

# REQUIREMENTS CAPTURE ISSUES ON THE DESIGN OF PRIMARY HEALTHCARE FACILITIES

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**ABSTRACT:** Currently in the UK there is a big investment into modernising healthcare delivery. This includes the design and construction of new facilities to provide patient centred services. To allow this, a new national initiative, the NHS LIFT, was set up to provide a new procurement framework for the delivery of primary healthcare facilities. In this context, design plays a major role as the catalyst for change. This paper presents partial results of an investigation into the front-end of design for 4 primary care projects developed under one LIFT partnership. The paper describes requirements capture issues identified through 22 semi-structured interviews. The aim was to capture the way the process was developed as well as the main problem areas. Results describe problems related to the healthcare delivery system redesign, the complexity of structure and multitude of stakeholders, the poor definition of processes and the confusion with roles and responsibilities.

**Key words:** design; primary healthcare facilities; requirements capture

## 1. INTRODUCTION

In the UK, there is great concern about improving healthcare outcomes for patients. This is reflected in the healthcare modernisation programme (DOH, 1998), which aims at tackling the root causes of ill health, breaking down barriers between services and making services faster and more convenient. A renewed focus on patient-centred care is a fundamental part of the modernisation programme in the NHS<sup>1</sup>. This focus is putting greater emphasis on the need to improve the quality of healthcare environments.

Healthcare environments, by their own nature, are supposed to be spaces for healing. The idea of the therapeutic environment has been discussed for some time and has supporters not just among architects and designers, but also among health providers (Francis, 2002). There is growing interest to support the link between the environment and health, through the proposition that the environment has an influence over the healing process and over health outcomes. As a consequence, the design of healthcare facilities has recently re-emerged to become a major focus in debates over therapy (Gesler et al., 2004). The challenge is delivering high-quality buildings that successfully accommodate clinical interventions and complex medical technology while providing a humane, therapeutic environment (Devlin and Arncill, 2003; Gesler et al., 2004).

In this way, it is believed that design can be the catalyst for change throughout the NHS, by providing appropriate environments that support better health outcomes. Such change includes the delivery of buildings focusing on health as opposed to sickness. It also includes the introduction of participatory techniques so that different perspectives are taken into account during the design of healthcare environments.

In order to allow such innovation, a new procurement framework has been put in place through a joint effort between the Department of Health and Partnerships UK. LIFTs (Local Finance Improvement Trusts) are programmes set up to allow NHS Primary Care Trusts

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<sup>1</sup> NHS is the National Health Service in the UK

(PCTs) and their local partner organisations to develop primary care facilities through Public Private Partnerships (PPPs). The new primary care centres should include local clinics and GPs surgeries, as well as other bodies such as opticians and dentists. LIFT projects have a twofold objective, which consist of providing local healthcare buildings and also catalyse the regeneration of deprived urban areas. Therefore, requirements capture for such buildings is challenging and plays a major role in helping the achievement of the modernisation programme objectives.

The initial stages of design (i.e. its front-end) are usually unclear and fuzzy, involving the capture and translation of requirements from different stakeholders, whose cultures and objectives vary often significantly. Many problems have been related to requirements capture in construction projects, and consequently there are substantial benefits to be achieved by understanding and better managing this process.

This paper presents partial results of a research project aimed at understanding the front-end of the design process in primary healthcare projects. To do so the paper briefly presents requirements capture concepts accordingly to the literature. It then describes the research method used to identify main requirements capture problems that occurred in the development of 4 LIFT primary healthcare projects. Research results are then presented in terms of the main issues identified through different stakeholders' perspectives. Suggested improvements for future LIFT projects are also presented.

## 2. REQUIREMENTS CAPTURE

The origins of the study of requirements capture lie within the new product development body of knowledge. In construction, the client requirements for a building project are defined as part of the briefing process (Shen et al., 2004). Briefing has been long considered as central to a successful project, as inefficient briefs tend to greatly increase the total cost of buildings while not achieving appropriate customer satisfaction.

According to Barrett and Stanley (1999:3-4), briefing should be '*seen as the process running throughout the construction project by which means the client's requirements are progressively captured and translated into effect*'. Construction briefing can be regarded as both a product -the brief- and as a process - the briefing (Ryd et al., 2004). Requirements capture has been defined by Bruce and Cooper (2000:xii) as: '*...the iterative process by which the needs, preferences and requirements of individuals and groups – stakeholders – significant to product development are researched and identified. Requirement capture defines: customer, user and market requirements; design requirements; and technical requirements.*'

Therefore, it involves the gathering of information from specific sources identified as being significant to the development of a building design. Its objective is to create a consistent set of information that represents the composite views of all stakeholders.

