

VALUE FOR MONEY IN THE DELIVERY OF PUBLIC INFRASTRUCTURE

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Abstract

Public infrastructure, which is central to the economy of a country, has little inherent value, but creates value through the economic and social activities it supports. The economic downturn has put the spotlight on the value for money proposition that planned and delivered public infrastructure provide. A number of different organisations have over the last few years began to put in place processes and procedures to deliver value for money. Others have identified the drivers of value for money. Approaches to monitoring and assessing value for money have also been recently documented. It is important to not only have a clear understanding of what is meant by value for money but also how value for money can be demonstrated or confirmed in the context of infrastructure delivery. Such an understanding enables a strategic approach to be taken in the design and implementation of a procurement and delivery management system for infrastructure.

This paper outlines current thinking around what constitutes value for money and how it is assessed. It also indicates how procurement and delivery management systems need to be designed and implemented to support of this imperative.

Keywords: value for money, procurement, delivery management, infrastructure

INTRODUCTION

People are surrounded by economic infrastructure (fixed capital investment including construction works) which are foundational to a better life for all. Investment in economic infrastructure occurs in expectation of demand or in reaction to demand for capacity. When it happens, it has the following three impacts (Watermeyer, 2011a):

- 1) an initial growth in demand for people, equipment and materials on the project, which lasts as long as it takes to create the asset;
- 2) a demand on resources over the lifespan of the project to maintain the asset; and
- 3) a productivity impact in the overall economy, either producing more or producing it better due to more efficient infrastructure (or simply the availability of capacity like harbour capacity and electricity).

Expenditure on economic infrastructure will not necessarily lead to economic growth. Infrastructure which provides improvements or efficiencies in services, production or export capabilities and which is delivered and maintained in a manner which minimizes waste of materials, time, and effort in order to generate the maximum possible amount of value, is most likely to contribute to economic growth.

The failure of or the lack of sufficient infrastructure puts the spotlight on government whose goal is to deliver a better life for all. The tackling of poverty and underdevelopment in Africa is being hampered by shortcomings in the delivery and maintenance of infrastructure as

evidenced in a recent World Bank report (Foster, 2008)) which examined infrastructure in 24 countries that together account for 85 % of GDP, population and infrastructure aid flows of Sub-Saharan Africa. This report found that:

- in some countries infrastructure provision is not focussed where it is most needed;
- countries typically only manage to spend about two thirds of the budget allocated to investment in infrastructure; and
- about 30% of infrastructure assets are in need of rehabilitation.

The global financial crisis has caused governments to rethink the management of their procurement and delivery management systems in the wake of massive fiscal stimulus packages. Governments need to manage these expenditures wisely in order to obtain value for money, sustain public and private confidence that public funds are being well spent and demonstrate financial stewardship and lasting benefits (Schooner and Yukins, 2011).

The key question that is currently being asked whenever new public infrastructure is contemplated or delivered is “does the investment represent value for money?”

THE VALUE FOR MONEY CONCEPT

Principles

The Office of the Auditor-General of New Zealand (2008) defined value for money in a procurement context as “*using resources effectively, economically, and without waste, with due regard for the total costs and benefits of an arrangement, and its contribution to the outcomes the entity is trying to achieve.*” This office stressed that value for money in a procurement context does not necessarily mean selecting the lowest price but rather the best possible outcome for the total cost of ownership (or whole-of-life cost).

Barnett *et al* (2010) consider value for money to be a term generally used to describe an explicit commitment to ensuring that the best results possible are obtained from the money spent. They furthermore point out that such a term reflects a concern for more transparency and accountability in spending public funds, and for obtaining the maximum benefit from the resources available. The UK National Audit Office (2010) defines “*good value for money*” as the “*optimal use of resources to achieve the intended outcomes.*” The Department for International Development (DFID) (2011) views value for money as a means for developing a better understanding (and better articulation) of costs and results so that more informed, evidence-based choices can be made.

Jackson (2012) argues that value for money is about “*striking the best balance between the “three E’s” – economy, efficiency and effectiveness*” and is “*not a tool or a method, but a way of thinking about using resources well.*” Jackson also points out that a “*fourth “E” – equity – is now also sometimes used to ensure that value-for-money analysis accounts for the importance of reaching different groups.*” DFID (2011) views “equity” in the context of value for money as “*making sure our development results are targeted at the poorest and include sufficient targeting of women and girls.*” Equity, from a developing country perspective can also relate to the establishment and strengthening of indigenous building materials and methods and the promotion of construction technologies that increase employment; all of which ensure local participation in projects. Accordingly economy, efficiency and effectiveness relate to the primary objectives of a project whereas equity

relates to the secondary objectives of the project i.e. what can be promoted through the delivery of the product e.g. the alleviation and reduction of poverty, job creation or the promotion of health and safety performance beyond statutory requirements (Watermeyer, 2012a and b).

