MAXIMIZING OUTCOMES: CONNECTING CONSTRUCTION PROJECT RESULTS TO BUSINESS PROGRAMMES

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Abstract

Whilst real estate facilities represent a fair share of a country's and a business's assets, not much effort is invested to both maximize the outcomes of construction initiatives and to streamline the project delivery process. This could be explained by a client need to acquire maturity and capabilities for connecting construction project results to business programmes.

This paper proposes a conceptual framework for client-driven integrated requirement management in construction. It argues that the client needs to describe and measure project outputs not only in terms of expected end results, but also as requirements to be met. This framework aims to help the client track project performance and alignment with strategic expected outcomes using requirement metrics.

Keywords: strategy, value, project management

Introduction

Numerous reports have been published over the last twenty years requesting drastic changes to be brought to the way projects are managed in the construction industry. One of the most influential may be Latham's seminal report (1994) which triggered a series of actions from the British government, not only for rethinking the industry, but also for redefining how projects are identified and managed, and for increasing the government's project management capabilities. At the heart of this business reengineering is the "value for money" concept. First interpreted as a cost reduction effort aimed at increasing productivity in the industry, this concept goes even further by redefining the client-supplier relationship, with a strong emphasis laid on a more proactive, better organized client.

This paper argues that, to achieve value for money (VFM), the client must take a lead role in defining and managing his requirements. It also asserts that VFM is best achieved by maximizing outcomes, a feat achieved not at a project, but at a programme level. It finally suggests a requirement management framework for dynamically linking such outcomes with the business strategy.

Redefining the client-supplier relationship

There are certain issues associated with VFM. While it has been identified as the client's most important concern in the UK, there still is no consensus on how to define it. Another issue is how we measure VFM, with its value being in the form of a mixture of tangible and intangible benefits. Some authors (O'Reilly 1987; Koskela 2000) associate VFM with meeting client requirements. A requirement is a robust definition of what is expected: it is tangible and measurable. In other industries, value is also associated with the capability of dynamically aligning projects with business strategy (Henderson and Venkatraman 1999; PMI 2003).

Requirements are set at the organization's strategic, business and project levels. Alignment could be achieved by dynamically linking these layers or requirements. It could be said that VFM is achieved by meeting client requirements at all organizational levels. Another issue is how to deal with VFM. Two streams are emerging in VFM research: the one takes the traditional client-supplier relationship, where the definition and management of requirements are supplier-driven (professionals and builders), while the other advocates for a client lead role to ensure his requirements are met.

The professional associations' frameworks define a precise phasing of the delivery processes, which is reflected in the fee structure of their standardized contracts. In these frameworks, the capture and management of requirements is driven from the supplier side: the architect acts as the "maître d'oeuvre", the one who will translate client wishes into the desired architectural expression of a facility. Studies have identified numerous flaws in this supplier-driven process:

- builder knowledge is not integrated into the design process
- client requirements are not efficiently captured and managed by the briefing process

Architects are trained to translate their vision of project requirements through drawings and specifications. However, they often lack the knowledge to assess the constructability of these requirements. In a traditional cost-based procurement process , constructability issues constitute on of the main sources of changes, which usually have negative impacts on the value delivered in terms of quality, cost or schedule. Alternate procurement processes, such as design, buil d and construction management, help resolve this issue by enabling the integration of builder knowledge during the design process.

Handling client requirements is more of an issue in the delivery of VFM. Capturing clients' requirements is usually done by the architect in a single event occurring during the briefing process. Authors (Latham 1994; Barrett and Stanley 1999) describe this process as being both critical to successful construction and problematic in its effectiveness: the architect is ill-equipped to understand and manage complex client requirements; approaches in defining the functional and technical requirements are not systematic, briefs are often written in jargon that is so technical that clients' stakeholders cannot relate them to their business needs. Moreover, these requirements are not considered as baselines for measuring the project success, but as starting points from which design concepts can be derived and compared. Not much attention is given to meeting user expectations; even less is given to measuring their satisfaction through post-occupancy audits. This ill-defined requirement management process has several consequences:

- The needs/requirements provided by the client are not complete, nor are they aligned with business needs: the architect uses assumptions based on their perceptions of customer value, which tend to be influenced by their professional and personal backgrounds (Whelton 2004).