Prior research has approached requirements capture from different perspectives. In the product design area, requirements capture has been expressed as a process, and tools that could be applied during its development have been proposed (Bruce and Cooper, 2000). When applying such tools, sound decision making structures and control mechanisms need to be in place. Bruce and Cooper (2000) also emphasise the need for having one stakeholder with ownership over the requirements. Young (2002) presents a group of requirements gathering tools:

- *Interviews* to gather information. As the predisposition, experience understanding and bias of the interviewee influence the information obtained, the use of context-free questions should be sought;

- *Document analysis*, which can include business plans, vision statements, contracts, requests for proposals, etc;
- *Brainstorming* with stakeholder groups, which should include both idea generation and idea reduction. The former is used to identify as many ideas as possible, whereas the latter rank the ideas into those considered to be more useful by the group; and
- *Requirements workshops* are a powerful technique to reach consensus concerning particular requirements. Through these workshops customers, user representatives and developers can work together to produce consensual requirements specification.

Within the construction domain, traditionally the design and construction processes have been subdivided into stages, and briefing has been considered to be part of the preliminary stages of design (e.g. Suh, 1990; Cross, 1994). However, more recently, briefing started to be approached as a process that extends into the detail design and further to the construction phase (Blyth and Worthington, 2001, Ryd 2004).

Requirements capture has been widely described as problematic in its effectiveness as it is developed in an ad-hoc manner, being usually approached in construction as a static document and not as a process through which requirements and needs are better understood, registered and translated into product specifications (Barrett and Stanley, 1999). Although different research initiatives have been developed to improve the briefing process, current practice is still considered by many as inadequate and has many limitations (Shein et al., 2004).

Improvement areas for briefing have been proposed by linking it with theories of decision-making and uncertainty (Barrett and Stanley, 1999). The first proposed area is empowering the client, so that support is given for an 'effective' client throughout the process. This means supporting the clients describe into words their aspirations and their area of activity. The construction industry professionals should be responsible for understanding and interpreting those needs into a build solution. Clients will have a varying level of confidence and competence to play an active role in the process, therefore different strategies should be used to support diverse clients.

The second improvement area is 'managing the project dynamics', which is related to taking the briefing through to the construction process. It therefore considers that a joint decision making process is involved in briefing, and so the question of how early in the process decisions should be made or whether flexibility should be retained is central to how the process is managed.

Barrett and Stanley (1999) also propose that an appropriate user involvement is an essential component for an empowered client, and the use of visualisation techniques is seen as a way to support clients' decision making process. The final improvement area is team building, which is very closely related to managing the project dynamics.

Research has also been developed focusing more specifically to the requirements capture and briefing process in healthcare design. A UK initiative looking into design briefing has been commissioned by the NHS, and its results are discussed as follows.

## **2.1. Requirements capture in healthcare**

The new generation of healthcare buildings in the UK has been informed by a number of design goals which include a new understanding of healthcare settings as therapeutic environments as well as efficient clinical spaces, and the buildings need to be integrated with their urban surroundings and be accessible to patients (Gesler et al., 2004). Within primary healthcare such goals are even more ambitious, as primary healthcare centres are supposed to be spaces that attract people and therefore promote the health of the population, as well as work as focal points for the regeneration of deprived urban areas. Given such ambitious

goals, the questions of how to better capture requirements and how to evaluate design quality play a major role.

In a partial response to such questions, the NHS has commissioned the 'design brief working group' to provide guidance to trusts in the design brief for healthcare buildings (NHS Estates, 2002). This work has resulted in a guidance document which identifies key areas that must be thought about at briefing, called *basic thinking tool*. The guidance also provides a *map for the briefing process*, and presents a *design quality briefing tool*, which is based on the 'Achieving Excellence Design Quality Evaluation Toolkit' – AEDET (NHS Estates, 2001). AEDET demonstrates the strategy proposed by the NHS to capture and represent knowledge that might be relevant for healthcare design.

The 'basic thinking tool' rightly states that healthcare briefing should take a wider perspective, from strategic inception through to the end of the building lifecycle. It also describes key strategic and design issues, include aspects such as people (or human aspects as the impact of the development at the local community), sustainability, economic (in terms of building value), place (or physical elements of the building, such as site, image and character), and performance (i.e. the effectiveness of the in-use performance of the building).