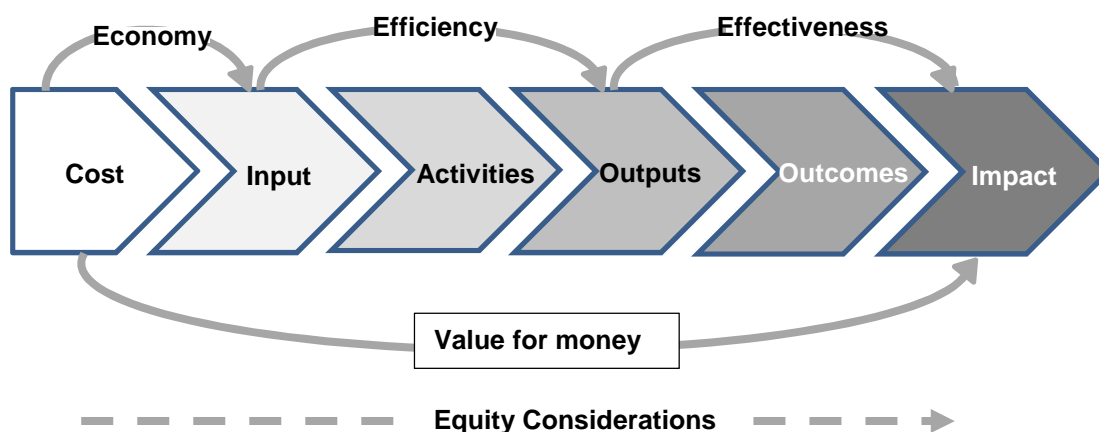
Table 1 interprets the 4 “Es” associated with value for money based on Adam Smith International (2012), Department of International Development (2011), Jackson (2012), National Audit Office (2010) and Watermeyer and Pham (2011).

Table 1: Interpreting the 4 E’s associated with value for money

Dimension of value for money	Interpretation	Underlying key questions
Economy	Economy focuses on the reduction of the cost of resources used for an activity with a regard for maintaining quality. It relates to how cost-effectively financial, human or material resources are acquired and used. It speaks to acquiring inputs of the right quality at the right price.	<p>Can the same or equivalent inputs be obtained for less money?</p> <p>Would using less expensive different / alternative inputs risk effectiveness, including sustainability?</p> <p>Would using less expensive inputs risk greater maintenance costs over the life of the project?</p> <p>What are the cost inputs and the whole life costs?</p>
Efficiency	Efficiency focuses on the increasing of an output for a given input, or minimising input for a given output, with a regard for maintaining quality. It is a measure of productivity as it relates to how resourcefully inputs are converted into outputs and subsequent outcomes. It speaks to how well inputs are converted to outputs.	<p>Can the same results be achieved while saving on how the activities are managed?</p> <p>Would making savings on how the project is managed risk a reduction in effectiveness or incur other costs?</p> <p>Would different pathways in delivery achieve different outcomes?</p> <p>How much is got out in relation to what is put in?</p>
Effectiveness	Effectiveness focuses on the successful achievement of the intended outcomes from an activity. It relates to how successfully an intervention achieves its intended outcomes and subsequent impacts are realised. It speaks to how well outputs achieve desired outcomes.	<p>What outcomes have been achieved?</p> <p>What is the gap between what has been achieved and what was intended?</p> <p>Is the performance acceptable?</p> <p>What are the qualitative and quantitative measures of increase or decrease in outcomes that demonstrate that a project is effective in delivering its intended objectives?</p>
Equity	Equity focuses on the selection of resources and targeting strategies to promote secondary objectives. It relates to the potential to generate business and employment opportunities for targeted groups. It speaks to what equity can be leveraged through a project.	<p>Who benefits from the business and employment opportunities generated by economic activity?</p> <p>What targeting strategies are applied to promote secondary objectives?</p> <p>How is health and safety performance improved?</p>

Monitoring and evaluating value for money

Adam Smith International (2011) point out that donors including the Department for International Development (DFID) generally use a “results-based management” approach to monitor and evaluate the performance of their activities and to focus on whether or not their support creates positive, lasting changes (see Figure 1). The funding and deliverables of the activities are in terms of this approach are a means to an end.



Cost	Sum of money required to fund the intervention
Input	Inputs cover all the materially significant financial, human and material resources used for a development intervention
Activities	Activities are used to deliver outputs
Outputs	Outputs relate to products, capital assets and services which result from a development intervention. Outputs are limited to the specific, direct deliverable of the intervention.
Outcomes	Outcomes are the likely or realised short-term/medium-term effects of the outputs of any intervention. Outcomes are used to identify (a) what will change, (b) who will benefit and (c) how it will contribute to poverty reduction and/or the Millennium Development Goals
Impact	Longer-term effects are produced, directly or indirectly, by a development intervention. Impact refers to higher level identified achievements that the intervention will contribute towards

Figure 1: Results chain framework (after DFID, 2011)

An alternative way of looking at Figure 1 is to consider it as a quality management system. ISO 9000 (2005) in this regard defines quality as the “*degree to which a set of inherent characteristics fulfils requirements*” and a quality management system as a “*management system to direct and control an organisation with regard to quality.*” It also defines efficiency as the “*relationship between the result achieved and the resources used*” and effectiveness as the “*extent to which planned activities are realised and planned results achieved.*”

The UK National Audit Office (2010) offers a practical analytical framework within which judgements regarding good value for money can be made in a consistent manner i.e. whether or not optimal use of resources was made to achieve the intended outcomes, using the following six steps and the process outlined in Figure 2:

- 1) Establish what is optimal (i.e. “*the most desirable possible given expressed or implied restrictions or constraints*”) by considering what reasonable constraints need to be taken into account in respect of planning (what is wanted), implementation (delivering or procuring well) and monitoring (being able to assess performance).

