The critical role played by the client in delivering infrastructure project outcomes

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INTRODUCTION

The construction industry delivers its products in a uniquely project-specific environment which continuously involves the occurrence of events that may be foreseen or unforeseen, and that can impact on project outcomes during the protracted delivery process. It also involves different combinations of funders, clients and built environment professionals, inherent site conditions, materials and technologies and general contractors, specialist contractors, skills and workforces.

A supply chain can be regarded as the sequence of tasks that provides products or services to the organisation. The supply chain for infrastructure can be represented as the flow of information from one set of tasks to the next, with decision points or gates at the boundaries between tasks, which provide the opportunity for ensuring that the proposed project remains within agreed mandates, aligns with the purpose for which it was conceived, and can progress successfully to the next task. Procurement, which is the process which creates, manages and fulfils contracts, brings together built environment professionals, general contractors, specialists and subcontractors to deliver specific client requirements. Procurement binds the participants in the supply chain and defines the obligations, liabilities and risks that link the parties together in a process that needs to deliver value for money. Supply chain management is accordingly concerned with the governance, oversight, coordination and monitoring of inputs, outputs and outcomes of the supply chain.

Clients need to specify, procure and deliver infrastructure projects through a supply chain process which involves "buying" and "selling" responsibilities. There is a direct linkage between the role played by the client and infrastructure project outcomes, regardless of the project size, complexity and location. This article, drawing on the findings of two case studies, one of an unsuccessful project and the other from a successful project, and the recently published e-book, *Client Guide for Improving Infrastructure Project Outcomes,* co-sponsored by the University of the Witwatersrand (Wits) and Engineers Against Poverty (**www.wits.ac.za/ipdm/guides/client-guide/**), identifies and describes what clients ought to do to improve project outcomes.

The efficient and effective functioning of the supply chain management system for the procurement and delivery of infrastructure is fundamental to delivering value for money. Value for money is all about striking the balance between economy, efficiency and effectiveness in the results chain framework indicated in Figure 1. Implementation sits between "economy" and "effectiveness".

VALUE FOR MONEY

Value for money refers to a project that is well worth the money spent on it. It is the effective, efficient and economic use of resources, or the optimal use of resources to achieve intended outcomes. Value for money is the attainment of a desirable or satisfactory outcome in relation to a carefully considered budget. In the context of infrastructure projects, project outcomes are benchmarked against the client's value proposition, usually set at the outset of the project and perhaps modified at the start of construction or supply.

