ACTIVITY BASED COSTING IN HEALTHCARE: A UK CASE STUDY

Michela Arnaboldi
Politecnico di Milano (Italy)

Irvine Lapsley
University of Edinburgh (UK)

ABSTRACT

The reduction of public funding and the emphasis on performance measurement in public services have influenced the management and accounting practices of many healthcare systems. The pressures have led many managers to search for management tools, often derived from the private sector, in the attempt to rationalize their use of resources. Activity Based Costing (ABC) is one of these techniques which has gained considerable attention both from practitioners and researchers. This paper examines the case of a UK healthcare organization which implemented ABC to provide sharper cost information for control and decision making. The paper is a longitudinal study of an accounting application which provides insights into the process of adoption and enactment of costing innovation in healthcare.

Healthcare systems, internationally, face pressures to deliver cost efficient care in the face of escalating demands. These pressures have led to many initiatives to improve the management and efficiency of healthcare delivery. This paper examines the trajectory—from initial idea to implementation—of the adoption of activity based costing (ABC) to improve efficiency by one healthcare organization. The healthcare organization which is discussed in this paper is a blood transfusion service, part of the UKs National Health Service. This study reveals the challenges, the pitfalls and the problems of adopting a costing technology which is radically different from previous practices in a healthcare setting.

RESEARCH CONTEXT

The UK’s blood transfusion service is currently organized into four regional centers for the collection and distribution of blood (Varney & Guest, 2003). The role of these centers in the healthcare system is crucial and their management is complex from the ‘raw material’ procurement phase through to final use. The UK’s transfusion services rely on voluntary donors, who donate their blood up to three times a year. Though this
main input material is free, the costs of transfusion centers are significant as they manage many varied phases within a long supply chain: collection, processing, testing, delivery (on a daily basis) and clinical assistance.

Furthermore, since 1980, there has been an increase in costs within these services because of two major events: the discovery of HIV and of Creutzfeldt-Jakob Disease (vCJD)—the human variant of Bovine Spongiform Encephalopathy (BSE). These events affected transfusion centers deeply by putting them at the center of public controversy. In particular, the discovery of HIV altered the relationships of donors, transfusion centers and patients. This situation raised a sense of uncertainty in everyone - citizens, politicians, researchers, doctors - and the consequences for blood transfusion services were significant in many countries around the world. Costs increased after these events because of the need for higher safety measures. At the same time, the services had to deal with a reduced number of eligible donors. The appearance of the human variant of the BSE affected the management of the UK's transfusion service at another level: since 1998 they have been forbidden to use UK plasma; for the first time these centers were obliged to buy a ‘raw’ material which was previously free.

In this context, management's focus on cost reduction and tighter cost control had become an important issue. Several researchers have addressed this issue by looking at costs for specific processes (Sonnenberg et al., 1999; Strauss, 2001; Amin et al., 2003) or by surveying the costs incurred by the transfusion system (Varney & Guest, 2003; Syrjälä et al., 2001). This paper sits between these two strands by looking at the experience of a healthcare organization which has undertaken an overall project for implementing an innovative costing technique - activity based costing—for the whole institution.

**Activity Based Costing: Previous Studies**

Activity Based Costing (ABC) and Management (ABM) have gained and maintained a central role in the activities of both practitioners and researchers. The debate on ABC still occupies a central place in the accounting literature, showing contrasting interpretations of the benefits of this technique. For example, Arnaboldi and Lapsley (2003, 2004) have focused on the manner in which public sector organizations may adopt ABC as an act of mimicry of the private sector to portray themselves as more “businesslike”. Further, since the early empirical study of Cooper and Zmud (1990), researchers have developed different interpretative perspectives, highlighting alternatively factors influencing ABC implementation (Shields, 1995; Swenson, 1995) or the stages of its application processes (Anderson, 1995; Gosselin, 1997).

These two perspectives are interdependent as factors which can influence different stages, with a varied influence, over a project’s life. This combined approach to investigating ABC is advanced by Krumwiede (1998), who studied the relationship between stages and factors in ABC adoption in a survey of U.S. manufacturing firms. He argued that the early adoption of ABC is influenced by external factors (e.g. cost distortion and decision usefulness of cost information), but also internal elements (e.g. team size). In the implementation stages the need to develop a routine system is predominant and Krumwiede identifies several elements influencing ABC enactment:
the level of top management support; the level of non accounting ownership; the clarity and consensus for ABC objectives, training and purposes.