- 2) Capture the scale of resources initially in the plans and later, as outturn.
- 3) Identify expected and actual outcomes by considering the planned achievements and later actual achievements.
- 4) Establish the consequences for value for money by comparing expected and achieved outcomes or what could have been achieved.
- 5) Draw an overall conclusion on the value for money achieved with these resources (external comparison) by comparing performance with appropriate external benchmarks such as alternative actions, accepted good practice or internal/external industry benchmarks, past performance and shareholder expectations.
- 6) Make recommendations to secure improved outcomes.

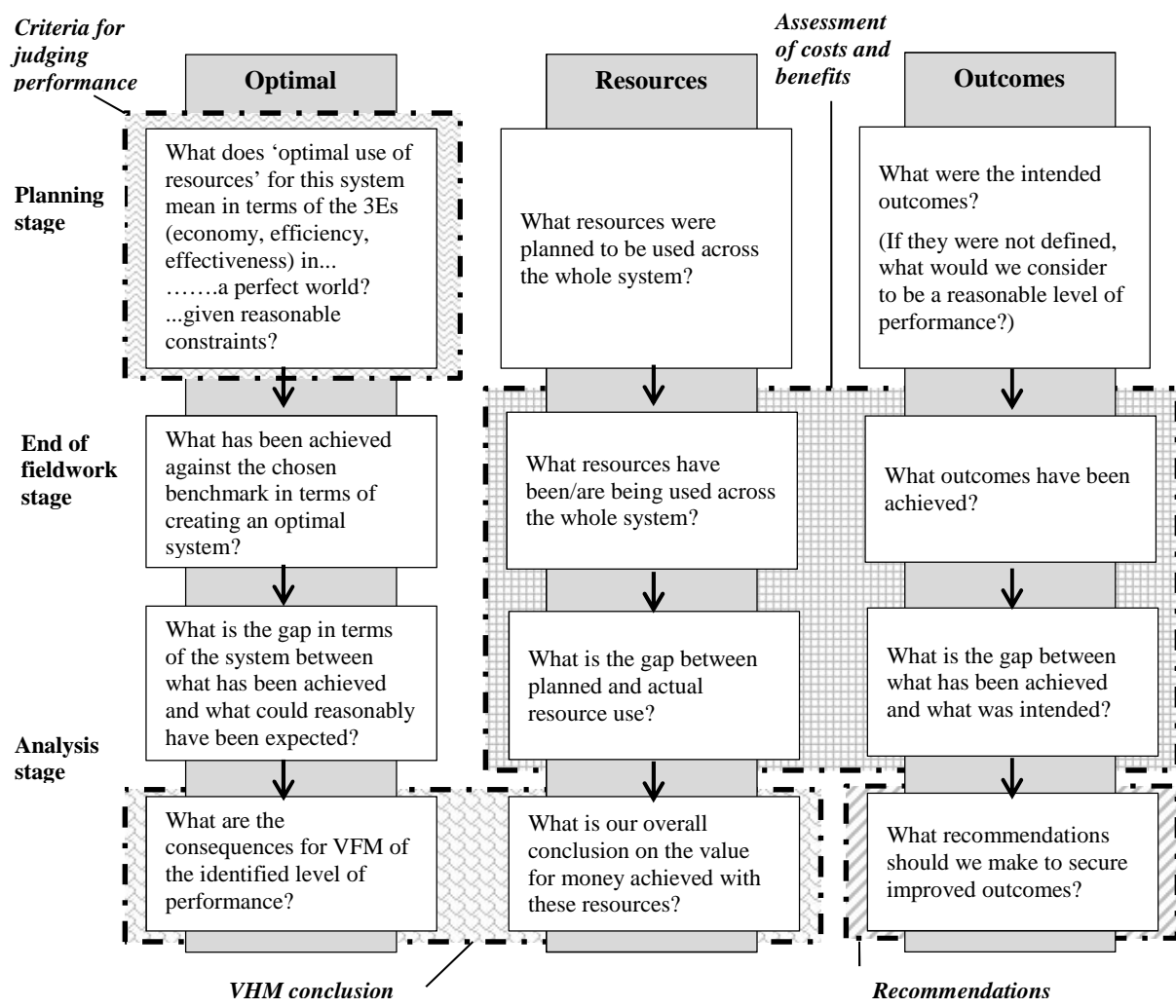


Figure 2: Framework of questions for assessing value for money (National Audit Office, 2010)

Delivering value for money through projects

The management approach to delivering value for money over the life of a project is summarised in Figure 2. The critical starting point is to clearly define objectives and expected outcomes as well as parameters such as the time lines, cost and levels of uncertainty. This frames the value for money proposition that needs to be implemented at the point in time that a decision is taken to proceed with a project i.e. it establishes “economy” and identifies

“equity”. The end point is to compare the projected outcomes against the actual outcomes i.e. to confirm the “effectiveness” of the project in delivering value for money.