The efficient and effective functioning of the supply chain management system

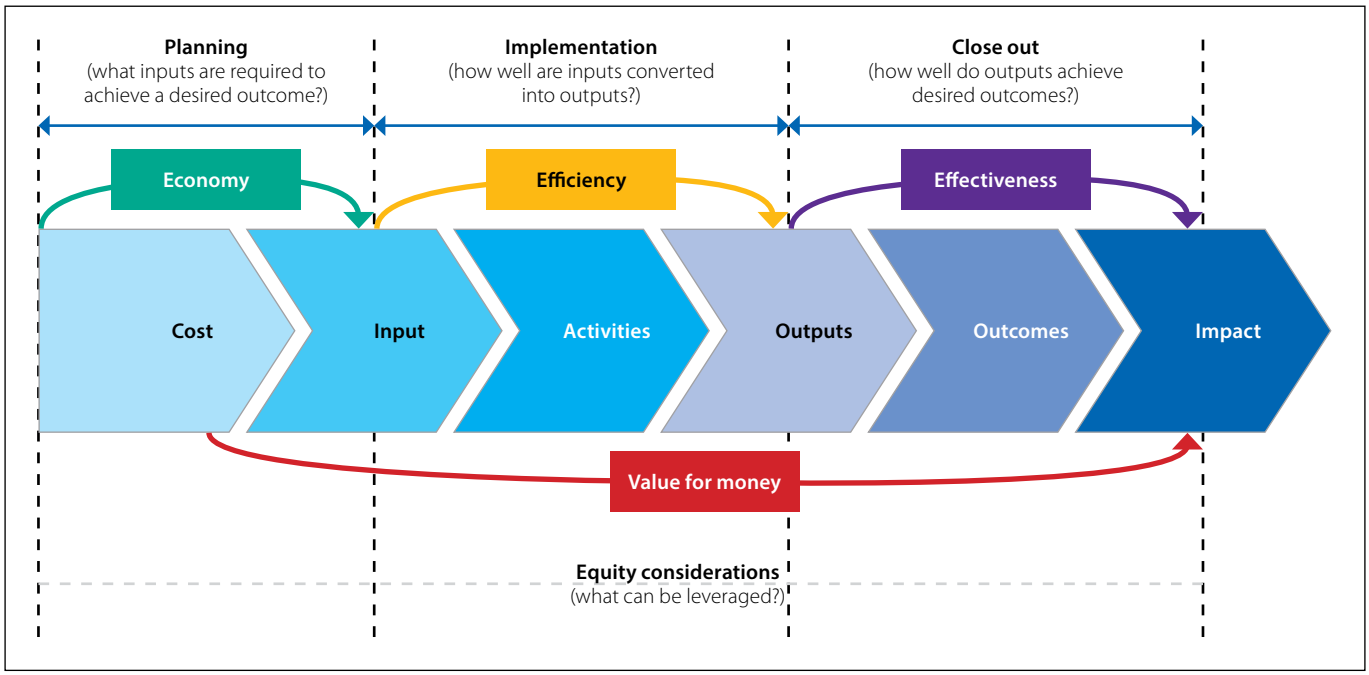

Figure 1 The value for money concept

for the procurement and delivery of infrastructure is fundamental to delivering value for money. Value for money is all about striking the balance between economy, efficiency and effectiveness in the results chain framework indicated in Figure 1. Implementation sits between "economy" and "effectiveness". Projects need to be executed "efficiently" in order to minimise delays, scope creep and unproductive costs, and to mitigate the effects of uncertainty on objectives so as to maintain the value for money proposition formulated at the outset of the project. Any gap between intended and achieved outcomes puts value for money for a project at risk. All too often, the gap between what was planned and what was achieved in an infrastructure project is significantly different.

There is a linkage between value for money and accountability in terms of an organisation's governance requirements. The Constitution of South Africa, for example, in Section 195 (Basic values and principles governing public administration) requires the "*efficient, economic and effective use of resources* ..." and their "*accountable*" administration.

PROCUREMENT PRACTICES

There are several commonalities between different categories of procurement ranging from the procurement of general goods and services for consumption to the procurement of infrastructure projects. For example, there are six universally applicable principal tasks associated with a procurement process, namely establish what is to be procured, decide on procurement strategies, solicit tender offers, evaluate tender offers, award a contract and administer a contract. There are also commonalities in a number of methods and procedures and governance structures, such as the committees for the approval of procurement documents, the evaluation of tenders and the recommending of the award of a contract which are commonly applied to all categories of procurement. Such commonalities give rise to the notion that the procurement of infrastructure projects can be approached in the same way as that for general goods and services for consumption, possibly with some deviations in the way that construction contracts are administered. This may be true in the application of certain tools and at a procedural level. However, at a strategic and tactical level there are significant differences.

Infrastructure procurement needs to be approached differently to the procurement of general goods and services. This is because the procurement of general goods and services usually involves the direct acquisition of products which are standard, well-defined and readily scoped and specified. The process normally involves the production of a specification which then forms the requisition. An immediate choice can be made in terms of the cost of goods and services that satisfy the specified requirements, which can be paid for upon delivery. In contrast, it is usually not possible to directly acquire infrastructure in the way that general goods and services are acquired, as the delivery of infrastructure involves the procurement, programming and coordination of a network of suppliers of goods and services which are required to collectively deliver or alter an asset on a site in accordance with specific client requirements and objectives. This network can include different companies specialising in design, manufacture, supply, assembly or construction. There are accordingly many more risks to manage in infrastructure procurement, due to events which may be foreseen, but not quantifiable during the early stages of a project, or unforeseen. The delivery of infrastructure accordingly needs to be managed by the client at both a strategic and project level.

