

TARGET COSTING IN CONSTRUCTION: PERCEPTIONS FROM QUANTITY SURVEYORS

L MOTUBA, N NOGQALA¹ and TG MONYANE², FA EMUZE³

Department of Built Environment, Central University of Technology, FS, Bloemfontein, South Africa

The purpose of this research is to explore target costing (TC) principles in relation to its use and adoption, with the intention to reveal the potential for positive impact on project performance in South Africa. The field work used interviews about the principles of target costing to uncover the nuances of cost management practices in the construction contracting sector. Interviews were conducted among practising quantity surveyors (Qs) in Bloemfontein and Buffalo City of South Africa. The Qs opine that when TC is utilised, construction projects can be managed efficiently in terms of budget and expenditure and the design of the project with its related change orders can be minimised. However, the Qs also perceived that implementation of the principles TC could be difficult due to lack of extensive knowledge of its implementation. The study is relevant because the new knowledge will help to develop strategies for professional development and update the education curriculum to train the Qs for future challenges.

Keywords: Construction, Estimation, Performance, Project.

1 INTRODUCTION

The Japanese are the originators of target costing (TC) in the 1960s and it remained unexplored until the 1980s (Feil, Yook and Kim, 2004). When it emerged as a superior competitive edge for the Japanese, immense efforts were made to introduce TC to western countries. As such, countries in North America and Europe have adopted TC for competitive advantage and cost improvement purposes (Feil *et al.*, 2004). However, it appears that TC is a country specific system since many variations of the philosophy have been developed in recent times.

The construction industry has been criticized for poor performance, particularly in either completing the project within budget and durations stipulated. As a prolific researcher on cost overrun, Flybjerg (2004) note that for over 70 years, cost overrun has not decreased, they are more pronounced in developing countries and that the industry has not been learning at all. The continuous repetition of projects running over budgets points to the need for innovative practices (Nicolini, Tomkins, Holti, Oldman and Smalley, 2000). Furthermore, Nicolini *et al.* (2004) cited the high costs of the construction as a worrisome trend in the international arena. This trend is underpinned by poor cost performance. South Africa is not an exception when it comes to poor construction cost performance (Ramabodu and Verster 2010; Monyane and Okumbe

2012; Akinyede and Fapohunda 2014; Mukuka, Aigbavboa and Thwala 2014), which also give rise to the need for innovative practice in construction.

As a result of the poor performance, cost management is in need of innovative practices in which TC is a promising concept. The crux of TC is not to develop first, a new model of car and then determine what it will cost and then place it on the market with a cost plus price (Nicolini *et al.*, (2000). It is price driven first and then the design follows the price. TC is a concept that has fairly matured in the auto industry and assembly industries in Japan, but it is still a work in progress in the United States of America (USA) and European countries (Ansari, Bell and Okano, 2007). However, “like the early days in the development of the literature on budgeting and performance measurement, academic research on TC lags practice” (Ansari *et al.*, 2007).

In brief, this paper is structured as follows: description of TC, the awareness of the concept by the industry, the environment where target costing provides greatest benefits and the barriers of implementing the concept. Lastly the paper demonstrates how TC can be implemented.

2 WHAT IS TARGET COSTING

TC is originally introduced in Japan under the name *Genka Kikaku* as an expression that clearly connotes it as an overall strategic approach to reduce costs and not only as costing technique (Nicolini *et al.*,2000). According to Feil *et al.* (2004), it became apparent that the Japanese do not themselves agree on the true meaning of *Genka Kikaku*. It would seem that value engineering was first used in Japan was known as *Genka Kikaku* which occurred at Toyota in 1963, though it was not mentioned in Japanese literature until 1978. Later “*Genka Kikaku*” was translated into “target costing,” the term now used throughout the world (Tani *et al.*, 1996 cited by Feil *et al* 2004).