The process framework describes milestones, briefly highlights skills needs of team members, and portrays the need for control mechanisms and for accountability in terms of achieving cost, time, quality and performance objectives. It has 3 phases: (a) Strategic phase, with four milestones, i.e. service and estate strategy, strategic outline case, outline business case (initial and preferred option); (b) Project phase, including specific project realisation, development updating, project completion; and (c) Operational phase, including project start up and continuous updating until the end of the building life cycle. However, the process is set up at a very generic level and little information is given in terms of activities, responsibilities or timeframes.

More detail is provided in terms of the *design quality briefing tool*. It proposes that design briefing should be developed with a basis on the evaluation criteria proposed in the AEDET framework. As such, it describes three main headings: (a) *functionality*: use, access and space; (b) *impact*: character and innovation, citizen satisfaction, internal environment urban and social integration; and (c) *build quality*: performance, engineering, and construction. A number of detailed issues to be considered under each heading are also presented.

Nevertheless, the AEDET framework itself has been heavily criticised (see Gcsler et al., 2004). The critiques are based on difficulties in using a 1-10 scoring system to evaluate quite complex quantitative judgements about design, as well as with regards to the lack of detailed references to the theoretical and empirical basis which supporting the approach used.

Such critiques can be extended to the briefing advice document (NHS Estates, 2002). Even though the basic thinking tool presents some important considerations for both clients and professionals involved in capturing client requirements, the tool is presented as a list of issues to be considered, and how such issues should be addressed at the briefing stage is not clear. The tool also does not propose any strategy for classifying or ranking requirements. Furthermore, the proposed process is poorly defined, not presenting sufficient information to appropriately support briefing. Perhaps as a consequence of such shortcomings, the extent to which the advice for trusts has been taken on board in practice remains unclear.

### 3. RESEARCH METHOD

The epistemological option for this research is based on the interpretative school of thought. The research uses qualitative approaches to inductively, deductively and holistically

understand human experience in context specific settings. The research approach adopted is case study in a diagnostic action research mode (Susman and Evered, 1978).

The primary unit of analysis for this study is at the LIFT programme level, focusing on the front-end of the design process. Information about the LIFT programme and in particular the four projects under analysis were collected through 2 to 3 hour semi-structured interviews with key personnel from each stakeholder group involved in the projects. A total of 22 interviews were conducted between June and October 2004, with stakeholders from different levels of the LIFT organisation, including clients and designers. Before the interview, each interviewee received a copy of the research project brief presenting research aims and objectives. An interview protocol containing a list of indicative interview questions also accompanied the brief.

During the interview, confidentiality and anonymity were assured to the interviewees, and all interviews were audio-taped. Also, immediately after the interviews, the researchers filled in an interview summary pro-forma (Miles and Huberman, 1999). This pro-forma followed the format of the interview protocol and included the following broad questions:

- What were the main issues that struck the researchers during the interview?
- Key information on the target questions:
  - Interviewees' background (educational and work experience)
  - Story of the project (involvement of the interviewee in the design process)
  - Accuracy of the requirements
  - Issues/barriers that the interviewee wanted to emphasise
  - Possible improvement strategies suggested by the interviewee
  - Discussion on the interviewee's awareness of good practice
  - Any other issues
- Any other interesting, illuminating or important points noted in the interview.
- Any emergent issues/questions to be followed up in a next interview.

As this research involves multiple investigators, it is important that training seminars take place as the research ensues. Training seminars, according to Yin (1994), involve the constant interactive discussion between multiple investigators regarding a range of issues. Such issues include methodological perspectives of the research, data collection techniques and analytical processes. For this purpose, the interview summary forms completed by each researcher can be seen as a vital exemplar of a tool to assist the conduct of a training seminar. This was also necessary during the analysis, as debates between different researchers' perspectives ensured a more complete and holistic treatment of the research data.

Data analysis was conducted using template analysis. King (1998) noted that "template analysis is a very widely used approach in qualitative research... often referred to by terms such as 'codebook analysis' or 'thematic coding' (p. 118)". According to King, "the essence of the approach is that the researcher produces a list of codes (a 'template') representing themes identified in their textual data. Some of these will usually be defined a priori, but they will be modified and added to as the researcher reads and interprets the texts (ibid.)". It must be said here that although template analysis is a form of textual analysis as mentioned above, King pointed out "it is most often used on transcripts from individual or group interviews (1998: 133)". The next section describes the main findings according to the preliminary analysis, based on the data gathered through the interview summary pro-forma.