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Table 1 Differing procurement paradigms

Paradigm	Defining characteristics of the procurement system
Administration	System is administrative in nature, regulated in detail, and rule-driven where compliance with rules and ticking of boxes are more important than obtaining value for money. Highly centralised decision-making where management discretion is discouraged. System is unresponsive, inefficient, slow and incorporates inappropriate bureaucracies.
Management	Regulatory system provides a wide range of options to managers, enabling managers to take a strategic approach to procurement to improve project outcomes both in terms of strategy and tactics and to achieve better value for money. Decision-making is decentralised with emphasis on clear accountability, efficiency, effectiveness and project outcomes, while maintaining compliance with a simplified, higher-level set of regulations and standards such as the SANS ISO 10845 standards for construction procurement and standard forms of contract which enable risks to be allocated between the parties to the contract.
Governance	Retains management regulatory system and standards with wide range of options. Adds the additional dimension of governance which enables alignment of choices with organisational strategic objectives and values and stakeholder aspirations. Attention to improving the role of the client, as a means to achieving better results from procurement. Emphasis on collaborative relationships between "buyers" and "sellers" to achieve further gains in improving value for money.

There has over the last few decades, particularly in the public sector, been a change in the way that organisations function in procuring and delivering projects, as indicated in Table 1. Procurement practices under the administration paradigm tend to degenerate into a "ticking of boxes" exercise, where compliance with rules or the application of mechanistic approaches are more important than project outcomes. The management paradigm has the potential to improve project outcomes, as it permits managers the discretion to explore and apply different options. The governance paradigm has the greatest potential to deliver value for money, as it focuses on strategic objectives and outcomes.

LESSONS LEARNED FROM SUCCESSFUL AND UNSUCCESSFUL PROJECTS

Case Study 1: DG One Complex in Dumfries

The recently published *Report of the Independent Inquiry into the Construction of the DG One Complex in Dumfries* (**http://www.dumgal.gov.uk/article/17432/DG-%20One-build-inquiry**) probes the reasons for the failure of a project which started in 1998. The brief for this project was to create an energy-efficient building of high design quality that would provide a wide range of high-quality sporting and leisure facilities for the public, would become a centre of excellence for the region and would have a life span of more than 40 years. The building was delivered by a design-and-build contractor.

The building opened some ten years after the first decision was taken by the Council to replace the existing facility. Instead of lasting 40 years, it remained open to the public for only six years, during which time its effective operation was regularly compromised by failures arising from its poor quality of construction. In 2011, some three years after its opening, the Council appointed legal advisors and independent technical advisors to investigate the cause of the defects, and to produce cost proposals for their remediation in contemplation of litigation against the contractor. The project also failed in terms of its short-term objectives. The contract period of 18 months was exceeded by more than 40% and the lowest tender exceeded the admittedly inadequate Council budget of £9.5 million by £3 million or just over 30%. The outturn contract cost was £12.67 million in 2008.

The 2017 outturn project cost as provided to the Inquiry was £33.024 million. This amount comprised an initial contract outturn cost of £17.341 million, additional costs associated with the closure of the facility and the pursuing of the legal claim against the contractor of £4.220 million, and the current assessment of the final reinstatement of the facility of £20.943 million, less the settlement received from the contractor of £9.00 million.

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The Inquiry acknowledged that the fundamental failings relating to the construction of the facility were failings on the part of the design-and-build contractor to meet the basic standards of the industry or to comply with the requirements of the contract or statutory building regulations. The Inquiry, however, went on to state that, although the Council had not unreasonably placed significant reliance on the size and experience of a major national contractor to deliver the project, the "*majority of the Council's failings related to their lack of expertise as a client and their inability to proactively avoid and effectively identify and respond to the failings of the contractor.*"

