How Top-management Commitment in Information System Implementation influence IS usage and benefits achievement?

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Abstract

Ever more researchers have been concerned with the role that Information Technology (IT) plays in the healthcare organizations either reducing medical errors, improving organizational performance or, allowing better healthcare delivery and patient safety. Though the value attributed to IT in healthcare, many attempts at Healthcare Information Systems (HIS) implementation have failed. Case studies, relating to an organization-wide information system (IS) project were conducted in two Portuguese hospitals. The purpose of the research was to understand the role of top-management commitment in HIS implementation and its effect on users' commitment, as well as on the way they use that technology. A qualitative, interpretative and case-based research strategy was carried out employing semi-structured interviews and document analysis. Findings revealed that top-management commitment is important in influencing users' commitment towards a project of HIS implementation, as well as in the way they use the IS contributing to the achievement of the expected benefits.

Keywords: Healthcare Information Systems (HIS), Top-Management Commitment, Perceived Benefits, Information Systems Usage

1. INTRODUCTION

Ever more researchers have been concerned with the role that Information Systems/Technology (IS/IT) plays in the healthcare organizations either reducing medical errors, improving organizational performance [Schäfferling, A. and Wagner, H. 2013] or allowing better healthcare delivery and patient safety [Thakur et al. 2012].

Reflecting the value attributed to Healthcare Information Systems (HIS) and health data, the Organization for Economic Co-operation and Development (OECD) published a report that shows the efforts that have been made by some countries in Healthcare Information Technology (HIT). This report focuses on two main dimensions: the development and relationship between health data and healthcare and the development and use of electronic medical record (EMR) [OECD 2013].

The clinical records aim at the future memory and communication among the health professionals who care or will take care of patients. Should therefore be clear and detailed [Rodrigues 2011].

The absence or deficiency of clinical information can compromise the health of patients, apart from not credibly represent the services rendered. Thus, studying how healthcare professionals use HIS can contribute to understand how the benefits expected from them can be achieved.
The assimilation of a HIS (as any IS) requires considerable changes in organizational processes [Hung Shin-Yuan et al. 2014] that are sometimes not easily accepted by healthcare professionals in their practice. For instance, applications such as EMR are frequently resisted by the same community that is expected to benefit from its use [Bhattacherjee et al. 2007].

The role of users in the adoption of an information systems (IS) into an organizational context has been an important topic in the IS research field. Therefore a successful implementation requires the ability to ensure user commitment and acceptance during the adoption process [Jensen and Aanestad 2007]. A number of studies have advocated the need to attain greater commitment from all levels throughout implementation [Cardoso and Caldeira 2012; Hwang Y. 2005].

Considering the existing problems with HIS implementations, case studies relating to an organization-wide IS project were conducted in two Portuguese hospitals.

This paper reflects some results from a much more extensive research, whose description certainly exceed the size allowed. Here, the purpose was to understand from the users perspective, the role of top-management commitment in HIS implementation and its effect on users' commitment, as well as on the way they use that technology. The following research questions were developed:

- How does top-management commitment influence the users' commitment towards a project of HIS implementation?
- How users' commitment with the HIS influence its usage?

A qualitative, interpretative and case-based research was used employing semi-structured interviews and document analysis.

The theoretical lens of Technological Frames of Reference (TFR) of Orlikowski and Gash [1994] and commitment of Meyer and Herscovitch [2001] were used to analyze data.

A brief Literature Review about the subjects, Research Methodology, Findings and Conclusions, follows.

2. **THEORETICAL BACKGROUND**

2.1. **Commitment to IS**

The technology adoption introduces numerous issues inside or outside the project which can affect stakeholders technological frames (assumptions, expectations, and knowledge of the technology) [Orlikowski and Gash 1994], which can compromise the success of the project. Therefore,
understanding their viewpoints can increase their commitment, reduce their resistance, facilitate the IS Implementation and the accomplishment of expected business benefits [Dhillon 2005].

This research bases its definition of commitment on that stated by Meyer and Herscovitch [2001]. They define commitment as ‘a force that binds an individual to a course of action of relevance to one or more targets’ [p.301]. This choice is founded on the fact that these authors extend the definition of commitment to include the nature of the targets (e.g., an organization or a desired outcome) to which employees become committed.