The implementation of infrastructure projects needs to be responsive to the project objectives, deliver the expected outcomes and remain as far as possible within the confines of the parameters upon which the decision to proceed with the project were based. Cost overruns and lower-than-predicted income streams frequently place project viability at risk and turn projects that were initially perceived to be vehicles to economic growth into obstacles to such growth (Allport, 2011). Accordingly, implementation which sits between “economy” and “effectiveness” in the results chain framework needs to be executed “efficiently” so that time delays, scope creep and unproductive costs and the effects of uncertainty on objectives (risks) are minimised in order to maintain the value for money proposition formulated at the outset of the project. This necessitates that the implementer of the project exercise due care and reasonableness during implementation. Failure to do so may result in substandard or unacceptable performance which results in a gap between intended and achieved outcomes. This puts value for money for a project at risk.

Due care speaks to the care that an ordinary and reasonable person would normally exercise under circumstances such as those under consideration. The concept of due care is used as a test of liability for negligence i.e. a breach of duty of care which results in loss to the person or entity the duty is owed. Negligence usually includes doing something that an ordinary, reasonable and prudent person would not do, or not doing something such a person would do considering the circumstances and situation. Reasonableness on the other hand applies to that which is appropriate for a particular situation, circumstance or context and the way a rational person would have acted.

Accordingly, an implementer that implements projects with due care needs to:

- put in place a suitable and appropriate procurement and delivery management system,
- allocate tasks and responsibilities and provide the necessary financial and human resources to enable the system to be effectively implemented;
- have in place delivery policies; and
- take corrective action to meet objectives when it became clear that some of the objective might not be met.

INHIBITERS OF VALUE FOR MONEY

Flyvbjerg *et al* (2003) have identified two root causes for lack of success, namely:

- optimism bias - the human mind’s cognitive bias in presenting the future in a positive light; and
- strategic misrepresentation – behaviour that deliberately underestimates costs and overestimates benefits for strategic advantage usually in response to incentives during the budget process.

HM Treasury (2011) has cited the two main causes of optimism bias in estimates of capital costs as:

- *poor definition of the scope and objectives of projects in the business case, due to poor identification of stakeholder requirements, resulting in the omission of costs during project costing; and*
- *poor management of projects during implementation, so that schedules are not adhered to and risks are not mitigated.*

Hawkins and McKittrick (2012) in their report on the pilot countries in Construction Sector Transparency Initiative (CoST) programme found that in the 145 projects sampled in eight countries, 31% exhibited poor management of time and cost with at least 55% being over budget and 8% being more than 100% over budget. They observed that, apart from pilot study countries being greatly challenged to disclose the 31 items of information required in terms of the CoST programme, procuring entities rarely met even their legal requirements for disclosure (See Figure 3). In most of the countries assurance teams had to assume responsibility for the collection and collation of the information for disclosure. It is therefore not surprising that Jackson (2012) cites the lack of data upon which to base decisions as a key challenge in delivering value for money.

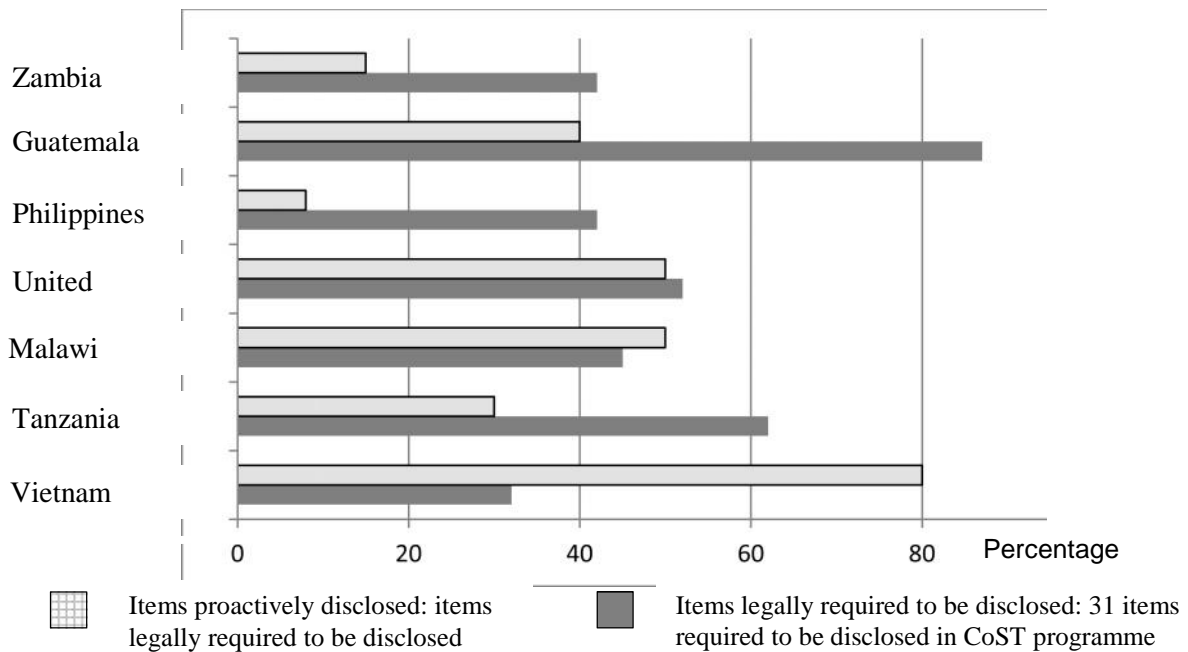


Figure 4: Information disclosure in the CoST pilot countries (after Hawkins and McKittrick (2012) and CoST (2011))