## 4. FINDINGS

Research findings suggest that the main issues in the requirements capture for the four LIFT projects analysed can be related to four main areas, as represented in Figure 1. The whole

process starts with the need to redesign the healthcare system and provide facilities in which new, improved services could be delivered to the community. To allow this, a complex structure involving different organisations and a multitude of stakeholders was put in place. Also, the processes necessary to do so were, in general, poorly defined. Such poor definition of processes created a confusion of roles and responsibilities that spread through all parties involved. Such issues influenced, at a micro level, a lack of understanding of tasks and how they should be developed, e.g. poor understanding of briefing.

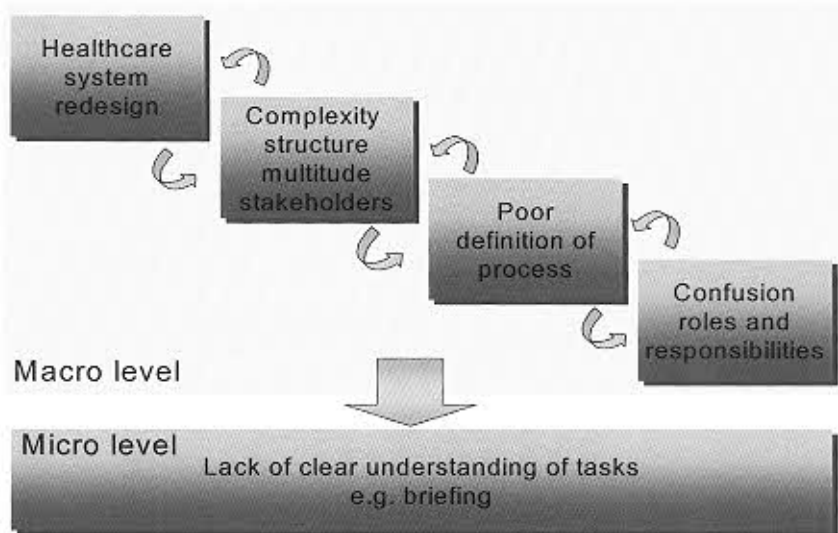


Figure 1: Overview of the process issues at the macro and micro levels

In fact, in the context of the LIFT projects analysed, there were three different and interrelated processes being defined and developed concurrently. These are closely linked and have been influencing each other in different ways. Difficulties related to the definition and development of any affects the other processes, as described in Figure 2. Firstly, the healthcare system redesign was being developed, and was still embryonic during the initial design stages. Simultaneously, the organisational structure linking different public and private sector partners was being defined and the relationship between the organisations and people involved in them was evolving through time. Finally, the design and construction processes were being defined and developed for the delivery of the local LIFT buildings.

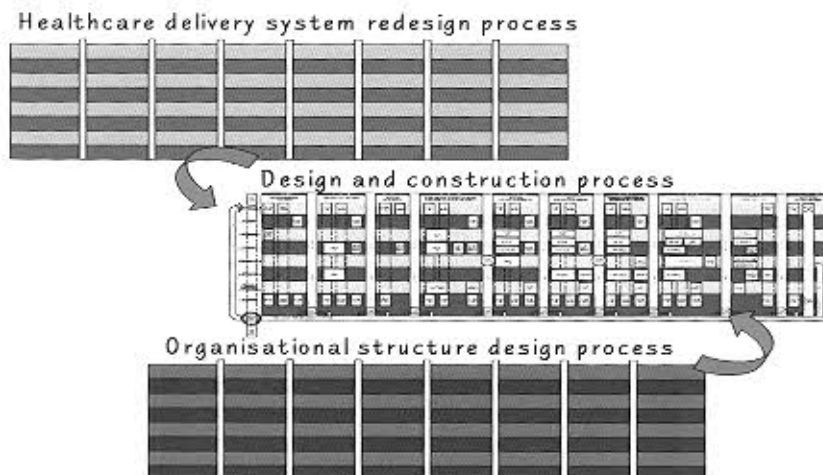


Figure 2: Interrelated processes in LIFT projects

The partnership is also dealing with a multifaceted and novel product (i.e. new type of buildings with novel services being delivered, and a new procurement method with specific legal and financial systems). Furthermore, the LIFT structure analysed is the largest in the country, with a high volume of buildings (13 1<sup>st</sup> tranche schemes), and this further increased the complexities of the initiative and in some instances generated difficulties in building up relationships and communications between partners.