Based on the definitions of commitment given by Meyer and Herscovitch [2001] and considering the scope of this work, the concept of commitment to an IS project implementation is seen as an acceptance of that project and a higher affinity, identification and engagement in attaining the expected benefits, from it [Cardoso 2012; Cardoso and Caldeira 2012], whereas resistance or lack of commitment is viewed as a set of behaviours adopted by users against the IS, which may impair the benefits achievement.

2.2. **Top Management Commitment**

Top-management commitment is rated as the most important factor in planning and the implementation of IS [Basu et al. 2002], and in the influence it has on the commitment of other stakeholders [Sabherwal et al. 2003]. It is also important in the organization's effectiveness in converting IT investments into useful outputs [Dezdar and Ainin 2011]. Inversely, lack of commitment of the top managers could lead to indifference or deliberate resistance and may even cause the project to be abandoned [Sabherwal et al. 2003].


In this research, top-management commitment is seen as the affinity and identification with the project and the capability to influence the progress and success of its implementation. It includes all the measures and support provided by managers, both in terms of availability of resources and in the level of involvement of users in the project implementation [Cardoso and Pedron 2013].

2.3. **Benefits**

The benefits enabled by IS/IT can be seen as the advantages for a particular stakeholder or group of stakeholders who want to get value from the investment. They can be as either tangible or intangible,
depending on the objectivity and capability to be measured [Ward and Daniel 2006]. This paper focuses especially on intangible benefits as they are perceived by users (perceived benefits).

Most of the benefits enabled by the use of the HIT/HIS fall under one of the following categories: quality of care; effect on efficiency [Leapfrog 2006] and cost reductions [Caldeira et al. 2012].

3. **RESEARCH METHODOLOGY**

Following an interpretivist view of the world, a qualitative and interpretive case-study strategy was adopted, using multiple case studies. This research strategy is appropriate when the investigator is faced with a reality that is complex, subjective and socially constructed [Walsham 2006].

3.1. **Research Design**

Figure 1 provides an overview of how the research was conducted.

The research started with a comprehensive literature review that allowed to define the research topic and the research questions, as well as to set up the interview guidelines. In a second stage hospitals were selected, with the third phase comprising the fieldwork. The fourth phase consisted in the processing and analysis of data from the cases and the production of the written reports. And after that, a cross-case analysis of the findings was conducted, with subsequent generation of theoretical findings.

The literature review accompanied all stages.
3.2. Data Collection and analysis

The field work was carried out between 2007 and 2011. Data collection was based mainly on semi-structured interviews, following Walsham [2006] and Yin [2003]. However, with the aim of achieving an appropriate degree of internal validity [Yin 2003], rigor, richness and depth (Flick, 2002), other sources of evidence were used. They included document analysis and direct observation.

In the two organizations, ‘Hospital A’ and ‘Hospital B’, 64 and 65 interviews were respectively carried out. The range of interviewees included: managers, implementers and users (physicians, nurses, and assistants).

Table 1 displays the number of interviews within each professional group.
Data were analyzed within an interpretive and qualitative perspective [Huberman and Miles 1994; Denzin & Lincoln 2011].

As a step towards producing a conceptual coherent explanation of the phenomenon being studied, several techniques similar to those of Grounded Theory were used, including: the coding of data segments into categories; subsequent coding to identify patterns in the data; and seeking emergent themes [Huberman and Miles 1994].

The coding process was carried out using NVivo software (specific software for qualitative research).

4. The Case Studies: Overall Description

The two organizations have adopted the same software, designated herein as Paper Free Software Solution (PFSS) to computerize all health services. This HIS brings together characteristics of Electronic Medical Record (EMR) and Decision Support Systems (DSS) allowing the registration, consultation and analysis of data produced in the clinical care process.

4.1. Case A

Hospital A is a large hospital with a capacity for 331 beds, providing healthcare to a population of approximately 170000 people. In December 2011, the hospital employed 1467 people.

The computerization of Hospital A, which includes the implementation of the PFSS suite, was part of the management strategy for the hospital, with a “significant investment in the IS/IT areas ....”
according to the Executive Member responsible for the project. This contributed to an internal climate marked by the leadership of the Board and predisposed to change.

The implementation of PFSS started in the Emergency Room (ER) at the end of February 2007, gradually being extended to the other clinical areas. In July 2011, when the fieldwork was finished, PFSS was working "in around 95% of specialties in the Outpatient Department (OD) and 65% of services in the in-patient department", according to a member of the monitoring team (MT).