DRIVERS OF VALUE FOR MONEY

A scan of recent publications suggests project outcomes can be improved in a number of ways. DFID (2011) have identified skills and behaviours, transparency, internal scrutiny, external scrutiny, results and value for money tools, systems development and influencing partners as being drivers of value for money. Dobbs *et al* (2103), suggest that boosting infrastructure productivity could save \$1 trillion dollars a year and cites the following main levers to delivery potential savings, namely:

- improve project selection and optimise infrastructure portfolios;
- streamline delivery;
- make the most of existing infrastructure assets; and

- upgrade infrastructure governance systems to ensure close co-ordination between different infrastructure authorities, clear separation of political and technical responsibilities, broad public-private sector co-operation, trust-based engagement of stakeholders throughout the process to avoid suboptimal solutions and unnecessary delays, the availability of reliable data on which to base day-to-day oversight and long term planning and strong public-sector capabilities across the value chain of planning, delivery and operations.

The South African Planning Commission's *National Development Plan 2030: Our future – make it work* proposes that the following five areas be focused on in designing a procurement system that is better able to deliver value for money, while minimising the scope for corruption (Watermeyer *et al*, 2013):

- 1) differentiate between the different types of procurement which pose different challenges and require different skills sets;
- 2) adopt a strategic approach to procurement above the project level to balance competing objectives and priorities rather than viewing each project in isolation;
- 3) build relationships of trust and understanding with the private sector;
- 4) develop professional supply chain management capacity through training and accreditation; and
- 5) incorporate oversight functions to assess value for money.

The George Washington University Law School (Schooner and Yukins, 2012) have expressed the view that proper management of government procurement systems is critical if massive fiscal stimulus packages in the wake of the global crisis are to deliver value for money. They stress that leaders, in order to fulfil their fiduciary responsibilities, need to maximise competition among the global economy's most qualified firms, strive to purge corruption from procurement, and build (or restore) capacity in their public procurement systems. They point out that the current economic downturn present governments with a unique opportunity to invest in rebuilding their professional acquisition workforces by aggressively recruiting the best talent, bolstering skills-based training, improving retention and incentives, and identifying best practices for efficient procurement.

The Construction Sector Transparency Initiative (CoST) is a country-centred initiative which seeks to improve value for money on projects. It does this by increasing transparency in the delivery of construction projects by ensuring that basic information associated with projects is disclosed to the public at key points throughout the project cycle. CoST compliments rather than replaces a country's supervision, audit, regulatory, investigative, and judicial functions by putting in place a multi-stakeholder group to verify and interpret disclosed information along the full value chain on large projects. Stakeholders can then use this knowledge as a basis for holding the responsible parties accountable. This results in improved performance which in the long term is expected to improve value for money from investments in infrastructure as indicated in Figure 3. CoST in essence brings key stakeholder groups together on neutral ground and assists them to form and pursue shared objectives in improving value for money in construction projects and in improving efficiency and effectiveness.

Watermeyer (2011) points out that a procurement system is always designed around a set of system objectives. These typically relate to good governance (primary objectives) and, particularly in developing countries, to the use of procurement to promote social and national

agendas (secondary or non-commercial objectives). Procurement systems such as those which are based on the following system objective provide a platform to achieve fair competition, reduce the possibilities for abuse and improve predictability in procurement outcomes are therefore most likely to realise value for money:

- primary objectives: the procurement system shall be fair, equitable, transparent, competitive and cost-effective.
- secondary objectives: the procurement system may, subject to applicable legislation, promote objectives additional to those associated with the immediate objective of the procurement itself.