- Because the architect becomes, with the brief, the manager of the requirements, the client does not have all the means for measuring the value of any proposed solutions.

The first research stream strives to improve suppliers' existing processes and to increase capabilities in respect of client requirements: by applying value management techniques at the early stage of the project (Green 1996), or by deriving techniques and tools from product development, such as "Quality Function, Deployment", to introduce the voice of the client in the design process (Kamara, Anumba et al. 2002).

The second research stream addresses client issues in identifying and managing their own requirements. It is recognized that the client's handling of the briefing process is often messy, fuzzy or ill-defined (Kelly, Morledge et al. 2002). This in turn results in ill-defined requirements, which necessitate numerous adjustments during the planning and delivery processes, generating a significant amount of waste or non-value added activities. Some researchers suggest that clients take a more proactive stand in defining and tracking the fulfillment of their requirements in order to reduce this waste. Whelton (2004) proposes that the project manager act as a facilitator for eliciting client stakeholders' requirements; Cho and Gibson (2001) and Szigetti et al (2004) propose tools based on indexes or checklists to be used by clients for identifying the expected characteristics of their facilities and assessing the design proposal against these characteristics. These approaches require greater involvement from the client in describing their needs and a better framed process for assessing the value of options and design solutions proposed by suppliers. The tools proposed in these approaches, however, have serious limitations: Strategic and business requirements cannot be reflected in these checklists. They also fail to address the necessity to be adaptive to emerging strategic requirements. They nonetheless challenge an important aspect of the client supplier-relationship: the client's responsibility is not to be prescriptive, but rather, to define the "what" of their requirements, while the supplier has to establish the "how," i.e., to define the best solution.

Obtaining best value for money demands a paradigm shift from industry practices established around the traditional cost-based procurement process. Existing practices have to be challenged, both by the client and by the supplier. These changes could be achieved not only by revisiting tools but by changing these processes as well: clients have to build capabilities for identifying and defining their requirements, and for measuring results against the requirements; they also need the capabilities and processes for dynamically linking construction projects with business and strategy.

Building requirement management capabilities

Our assertion is that VFM is better achieved through a systematic approach to managing requirements. Research on requirement management is just beginning to emerge in the construction field. There is no framework available to describe processes or tools for the client to systematically manage requirements. Other disciplines have nonetheless acknowledged the importance of requirements. It is widely recognized in IT, for example, that specifications and managing customer requirements are the two largest problems in delivering

projects (ESPITI, 1995); two-third of all projects run into trouble for reasons directly related to requirements (Standish 1994). This industry has heavily invested in developing systematic configuration and requirement management approaches and tools, and in developing models for assessing and building client capabilities in eliciting and managing requirements.

This paper picks up from previous research on deriving requirement management framework applicable to construction projects from other industries or disciplines. Forgues, Gendrau, Lefebvre, (2005) suggest a model derived from software engineering which combines a gating process with the German government "V" software engineering model. Begin and Forgues (2003) propose a 9-step project requirement management framework derived from weapon system development. This operation concept integrates both configuration and requirement management into a process incorporated into a government construction project management system. Configuration management baselining and requirement management processes provide controls to all phases of the project life cycle. The beta version of the Organizational Project Management Maturity Model (PMI 2003) was used to identify which capabilities had to be developed for implementing the concept of operation.

Some authors argue that systematic requirement management could not be applied for construction projects. Whelton (2004) questions the applicability of such approaches. He makes a case that requirement management is not suitable for defining requirements for two reasons: the wicked nature of complex problems related to designing a building; and the effort and expertise required by the project manager for systematically managing requirements. He advocates developing project managers' soft skills for eliciting stakeholders' requirements. Wicked problems are not peculiar to building design. In information technology, for example, Enterprise information systems are very complex, and involve numerous stakeholders with often conflicting requirements. Similar tools and methods for eliciting requirements are used in combination with requirement management systems. Moreover, the importance of wicked problems in the project definition process is questioned: there are a lot fewer wicked problems in this process than it is usually believed (Winch 2002). This assertion also does not consider the fact that clients often have poor project management processes and skills. In Information Technology, there are other specialists, such as configuration managers and business analysts, accompanying the project manager, and the roles of the former are to support the project manager in this task.