The groups including nurses and assistants revealed a greater acceptance of the IS, while doctors showed most difficulty in complying with, and using, the system.

4.2. Case B

Hospital B is a medium-sized hospital, with a capacity of 182 beds. It serves a population of approximately 74 thousand inhabitants. In June 2011, Hospital B had 589 registered workers.

In February 2007 the Hospital was integrated into a Hospital Center (HC) whose integration process had a strong influence in the implementation process of the PFSS.

The hospital and all its workers were driven by continuous improvement and acceptance of change. With integration into the HC, the management body and its headquarters changed, moving location to the district’s capital. This contributed to a climate of insatisfaction, loss of identity and uncertainty about continuity of the PFSS’ implementation.

The implementation of the PFSS was gradual, starting with the Emergency Room (ER) in 2003. The spreading out of the software to the whole hospital happened only when the ER had completed its implementation with success. The implementation process was extended until 2010, but at the in-patient level, the process was not completed, with the physicians refusing the use of PFSS in medicine services.

The nurses and assistants have revealed to be completely committed with the project. Conversely, the doctors have showed different levels of commitment, including active resistance.

5. Research Findings

It was possible to identify in the two research sites four most relevant and connected themes for the study: organizational context, technological frames (TF), commitment, and usage; which in turn encompass categories and sub-categories.

The themes that are most directly relevant to this analysis are TF, Commitment and Usage. This paper will focus only on some relevant categories which have particular significance to answer the
research questions: *Implementation of IS* in the domain of TF, *Commitment* and *Usage* and the categories related with them. In table 2 are presented the themes and categories that were analyzed as well as their respective description.

<table>
<thead>
<tr>
<th>THEMES AND CATEGORIES</th>
<th>DEFINITION</th>
</tr>
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<tbody>
<tr>
<td><strong>Implementation</strong></td>
<td>Implementation refers to all knowledge, expectations, interpretations, and understandings that healthcare professionals have regarding the implementation of the IS project, starting from the point when the Board decides to proceed.</td>
</tr>
<tr>
<td>- Motivation for IS adoption</td>
<td>The intentions/objectives behind the purchase and adoption of the HIS.</td>
</tr>
<tr>
<td>- Communication</td>
<td>Include the way used by the management team to communicate the objectives and the expected benefits of the system as well the way it will be implemented.</td>
</tr>
<tr>
<td>- Management support</td>
<td>Includes the perceptions that participants have of the support provided by the Board, both in terms of availability of resources, as well as the level of involvement in the implementation.</td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td>Commitment to an IS project implementation is seen as an acceptance of that project and a higher affinity, identification and engagement in attaining the expected benefits, from it.</td>
</tr>
<tr>
<td>- Lack of Commitment</td>
<td>Lack of commitment is viewed as a set of behaviours adopted by users against the IS, which may impair the benefits achievement.</td>
</tr>
<tr>
<td>- Top-management commitment</td>
<td>The affinity and identification with the project and the capability to influence the progress and success of its implementation. It includes all the measures and support provided by managers, both in terms of availability of resources and in the level of involvement of users.</td>
</tr>
<tr>
<td><strong>Usage</strong></td>
<td>The usage of the application by users relates to how often they use it, and the quality of information was introduced in PFSS.</td>
</tr>
<tr>
<td>- Correct Usage</td>
<td>The correct usage is associated with the full and adequate use of IS, in order that the information can be shared and considered reliable and trustworthy for the continuity of care as well as for the production of management indicators.</td>
</tr>
<tr>
<td>- Partial Usage</td>
<td>It consists in partial use of the application’s fields. At this level of use, the information entered is sometimes woefully inadequate to monitor the patient efficiently.</td>
</tr>
<tr>
<td>- Not use</td>
<td>Consists in total refuse in using the IS.</td>
</tr>
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Table 2 - Themes and categories resulted from data analysis
5.1. **Case A**

5.1.1 **Implementation of IS: Technological Frames of Users**

**Motivation for IS project adoption.** In the words of the executive member responsible for the project “the motivation for the hospital to acquire this clinical software arose from the realization that the hospital, as with all hospitals in the National Health Service, had no clinical software that would guarantee the application of IT to the production area”.