The Inquiry was of the view that "*throughout the implementation of the original project and the development of the remedial project, the Council failed to allocate the appropriate internal level of resources in terms of expertise, experience or time resource. The lack of appropriate sufficiently informed experience and expertise in the planning, procurement, project management and inspection … at both strategic and execution levels, coupled with the under-resourcing of his work, compromised the position of the Council as*

a client ... the failure to establish a dedicated and fully resourced project management board to oversee the remedial works project and to appoint a full-time in-house project manager with construction procurement experience during the development of the brief, procurement and early construction stages of the remedial works contract, led to a lack of a necessary informed proactive influence by the Council ..." The Inquiry also pointed out that the Council "*failed to provide effective strategic and executive project and contract management support to the level that would be normally expected of an informed client body ..."* and *"the process used by the Council to determine the procurement route was over-complicated and lengthy, inappropriate for the detailed involvement of a non-specialist committee, lacking informed professional input and highly subjective in terms of the criteria used for the assessment of bids."*

The Inquiry pointed out that reliance should rather be placed on *"putting in place the necessary properly resourced, appropriately experienced and relevant professional expertise to seek to ensure that the building is being specified and constructed correctly in the first place, rather than seeking to rely on the right to sue if things go wrong."* It also made the observation that *"the required level of informed independent scrutiny was not adequately provided by the Council."*

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Case Study 2: First phase of the delivery of two new South African universities

The South African National Development Plan (2012) recognises higher education as "a major driver" of economic development which is critically important for educating and training people with high-level skills, providing knowledge that equips people for a changing society and economy, and provides opportunities for social mobility. Accordingly, this plan set the goal of increasing enrolments from 1.1 million in 2014 to 1.6 million by 2030.

South Africa has historically been served by 24 universities located in seven of its nine provinces. Government took the decision during September 2011 to build two new universities in the Northern Cape and Mpumalanga, the two provinces which lacked a university. Given the complex scope and challenging timeframes, the government's Department of Higher Education and Training (DHET) appointed the experienced Campus Planning and Development Unit at the University of the Witwatersrand to lead the delivery of the project. Work immediately started on the identification of where within these provinces these universities would be located. This was followed by the land assembly, feasibility studies and

Table 2 Building costs for the first phase of the two new universities

Package orders issued in terms of a framework contract	Price at the start of construction with allowance for inflation excluding contingencies	Final construction cost to client	Final cost including professional fees	Cost norm determined from DHET's cost norms
Buildings SPU (3 package orders)	R529m	R538m	R614m	R649m
Buildings at UMP (3 package orders)	R270m	R276m	R320m	R331m

institutional and spatial planning. These two universities were formally established in terms of South African legislation during August 2013.

Existing buildings on the selected sites were refurbished and repurposed to receive the first intake of students at the start of the academic year in February 2014 – 127 students at the Sol Plaatje University (SPU) in Kimberley and 169 at the University of Mpumalanga (UMP) in Nelspruit. By February 2015, the total number of students rose to 337 at SPU and 828 at UMP. New teaching facilities and residences were, however, required to accommodate the February 2016 total student numbers of 700 at SPU and 1 255 at UMP.

The plan from the outset was that the new build would be overseen by staff of the new universities. However, when it became evident that the handover to the new universities could not be achieved before the start of the major construction in October 2014, the Wits team stepped in and handed over delivery management responsibilities to the new universities only after 31 March 2016.

The new facilities for the 2016 intake were built within budget, slightly below cost norms, with less than 2% difference between the cost at the start of construction and the final cost despite the fact that up to 70% of the works could not be priced when construction commenced (see Table 2). Their construction yielded high levels of broad-based black economic empowerment and local participation, and some 40 000 hours of structured workplace learning for 545 workers. One of the buildings received a commendation at the World Architectural Festival, indeed a stunning project outcome. (The full close-out report, which provides a succinct anatomy of the project, can be downloaded from **www.wits.ac.za/ipdm/guides/close-out-report/**)

So, what was exceptional about this project? Firstly, the extremely short time between a political decision being taken and the realisation by the first beneficiaries of the intended outcomes of a major, complex project – 28 months. Secondly the delivery of academic facilities and residences at the start of each academic year in an efficient, effective and economical manner within the constraints of public sector procurement legislation whilst supporting the development of the surrounding community.

This project was presented as a case study to approximately 130 senior government officials involved in infrastructure projects at two separate workshops, sponsored by National Treasury. Both these workshops identified procurement strategy, governance, client leadership and a skilled client team as the critical innovations and practices that led to these successful project outcomes.