TC in view of Ballard and Reiser (2004) is a product development practice that converts costs into design criterion rather than a design outcome. A description of TC in construction terms by the exact words of Ballard (2007) is the practice of constraining design and construction of a capital facility to a maximum cost. Ballard (2007) outlines that it is an appropriate practice for all clients with financial constraints (maximum available funds or minimum ROI requirements) that a capital facility project must meet in order to be considered successful by that client. This definition fits in perfectly with the needs of local construction sector for both private and public clients. However, Cooper and Slagmunder (2004) define TC as a technique used to manage the future profits of firms. Once this target cost has been established, value engineering (VE) is used to find ways to improve the product design so that the target cost can be achieved. The TC process reverses the traditional method of costing, whereby the market price is first determined if the product will sell and then the desired profit is then subtracted to give the designers the cost to which they must design the final product. The below formula clearly explains the concept better. The word “must” cannot be stressed enough in the definition of TC because if the designers cannot design the

product and produce it to the required cost (Clifton, Bird, Albano and Townsend (2004).

Target cost = Target Price (revenues) – Target Margin

The distinction between target costing and target cost contracts (TCC) / guaranteed maximum pricing (GMP) are of the utmost importance in this regard. It must be stressed that the two concepts are totally different and this study is not referring to TCC/GMP. The author makes the distinction for the reason that in the findings some respondents mixed the two concepts as the same which they are not.

2.1 Challenges and barriers of implementing target costing

TC principle has no doubt demonstrated its effectiveness in manufacturing sector. Although a significant number of projects have achieved the same outcome in the construction industry, unfortunately TC has not been fully utilised by the construction industry due to its fragmented nature. TC has been applied mostly on design and build projects, the first successful project being the St Olaf College field house in the USA (Ballard and Reiser, 2004). TC method has had questions raised about its applicability in construction. Nicolini *et al* (2000) made an analysis of applying target costing in the UK construction industry and found that the industry lacks data needed to drive down costs through systematic improvements. There are deep seated resistance to change in the industry, which will hinder progress of fully developing TC to drive down costs. The application of TC in construction was carried out in a Brazilian social housing project. Jacomit and Granja (2011) report that standardisation and replication were seen as opportunities for its use as a result of the project experience. However, due to being a public project the outsourcing of design and the tender bidding process became hurdles in the application of the TC approach. The results obtained by an attempt on applying TC on social housing project by Jacomit and Granja (2011) came out with a proposition that TC can be more successful if applied by a company co-ordinating product development process and construction, an example such as adopting a design-and- build project delivery system. The benefits of target costing are better explained in Table 1. Table 1 demonstrates the difference between cost-plus contracts, which are similar to the traditional system used in locally of first designing and then pricing with profit added after that. Zimina, Ballard and Pasquire (2012) carried out an action research and successfully adapted target costing from manufacturing to peculiarities of the construction industry under the name target value design (TVD). Zimina *et al.* (2012) makes the following distinctions between target costing and target value design:

- Target costing - is the original cost and profit management concept developed in manufacturing.
- Target value design - is an adaptation of the original target costing concept to the construction.

Table 1. Cost plus and Target costing compared.

Cost plus	Target costing
Price determines cost	Costs determines prices
Performance, quality and profit (and more rarely waste and efficiency are the focus of cost reduction)	Design is key to cost reduction, with costs managed out before they are incurred
Cost reduction is not customer driven	Customer input guides identification of cost reduction areas
Cost accountants are responsible for cost reductions	Cross functional teams manage cost
Suppliers involved late in the design process	Early involvement of suppliers
No focus on through life costs	Minimises cost of ownership for client and producer
Supply chain only required to cut costs	Involves supply chain in cost planning

Source: Nicolini *et al* (2000)

Zimina *et al.* (2012) found some application limitation of TC in their case study project. These limitations include:

- The lack of a rigorous basis for clients’ determination of asset worth and allowable cost, e.g. an operations cost model;
- A need for an accurate method of benchmarking project costs from programmatic data;
- When cost savings are not assured until late in the design phase, limiting client investments in value-adding enhancements;
- A failure to adjust allowable costs, and hence project budgets, to changes in whole life costs and benefits from design innovations, and
- An inflexibility of financing changes in the project budgets, even when the return on investment is otherwise compelling.