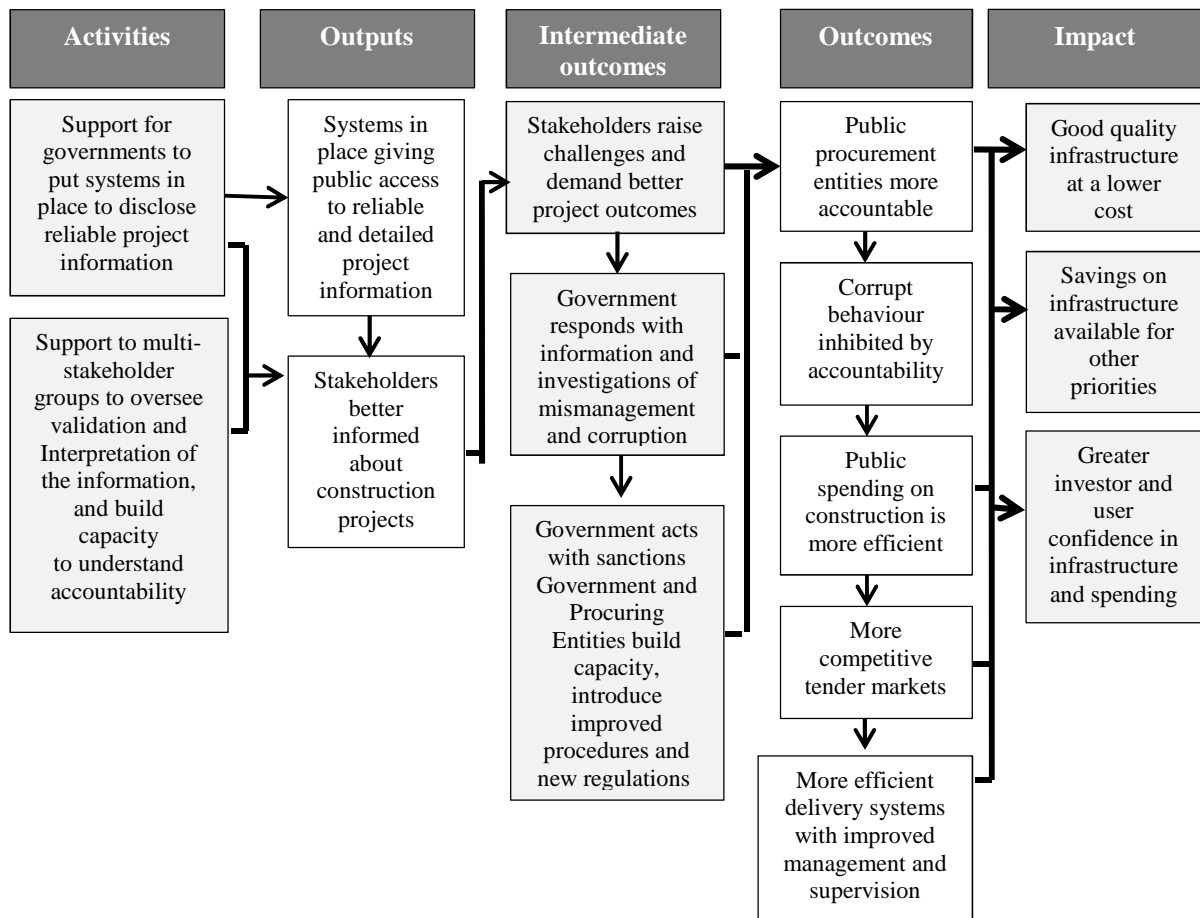


Figure 3: Results chain for the CoST Programme (Construction Sector Transparency Initiative, 2013)

Watermeyer (2011b) points out that there are a number of different approaches to procuring goods, services and works, each of which can result in different outcomes. Procurement strategy is all about the choices made in determining what is to be delivered through a particular contract, the procurement and contracting arrangements and how secondary procurement objectives are to be promoted. Resources and objectives need to be matched to the choices made regarding the manner in which needs are to be met in order to achieve optimal outcomes.

DFID (2013) has recently issued a statement which sets out how their suppliers are expected to demonstrate delivery on value for money. Forms of contract which provide open book

approaches to the costing of changes due to the occurrence of risk events, are drafted on a relational contracting basis, based on the belief that collaboration and teamwork across the whole supply chain optimises the likely project outcomes, provide pricing arrangements that align payments to results and reflect a more balanced sharing of performance risk are most likely to enable suppliers to deliver on DFID's expectations.

The Society of Construction and Law (2002) has published a protocol for determining extensions of time and compensation for delay and disruption. It exists to provide guidance in the form of 21 core principles to all parties to the construction process when dealing with time or delay matters. It recognises that transparency of information and methodology is central to both dispute prevention and dispute resolution. Forms of contract which contain provisions dealing with unforeseen events that can give rise to an extension of time or compensation for the additional time spent and the resources employed in a manner which is consistent with this protocol are most likely to deliver value for money.

Lichtig (2006) has indicated that in order to provide higher value and less waste the fragmentation in design needs to be addressed, preferably before 25% of the design is complete. Target cost contracts can be used to facilitate early contractor involvement in terms of the design by employer, develop and construct and design and construct contracting strategies. Accordingly forms of contract which make provision for cost based pricing strategies can be effectively used to deliver value for money (Watermeyer, 2012b).

A MODEL FOR THE DELIVERY OF INFRASTRUCTURE

The critical starting point in delivering value for money through infrastructure projects is to clearly define objectives and expected outcomes as well as parameters such as the time lines, cost and levels of uncertainty. This frames the value for money proposition that needs to be implemented at the point in time that a decision is taken to proceed with a project i.e. it establishes "economy" and identifies "equity". The end point is to compare the projected outcomes against the actual outcomes i.e. to confirm the "effectiveness" of the project in delivering value for money.

The implementation of infrastructure projects needs to be responsive to the project objectives, deliver the expected outcomes and remain as far as possible within the confines of the parameters upon which the decision to proceed with the project was based. Implementation sits between "economy" and "effectiveness" in the results chain framework. It needs to be executed "efficiently" in order to minimise time delays, scope creep and unproductive costs and to mitigate the effects of uncertainty on objectives (risks) so as to maintain the value for money proposition formulated at the outset of the project. This necessitates that the implementer of the project exercise due care and reasonableness during implementation. Failure to do so may result in substandard or unacceptable performance which results in a gap between intended and achieved outcomes. This gap puts value for money for a project at risk.

Due care speaks to the care that an ordinary and reasonable person would normally exercise under circumstances such as those under consideration. The concept of due care is used as a test of liability for negligence i.e. a breach of duty of care which results in loss to the person or entity the duty is owed. Negligence usually includes doing something that an ordinary, reasonable and prudent person would not do, or not doing something such a person would do considering the circumstances and situation. Reasonableness on the other hand applies to that

which is appropriate for a particular situation, circumstance or context and the way a rational person would have acted.