Linking project with strategy through requirements

The 9-step framework developed by Begin and Forgues provides the client with a systematic process for managing the requirements at the project level. It is an evolutionary, incremental, and team approach to requirements gathering and development. It also includes a disciplined approach to change control. The objective is to take broad and abstract business needs obtained from stakeholders and translate or break them into a series of more precise, focused, unambiguous and manageable requirements that can be easily understood by the persons designing the facility. This, in turn, allows the project manager to control the design,

development, implementation and commissioning of the end result, thus ensuring that the project will deliver a product that meets the clients' expectations. The requirements tracking and control process involves setting up a documented process in which the tracking of requirements can be carried out. This framework helps streamline the delivery process and eliminate waste generated by non value-added iterations. It does not yet address how these projects can be dynamically linked with strategy through requirements.

Client requirements evolve from the corporate strategy to projects. The problem stems from the complexity of the paths they have to follow. Since strategic requirements are fragmented between the various elements of the organization, it therefore becomes very difficult to trace the strategic foundation of specific project requirements; validating if the project results meet strategic expectations is almost impossible. By building traceability between the different levels of the organization, decision paths can be travelled in both directions, from broad to detailed requirements and vice versa. Traceability is probably the most important feature provided by requirement management tools. It involves understanding how high-level requirements – objective, goals, aims, aspirations, expectations, needs – are transformed into low-level requirements. It is primarily concerned with the relationship between layers of information.

The proposed framework organizes the management of requirements within 3 dimensions:

- the benefit realization aspect of the project: achieving the organization's strategic objectives (strategic requirements)
- the value generation aspect of the project: meeting user/occupant needs and expectations with the best value for money (business requirements)
- the technical aspects of project delivery: meeting the project objectives in terms of quality, cost and schedule (project requirements)

The realization of best value for money within these dimensions can be described using the much heralded museum of Bilbao in Spain as an example. The project dimension of requirements were defined against strategic requirements – (national) increasing national wealth and gaining international prestige, (local) economic and urban revitalization for the city of Bilbao – and business requirements: the Guggenheim family's specific financial, functional and architectural requirements. Dealing with all these dimensions is usually a long, painful and expensive ad hoc process. A 3-dimensional requirement management framework will help drastically reduce the number of iterations, streamlining the process. Another advantage of organizing the management of requirements within these 3 dimensions is that it fits both the traditional hierarchy of an organization decision process (executive, mid-management, operation) and the emerging systemic approach of organizational project management (portfolio, programme and project). It is suggested that, to fully benefit from this framework, the organization must first build programme management capabilities. Authors (Thorp 2003; Thiry and Matthey 2005) agree on the role of the programme as the driving belt between strategy and project outcomes. A Programme is defined as a group of related projects managed in a coordinated way to meet a specific business need. It aims to

maximize the business outcomes of the projects by carefully choosing them and managing their dependencies. Challenges present in programme management are find ing the right balance between project constraints and strategic expectations, and building the right synergy between related projects for maximizing outcomes. Figure 1 illustrates the pivotal role of programme management for translating strategic requirements into projects.

