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THE SHIFT FROM COST TO VALUE

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Abstract

The role of the building economist has changed from one almost solely restricted to the accounting of construction costs to one concerned with adding value to the construction process. The role has changed dramatically during the latter half of the twentieth century. This has been due in part to a growth in knowledge and understanding, the introduction of new technology and the general dissatisfaction of clients and their higher expectations. Government sponsored reports have pointed to deficiencies in existing arrangements within the construction industry that compare it unfavourably with the developments and progress in other industries. One issue from many of these reports is the relatively high costs of building and the extent to which these can be reduced whilst still retaining value.

This paper examines the changing shift in emphasis from cost to value that has occurred during the latter part of the twentieth century. It also considers some of the major issues that have repercussions on costs of building. Finally it seeks to identify those areas that are likely to be fruitful in the quest for future possible cost reductions.

Keywords: Costs, Value, Cost reductions,

Pomak od cijene koštanja prema vrijednosti

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Sažetak

Uloga se građevinskog ekonomista mijenja od one skoro posve ograničene na računovodstvo građevinskih troškova ka onoj koja se bavi povećavanjem vrijednosti u građevinskom procesu. Uloga se dramatično promijenila tijekom druge polovine XX. stoljeća, i to, dijelom, zbog većeg znanja i razumijevanja, uvođenja novih tehnologija, kao i općeg nezadovoljstva klijenata uslijed njihovih većih očekivanja. Državna izvješća ukazala su na nedostatke postojećih odnosa u gradevinarstvu, nepovoljno ga uspoređujući s događajima i napretkom u drugim granama privrede. Jedno od pitanja u tim izvješćima jesu relativno visoki troškovi građenja, te raspon njihovog mogućeg smanjenja uz zadržavanje vrijednosti.

U radu se razmatra pomak u naglašavanju troškova prema isticanju vrijednosti u drugoj polovici XX. stoljeća. Također se razmatraju neka glavna pitanja vezana uz troškove gradenja. Na kraju se nastoje utvrditi područja koja bi mogla uspješno ubuduće smanjiti troškove gradenja.

Ključne riječi: troškovi, vrijednost, smanjenje troškova

1 Introduction

Prior to about the 1950s the role and work of the building economist was limited to that of an accounting role. Whilst this role was important, it was already evolving from one solely restricted to the preparation of contract documentation and final accounts for building projects. Included within its activities were the preparation of approximate estimates of cost prior to the design and the preparation of interim payments during construction.

The estimates of cost frequently required revision to the contract documentation even before the contractor had started the work on site. Such revisions arose because tenders far exceeded the estimates of cost. In some cases projects had to be abandoned because building costs had not been properly considered and evaluated.

The work and role of all professions has changed dramatically during the latter half of the twentieth century. The need for change in building economic practice became evident as the nature and complexity of work increased, and clients became increasingly dissatisfied with the methods that were adopted for advising on building costs, procurement and the settlement of final accounts. Knowledge also expanded and the new technology provided users with easier access to information data bases.

2 Changing emphasis

Table 1 identifies some of the major changes that have occurred in the change from cost to value.

	Approximate date
Accounting to forecasting	1950
Cost studies	1960
Cost planning	1960
Cost modelling	1970
Life cycle costing	1975
Value analysis	1985
Facilities management	1990

Table 1 Change from cost to value

2. 1 Accounting to forecasting

The first shift towards adding value to the construction process was the change in emphasis from one that was solely concerned with an accounting function to one of a broader role concerned with the forecasting and controlling of building costs. Much debate took place on whether building economists were able to control building costs or that they were simply cost advisers. The mere fact that the debate took place at all sought to emphasise the changing role that was then taking place.

2. 2 Cost studies

At about the same time different organisations, such as the Royal Institution of Chartered Surveyors and various government departments, notably the then Ministry of Education [1], began to develop strategies concerned with the comparison of building costs, prices and values. Many of the major public sector clients, such as those involved in education, hospitals and housing were concerned about the disparity between the differences in the costs of building, to meet the same client requirements. Also the massive building programmes that were taking place in the 1960s required the different government departments to radically examine their expenditure on capital projects.