Furthermore, there was a great importance being put on the design inclusion into the urban environment, which generated pressures for the team to deliver high quality buildings, therefore creating extra complexities for requirements capture. Therefore, there is a strategic view that LIFT buildings need to provide an external envelop which is interesting, with volumetric views that are welcoming to attract people to use the buildings, and at the same time provide the necessary functionalities to support different types and mixes of services.

Even though the strategic importance of an appropriate client requirements management was well known throughout the partnership, the adoption of good practice advice available, including the advice for healthcare briefing (NHS Estates, 2002) was very poor. From all interviewees, only the architectural advisor has partially used the AEDET tool, and he actually pointed out a number of problems on its use. The following section describes some of the main factors which have influenced the requirements capture process at each of the four areas identified.

#### **4.1. The healthcare system redesign**

Problem area: healthcare delivery service models were not sufficiently defined when design development started

The service models seem not to have been sufficiently defined and understood by the clients (i.e. the Primary Care Trusts) in the beginning of the design process. Therefore, the types of activities to be hosted in the buildings were not established, and evolved concurrently with design development. This is due to the fact that LIFT proposes a new way of working for healthcare professionals, bringing a number of different services together. However, the poor definition of the service models had negative consequences over the design process. As service models were embryonic, they were not appropriately considered when defining the initial building needs. This caused a number of changes in the building requirements at later design development stages, with consequent time and costs disruptions.

Within any LIFT scheme, the private partner should provide support for the public client in the redefinition of the healthcare service provision. However, poor support has been provided for the projects under analysis due to fact that these were being developed during the bidding process through which the preferred private partner was being selected.

Therefore, there is a challenge for LIFT initiatives in aligning the service agenda with the buildings agenda, i.e. providing accurate information for building design from the healthcare service delivery side while at the same time reducing the pressures put into service delivery side by the need to provide information to allow design development.

#### **4.2. The complexity of structure and multitude of stakeholders involved**

Problem area: Complex organisational structure

The organisational structure put in place to allow the development of the studied LIFT projects is complex in nature (linking public and private sectors) and in size (i.e. more than 25 different organisations are involved, including 6 public sector clients and 3 Local Authorities). The poor level of LIFT experience of the organisations involved and, in some instances, poor allocation of time/resources further increased the overall complexity.

As a consequence, design decisions have been made separately by different stakeholders<sup>2</sup> throughout the process, and sometimes conflicting decisions were made by different stakeholders at different points in time. It also appears that, in some instances, there was poor stakeholders' empowerment to take appropriate decisions due to the political pressures surrounding the partnership. In some instances, neither the client nor the designers appear to have had enough authority to determine which requirements should be considered and which should be disregarded. This has led into problems which included 12 months delay in reaching financial close for the schemes. Also, the expected economies of scale that were aimed when grouping different clients were not achieved at the analysed schemes.

Problem area: Stakeholders appearing and withdrawing from the schemes during design development, and tensions between the parties involved

It has been identified that the stakeholders for each LIFT scheme (i.e. general practices, dentists, pharmacies, etc) were not clearly determined from the beginning of the design process. The primary reason for that was the poor definition of the services delivery models, as mentioned beforehand. Other reasons include the search for third party revenue which occurred along design development, and conflicts between specific needs of different stakeholder groups.

The definition of the schemes' requirements was partially done through various meetings held by the PCTs. However, different stakeholders would be present at different meetings. Normally, such stakeholders had varying needs and requirements, which were impinged on the designs without ranking of the importance of requirements or of the stakeholder groups, and usually with poor consideration on affordability. As a consequence, there were difficulties in trade-offs between users 'wants' and a prioritisation of needs.

Also, the General Practitioners (GPs) were given high levels of flexibility within LIFT schemes, as they can easily withdraw from the projects at any time of the building life cycle. This has caused difficulties during design as building requirements were changing according to the stakeholders to be involved in the buildings, and the composition of stakeholder groups has changed a number of times.

While changes in requirements are normal within any design process as they evolve with design development, it appears that in the studied schemes such changes were excessive, poorly controlled and kept occurring even at late stages of design development. In some schemes changes in the strategic direction of the projects arise at the middle/end of design development, partially due to the poor commitment of the parties involved.