The reasons that led the organization to adopt and purchase this software do not seem to have been properly understood by the users, who stated that the importance of the system had not been explained to them, along with the benefits of the system implementation:

”It was important that it was explained to us why, and what the system would be used for, and that we were given information about the importance of the IS project” (MJP_P_I7).

Furthermore, remained the assumption that the IS was imposed by third parties or by the Ministry of Health. For some users, the Board decided to adopt it ”because there were directives to adopt from the ministry” (JM_N_I4).

This assumption that something was ”imposed from above”, appears to have caused some hesitation to accept the project by some professionals, and affected their commitment to the same.

The strategic objectives inherent to the adoption of the system can be included into three categories: improve clinical management, improve information management, and make the hospital paper free. Some of the interpretations of respondents for these objectives are revealed through the following observations:

”Facilitating the consultation of records by various professional groups; the increase in fidelity and availability of records” (A.S._P_I8).

”There will be a clinical component that is perfectly ‘manageable’ by the medical staff of the hospital that will translate into management indicators” (F_Mg_I1).

”To have records produced in a reliable, standardized and continuous way” (DC_Mg_I4).

**Communication.** The communication to employees regarding the implementation of the PFSS and its entering into service followed the normal procedure as regards formal communication in this type of public organization (e.g. formal circulars, website and meetings). The excerpt presented below (taken from the website) exemplifies how the Board made this communication:

’[The Hospital A], authorized the [PFSS], a software suite that allows the replacement of paper by digital format, and an increase in the quality of the healthcare provided”
However, for a great number of professionals (doctors, nurses and assistants) the process of communication and information dissemination of the project was insufficient.

The importance of a good communication for the project and its objectives is also highlighted by the PFSS project manager: “they are projects where there is a large component of change management and, in that management of change, communication is very important”. This manager recognizes that communication has been an on-going concern during the implementation, though he considers it is necessary to improve it: “we still don’t do it in the best way”.

**Management Support.** The Board of Directors (BOD), as part of its implementation strategy, created a working group (WG) formed by professionals with a leadership profile and ability to influence the progress of the project, in which a member of the Board was also present.

The WG participated in meetings with the PFSS team, helped to implement the measures decided by the Board, encouraged the use and participation of professionals, all while dealing with any difficulties that arose, as demonstrated by one of its members:

"I had several meetings with team leaders of each team to organize how we would proceed in terms of implementation, and [tried] to solve all the problems that [would] arise on a daily basis” (CB_P_I1).

The support of the BOD also included backing the measures that the working group adopted, either through formal communication or by providing the necessary means and resources as mentioned by a member of the WG:

"There was never a lack of support. The biggest hurdles were overcome, with a bit of encouragement by the BOD, with their letters alerting every one of the need to cooperate”(PP_P_I5).

According to the coordinators of the MT, the support to implement the PFSS they expected from the management team sometimes, did not meet their expectations, particularly in relation to the lack of decisions by clinical management that would have helped resolve or minimize some of the difficulties encountered in implementation:

"There are a number of decisions, a series of mandatory procedures that we needed which are currently of a clinical nature and, the Clinical Director is not present "(L_MT_I1).

On the other hand, the permanent monitoring for almost two years, by the team of the firm supplying the IS was highly valued and recognized by the users:

"In terms of company staff, during the implementation phase they were very present! They were always available to provide the necessary support "(PG_P_I4).
5.1.2 Commitment

The nursing and assistants groups exhibited a greater acceptance of the PFSS and recognition of its importance to the profession, despite initial difficulties. At contrary, doctors showed most difficulty in complying with and using the system.

The commitment to the system is demonstrated by the interviewees through comments such as:

"We have a lot of work to do in improving the system, to involve professionals and in the shortest space of time we can take from the IS all that it can offer" (SB_P_I13).

"I think everyone complied really well "(MJP_P_I7).

Lack of Commitment. Cases of resistance occurred in some specialties, and were more visible in the out-patient and in-patient medical services, like Medicine. These phenomena of resistance were mainly characterized by a refusal to use the application, or by using it only partially, and/ or by verbalizing opposition to the system.

Cases of resistance to the system in the out-patient department are presented by a member of the MT:

"We have physicians from various specialties who refuse to enter prescriptions [exams and therapeutic] in [PFSS], they continue with paper, although there is already a norm for the hospital that these requests are made only in [PFSS]".