The proposals from different parts of the country for the design of new school building projects, for example, revealed substantial differences in layouts and aesthetics with their consequent differences in building costs. The standardisation of building costs was therefore made a priority by the Ministry of Education through the introduction of school building cost limits. This was a further shift towards considering value for money in building design and recognising that the costs of construction were one aspect of the equation to be considered.

2. 3 Cost planning

The above scenario realised that it was equally important to properly plan building expenditure as it was to design the building itself. Cost planning was developed to meet this need [2]. This initially developed through two different and separate philosophies

that were to be merged in to a single cost planning system utilising the best attributes from each. One sought to limit the total costs of building and became known as elemental cost planning or "designing to cost". The other was commonly referred to as comparative cost planning or "costing a design". In fact the twin aims of cost planning were to assist in the development of balanced designs of buildings and to secure value for money, whatever that meant at the time.

2. 4 Cost modelling

Several attempts have also been made to attempt to model costs in different ways through statistical techniques, simulation and expert systems [3]. Whilst costs will always remain an important ingredient in building design, there are likely to be different and more efficient ways developed in the future for their calculation and estimation. The interest in cost modelling helped to establish new ideas about cost relationships and provided an alternative dimension of how costs might possibly be derived in the future.

2. 5 Life cycle costing

The emphasis on building costs also began to switch from that which concentrated on initial costs alone, towards a more holistic view of building costs over the entire life cycle of the project. Whilst it became recognised that life cycle costs were indeterminate, their consideration allowed competing proposals to be compared and helped designers to consider more carefully the long term consequences of their design solutions. For example, the examination of the initial costs of construction in the context of future costs in use, would probably yield an overall better financial solution for the owners and users of property. Life cycle costing provided yet another shift away from the consideration of building costs alone to one that sought to add value [4].

2. 6 Value analysis

The use of this technique has placed emphasis upon reducing the unnecessary waste in building design. Such a reduction will help to eliminate unnecessary construction costs whilst at the same time maintaining or improving the other variables in building design and construction. The analysis is described as a set of techniques for the sole purpose of efficiently identifying unnecessary costs before, during and after construction. The heart of value analysis is of doing more for less. It either results in enhancing value for the same cost, achieving the same value for a lower cost or enhancing value for a lower cost [5].

2. 7 Facilities management

Initial building costs and costs in use have also been contrasted with the other costs associated with project's development such as land, equipment and furnishings that were frequently outside of the remit of the building economist. Eventually all of these aspects would be considered through the emerging practice of facilities management, a role in which building economists would feature prominently [6]. For example, it was now

insufficient to simply consider how much space should be provided, what was equally important was also how this space should be used. These considerations provided yet another shift towards the principle of adding value.

3 Constructing the Team

The construction industry in Great Britain, has over the past fifty years produced several different reports, many of which have been government sponsored. These have ranged from the Simon Report (1944) [7] to the Latham Report (1994) [8] and include, Building Britain 2001 (1988) [9]. The themes of all these reports have been aimed at change which is necessary to improve performance in the construction industry, its products and improved client satisfaction. The underlying theme has been one of providing better value for money for the owners and users of buildings.

The Latham Report draws comparisons between buildings and motor cars. It suggests, for example, that cars built thirty years ago tended to have numerous faults and were relatively costly. Today they are designed and built in much less time with a consequent saving in their costs. In the past car designers would go into their studios and create cars that were isolated from customer demand, customer requirements and the manufacturing process. They may have been aesthetically appealing, but they were sometimes difficult to manufacture and awkward to use. The costs of car manufacture has been reduced due to better planning and organisation in a more efficient and cost effective manner. Whilst the modern motor car now closely matches users needs, modern buildings still result in dissatisfied clients.