The more recent work of Anderson et al. (2002) covers a gap in the literature by addressing attention to a stage almost neglected by previous studies: the process of designing the ABC model. In particular, they explore the interaction amongst team dynamics, composition, outcome and the external environment. The insights given by the present field study extend our understanding of the factors influencing the application of this accounting technique for achieving and analyzing routine systems. While previous research offers a complete range of elements for investigating ABC, there are still two issues which remain partially unexplored; first, the identification of further dimensions related to group dynamics opens up the possibility of examining its influence in the implementation and use phases; second there is a general lack of case study research on ABC adoption, which would allow a deeper investigation of the complex interaction of environmental, organizational and human factors in its implementation.

Looking at the public sector, there have been several attempts to apply ABC systems. Though these contributions provide only a partial framework for interpreting the whole trajectory of ABC development, they were fundamental in informing this study; in particular they highlighted specific dimensions characterizing the implementation of the costing technology in the public sector context. A first difference is in the adoption phase, where the influence of government requirements has been the trigger for public institutions to undertake this innovation in accounting systems. However, the differing outcomes for similar organizations has emphasized the emergence of an ‘enabler’ factor, understated in private sector research: the existence, within the organization, of a champion for ABC. These champions sponsor and lead the implementation of the system, but their position and remit within the organization has often ended in the narrow application of ABC in marginal services or in unused systems (Arnaboldi & Lapsley, 2003).

There has been a consistent advocacy of ABC systems as an effective management tool in healthcare organizations (Chan, 1993; Lee & Mahenthiran, 1994, Upda, 1996). These contributions enhanced the knowledge of a particular application field, hospitals, highlighting the presence of specific structural elements which can prevent the implementation of ABC. Lee and Mahenthiran (1994) investigated the structural elements influencing system implementation, highlighting the co-existence of different groups (medical professionals, administrators, lab technicians and nurses) with sometimes conflicting interests. They argue that an agreed common strategy is a prerequisite for carrying out an ABC exercise successfully. This linkage to strategy is also an important issue in private sector studies (Anderson, 1995; Krumwiede, 1998; Anderson & Young, 1999; Anderson et al., 2002), however in healthcare it is further complicated by the multidimensional nature of objectives. The main private sector goal, profit, does not apply in public sector organizations. Also, in hospitals physicians and administrators have different perspectives on service delivery and the final goal of the organization, which are not easily merged in a single strategy. A similar complex pattern is shown moving from adoption to design and implementation (West & West,
1997; McGuire et al., 1997). There are problems in all the phases of systems creation: the identification of activities, the identification of cost pools and the definition of the drivers. A common suggestion by all of these authors is to focus the ABC system on specific subunits within the organizations. The more recent literature shows two different trends. First a further narrowing of this approach with several applications for specific medical processes (see for example Beecham et al. (2001) and Orlewska E. (2002)). This trend has affected the particular sphere of transfusion centers as well, where contributors have looked for cost alternatives at the systemic level (Goodman et al., 2003; Varney & Guest, 2003; Syrjälä et al., 2001) or at technical process levels (Sonnenberg et al., 1999; Strauss, 2001; Amin et al., 2003). On the other hand there has been an interest in analyses of the usefulness of ABC for cost comparison in healthcare systems, particularly for hospitals and integrated care (Paulus et al., 2002, Negrini et al., 2004)

**FIELD STUDY: THE REGIONAL SERVICE**

The setting for this research is a Regional Blood Transfusion Service (RBTS) which is responsible for blood collection and provision in one of the UK regions. RBTS's major activities are in the collection and testing of blood and the manufacture of products for clinical purposes. The organizational configuration of RBTS is complex as they carry out a wide range of activities related to blood processing, which may however be grouped into four major processes: blood supply chain, protein fractionation, clinical diagnosis, manufacturing and clinical services. Exhibit 1 depicts these processes, their output and the main phases in which they can be divided.

