automatically in function of the level of stock of certain materials, and the generation and shipment of orders placed manually to the Supplies Module.

Interface I-10: This allows modifications to be made to the planned capacity of the External Consultations, in function of the periods of time that the equipment of each Service is not available due to maintenance or repair work.

Interface I-11: This interface allows the localisation of the electronic file of documents associated with each medical history from the application that manages the Clinical Records.

A. Insert Figure

The process of implementation of the ERP system by OFFER began at the end of 1997 and lasted approximately 6 months. According to the evidence obtained, the involvement of the top managers was continuous, and they kept up the pressure to complete the project on time.

V. Discussion

For the analysis of the evidence obtained, the information is grouped according to the following three phases (Escobar et al., 2004): (1) prior or preliminary, (2) implementation and (3) operation. Interviews □ were held with the directors responsible for Human Resources and Accounting, and with the General Management and managers of the Finance and Costs Area of the centre, with the object of identifying the degree of satisfaction of these user groups with the system. The interviews, both individual and in groups, enabled us to clarify the goals and objectives of the company, and identify not only the achievements obtained but also deficiencies that have become evident. Since these persons were also active participants in the process of implementation of the system, we were also able to determine if the wishes and expectations generated in respect of the system have been fulfilled.

As a preliminary observation, the HSP had, from the very beginning, been conceived of as an organisation which would operate with an ERP system that would facilitate the performance of its patient healthcare activities, its administrative management and its decision-making. Its philosophy is to seek the maximum satisfaction of its users, in both the scientific-technical and human aspects of its activities. It could be described as a young hospital that aims every day to offer high quality healthcare, where the professionals who work in it are considered to be its greatest capital asset. Thus, in the Business Plan formulated when it was created, a part was included referring especially to systems and information technologies; in this part, it was stated as a general objective that the nucleus of information must be the interaction of the patient with the organisation, and that, on the basis of this source, both the clinical and financial/cost information would be integrated. This stipulation was accepted by all the employees, as demonstrated by the following statement of the Sub-director of Nursing:

"The integrated system (…) was an objective for this hospital; we wanted to have an integrated system of management that will provide us with information. In the large hospitals the problem they had (…) was the topic of information; that is, at the level of the administrative management, the information was being received piecemeal from the different departments". However, from the conceptual point of view, the organisation of the hospital provides its services to certain basic clients, the clinicians (doctors and other specialists), who in turn provide these to the patients, who are therefore the final clients of the organisation. Thus, the entire executive organisation is set up in such a way "that the doctors and specialist medical personnel may perform to perfection their work of patient care". The doctors are thus the direct clients of the organisation and are dependent on the organisation in a strictly functional, not hierarchical, sense. Hence, the situation in which the doctors consider themselves to be clients of the HSP and not simple users of the ERP system, like the rest of the employees, has clearly conditioned the implementation of the system.

Although the process of implementation of the ERP system had the support and active participation of the top management, there was a need to bring together the interests of functional areas with different cultures. The fundamental concern of the doctors and clinical practitioners is to return their patients to good health, whereas the managers are responsible for obtaining efficiency in the utilisation of limited resources. The effect of this was that the design of the ERP system was orientated towards ensuring the good functioning of each of the functional areas, separately, rather than towards...
establishing an information system in which the source data only needed to be captured once, in which all the modules were fully integrated with each other and the system as a whole, and in which all the operating settings were uniform (the original objectives). Despite a total of 11 interfaces having been designed to inter-connect the different modules and applications that comprise the HSP’s system of information, in the opinion of the Subdirector responsible for financial and cost control, “if we are speaking of integration of all the systems, what has failed most is the integration between the patient care system and the rest of the systems not directly related to patient care”.

In consequence, not all the users are equally satisfied with the results of the process of implementation and with the way the information system operates. In this respect, we can identify two large groups of users: clinical practitioners and administrative managers.

The clinical practitioners have ensured that the part of the system that they utilise (Modules 1 and 3) cover all their needs. In general terms, those responsible for Patient Care Management, Clinical Management, Human Resources and Payroll are fairly satisfied with the performance of the system, according to the views expressed by the Medical Subdirector, who stated that "having an Integrated System of Management in this case, in the part of the patient care area, enables you in principle to have everything close to hand; in other words, to have clear, up-to-date information rapidly at your disposal, which is also directly connected with the management of the patient”. The Subdirector of Nursing stated: “I believe that we have one of the best integrated systems because, despite some of the interdepartmental aspects remaining to be done, it is perfectly integrated, or practically integrated. We only have very little still to do, very little”.