3. 1 Cost Reductions

An item of major importance to building economists is the suggestion in the Latham Report [8] of a 30% reduction in building costs by the year 2000. Such cost reductions should not generally reduce quality, unless there are issues of over-specification. Also whilst costs decrease, quality and value should at least be maintained, and in the light of some of the above comments they need to be improved. At least one major client of the construction industry has already intimated that the cost-value reductions proposed will be insufficient to meet their general aims and objectives.

However, it is also very important that any cost reductions in buildings does not refocus the construction industry backwards fifty years towards the emphasis on initial costs alone. The importance of ensuring that life cycle costs are given their rightful importance in the overall building process must be maintained.

This is implications, in this context, is of reducing building costs by adding value. It is the principle of doing more with less. An aim that is now prevalent throughout many areas of society.

4 Issues to consider

Before examining possible areas where cost reductions might be possible, the following points should be considered in context.

4. 1 Recession

Firstly, the construction industry (in Great Britain) has been in a severe recession. Some will argue the worst recession for the industry this century [10]. As any economist knows, prices charged for a commodity relate basically to the supply and demand of that commodity. The construction industry's products are no different in this respect. Any anticipated real cost reduction in building costs, over the next five years, will therefore need to take into account the fact that present costs are being artificially depressed due to the recession. Therefore it needs to be asked whether such cost reductions will be real or only relative?

4. 2 Low wage industry

Secondly, the industry is a low wage industry when compared with other industries. Any comparison of the wages and salaries paid at all levels in construction with industries such as energy or air transport, indicates this fact. The industry has also been described by some as a "handicraft" industry because of its lack of use of modern technologies [10]. Since it is not a high wage industry it frequently does not encourage the best individuals to join it, at any level. If the industry wants more innovation and efficiency then it needs to attract better talent at all levels. This inevitably means increasing salaries and wages, and hence costs, at least initially.

4. 3 Cost efficiencies already made

Thirdly, it must also be accepted that substantial cost efficiencies have already been introduced and maintained in many different ways during the latter half of the twentieth century through, for example, cost planning, mass production, bulk purchase, prefabrication, buildability, subcontracting, off-site manufacture, etc. This, of course, in no way mitigates against a view that further cost reductions are not therefore possible, even in these areas of activity. In fact just the opposite is true. Since reductions have already been achieved in the past, this encourages the possibility for the future. Table 2, lists some of the progress already achieved in cost-value efficiencies.

Use of artificial rather than natural materials
Prefabrication off-site of building components
Standardisation of designs and components
Simplicity in design and detailing
Selection of appropriate procurement methods
Buildability
Efficiency through engineering technology
Construction management on site
Integrated design and construction

Table 2 Examples of progress achieved in cost -value efficiencies

Any comparison between buildings constructed at the beginning and end of this century also provide evidence that considerable progress in the reduction of building costs has been achieved in a number of different areas [3]. In essence, it is unlikely that we could now afford to build housing, schools and hospitals in the manner constructed at the turn of the century. Many modern designs incorporate improved construction and technology at lower costs, whilst still achieving the same broad client objectives in terms of function and appearance. The examination of such buildings help to illustrate the principle of maintaining or increasing value, whilst at the same time reducing cost.

5 Cost-value reductions

The following are some of the issues associated with the construction of building that can effect possible cost-value reductions.

5. 1 Incomplete design at tender stage

Almost all forms of contract allow for the possibility of variations or changes to the design and specification occurring during the on-site construction period. This mitigates against careful contract planning and has an impetus for causing delays, increasing costs and encouraging contractual claims. Where designs can be complete at tender stage then both the length of time the contractor spends on site and the overall time from inception through to completion is able to be reduced. Where the contractor is on site for a shorter period of time this inevitably reduces construction costs.

5. 2 Over-specification

There continues to be a constant striving to improve quality and standards of buildings and this is generally appropriate. However, in some circumstances, particularly where the work is to be subsequently covered up, the standards of work expected may be too high. Certainly it is higher than in some other countries, where the level of specification is more appropriate to the standards required by the element.