The blood supply chain is the core process within RBTS. The first phase (blood collection) is based in five different sites and it covers all the steps needed in providing blood to the patient, from the collection to the final delivery. This process is strictly related to all the other *chains*: starting from the manufacturing plants as the providers of raw material, arriving at the clinical service, which is the fundamental link within the hospital for the use of blood. Blood processing and testing by RBTS is performed in centers situated in two major UK cities. Stock management ensures that blood continues to be distributed according to need, and it facilitates the use of available supplies. Finally the transport units, besides supporting blood collection activities, provide an integrated system for delivering RBTS's products to hospitals on a daily basis.

In addition to the supply chain, RBTS has two manufacturing plants (named here PL1 and PL2). The manufacturing plant 1 (PL1) is the division of the RBTS responsible for providing hospitals with plasma products. This plant manufactures the blood into four core products though the range includes hundreds of antibody products, albumin and coagulation factors. A further process entails the development and manufacture of products for use in clinical diagnosis (PL2), bioscience research and further manufacturing. The product range includes reagents for blood grouping, hematology, clinical chemistry and immunochemistry. The last major activity is the Clinical Service, which plays an important role in completing the whole process: clinical staff (through five main local sites) support ordering and prescribing blood components for
treatments. Part of the clinical services implies direct contact with the patient. Furthermore, RBTS offers contract services to the bioscience industry and currently manufactures products for major global players in the medical device, diagnostic, biotechnology and pharmaceutical sectors.

### Exhibit 1

**RBTS Activities**

<table>
<thead>
<tr>
<th>RBTS Activity</th>
<th>Output</th>
<th>Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The blood supply chain</td>
<td>Blood products</td>
<td>Blood collection</td>
</tr>
<tr>
<td>2</td>
<td>Blood processing &amp; testing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stock management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distribution</td>
<td></td>
</tr>
<tr>
<td>2 Protein fractionation (PL1)</td>
<td>Plasma products</td>
<td>Protein fractionation</td>
</tr>
<tr>
<td></td>
<td>Stock management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distribution</td>
<td></td>
</tr>
<tr>
<td>3 Clinical diagnosis manufacturing (PL2)</td>
<td>Reagents for blood grouping, hematology, clinical chemistry and immunochemistry</td>
<td>Cell culture</td>
</tr>
<tr>
<td></td>
<td>Down stream processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Filling, labeling and packing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Testing</td>
<td></td>
</tr>
<tr>
<td>4 Clinical services</td>
<td>Hospital support services</td>
<td>Testing</td>
</tr>
<tr>
<td></td>
<td>Product selection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ordering &amp; reporting</td>
<td></td>
</tr>
</tbody>
</table>

**Method**

This research was based on a single embedded case study approach. The appropriateness of this method is related to the uniqueness of this case (Yin, 1994), which differentiates this investigation from previous contributions to the ABC literature. The differences are related to many dimensions of this application: the scope (involving the entire organization and not only a subunit); the trajectory (over time and across all ABC ‘creation’ phases); the field (transfusion service); the management and commitment to carry out the exercise. The use of an embedded case study is justified by the need to analyze different levels and units within RBTS: the organization as whole, the four subunits in which the system has been developed and individual actors in this organization.

Data was collected using four main different sources for triangulation: public documentation, interviews, site visits, and assisted access to the organization’s information systems. First we analyzed public documentation related to RBTS (annual reports, governmental studies, internet literature) which provided important background information. The visits to the organization provided the main data for the analysis, in particular interviews. Twenty-six interviews were carried with key actors in RBTS on ABC implementation. The duration of each interview was, on average, one hour. These key actors had different positions within the organization including senior managers, operational managers, business manager, laboratory directors and
technicians, and clinical directors. Furthermore, these interviewees had different roles in ABC development: as part of the project team, as users, or as external observers. Each interview was based on a previously defined check list. Site visits added further sources of data for the study: the direct observation of plants, laboratories, delivering and stocking areas and access to internal programs and archives. This access was particularly important in understanding the difficulties of the ABC exercise and the complexity of the processes tackled.