However, the managers (the users of Module 2) appear rather unhappy given that they do not receive correctly the information generated in the other modules. On this question, the Subdirector responsible for finances and cost control emphasised that "the integration between patient care information and cost information did not function as we wanted. An ABC system of costing and an advanced system of clinical guidelines, in which each step was associated with its cost, were tried and failed. It was not possible because, in practice, it was very difficult to collect the information; that is, the guidelines were so detailed that there was no way the data could flow towards the SAP, no way all this could be handled with the patient care information in detail and was not being received. That was where a lot of effort was made and it was not achieved. The guidelines were prepared, they did not get to be implemented, and there was no way of collecting this information". He also states "well, the financial system is well implemented, but perhaps we lack something in management control, because we have not fully developed all its possibilities, and to do that, we now have to take advantage of the change to a new version. Not because each of the tools is not implemented but because, in order for the information to come out as you want, you have to enter it in the correct way. Well, at the time other things were given priority, and now is the time to change it". Lastly, in an attempt to find an explanation for this situation, he stated that "the integration with the patient care information is a failure for us because each system in its part (package) functions well". As can be observed, in this statement the Subdirector tacitly accepts the balance of power in the hospital between the clinicians, who are preponderant, and the managers.

For his part, the manager responsible for the Accounts Department stated that "now everything is much more stabilised, but there have been many disputes with the departments, and we have basic problems that have not been solved because at the time they were not put forward correctly". In particular, he complained that "every time that I have to finalise accounts with Pharmacy, complications!, and many years have gone by like this. When I have any difference and have to investigate, I have to go to their program, extract data, cross-check the figures with mine, see what they have charged to me and what they have not charged to me, trust in what they tell me and then check it. It's not easy, it's not easy, and then there is a slip, a gap of information, also very important, between one module and another. (...) In the case of the interfaces there is information that we are not picking up, and that also is not good". Lastly, there is also the complaint that "the interface is not transparent. A payroll is transferred to me, but I don't get to see the concepts of the payroll, I do not see the number of persons. They transfer them to me grouped by cost centre".

VI. Conclusions

In this study we have set out to identify, from a technical or technological perspective, the impact of the influence exerted by the various heterogeneous functional areas that coexist in a hospital, basically differentiated into clinical and management personnel, and that have traditionally been accustomed to employing information systems that were designed, implemented and operated independently of each other.

It has been demonstrated how the very same decision regarding the type of ERP system to implement has reflected, from the first moment, the organisational complexity over which the system had to be implemented. As can be confirmed in the choice of the design of the system and its modular structure, these factors demonstrate the not-always coincident interests of the two groups of personnel, clinical practitioners and managers, previously mentioned.

In the case analysed, evidence is obtained on the attempt made to resolve this complexity from the technological perspective, by means of the sophisticated set of interfaces described here. Although all the interfaces were developed, not all are utilised. In particular, interfaces 1-5 and 1-6 are not currently utilised. These interfaces would allow the
Invoicing module to be related to the General Accounting and Analytical Management, and are fundamental for the correct integration of information between Modules 2 and 3. Despite this, on analysing the degree of satisfaction of the users of the ERP system, in the case of the clinical personnel it meets practically 100% of their expectations, whereas those responsible for the management of the hospital are found to be rather less satisfied, as they have not seen their initial expectations fulfilled in respect of the system.

A plausible explanation for this situation could start from recognition of the heterogeneity of these two pressure groups, which exist in some form in all hospitals; this heterogeneity is encapsulated in their respective general objectives: effectiveness in healthcare for the clinicians, and organisational efficiency for the managers. This generates a fierce struggle for control of the organisation. In this framework, the process of implementation of the ERP system, seen as a formalised instrument of the hospital’s control system, is taken as an opportunity by the managers to try and increase their degree of control over the organisation and, therefore, to increase their relative power in the hospital. For their part, the clinical personnel interpret the situation basically in a similar way to the managers, and their reaction is one of rejection faced with a perceived reduction in their control and power; this therefore translates into resistance to key integrative features of the ERP system.

In our particular case, that of a newly-established hospital in which its initial specifications already included the implementation of an integrated system of information, the resistance shown by the clinical personnel has not been as radical as a refusal to use the system at all, but has been more selective and nuanced. As we have been able to confirm, those modules concerned with basically clinical information are being utilised: what the clinicians have succeeded in resisting is the full integration of this clinical information to allow the ERP system to be used as originally intended by the specifiers.

VII. REFERENCES


Figure 1. Diagram of the implementation of the ERP modules.
Source: Author's own elaboration according to information provided by the HSP.