To face the situation, the WG and the Board were compelled to take some actions, such as: holding meetings, issuing regulations or reduction/ withdrawal of request forms for exams and paper prescriptions.

The situations of resistance, or lack of commitment, compromise the accessibility to information by other professionals and, the achievement of all or at least some of the expected benefits of IS.

According to project manager, the occurrence of resistance phenomena to PFSS evolved positively: “We had a lot of resistance initially. Now, 85% of professionals recognize the potential and the advantages of working with the PFSS”.

Top Management Commitment. Besides being expressed by members of the board, top-management commitment has been shown by the actions taken by the board to increase the commitment and degree of use of PFSS. These actions included: communication of objectives and expected benefits of the PFSS, involvement of operational managers in the implementation process, supporting the WG or participating every weeks in work-meetings with the implementers.

Some comments presented below show how the BOD was committed to the project:
“What is important is the need to focus on emergency room because the people who work there also work in the other services and if these people do not see the benefits and advantages there will be problems when it comes to installing the other applications.” (Member_board_Meetings_PFSS).

"No one can say that the problem is the lack of investment in Emergency Room, it’s not true! I highlight three or four key things that were given to me! Ranging from equipment, the recruitment of a social worker … all of this was authorized by the Board" (C.B_Conv_1).

Demonstrating how top-management commitment influences nurses’ compliance to the system, the MT coordinator highlights the effort of the Nurse Director, "that engages people and tries to listen to them, involving them in the changes ".

5.1.3 Usage

Two types of usage were found: Correct usage and Partial Usage of the system. In the initial phase was verified also some cases (few) of Not use.

Correct Usage. Considered by most professionals as the ideal for achievement the benefits, because the information entered in HIS is more reliable for the continuity of care, can be shared as well as, allows the production of management indicators:

"as more and better information you have available, the lower the risk of any mistakes, or complications for the patient "(SB_P_I13).

For some healthcare professionals the benefits of the system is a result not only of the extent of the services covered by the PFSS and the number of users, but also the type and quality of records that are held in the system:

"when every healthcare provider uses the system to produce their records, and do so well, so that they can be shared by all other professionals" (SB_P_I13).

Here, this type of use is more characteristic of the nurses and assistants groups.

Partial Usage. At this level of use, the information entered is sometimes woefully inadequate to monitor the patient efficiently, particularly due to the fact that in such cases the information is spread over two different media (paper and digital).

Partial use of the system is characteristic of most professionals working in the emergency and out-patients departments, particularly the individuals in the medical profession:

"I myself do not use all the features. I use around 30 or 40% if that "(SB_P_I13).

Some of those interviewed defend making the use of the system compulsory and strong support of the Board in order to overcome some cases of resistance to the system:
“I think that these things, if they are going to be used, must be imposed, people must be forced to use the PFSS…” (JM_P_I12).

5.2. Case B

5.2.1 Implementation of IS: Technological Frames of Users

As in the Case A, here are analyzed the following categories: Motivation for IS adoption, Communication and Management Support.

Motivation for IS project adoption. The main objective of management was to ensure the existence of a unique electronic patient record that would allow a more credible, reliable and accessible clinical information to all professional workers, as well as enhance patient care and supply management indicators:

“To have better information, more reliable, (...) logically the best would be to take decisions based on the information that the system generates for us” (E_Mg_I1).

The objectives inherent to adoption PFSS can be grouped into three larger objectives: Clinical Management, Information Management and Decision Support. The following statements indicate the idea users have about the motivation behind the adoption:

“Maybe to make people’s work easier and to avoid paperwork, isn’t it?” (A_A_I4).

“Easier access to information and administrative services being able to control our activities” (L_N_I8).

Communication. According to the executive manager, the communication with the employees regarding the implementation of PFSS followed the usual procedures, i.e. meetings were held with the representatives from each clinical area and memos were circulated informing of the adoption of the system and the implementation process. Even so, some physicians considered that the information given by the Board, namely regarding the system's objectives was inexistent or insufficient:

“There was training on how it worked, but there was no justification as to why it was being implemented…” (E_P_I4).

Management Support. After the decision of the PFSS adoption, in the first phase of implementation, there was a strong involvement and support by the Board in the sense of obtaining the adherence and participation of all professionals as well as allocating the necessary resources. All the operational managers and Service directors were involved through discussion meetings and by assistance of a working group (WG) nominated by the BOD:
"In the previous situation, there was a leadership that was physically present. The manager was present every day and we had frequent meetings (...)"