Accordingly, an implementer that implements projects with due care needs to:

- document and put in place a suitable and appropriate procurement and delivery management system;
- allocate tasks and responsibilities and provide the necessary financial and human resources to enable the system to be effectively implemented; and
- take corrective action to meet objectives when it becomes clear that some of the objective might not be met.

DESIGNING A PROCUREMENT AND DELIVERY MANAGEMENT SYSTEM TO DELIVER VALUE FOR MONEY

The review of the literature in this paper suggests that project outcomes can be improved by embracing the following in the design of an infrastructure delivery management system:

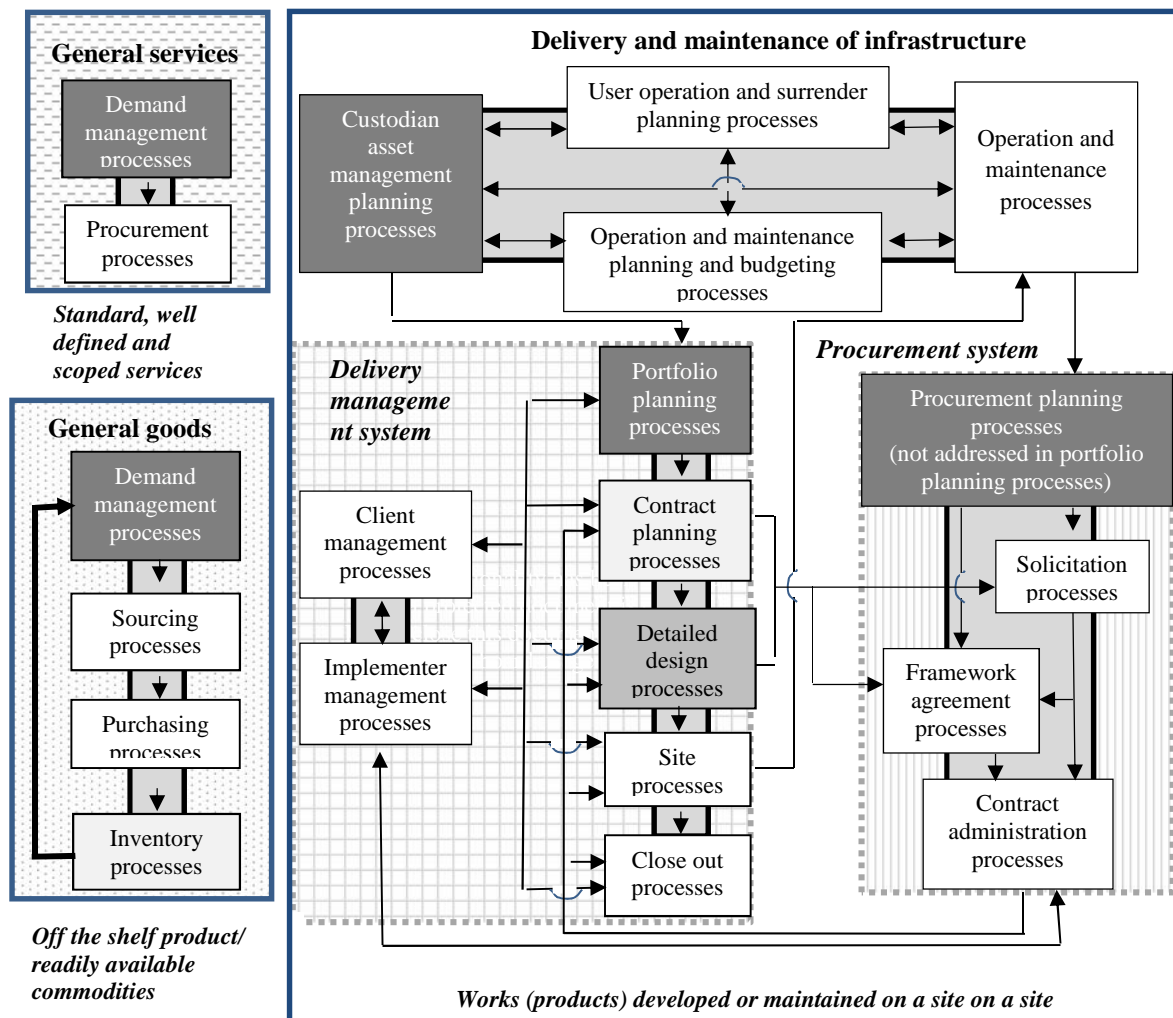
- adopt a strategic approach to procurement and delivery management above the project level;
- establish trust-based engagement of stakeholders throughout the process to avoid suboptimal solutions and unnecessary delays;
- put in place governance systems which incorporate oversight functions to assess aspects of value for money throughout the project cycle in a systematic manner;
- put in place rigorous project selection processes;
- differentiate between the different types of procurement which pose different challenges and require different skills sets (see Figure 4);
- standardise delivery in a manner which enables risks to be proactively managed and responsibilities to be clearly established;
- build relationships of trust and understanding with the private sector;
- put in place reliable data gathering systems on which to base day-to-day oversight and long term planning;
- develop strong public-sector capabilities across the value chain of planning, delivery and operations; and
- increase transparency through the disclosure of information which is subjected to internal and external scrutiny.

