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Delivering Energy-Efficient Social Housing: Implications of the Procurement Process

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Abstract

This paper explores the challenges faced by social housing providers in the UK when implementing quality assurance procedures in their effort to provide their tenants with energy-efficient homes. Based on data collected from the project team and project documentation, a comparative analysis of the procurement process of two social housing developments in the UK is presented. The results of the study show that despite the two case studies pertaining to the same housing association, they followed different quality management approaches to deliver energy efficient dwellings.

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1. Introduction

In the current use of energy worldwide, buildings are considered to consume 40% of the primary energy and thus being responsible for 40% of the total amount of carbon emissions [1]. To address the issue, the UK government has committed to cut carbon emissions by 80% of 1990 levels by 2050 [2].

The UK domestic sector in 2014 accounted for approximately 26.5% of final energy use [3], 66% of this energy was consumed for space heating [4]. Consequently, to meet the carbon emission aims it is crucial to reduce the demand for heating energy in the sector by enhancing the thermal performance of the existing housing stock and building new energy-efficient homes. Aligned with the objectives established in the Climate Change Act 2008 [2], in the recent

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years the UK social housing sector has implemented numerous measures in order to mitigate fuel poverty and reduce carbon emissions in the operation of their assets [5].

Despite the amount of effort invested in this large scale endeavour, recent studies suggest that the energy savings envisioned by the energy efficient refurbishments and new-built homes are not matching their original targets. There is a common acknowledgement among social housing providers that the best practices which would lead them to achieving the energy performance targets are still to be set [5, 6]. Among various contributing aspects to the energy performance gap, poor quality management and the occurrence of defects have been recognized as important reasons to unexpected air permeability and thermal bridging, and thus leading to unpredicted heat loss [7]. According to Zero Carbon Hub [8], various quality assurance procedures have been deployed in the construction industry over the last decade; nonetheless other issues are considered prior to energy efficiency. In this regard, there is a need for an increased focus on quality towards energy performance of buildings which should be embedded in the early stages of projects and defined at the *Initiation* phase of the procurement process [9].

For many decades, procurement had the perception of being a bureaucratic function within an organization, merely a transaction method between the supply chain and the demand [10]. Recently, procurement has evolved into a strategic tool for achieving best value for owners by integrating social, economic, and environmental objectives [11]. As each construction project passes through a procurement phase, a significant potential exists in procurement to improve the project quality management. However, the full potential of procurement is not undertaken by the construction industry [11].

This paper intends to investigate (1) how the social housing providers define and incorporate quality management systems in the procurement stage of their new-built and retrofit projects, and (2) identify areas of improvement in these practices towards achieving higher building energy efficiency. It particularly focuses on how social housing providers address building energy efficiency in the initial conceptualization of the projects and the definition of the procurement process.

2. Procurement

It is a generally accepted concept in the construction industry that a project to be considered successful should be completed as scheduled, within budget and quality standards and fairly meeting the client's aspirations [12]. Undeniably, the achievement of these criteria has been associated to the appropriate selection and implementation of the procurement method according to the project's characteristic and complexity [13, 14].

The procurement method is a deliberate strategy which is designed to identify the best way of achieving the objectives of a project. It is an organizational system that defines the relationships of the various participants of the project, where responsibilities and authorities are assigned [14]. It also plays an important role in coordinating and linking the different parties of the building team throughout the building process, both functionally, defining roles and authority; and contractually establishing responsibilities and liability caps [10, 12].

Construction procurement can be analyzed under three perspectives: as processes, methods, and procedures [9, 15]. The process perspective explores the activities related to procurement, which spans from identification of project requirements to the project completion. The methods perspective analyzes the organization and rules for obtaining a constructed facility. The procedures perspective focuses in the means of obtaining bids and selecting contractors and suppliers.

2.1. Procurement processes

The procurement process encompasses the activities throughout the project, starting by establishing the client's aspirations and the business case and ending with checking the compliance of the previous requirements. According to BS 8534:2011 [9] which deals with the construction policies, strategies and procedures, the procurement process can be divided in four main parts: *Initiation*, *Procurement strategy*, *Procurement tactics* and *Managing performance and delivery*.

The *Initiation* phase is where the business case is develop, identifying the project objectives, aspirations and needs. It also outlines the overall roles, responsibilities and accountabilities as well as carrying out a value management study [14, 16].

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