2.2 Case examples of TC in construction

This TVD project is part of a 3-year research initiative started in June 2010 by P2SL requested by the member company DPR Construction (de Melo, Do, Tillman and Ballard 2015). The UCSF Medical Centre at Mission Bay is a Greenfield integrated hospital complex on a 57-acre biomedical campus composed of three buildings: (1) Hospital – comprising children’s, women’s, and cancer inpatient facilities; (2) Gateway Medical Building – comprising ambulatory services for paediatric, women, and cancer patients; and (3) Energy centre – the building that houses the equipment, for example, boilers and coolers (de Melo *et al.*, 2015). UCSF is one of the world’s leading centres of health sciences research, patient care, and education. The Mission Bay project is the largest capital project in the history of the University of California and is one of its first TVD projects (de Melo *et al.*, 2015). Even if it was not possible to apply all of the

TVD principles on the project due to regulatory or legal restrictions, a partial TVD application still provided cost savings. Overall, the project team was able to reduce U\$100 million from the project cost (de Melo *et al.*, 2015). The data also suggest that the contractual relations, the use of some IPD principles, the shared incentives, the best value contractor selection, the co-location, and the key project personnel training acted as enablers to attain the level of collaboration required for a TVD implementation (de Melo *et al.*, 2015).

3 Methodology

The research design that was adapted for this study was qualitative in nature. Sociologists using these methods typically reject positivism and adopt a form of interpretive sociology (Parkinson and Drislane, 2011). Qualitative research is a situated activity that locates the observer in the world. It consists of set of interpretive, material practices that makes the world visible. These practices transform the world. The method is relevant to the study since the topic of the study adopts the behavioural approach to the concept of TC, where an untapped concept will be introduced to the sector, and then perception of the concept will be tested in the industry. A need for a new approach in research methodology has been suggested to solve the problems of construction (Alsehaimi, Koskela and Tzortzopoulos 2013; Laryea and Leiringer 2011). The selected method is appropriate for the topic since its objective is to establish the awareness of an untapped concept and then introduce it to the industry as a knowledge progression framework.

Qualitative research uses methods such as observation and interviews to describe account of a phenomenon. The practices inherent in qualitative research turn the world into a series of representations. These practices are field notes, interviews, conversations, photographs, recordings, and memos. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln, 2005). The study is exploratory, and employs an analytical approach to research. According to Funer (2004), in conceptual analysis, concepts are treated as classes of objects, relationships, properties or events. This involves definition of the concept through identifying and specifying the conditions under which the phenomenon is classified or could be classified. The study adopted a semi-structured interview approach. Each interview lasted thirty minutes long. The sampling population were ten professional Quantity surveyors from Bloemfontein and ten Quantity surveyors from Buffalo city municipality where the first two authors of this paper are based. The professionals were approached to be interviewed because they are the best professionals suited to initiate the implementation of the concept of TC. Leedy and Ormrod (2010:141) confirm that “A typical sample size is from 5 to 25 individuals”, although size of the sample in qualitative study is irrelevant due to the fact that value is based on quality of the data (Bazeley 2013; cited by Hosseini, Rameezdeen, Chileshe and Leehmann 2014). Stratified random sampling was chosen for the sample selection. All interviews were recorded and transcribed. The

results of the interviews are presented based on the respondents group in the next section.

4.0 Findings and Discussion

Firstly, the study's intention is to establish whether the industry is aware of the concept of TC. The study also sought responses to questions that would establish how the participant understood TC in their work as Qs in the two municipal areas of Mangaung in the Free State province and Buffalo city in the Eastern Cape.

4.1.1 Awareness of target costing by respondents

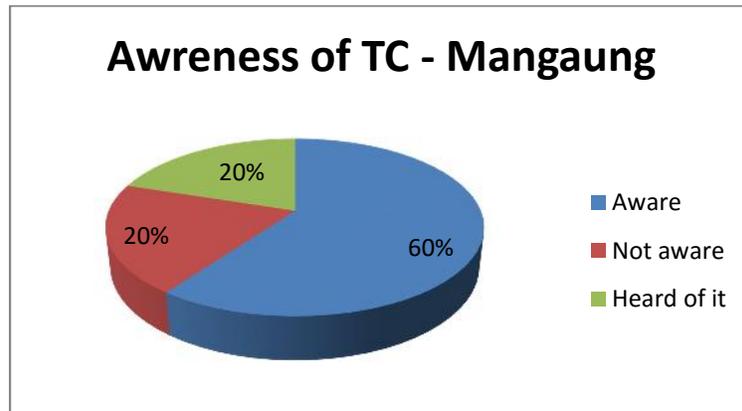


Figure 1. Awareness of target costing by respondents in Mangaung Municipality

It is notable that 60% of the respondents indicate that they are fully aware of the concept of TC, whereas 20% of them have no idea about it. A further 20% of the respondents indicated to have heard about it, but do not understand the process of implementing it. At this stage the respondents were not asked to define the concept.