RESULTS

The trajectory of ABC adoption in RBTS is analyzed drawing on a framework which segments innovation in phases and analyses organizational factors as important features of the implementation. The process of ABC application is referred to in four main stages: (1) the initiation and adoption, (2) the design, (3) the implementation and (4) the use of information. The second dimension collects the factors considered relevant to successful ABC adoption and implementation by different authors (Shields, 1995; Swenson, 1995; Shields & McEwen, 1996; Krumwiede, 1998; Anderson et al., 2002; Arnaboldi & Lapsley, 2003); further we include competition, which is usually not pertinent in public sector analyses. This dimension was initiated by the particular organization studied here, in which some divisions have recently looked outside the NHS for additional revenues, with a more “market oriented” management perspective. Exhibit 2 shows the framework adopted, which highlights previous research findings in the different phases. This framework has been used for interpreting the data collected, reporting on the whole trajectory of ABC creation, over the period 1993-2001.

(1) Initiation and Adoption

The initial idea of implementing ABC at RBTS in 1993 came from a top manager’s desire to understand the cost structure of the transfusion center. One distinctive feature here is the absence of any formal requirement from central government to implement this specific accounting system - the adoption of an activity based approach. The specific choice of the technique was based on the presence of an ABC champion within the organization, who advocated the benefits of ABC and more detailed cost information for decision making and control. However, this first attempt was not finalized in a project: the commitment to the project was confined to a few people within the organization and the top management did not provide the resources (human and financial) necessary for successful implementation, which was not considered a strategic priority.

This ‘embryonic’ idea was taken forward in 1996 when the commitment to the implementation was extended to all top managers. This led the way to the strategic definition of the intervention: the definition of the scope and the identification of the project team. The scope was defined by selecting the subunits in which to implement the new accounting technique; RBTS reflected the experience of other organizations in public sector and top managers preferred to narrow the exercise by focusing on one specific area, in this case the manufacturing plant 2 (PL2). Second, top management faced the problem of identifying appropriate people to define the activity based
framework. Here the complexity of activities and the lack of competencies within the institution led to the recruitment of an external consultant. Again the exercise was stopped, as in 1997 a major re-organization was needed and resources were directed elsewhere.

**EXHIBIT 2:**
**ANALYSIS FRAMEWORK**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Initiation and Adoption</th>
<th>Design</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top management, strategy, resource</td>
<td>Premise for complete development</td>
<td>Focus on human resources</td>
<td>Reducing development time, Overcome major problems</td>
</tr>
<tr>
<td>External consultants</td>
<td></td>
<td>Reduces development time</td>
<td>Reduces development time, Reduce competencies upgrading, Higher risk of accounting system duplication</td>
</tr>
<tr>
<td>Team competencies</td>
<td></td>
<td>Reduces development time</td>
<td>Reduces development time, Improves ABC framework</td>
</tr>
<tr>
<td>Team size</td>
<td></td>
<td></td>
<td>Indifferent</td>
</tr>
<tr>
<td>Team heterogeneity</td>
<td></td>
<td></td>
<td>Not considered</td>
</tr>
<tr>
<td>Process complexity</td>
<td></td>
<td></td>
<td>Increases development time</td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td></td>
<td>Not considered</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td></td>
<td>Reduces development time, Reduces development time</td>
</tr>
</tbody>
</table>

The third, and last, attempt started in 2000, when top management recognized the urgency of adopting a more precise costing system. The change in managers’ priorities was determined by the evolution of both external and internal conditions. Between 1997 and 2000 there were many environmental changes which emphasized the need to have a better understanding of costs: the increasing attention of government in controlling expenditure, a continuous reduction of funds, the appearance of vCJD and finally the opportunity of developing the marketing activities of the organization. This last feature was not marginal and it was particularly important in stimulating human resources within RBTS, who saw the possibility to become less dependent on the NHS, by increasing income selling their products outside UK.

This perceived need for a more refined costing system and “management orientation” was shared by many managers across RBTS at this last attempt. These views supported the persistence of the champion who was still convinced of the benefits of ABC. Further, the third attempt was favored by another internal condition: a
major re-organization of 1997. This was a priority which focused the efforts of top, middle and low managers across the organization for nearly two years, diverting resources from the second ABC intervention and other projects. Only after this ‘intense’ intervention was resolved was management’s attention ready to be directed to other strategic projects.