Furthermore, due to time delays of the schemes delivery, some GPs became sceptical that LIFT will work and that the buildings will be delivered. This has caused lack of trust and poor motivation in their involvement.

#### **4.3. The poor definition of processes**

Problem area: Processes were not appropriately defined

One of the major problems identified within the analysed schemes was the lack of appropriate and clearly defined processes to support the design front-end. This led to a lack of clarity on what the design process should be, how requirements evolve through time and how they need to be managed. This has influenced a number of issues:

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<sup>2</sup> The term 'stakeholder' here refers to the future tenants of the primary healthcare facilities as well as people or organisations with an interest on each scheme, who therefore would be involved in design.



- Lack of a sound project management structure – partially due to the late appointment of a project manager to be responsible for the schemes development. The project manager should focus on defining operations and improving communications between the parties;
- PCTs are novice construction clients – PCTs do not have any expertise on the design and construction process. As such, they need support in terms of technical issues regarding the design front-end, i.e. the selection of land and the capture of requirements so that informed decisions can be taken regarding the building viability and the definition of building specifications to fulfil users' needs. Such support was supposed to be provided by the private sector partner, but this was very poor in the schemes analysed. This has impinged a number of problems, e.g. the selection of very problematic or unviable sites for the schemes, and the consequent need to change sites after provisional planning approval for design was granted;
- Poor affordability knowledge - PCTs had in general a poor understanding of the financial issues relating to design and construction, which led to high aspirations for the buildings with poor consideration of financial constraints. Poor affordability knowledge has led to a number of otherwise unnecessary redesign;
- Tenant requirements document was not appropriate – a consultancy company has been contracted to develop a tenant requirements document. The quality of the document has been criticised by interviewees, as it was perceived to represent a 'template' of very broad need, which were very similar across the 13 schemes. Therefore, requirements capture was approached as a static 'document', and not as an evolving process;
- Poor design management – design management for the projects analysed was poor and was at the wrong organisational level. The initial idea was for it to be responsibility of the private sector partner, which is a joint venture. However, the contractor was partially responsible for design management, even though it lacked the necessary skills and empowerment to make decisions. Also, the clients were responsible for gathering requirements, and they too lacked design management skills.

In summary, the lack of appropriate processes in place has led to poor management of design, with inconsistent requirements management, poor ownership over the requirements and nearly inexistent change control mechanisms, as decisions made were not appropriately registered. Furthermore, due to the lack of a proper design brief, there were no criteria to evaluate design. Also, the PCTs had difficulties in signing-off requirements and designs due to the constant changes of stakeholders and project needs. Consequently, changes in requirements were dealt directly by the architects, and requests from users were generally included in design without considering affordability or the effects those changes had in terms of time delays and costs. As a direct consequence of mismanagement, a number of technical problems were identified in the proposed designs just before financial close was reached.

#### **4.4. The confusion of roles and responsibilities**

Confusion with regards to roles and responsibilities is an issue intertwined with the poor definition of processes and the complexity of the organisational structure defined for the LIFT partnership under analysis. All interviewees have stated that there is a great need to clearly define roles and responsibilities throughout the partnership.

#### **Problem area: disjointed strategic leadership and implementation**

The strategic vision for the whole LIFT initiative was well established and well known by both the public and private sector partners. However, some interviewees stated that such strategic vision has not yet been appropriately realised at the lower, operational levels, which has led to a mismatch between the strategic vision and the designs being delivered. In effect,

one interviewee stated that *'people forget that LIFT is about delivering healthcare over 25 years and not about delivering buildings'*.

#### Problem area: poor skills mix, including lack of development expertise

The strategic leadership of the analysed LIFT schemes has also faced difficulties in terms of identifying the skills mix and HR needed both on the private and public arms of the partnership. Resourcing on the private sector was considered to be thin, and there was an expectation of quick delivery. Interviewees also perceived that the public sector team was poorly resourced, and in some instances political agendas seemed to have directed decision making. Also, poor resourcing of the project team was considered to be the cause for the perceived poor support being provided both for the clients and contractors.