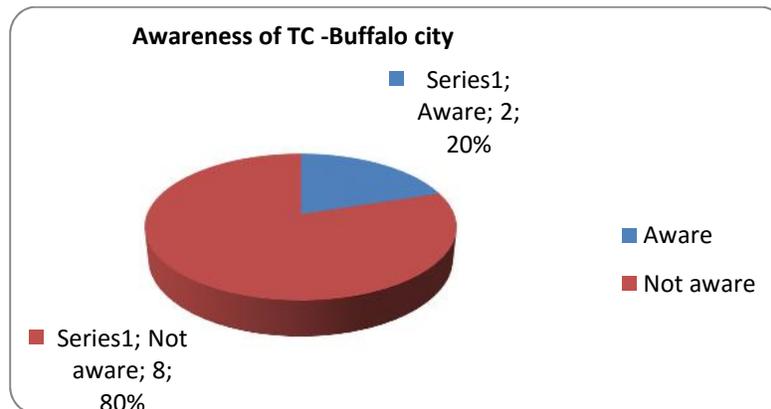


Figure 2. Awareness of target costing by respondents in Buffalo city Municipality

Figure 2 demonstrates that 80% of the respondents from the Buffalo city municipality have no idea about the concept of TC. Only 20% of the respondents say that they are aware of the concept. After the respondents were asked of the awareness, the answer provided was validated with a question requesting them to define TC in their own words to ascertain that their awareness of the concept match up to what literature says about the concept.

When the respondents were further requested to define what is their understanding of TC to be? In Mangaung municipality, respondents described it as a pricing method to reduce overall cost of products. Others said TC is basically budget control, in principle, it is the art of avoiding exceeding the client's approved budget within a project, systems such as value engineering are used in order to achieve the desired target and to minimize cost. While others had never heard of it, some said, it is a technique used to control the cost of a project and think it is the system used to minimize costs in a contract. At the Buffalo city municipality, majority of respondents had no idea as the Figure 2 indicates. The remaining 20% that indicated to be aware of the concept confused it with target cost contracts/maximum guarantee pricing. As indicated before on the definitions that target cost contracts and target costing are two different approaches and it is clear the respondents have no idea of the knowledge of target costing.

4.1.2 Benefits and challenges of target costing

The challenges highlighted by the respondents in both municipalities are majorly in agreement with one another. Amount of time necessary to fully implement the concept is a major factor which will not be favoured by most clients. Clients normally rush projects to go out to tender and seldom spent enough time to interrogate alternatives. The public sector will be the best client to implement, but with the bureaucracy it is just not possible to realise the desired results of fully implementing the concept successfully. The other challenge is the behaviour of people in terms of resistance to change. This is another hurdle to be overcome.

The benefits of the concept is that projects will be better handled by all instead of the cost management duties being that of the quantity surveyor alone. Integrated project delivery brings about all the stakeholders concerned with one goal of achieving the success of the project. Projects will be delivered within the stipulated budget and completed within the duration and mostly the client will get value for money. The concept will bring about new opportunities for Qs to take a leading role in the industry as opposed to recently. In a study carried out by Marginean and Bobescu (2014), case study of applying TC in Romania, it was found to be a very useful tool for cost management. The method applied indicates to them whether a task will be profitable or not before carrying it out.

4.1.3 How target costing can be implemented

For a project to be feasible, a comprehensive estimate has to be carried out to ensure the outcome desired by the client. Traditionally cost always followed the design and value for the client could be missing as a result. For instance, if a project is not economical for the client, cost cutting exercises were carried out so it can meet the client budget. However, if the client budget was known first and then the design followed it, value may be produced. Figure 2 is the recommended process to meet the allowable cost before making a decision to build (Ballard, 2012). The client may be willing to spend a certain amount on the project and that is dependable on the estimate produced. The amount the client is willing to spend may be reduced by funding constraint (Ballard, 2012).