Wits established a core delivery team under the leadership of a client delivery manager (suitably qualified and experienced built environment professional) who exercised CEO-level leadership, i.e. the New Universities Project Management Team (NUPMT). Core team members were selected for their expertise in fields such as programme management, infrastructure procurement, architecture, urban planning, engineering and ICT. Wits and DHET collectively formed the client team. Separate delivery teams were contracted to provide the works that were required for each of the two universities. Project governance took place through a Project Steering Committee and a Technical Integration Committee.

The Project Steering Committee (PSC) initially comprised representatives from DHET, the office of the premier in each of the affected provinces, the Universities of Pretoria, Johannesburg and the Witwatersrand, and the National Department of Higher Education. It was later expanded to include representatives from the new universities. The PSC, which met 15 times between March 2012 and January 2016, provided oversight and guidance to the development of both universities. The Technical Integration Committee (TIC), which met 50 times between February 2012 and March 2016, integrated the planning work and thinking of the DHET, the NUPMT and, following their establishment, the two new universities. The TIC Contract Subcommittee, which generally took place every two weeks, dealt with budget and procurement approvals and the unfolding contractual commitments that resulted in peak expenditure levels of approximately R134m per month.

A range of procurement strategies were adopted as indicated in Table 3. In total some 143 procurements were planned, resulting in the award of 219 contracts against which generally two to six orders were issued per framework contract. Approximately 700 orders were issued. Quality was evaluated alongside financial offer and preference (method 4 of SANS ISO 10845-3) in all competitive tenders save for those associated with furniture and equipment. 90.6% of the expenditure resulted from contracts awarded in terms of a competitive selection or competitive negotiations procedure.

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Table 3 Procurement strategy for the first phase of the two new universities

Contract type	Packaging strategy	Contracting strategy	Selection method (SANS ISO 10845-1)
Professional services	Framework and non-framework agreements	NEC3 Professional Service Contract (Option E: Time-based or Option G: Term Contract)	Negotiated quotation or open competitive selection
Construction	Framework agreements	NEC3 Engineering and Construction Short Contract NEC3 Engineering and Construction Contract (Option C: Target contract with activity schedule or Option F: Management Contract)	Open competitive selection or restricted competitive negotiations
Supply	Framework and non-framework agreements	NEC3 Supply Contract NEC3 Supply Short Contract	Open competitive selection or open competitive negotiations

ACHIEVING THE CLIENT'S VALUE PROPOSITION FOR A PROJECT

The physical delivery of infrastructure necessitates that a delivery team be put in place using an organisation's own resources or contracted resources. Such a team which performs a "supply" function performs project management and design functions, provides professional support services and manufactures, maintains, constructs, installs, provides, alters, rehabilitates, refurbishes or alters construction works. A client delivery management team, led by a suitably qualified and experienced client delivery manager, also needs to be established to provide effective leadership and direction to the delivery team and meaningfully engage with internal and external stakeholders. This team, which performs a "buying" function, needs to own the business case, procure and pay the resources to deliver the project, lead the project, manage relationships, oversee aspects of delivery and provide client direction (see Figure 2).

The client delivery manager needs to be held accountable for project outcomes. Such a manager also needs to lead the client delivery management team with single-point accountability and have direct access to senior client management when decisions regarding a significant departure from the plan or budget needs to be taken. The client delivery manager needs to be supported by both a technical team and an administrative team. The technical team may be required to provide advice on a range of matters; gather, process and store information that is necessary to manage the delivery of projects; manage activities associated with the initiation of projects; formulate, shape and document the client's specific requirements; monitor and evaluate the outputs of the delivery team; establish financial and cost controls and reporting systems; and procure the resources which are necessary to deliver the project. The administrative team needs to prepare the necessary documents for payment and to develop, maintain and keep up to date a number of registers for project governance purposes which capture information, such as that relating to planned procurement and commitments, contracts, payments and purchase orders.