Procurement system needs to be designed around objectives which speak to “economy”, “efficiency” and “equity” and contain a wide range of procurement procedures which enable best value for money in a number of different circumstances. Forms of contract, which form an integral part of any procurement system, need to support open book approaches to the costing of changes due to the occurrence of risk events, foster collaborative working relationships, provide pricing structures that align payments to results and reflect a balanced sharing of performance risk and deal with delays and disruptions efficiently and effectively. Furthermore they should be sufficiently flexible to accommodate both price-based and cost-based pricing strategies with any level of design responsibility.

The delivery of construction works needs to be managed and controlled in a logical, methodical and auditable manner. The starting point in the development of any delivery

management system is to identify the information which needs to be developed and accepted by the client at a particular point in the delivery process to enable a project to be advanced i.e. at a control point (or gate). The stages in the delivery of construction works can then be defined as the activities that need to take place between such points. These stages enable the work flow (sequence of connected activities) toward the attainment of an end of stage deliverable to be developed and culminate in gates (control points) which can be used to provide assurance that the proposed works (Watermeyer, 2012a):

- remains within agreed mandates;
- aligns with the purpose for which it was conceived, and
- can progress successfully from one stage to the next.



NOTE
 Client = organization responsible for initiating, financing and commissions works to be constructed, refurbished, rehabilitated or maintained and pays for it
 Implementer = organisation which acts as the agent of the client during implementation
 Custodian = organisation which acts as the caretaker of infrastructure throughout its lifecycle
 The client, implementer and custodian are not necessarily the same organisation

Figure 4: Commonly encountered public sector supply chains (after Watermeyer et al, 2012)

Table 2 illustrates the stages on a project involving the delivery of infrastructure or scheduled maintenance and how they relate to the dimensions relating to value for money and the

sequence of activities. Control points (gates) can be located within or at the end of the processes shown in Figure 4. This creates a control framework which ensures that positive control is exercised over processes. It also ensures that supporting information is gathered systematically (Watermeyer *et al*, 2012).

Table 2: Stages in the delivery of new infrastructure (After Watermeyer et al, 2012)

Dimension of value for money	Processes	Gate	Stage description	Deliverable
Economy	Planning at a portfolio level	G1	Infrastructure planning	Client approved infrastructure plan which identifies needs and links prioritised needs to a forecasted budget
		G2	Procurement planning	Client accepted construction procurement strategy for implementing the infrastructure plan in the medium term
	Planning at a package level	G3	Package preparation	Client accepted strategic brief for the works
		G4	Package definition	Client accepted concept report setting out the Integrated concept for the works
Efficiency	Detailed design	G5	Design development	Client accepted design development report setting out the integrated developed design for the works
		G6A	Design documentation (Production information)	Completed and client accepted production information for the works
		G6B	Design documentation (Manufacture, fabrication and construction information)	Client accepted manufacture, fabrication and construction information for the works
	Site	G7	Works	Completed works which are capable of being occupied or used and accepted by the client.
		G8	Hand over	Works which have been taken over by the user complete with record information
Effectiveness	Close out	G9A	Asset data	Archived record information and updated asset register
		G9B	Package completion	Completed contract or package order complete with closeout information

Poor decisions or analysis during the portfolio planning stage can have significant cost ramifications downstream. Accordingly, a project and economic appraisal needs to be undertaken during the portfolio planning phases to establish the “economy” and “equity” dimension in the value for money proposition which projects have to offer. Thereafter proposed projects need to be prioritised so that only those that are most likely to satisfy stated objectives and yield value for money are delivered.

It is important to continue with planning processes at a project or contract level before authorizing implementation. This allows:

- sufficient design concepts or solutions to be developed to establish the feasibility of the works or to select a particular conceptual approach to pursue;
- the design or solution at the end the planning stage to be “frozen” ahead of implementation;
- residual risks to be identified and their potential impact on project outcomes to be understood;
- the time, cost and scope of the project to be confirmed and adjusted to remain within the desired value for money parameter upon which the initial decision making was based; and
- informed decisions regarding implementation to be made.

Thereafter the delivery of construction works needs to be managed and controlled in a logical, methodical and auditable manner to ensure “efficiency” and “effectiveness” in implementation.

CONCLUSIONS

Value for money may be regarded as the optimal use of resources to achieve the intended outcomes. Underlying value for money is an explicit commitment to ensuring that the best results possible are obtained from the money spent or maximum benefit is derived from the resources available. It is a means for developing a better understanding (and better articulation) of costs and results so that more informed, evidence-based choices can be made. Value for money is about striking the balance between three “E’s” – economy, efficiency and effectiveness” whilst being mindful of a fourth “E” – equity.

Current procurement and delivery management systems needs to be reviewed and possibly redesigned to ensure that they deliver on the three “Es” and promote aspects of the fourth “E”. This may require a culture and mind set change to embrace new and emerging procurement and delivery management practices which are designed to support value for money outcomes.

Evidence based research is required to enable informed and effective decision to be made in order to deliver value for money on the basis of solid evidence, proof of effectiveness and the integration of experience and judgement. Such research is required not only to guide and shape value for money practices but also to transfer knowledge into practice.

Training and education is also required to support those engaged in the infrastructure supply chain to understand the value for money concept and their role in supporting this imperative.

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