The three initiatives at RBTS showed an evolution in the number of enablers encountered, but with a constant factor: the champion. His presence and persistence in adopting ABC was a trigger for all three attempts. However this was not enough to carry out the exercise; top management commitment, the linkage with organization priorities and resources proved to be necessary conditions for taking forward the exercise. As argued by Krumwiede (1998), these three elements are strictly related to each other. The implementation of complex systems, such as ABC, needs a significant amount of resources (financial, human and organizational), and further, if the adoption foresees the actual deployment in the routine of the organization it becomes a strategic issue and widespread support across the organization is required.

(2) System Design

The creation of an ABC system consists of four phases: (1) activities mapping and identification; (2) the definition of resources and costs of each activity; (3) the identification of the activity drivers; (4) the final selection of the activities and drivers which will constitute the operational system. These steps had been carried out twice at RBTS, in 1996 and in 2000. However, these two interventions differed substantially in scope and management. This gives a significant opportunity to see the effects of different paths in the same organization.

In 1996 the ABC intervention applied to only one subunit (PL2) within the organization and the exercise was carried out mainly by an external consultant. He supplied the required technical competence to deal with a complex accounting system. A restriction of the design and the experience of the consultant facilitated the definition of activities and drivers. The involvement of internal staff was marginal; this reduced the timescale and avoided the creation of work overload, but at the same time did not allow an upgrading of organizational competencies, or prepare the foundations for routine adoption of this costing system.

This particular facet of using external consultants is neglected in Anderson’s focus on the design phase (2002), which does not take into account the influences of this choice on the following stages. The limited involvement of staff in the design is certainly beneficial for reducing their workload, but it reduces involvement with and understanding of the practical difficulties of ABC. A higher involvement of staff in implementation acts dually: at the technical level it introduces staff to a system that they will use; second their involvement can reduce resistance during implementation. This issue is even more important for activity based approaches, which require considerable time to be dedicated to each activity to attribute personnel costs.

The second design phase started in 2000 under the auspices of a wide-ranging management commitment and the support of this initiative as a priority. This urgency resulted in the development of the ABC model for the whole organization. The
previous experience of RBTS pointed to the need to involve staff more directly. However, their lack of expertise led top management to hire an accountant with considerable experience of ABC, who became the project manager. The preparation of the project was not straightforward. The complexity of the organization, the specificity of the manufacturing processes and services required four different work teams which managed the design in RBTS subunits: the supply chain, the two manufacturing plants and the clinical services.

Each work team consisted of the lead financial manager and key actors within each subunit involved; the size of the teams was differentiated: three people for PL1 and PL2, four for the Blood supply chain, and seven for the Clinical services. Contrary to the findings of Anderson et al. (2002) the increase in team size was a critical issue for RBTS. The major reason for this difference is related to the type of teams included in their research, which consisted of people with a homogenous background. The largest group at RBTS (clinical service) was instead extremely heterogeneous, including clinicians, lab technicians and finance people. Their different perspectives on the process were essential in mapping out the activities of this service, but this increased the design time. Clinicians were the most critical and their resistance was emphasized by the geographical distance from the headquarters. As mentioned previously, there are five subunits dispersed geographically. Though they are formally accountable to RBTS, they are situated in hospitals, in which the commitment of RBTS top management is weaker. This shows the importance of top management commitment in the design stage, which is important to maintain the impetus of the project. As the boundaries of organizations are crossed the influence on human resources tends to diminish, reducing the power of project management staff’s efforts.

The complexity of the processes within RBTS was another major problem in designing ABC. This issue is not new, in particular among public sector researchers. They have often cautioned against carrying out empirical applications applying ABC methodology as the identification of activities and drivers is certainly not straightforward. The characteristics of the RBTS present a further complex context in which there are four subunits with significant differences. The establishment of four work teams helped in dealing with this complexity. However the different backgrounds of each team leaders inhibited advances in designing the framework.