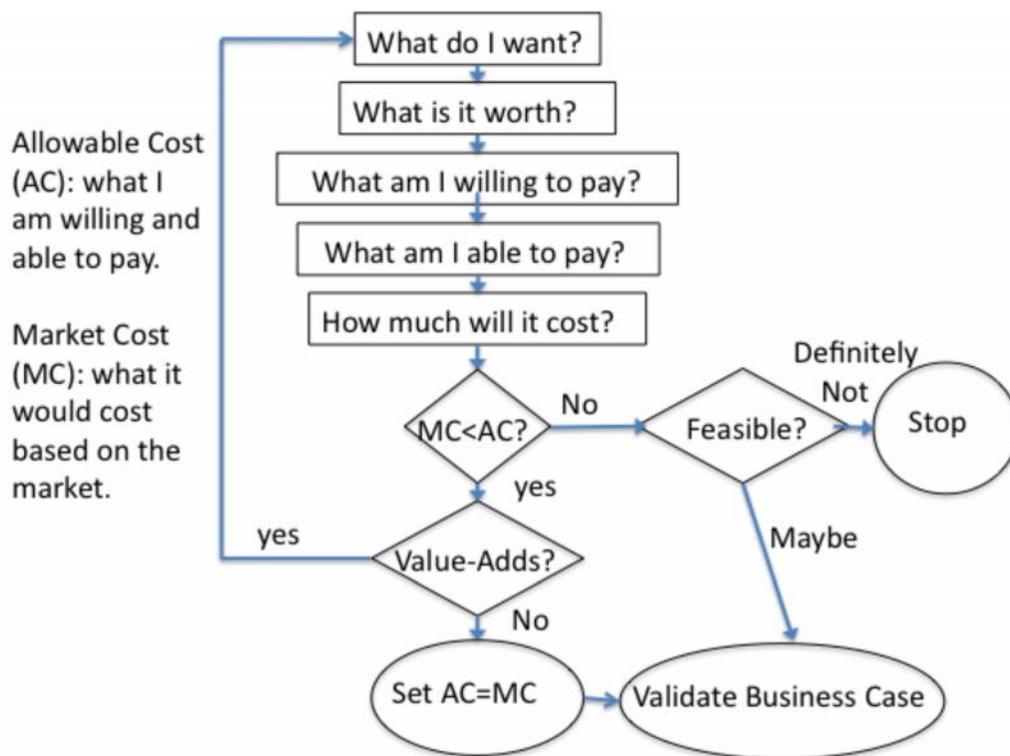


Figure 3. Process for Determining Project Budget (Ballard, 2012)

5 Conclusion

Target costing seemed to be an unknown phenomenon in the cities examined in this study. The QS professionals in the cities lack basic knowledge of the practice, which might be caused by limited on its successful implementation in developing countries. The successful implementation of target costing is reported in developed countries such

as the UK, whereas limited research findings is now emerging from Brazil, which is a developing country with an emerging economy like that of South Africa. The discourse in this paper shows that TC is method of designing to allowable cost, mitigating cost overruns, ensuring quality, eliminating waste and to make sure that all other targeted milestones of the projects are achieved on time. In relation to cost management, target costing emerged as a solution for improved project performance in both areas. The only challenge seems to be the resistance to change and willingness to embrace this new approach by the professionals within the construction industry. Target costing is viewed as implementable in these areas if emphasis can be put on acquiring more knowledge on its use, collaboration of all stakeholders in government, private sector, academics, home-owner associations, builders 'associations and professional bodies.

Acknowledgments

The financial assistance of the National Research Foundation (NRF) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the author and are not necessarily to be attributed to the NRF.