Another consequence of the poor skills mix was that some roles were effectively not fulfilled when needed, e.g. the developers' role. The public sector expected the private sector to take over such responsibility. However, in the beginning of the process, when the front-end of design happened, the private sector partner had not yet been selected, and the public sector has not effectively assumed such responsibilities as the needed expertise was not available. Issues such as the lack of a reasonable approach to site selection for the schemes, and the consequent problems with the selected plots of land are perceived to have happened due to the lack of development expertise. Poor information available on land impacted design decisions, and therefore generated greater risks for the projects.

#### **4.5. Proposed areas for improvement**

Improvement areas for LIFT primary healthcare schemes were proposed drawing from the identified main problem areas. The public sector client needs to acquire knowledge with regard to the development, design and construction process, which should encompass financial/cost and legal management, the understanding of their role and responsibilities involved in capturing requirements, the decision making process in terms of design decisions, and the ability to work in a project-based environment.

Therefore, it would be beneficial to design and implement a generic process for LIFT activities, which would include the definition of high-level activities, responsibilities, milestones and major decision making points. Such generic process would be helpful in clearly defining roles and responsibilities and in providing an overall process perspective to all involved. Improvements such as phase reviews and design freeze could also be introduced in this way. A specific clients' requirements management process should also be defined, agreed and implemented.

The appropriate skills mix of the stakeholders should be identified alongside the process definition. Furthermore, training would also need to be provided in relation to understanding the process and building teams. The LIFT team could facilitate the development of the skills mix and provide developmental opportunities through in-house training.

*Table 1. Problem areas and possible improvements*

| <b>Problem area</b>   | <b>Possible improvements</b>  |
|---|---|
| Healthcare delivery service models not sufficiently defined in the design front-end | <ul style="list-style-type: none"> <li>• Resourcing PCTs with the necessary process redesign experience, provide training</li> <li>• Recognise that requirements for the service models and buildings evolve concurrently, while considering the need for appropriate decision making process/control and design fixity. This should allow the time necessary for innovation to be allocated and the trade-offs between design improvement and delivery needs suitably addressed</li> </ul> |
| Complex organisational structure  | <ul style="list-style-type: none"> <li>• Build up a stronger relationship between partners by clearly defining roles and responsibilities, as part of a well established and jointly defined process</li> </ul>   |
| Stakeholders appearing and withdrawing during design, and tensions between parties  | <ul style="list-style-type: none"> <li>• Put in place strong design management with the definition of a specific requirements capture and management process, including the ranking of stakeholders/requirements importance for each scheme</li> <li>• PCTs defining requirements not based on individuals GPs needs but on broader needs, considering that changes in the practices at each scheme are likely to occur</li> </ul>  |
| Poor definition of processes  | <ul style="list-style-type: none"> <li>• Definition of project management structures through defining process activities, roles and responsibilities with agreed upon decision points (i.e. process milestones)</li> <li>• Provide training on the design and construction process, specially to allow the clients to become 'informed clients' in terms of building requirements</li> <li>• Introduce change control mechanisms</li> </ul>   |
| Disjoined strategic leadership and implementation                                   | <ul style="list-style-type: none"> <li>• Provide appropriate training for the operational levels to better disseminate the LIFT strategic vision</li> <li>• Having leadership from project management directing operational levels' activities</li> </ul>   |
| Poor skills mix   | <ul style="list-style-type: none"> <li>• Identifying appropriate skills levels needed at both the public and private sector arms of the partnership, for both technical (hard) and managerial (soft) skills</li> </ul>  |

## 5. CONCLUSIONS

The importance of appropriate management of the design front-end, especially requirements capture and management, has been long recognised. In the current context of the delivery of new health services through primary healthcare facilities, such importance is even greater as the proposed buildings need to accommodate innovative service delivery and also act as a focal point to promote the population's health.

However, many shortcomings in the design front-end exist. Within the schemes analysed, process management has underperformed, including poor developmental support, poor project management and poor design management leading to a number of problems, e.g. time delays, excessive costs, poor design quality and frustration. The healthcare systems redesign lacked consistent planning, and this has led to a number of problems in the requirements capture and consequently, redesign. The private sector body did not always provide effective developmental and technical support for the public sector client. In addition, it lacked sufficient knowledge about the provision of primary healthcare service and awareness of the contextual and cultural issues pertaining to public sector working practices.

Based on these issues, a number of recommendations for better design front-end in future primary healthcare LIFT projects were proposed. Those include the development of a generic LIFT process model, which could be used as a framework to establish activities and decision making point along the design and construction process. In this context, the definition of the ideal skills mix and training of project stakeholders is also essential.

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