The participation of the head nurses was more intensive and effective than that of doctors, contributing to the development of a greater commitment to the project in their teams.

After the integration in a HC, the situation became different, with a clear reduction of commitment of the new board and especially of the Clinical Management:

"I have a service director that never came here to a meeting with us… to come and ask if we needed anything" (FL_P_I13.1).

The continual presence of the monitoring team (MT) for a significant time was one of the aspects most referred about the feeling of support realized by the users during implementation:

“we have a support team on site, they are here 24 hours, providing help if someone has some problem (...) In that respect, they are phenomenal” (A_Mg_I2).

### 5.2.2 Commitment

The level of commitment to the project was variable among different professional groups, and between medical services.

Some comments from the interviewees show different levels of commitment as the following:

“From the two professional groups, those that adopted it better were without doubt, the nurses and the assistants. The doctors were a diverse group, as there are doctors that are extremely compliant and fill in all the records and others that have more difficulty” (A_Mg_I2).

**Lack of Commitment.** The lack of commitment is mainly attributed to the medical group, in a global way, and especially to the doctors of the in-patient medicine services:

“Have you heard about our colleagues in medicine? They do not use the PFSS. They may have many reasons, but I think the main one is that they have a certain reluctance” (MC_P_I9).

According to project manager, "the administration has an important role when it comes to deal with lack of commitment. Some 60% of the success of the implementation is down to them. They are the dominant bodies of leadership, they hold the knowledge; if people are not working for the system, and the system by itself cannot win through”.

**Top Management Commitment.** The members of the Board that were involved in the acquisition and adoption of PFSS changed during the course of integration in the HC, and the new management team reduced their support and commitment to PFSS project. The following comments are illustrative of that lack of support:

“Leadership at the moment is neither direct nor present. It is a leadership that is distant, because they (the leaders) are most of the time in the central unit. It reached an impasse because there was a change
in management and all the support that existed before was not carried over the present management” (R_Mg_I1).

"Management of hospital went away and thereafter PFSS runs on autopilot [unguided]. As there is no one to put pressure on, nothing happens" (T_P_I12.1)"

The current manager of unit (member of the previous Board) tried to maintain proximity with the workers and giving continuity to the projects. However, this support was not shared and well accepted by the other members of the Board, specially the clinical Director. Here, the role of the clinical management would be crucial, to advance with the project and overcome existing issues but the current clinical director, in the opinion of a doctor, “does not like the PFSS”.

5.2.3 Usage

Here, as in hospital A, three levels of usage were found (correct usage, partial usage and not use).

Correct Usage. It can be said that the nurses and the assistants were almost 100% compliant in all areas except in in-patient services where the nurses had to transcribe therapeutic prescriptions that the doctors had filled out on paper.

Looking at the correct use of the system, the following excerpts reflect the way how some professionals use the PFSS:

“"I use all the functionality of the system, with respect to my role as an orderly” (J_A_I3).

“"I have not written on paper for a year and a half, except to sign things” (MC_P_I9).

From the perspective of the interviewees, mostly nurses, the correct use of the application relates to the acknowledgement that usage of the IS provides benefits for the patient and the professionals, influencing their commitment to system:

“"I think it helps our work, it saves time, the records are more reliable, and there is less information lost. It benefits the patient principally, and above all, we benefit ourselves” (A_N_I13).

Partial use. Usage is partial in services of the In-patient and the Out-patient department.

In the ER, where the system was first installed, the usage level of the system is very high, although some doctors do not use all the functionality of the system.

Some users admit to using the IS only partially:

“"In the in-patient services I use just half of it” (P_P_I2).

“"I just use a bit. In the Out-patient department, I request the tests that I can and the imaging exams. The rest I use a manual process” (G_P_I5).
Not Use. In the in-patient services of Medicine, the resident medical staff shows an almost total refusal to use the system:

“The medicine services are the only ones that do not use the PFSS, but just the medical part” (T_N_I15).

The IS department manager referred to the impact that the refusal to use, or inappropriate use of the system, has on reaching the expected benefits:

“The most complete records would have to forcibly be those of the doctors, because from there it is waterfall effect, if a doctor makes an entry, a nurse has to make an entry, the assistants have to make an entry – if the doctor doesn’t make an entry, it compels the others to not use it” (A_Mg_I2).