6 References

- AlSehaimi, A., Koskela, L. and Tzortzopoulos, P. Need for Alternative Research Approaches in Construction Management: Case of Delay Studies, *Journal of Management in Engineering*, 29(4), 407-413, 2013
- Akinyede, I.J. and Fapohunda, J.A., Factors that affect budgeted cost through Building Production Process, *Eighth Built Environment Conference*, Haupt, T. (ed.), 238-247, Durban, South Africa, 2014.
- Ansari, S. and Bell, J., Okano, H., Target Costing: Uncharted territory, *Handbook of Management Accounting Research*, (2), 507-530, 2007.
- Ballard, G., and Reiser, P., "The St. Olaf College Fieldhouse Project: A Case Study in Designing to Target Cost," *12th Annual Conference of the International Group for Lean Construction*, 234-249, Elsinore, Denmark, 2004.
- Ballard, G., Target costing in the construction industry, (power point presentation) *P2SL Conference* - February 7, <http://p2sl.berkeley>, 2007.
- Ballard, G., Should project budgets be based on worth or cost? *20th Annual Conference of the International Group for Lean Construction*, 761-770, San Diego, CA, 2012.
- Clifton, B., Townsend, W., Bird, H. & Albano, R., *Target costing: market driven product design*. Marcel Dekker AG, New York, 2004.
- Cooper, R., and Slagmulder, R., *Target Costing and Value Engineering*, Productivity Press, Portland, 1997.
- Denzin, N, and Lincoln, Y. (Eds). . *Handbook of qualitative research*. (3rded.). Thousand Oaks, CA: Sage. 2005.
- de Melo, R.S., Do, D., Tillmann, P., Ballard, G, & Granja, A.D., Target value design in the public sector: evidence from a hospital project in San Francisco, CA, *Architectural Engineering and Design Management*, DOI: 10.1080/17452007.2015.1106398, 2015.
- Feil, P., Yook, K., and Kim, I., Japanese target costing: A historical perspective, *International Journal of Strategic Cost Management*, 10-19, Spring 2004.
- Funer, J., Conceptual Analysis: A method for understanding information as evidence, and evidence as information. *Archival Science*, 4, 233-65. 2004.

- Flyvbjerg, B., Skamris Holm, M. K., and Buhl, S.L., What causes cost overrun in transport infrastructure projects? *Transport reviews*, 24, 3-18, 2004.
- Jacomit., A.M., and Granja, A.D. An Investigation into the Adoption of Target Costing on Brazilian Public Social Housing Projects, *Architectural Engineering and Design management*, (7), 113-127, 2011.
- Laryea, S., and Leiringer, R., Built environment research in West Africa: current trends and future directions *In: Laryea, S., Agyepong, S.A., Leiringer, R. and Hughes, W. (Eds)*, 797-804, *4th West Africa Built Environment Research (WABER) Conference*, Abuja, Nigeria, 2012.
- Leedy, P.D., & Ormrod, J.E., *Practical research: Planning and design (9th Ed.)*. Upper Saddle River, NJ: Prentice Hall, 2010.
- Mărginean, R., and Bobescu, A.T., The cost control by applying the target costing method in the construction industry: Case study, *SEA - Practical Application of Science (II)*, 1(3), 348-357, 2014.
- Monyane, T.G. and Okumbe, O.J., An evaluation of cost performance of public sector projects in the Free State province of South Africa. Emuze, F.A (Eds) *2nd NMMU Construction Management Conference*, 11-197, Port Elizabeth, South Africa, 2012.
- Mukuka, M.J, Aigbavboa, C., and Thwala, W.D., Construction Experts' Perception on the Causes and Effects of Cost Overruns in Johannesburg, Gauteng Province, South Africa, Chien Ho Ko, (Eds), *(5th) International Conference on Engineering, Project, and Production Management, Port Elizabeth, South Africa*, 349-356, 2014.
- Nicolini, D., Tomkins, C., Holti, R., Oldman, A. and Smalley, M., Can target costing and whole life costing be applied in the construction industry? Evidence from two case studies. *British Journal of Management*, 11(4), 303–324, 2000.
- Parkinson, G. and Drislane, R. 2011. *Qualitative research*. In online dictionary of the social science. Retrieved from <http://bitbucket.icaap.org/dict.pl>.
- Ramabodu, M.S., and Verster, J.J.P., An evaluation of cost overruns in public sector projects: in the Free State province of South Africa, *5th Built Environment Conference*, 18-20, Durban, 2010.
- Reza Hoseini, M., Rameezdeene, R., Chileshe, N., and Leehman, S., Adoption of Reverse Logistics in South Australian Construction Projects: Major Drivers, Chien Ho Ko, (Eds), *(5th) International Conference on Engineering, Project, and Production Management, Port Elizabeth, South Africa*, 74-83, 2014.
- Zimina, D., Ballard, G., and Pasquire, C., Target value design: using collaboration and a lean approach to reduce construction cost, *Construction Management and Economics*, doi.org/10.1080/01446193.2012.676658, 2012.