All the teams struggled in the identification of activities and drivers, but there were specific problems in some areas. The design at the PL2 was the easiest as the team could rely on the information obtained during the 1997 experimentation, on the knowledge of ABC of the team leader, and on the availability of clear process maps. The PL1 design was complicated by the complexity of the manufacturing processes which were not easy to understand by the work team. The Supply Chain framework definition was crucial as it is the core activity of RBTS; the project manager devoted his major effort to this area and his contribution was extremely important in providing technical support and energizing staff efforts. Finally, the clinical service design was longer because of the complexity of the processes themselves and the behavioral issues discussed above. It is evident that team competencies are fundamental; further,
the rationale of the ABC system requires knowledge at different levels: ABC - structure and functioning, processes addressed and the existing accounting system.

(3) Implementation

The steps in which this phase may be divided vary significantly if the ABC application studied is carried out as an *ad hoc* exercise or if it is planned to become a routine system. While there are many examples of ABC adoption and design, the number of cases of operational systems is significantly lower. This situation is related to the amount of data needed to maintain these systems, which made many organizations decide against the use of ABC on a routine basis, but to use it for *ad hoc* exercises. Indeed, *ad hoc* applications are very useful to get a better understanding of cost drivers and further identifying value and non-value added activities (Lee & Mahenthiran, 1994). The case presented here is the unusual case of a desire to implement ABC as a routine system. This case study therefore examined the steps required to integrate ABC into the present accounting system. These steps are: data collection, data entry and calculation, and accounting system revision. The last step refers only to routine applications and it is related to three main issues: the revision of information systems, the definition of organizational responsibilities for operational running, and the frequency of data collection.

The desire to build a routine system led top management at RBTS to purchase from the outset an information device for supporting ABC. The *selection of software* was a crucial phase, as a number of elements needed to be considered: usability, interaction with other information systems, the scope for modifying activities and drivers, and the availability of reports. Top management decided to buy a flexible software package which was then adjusted and tailored to their systems by the four team leaders. The choice not to commit this task to external consultants was unusual and driven by the desire to create permanent competencies within the organization and maintain the ownership of the whole implementation process.

Team leaders faced many difficulties in uploading data (cost, activities and drivers), as the software was not easy to deal with; furthermore this situation was worsened by the inappropriate timing of *training*. The training on the software was provided two months after the procurement of the information system, due to contingent problems. However the desire of the top management to conclude the ABC application pressured the teams to begin the implementation of the system.

This implementation plan resulted in a considerable differentiation in the development time for the four subunits, which is explained by the different *team competencies*. The implementation at PL2 was the easiest as the team included a person with particular skills in dealing with these information systems and the ABC models. The problems in the implementation were mainly due to the difficulties in organizing all the data to be uploaded in the software: activities costs and drivers. The PL2 team leader overcame these problems by preparing an Excel file in which he collected all the costs to be apportioned to activities, evaluated the allocation basis for dividing these costs, and finally quantified all the drivers used. This intermediate step organized the information in an accessible way before using the software.
This problem of the software adopted and the lack of a holistic vision, were the main problems for PL1’s implementation; the team defined the activities and drivers, but they found difficulties in apportioning the costs to activities. For example the accounting database included the total depreciation of particular fractionation machinery, which needed to be split on set up and production. The technical difficulties in using the software overlapped here with a less clear perception of the ABC project by the team leader.

Subsequently, the data entry and software definition was completed in all the subunits, but two problems emerged; first not all the subunits had software for collecting labor time and second there were problems in interaction with existing information systems. Though both issues were considered during the software selection, the actual implementation showed some pitfalls. Top management adopted a partial manual upload of data, with the intention to use a software society to interface the ABC system with the accounting system, the staff time database and the manufacturing databases, which provided a lot of data used as drivers.

This technical element is not included in the framework, as previous ABC analyses tended to focus attention on organizational and behavioral issues. However, this issue is not new for managers who have to implement new information systems as reported by the project management literature (see for example Partington, 1996; Zakarian et al., 2001; Arnaboldi et al., 2004). The decision on the frequency of ABC reports was unresolved at the time of this study and will be dependent on the software problem solution.

(4) Use of Information

The last stage of this study analyzed the actual use of the information provided by the ABC information systems. The four main areas in which ABC information can be used are: stock evaluation, decision making, performance measurement and motivation (Johnson & Kaplan, 1987; Govindarajan & Shank, 1992; Greenwood & Reeve, 1994; Merchant & Shields, 1993). The debate on the usefulness of more precise cost information and particularly of a more detailed allocation of overhead is high; the difference among the subunits at RBTS provides an interesting picture on these issues and it adds to this debate.