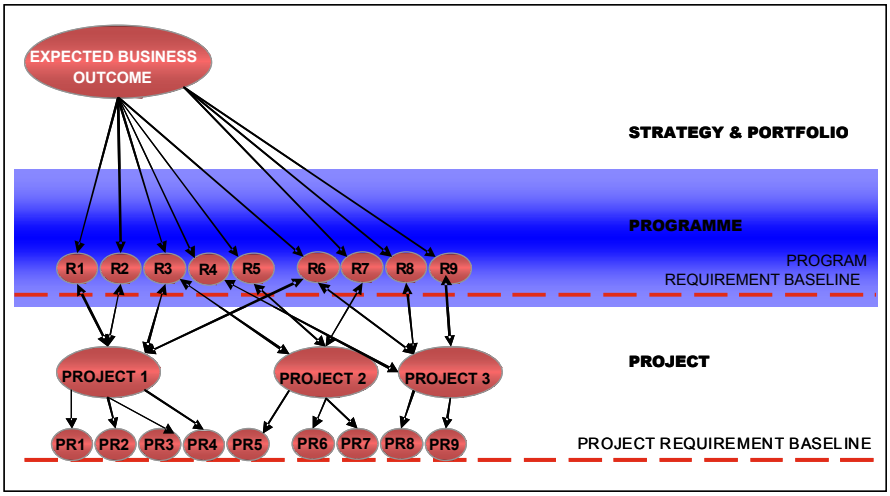

Figure 1: Requirement management framework

Strategic requirements set the targets to be met. At the strategy or portfolio level, the expected business outcomes are identified. Then, at the programme level, a specific business outcome is translated into sets of requirements that are scoped into a programme requirement baseline. Finally, the requirements are distributed among projects and scoped within each project baseline. This two-tier baselining allows the possibility of dynamically linking the 3 requirement management dimensions previously outlined. The management of the project or programme requirements life cycle will generate new information or knowledge that could:

- influence requirements in the programme or on the scope of the projects
- induce questions about the value of strategic requirements or constraints

The programme requirement baseline acts as the barometer for balancing the evolving vision with the reality in the field, and the driving belt which dynamically links project and strategy. Tracking requirements at the programme level has two main advantages:

- Changes to the project are handled considering not only the project itself but also its business value and its impact on related projects
- The process encourages the capture of emerging strategies

Figures 2 and 3 detail how the framework modifies the traditional approach in dealing with requirements. In the traditional construction process (Figure 2), client requirements are crystallized within a very narrow timeframe and communication band dominated by two key stakeholders: the project manager, who is the client representative, and the architect, who represents the design team.

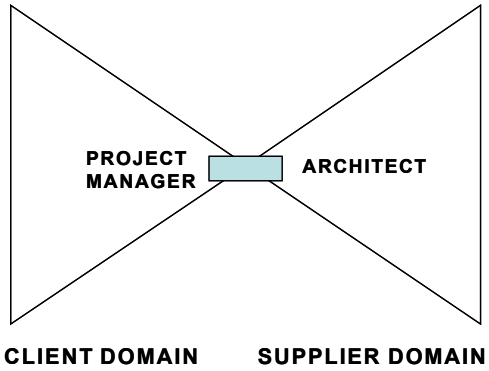

Figure 2

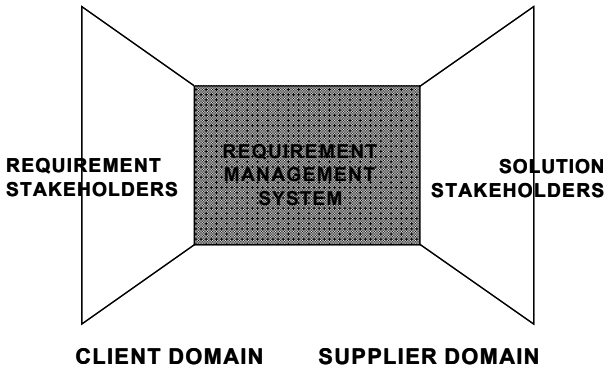

Figure 3

The concept proposed in the framework is expressed in Figure 3: in this model, the communication broadband is enlarged to include a much larger group of stakeholders, both in the client and the supplier domains. Key client stakeholders are assigned specific sets of requirements. They are responsible for validating supplier-related components of the solution and for agreeing on changes to these components. The requirement management system serves as:

- a collaboration tool to capture, organize and share requirements
- a project data/information repository
- a validation and change management system

The requirement management system is managed at the programme level. Configuration managers are responsible for supporting the systematic management of project requirements related to expected business outcomes.

Conclusion

The aim of this research is to provide clients with a workable and simple framework in which requirement management processes are used to translate strategies into expected business outcomes. It also suggests a new perspective for tackling the concept of managing value for money through systematic requirement management. The application of this framework is however limited to the owner-occupier clients who commission buildings as a factor of production in order to undertake some other business activity. Implementing it will require extensive revisiting of the existing processes organizations apply to their construction projects. The expected return on investment for applying such a framework may be largely sufficient to justify the change.

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