Besides compromising the continuity of care, not using the IS or doing an incomplete usage opens a precedent for the possibility of medical errors and the disadvantages associated with the paper clinical records (e.g., illegibility, risk of loss or adulteration).

The necessity to lay down rules of use and adopt measures to support the progress of the IS namely imposing compulsory use, is shared by the various professionals:

"The imposition and definition of rules has to happen, there has to be an authoritative figure(…)” (R_Mg_I2.1).

“While the HC does not take a stand over this, it is not going ahead ”(P_P_I2).

6. CROSS-CASE ANALYSIS

In the two cases the analysis of the data allowed the identification of similar patterns. Analyzing the two cases is possible identify the following findings:

1) An effective communication, with clear definition of objectives and expected benefits of IS, demonstrated to have influence on commitment to the project and the achievement of benefits from IS/IT.

2) As described by literature, the commitment of top management here revealed to have very influence on users' commitment and their utilization of system. Note that in the case A the level of usage evolved positively, particularly by a strong leadership demonstrated by the board. This leadership was marked by actions taken by the BOD, either motivating people towards adoption or controlling of development of resistance behaviors. At contrary, the resistance of a physicians group towards HIS was not overcome due the lack of support by new management team in the case B. It was also evident the importance that the operational managers and clinical management perform in influencing users to adhere to IS
3) The work done by MT was seen as an indirect support of management and was very valued by users. It increased their skills and gave them more confidence and commitment to the project.

4) The benefits most valued by users of the three professional groups that seem to impact their commitment to the project implementation and the way they use the HIS, were: safety, reliability and accessibility to information. Other benefits were also referred to by many users, as well as by administrators, including: decision support, patient benefits, activity support.

5) From the perspective of interviewees, the correct usage of the application is associated to the acknowledgement that correct usage of the system provides benefits for the patients and the professionals, as well as for organization. This perception acts to reinforce the commitment towards the project as well as, the correct use of the IS, constituting a cycle, represented by Figure 1.

![Figure 1 Cycle of Commitment-Correct usage-Perceived Benefits](image)

7. CONCLUSIONS

Considering the value attributed to HIS, health data and the critical role that stakeholders' commitment has for IT implementation, research was undertaken based on multiple case studies in two public Portuguese hospitals. A qualitative, interpretative and case-based research was used to analyze the implementation of a clinical information system. Some research questions were laid down as a starting point for the research: 'How does top-management commitment influence the users' commitment towards a project of HIS implementation? How users' commitment with the HIS influence its usage?'
Looking at data through the theoretical lens of TRF of Orlikowski and Gash [1991, 1994] and Commitment of Meyer and Herscovitch [2001], similar patterns were found in the two case studies. Using as a starting point these research questions, it was found that:

- Top-management commitment, in particular of the clinical management was pointed out as a critical point to contribute to a faster and more comprehensive implementation of the HIS, improving commitment of users and their usage of the system.

- The way the professionals use the system can increase the potential for benefits achievement. For example, a partial use of the system induced by lack of commitment can seriously compromise the achievement of likely benefits. Instead, a correct use of HIS facilitates the information accessibility by all professionals, improves quality of information and continuity of care to patients. It was found a positive relationship between project commitment, correct usage and perceived benefits, in which each one reinforces the other.

- A strong leadership and management support either increasing motivation of stakeholders (e.g. trough effective communication, allocating of resources) or, making decisions to support the implementation progress and increase the use of the system were highly valued by participants and revealed to be important in overcoming some issues, such as resistance.

Considering that this implementation project constitutes a learning process, some ideas resulting from the statements of participants as well as, from research findings are presented:

- A strong leadership is expected from Top management in situations that require authority.

- Understanding the users' technological frames should be a key factor in managing the adoption of IS as well as improving their use.

- The use of all features of the system must be mandatory and more restrictive measures in terms of paper use should be implemented right from the beginning.

- The presence of a monitoring team supporting the professionals can influence directly or indirectly the level of commitment and the correct usage of the IS.

This research followed an interpretative approach. Thus previous personal experiences of the author should be acknowledged as a limitation of this work. These research findings may be valuable to other settings and organizations as interpretations of phenomena but are not wholly predictive for future situations.

Further research that could compare the results found in this work in other contexts could provide significant insights in this area.
REFERENCES