Managers at PL2 used the information from the ABC systems as soon as they were available. Operational and business managers considered data to be urgent for an evaluation of the cost of the products and services sold outside NHS, which had never been previously costed. This situation is typical in public sector organizations in which cost issues have been neglected for two main reasons: the need to provide products and services to citizens, without consideration of financial matters such as cost recovery and second reliance on government funding. Environmental changes and expansion outside the UK gave RBTS’s managers the problem of evaluating the profitability of new markets and products. Managers gave evidence of this use of ABC, showing a list of products and clients which proved to be unprofitable.

From these evaluations, the next step, at PL2, was making decisions; first they decided to negotiate higher prices where this was needed, second they stopped the
production of some product-lines. The mixed (public and market oriented) nature of the organization emerged clearly, in this decision. One of these non-profitable products was provided to both the NHS and outside the UK. The decision to stop production needed a careful evaluation and involvement of the NHS, which wanted to see the economic convenience of buying this product externally.

The use of costs in the other subunits was marginal. It is important to say that PL2 managers obtained the ABC information significantly before other subunits but two elements seemed to play a fundamental role at this last stage: the commitment within the subunit and competition. The urgency of appraising the potential of expanding markets was a trigger in immediately using this refined cost information.

**Conclusion**

The paper has reported on the implementation of Activity Based Costing in a healthcare setting; these findings have implications generally, for the implementation of novel accounting technologies in healthcare settings. This application is significant at different levels: the persistence in system implementation (from 1993 to 2001), the scope of the project (the whole organization) and the actual achievement of results in ABC implementation on use (though only in some divisions). The embedded case study analyzed the organizations under different perspectives, investigating reactions, behaviors and results in the four subunits arising from the three attempts at ABC implementation. The repetition of the implementation along nine years in particular favored the comparison of different management choices in managing the project; while the different market attitude of the RBTS’s subunits provided a comparison of more market-oriented divisions against divisions still deeply embedded in the state healthcare system of the NHS. A summary of key dimensions is shown in Exhibit 3.

We have identified a number of factors which have influenced the implementation of ABC: top management support, corporate strategy and resources; the presence of a champion for ABC; external consultants; team size and heterogeneity; a competitive environment; training and interaction with existing systems. Similarly, these dimensions appear to influence the stages of (1) adoption, (2) design, (3) implementation, and (4) use. Top management support is crucial for getting the ABC project started, but had a limited impact beyond that, in this study. However, the champion of ABC had influence across all four stages of implementation, but with less power at the ultimate ‘use of information’ stage. The design stage is important with a variety of factors impacting on whether the ABC project would proceed to the implementation phase (see Exhibit 3). The progression from implementation of ABC to actual use was influenced by the existence of a competitive environment and by effective interaction with existing information systems. These findings underline the complexity of healthcare organizations as settings for accounting innovations.
### EXHIBIT 3
**SUMMARY OF THE MAIN RESULTS**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Initial Adoption</th>
<th>Design</th>
<th>Implementation</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top management strategy, resource</strong></td>
<td>Essential for extensive exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Champion</strong></td>
<td>Cohesive force</td>
<td></td>
<td>Supervisor and steering person</td>
<td>Low power in subunits</td>
</tr>
<tr>
<td><strong>External consultants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Team size</strong></td>
<td>Increases conflicts</td>
<td></td>
<td>Required where processes involve clinicians</td>
<td></td>
</tr>
<tr>
<td><strong>Team heterogeneity</strong></td>
<td>Increases conflicts and development time</td>
<td></td>
<td>Required where processes involve clinicians</td>
<td></td>
</tr>
<tr>
<td><strong>Competition</strong></td>
<td>Improves ABC framework</td>
<td></td>
<td>Improves quality of reports</td>
<td>Main driver</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td></td>
<td></td>
<td></td>
<td>Helps in interpreting data</td>
</tr>
<tr>
<td><strong>Interaction with existing systems</strong></td>
<td></td>
<td></td>
<td>Enables routine implementation</td>
<td>Facilitate data use</td>
</tr>
</tbody>
</table>

### REFERENCES