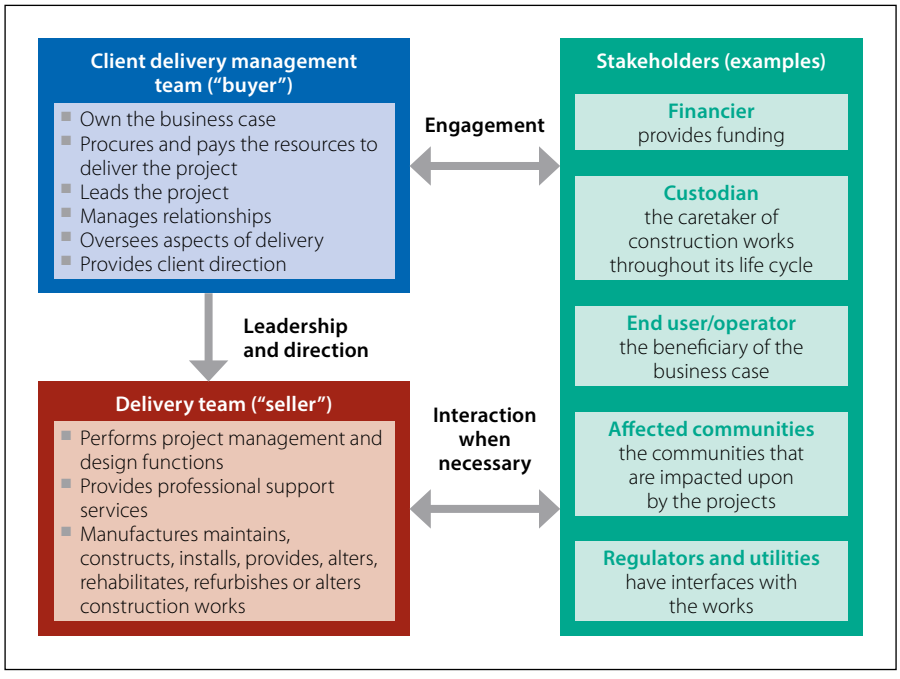

Figure 2 The principal role players in the delivery of infrastructure projects

The client's business case, vision, values and project priorities collectively make up the client's value proposition for a project, i.e. the promise of measurable benefits resulting from the project. Activities associated with the planning, designing, manufacturing / fabrication, construction / installation and commissioning need to translate the client's value proposition into project outcomes which impact on the three aspects of sustainability (economic, environmental and social) and result in a product.

Clients can influence project outcomes through (see Figure 3):

- **client leadership** to achieve delivery value at a programme and project level;
- **governance** that supports delivery by the client delivery manager and exercises accountability by the entire organisation as owner of the delivered product; and
- **procurement practices, strategies and tactics** that drive the client's priority goals and value proposition, and promote effective delivery outcomes.

All of these practices are within the control of the client.

Governance is the system by which the whole organisation is directed and controlled and held accountable to achieve its core purpose over the long term. Governance authorises, directs, empowers, provides oversight and limits the actions of management. It also ensures that the client organisation takes ownership of infrastructure delivery as an important component of the organisation's business, and that infrastructure delivery is managed as a business rather than as an ad-hoc collection of projects.

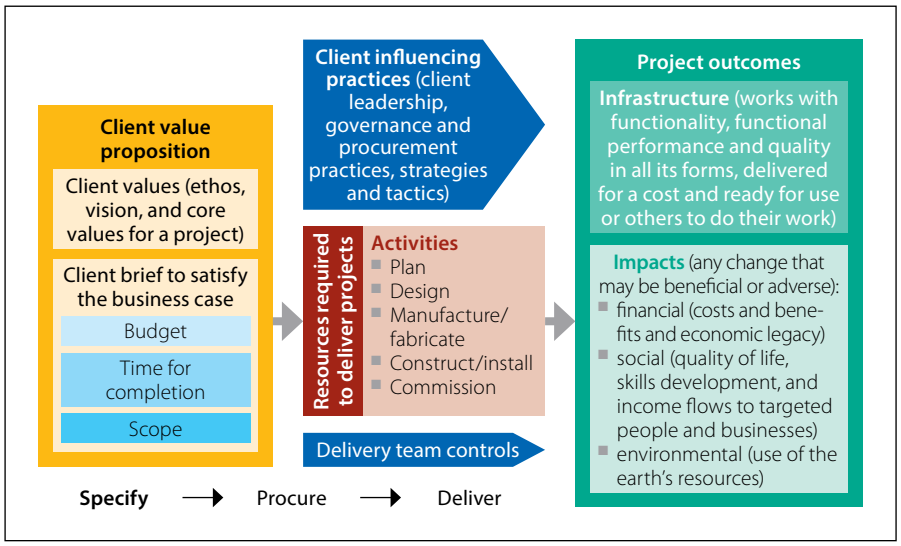

Figure 3 Translating the client value proposition for an infrastructure project into project outcomes

Client leadership is exercised by a client delivery manager, supported by senior management and the organisation's governance arrangements so that a desirable or satisfactory outcome, benchmarked against the client's value proposition, is achieved, i.e. an optimal balance of the project benefits, risks and costs. Such leadership is a "buying" function, which focuses on providing direction to and resolving challenges which are beyond the control of those that are responsible for the "selling" function.

Procurement strategy is all about the choices made in determining how the market is to be approached, what is to be delivered through a particular contract, the contracting arrangements, how secondary procurement objectives are to be promoted and which selection method will be employed to solicit tender offers. Procurement tactics enable identified procurement strategies to be effectively implemented.

DISCUSSION

Delivery management is the critical leadership role played by a knowledgeable client to specify, procure and deliver infrastructure projects efficiently and effectively, resulting in value for money. Delivery management as such includes knowledgeable leadership, consistent governance and systematic administration of procurement, contracts and project finances. Delivery management activities commence with an organisation's vision and business objectives, which inform the needs for more infrastructure or to modify or maintain the functionality of existing infrastructure. Delivery management activities include planning at a programme and project level and the procurement and management of a network of suppliers, including as necessary professional service providers, contractors and subcontractors to design, scope, detail and deliver infrastructure projects on a site.

The two case studies suggest that the absence of effective delivery management on a project tends to result in projects taking a long time to get off the ground and project success depending mainly on a fortunate combination of the design team and constructor rather than on the systematic direction of a competent client delivery manager. The project will be "supplier" driven and may, due to scope creep, be exposed to escalating costs and simply result in payment for what is designed. The appointment of a staff member with a technical background to function as a client project manager at a low to mid-level within the organisation is unlikely to provide effective client leadership. A client delivery manager who exercises CEO-level leadership, supported by a competent client delivery management team with relevant built environment expertise, is most likely to do so, provided that effective governance is in place which enables such a person to exercise such leadership.

A client delivery manager cannot function effectively in the absence of governance. Appropriate governance structures, such as a programme steering committee comprising senior managers, need to be in place. Such a committee needs to meet at least three to four times a year and be fully integrated into the governance mechanisms in the organisation's business, even when the organisation has an entirely different core business.

The procurement policies of an organisation need to adequately cater for infrastructure delivery. As such these need to include appropriate delegations of authority and designations of responsibility that support organisational accountability, as well as infrastructure delivery imperatives. Furthermore, it needs to include a functioning committee system, comprising a qualified procurement document review committee, a qualified evaluation committee and a tender committee that avoids delayed evaluation and awarding of contracts, addresses project value rather than lowest price and recognises that better value is achieved through procurement that rewards performance. Furthermore, the policy should enable the implementation of framework agreements and a wide range of procurement strategies and tactics which may be required to efficiently and effectively implement projects.

CONCLUSION

Client procurement and delivery management practices are central to the performance of, and have a direct impact on, the efficiency and effectiveness of the supply chain and hence the realisation of the client's value proposition for the project. Organisations need to put in place procurement and delivery management policies which support governance at both a project and programme level, client leadership practices and advanced procurement practices which make effective use of built environment professional expertise. These are the prerequisites for delivering consistently successful project outcomes.

Clients remain accountable for project outcomes. They accordingly need to invest in structures, processes and resources in order to obtain the outcomes that they seek. □

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