5. 3 Teamwork

Individuals tend to achieve results on the basis of a learning curve. Doing the same task a second time should allow savings in both time and money to be achieve through experience. The Latham Report [8] illustrates this by reference to well known repetitive projects, where on successive schemes waste and effort are reduced, time consuming aspects of construction eliminated and overall cost savings are achieved without any reduction in the quality and value of the finished project.

5. 4 Government involvement

The argument is often used to suggest that the industry is inefficient and clings to out dated practices. The industry also fails to invest properly due to its focus on short term gains. The reason for these are obvious. The booms and slumps in the industry help to

encourage and prolong such inefficiencies. Government could alter its own methods and timing of construction procurement. It could choose not to build during times of prosperity, but only build when private industry is in recession. It would then pay less for its projects, provide more stable prices and be able to offer a more even workload to the industry. Instead of using the industry as a regulator for ill, it could be used for gain.

5. 5 Training and education

Contractors include in their tenders substantial sums of money to rectify poor quality work on site. Training is task driven and developing the skills to carry out tasks. Education is much broader and attempts at changing the attitudes and cultures of individuals. The current emphasis at building craft level is training specific, with little attention being paid towards aspects of education. This does not engender pride in the work being carried out. This coupled with the output based incentive schemes, results in a poor product, expensive remedial work and dissatisfied clients. The industry has a poor reputation, better education and training could assist in improving this image.

5. 6 Construction as a manufacturing process.

Manufacturing industry has realised that the expensive component in their production is labour. The examination of any photographs of manufacturing workshops at the turn of the century with today, reveals a startling contrast in the number of people employed. Construction work on site, on the other hand, continues to remain very labour intensive. Whilst there is undoubtedly more controlled off-site manufacture, requiring assembly only on site, the process of erecting buildings has otherwise changed little. The development of site mechanisation has been slow over the past fifty years. The new technologies being used in manufacturing, such as computer controlled machinery have had little impact on the processes used on the typical construction site. Such machines not only produce goods to a defined standard but also assisted in helping to reduce some of the manufacturing costs.

5. 7 Procurement

A lot of attention has been given towards the different procurement methods used in the construction industry. Research has largely been inconclusive regarding the optimum choice of method to provide the best project overall; either in terms of cost, quality or design. Construction is also one of the few industries that continue separate design from the production process. However, this is also one of its distinctive features, recognising that the construction of buildings and other structures is often bespoke to a client's needs and represents an inherent difference from other industries. The production of "standard" buildings, that require limited architectural intervention, provides no real argument for the combination of design and construction generally.

5. 8 Increased standardisation and prefabrication

Manufacturing industry succeeds where it is able to produce a large number of standard units or components. Compared with thirty years ago some of the construction industry's products are now manufactured off-site under controlled mass produced conditions. The single difficulty that exists with these sorts of products is that when minor repairs are necessary, they often require replacements of components far in excess of the immediate problem with consequential costs to follow. This is a factor that must be considered in the life cycle costing of projects. The use and development of modular systems and components are areas to consider under the heading of standardisation and prefabrication.

6 Industry attitude to future cost reductions

Tables 3, 4 and 5 are the result of a survey of different companies representing a spectrum of the construction industry. The response was encouraging, in that all respondents felt that some cost reductions could be achieved without affecting the value. However, none of those surveyed felt that a 30% target was in any way realistic, unless more radical and fundamental changes to the industry and its products were made. Such changes were likely to be unacceptable to clients. Whilst some contractors believed that savings of up to 20% are possible, this was against a background where they were very much in total control of the building process. Under these circumstances they expected single point responsibility and little interference during construction operations on site from the client. House builders suggested that they had already achieved considerable savings and their main problem was concerned with the lack of demand for their products and its subsequent effect upon the volume of units constructed. In the present climate building costs were also very artificial with suppliers and subcontractors being prepared to offer very low prices for their products and services simply to stay in business.

Consultants, especially designers, on the other hand, were rather more pessimistic of possible long term cost savings, although they did accept that efficiencies could always be made. They tended to suggest that as far as possible these issues were always examined carefully during the design process. There was some resistance, amongst designers, towards further standardisation, in both the use of designs and components.

Component manufacturers, on the other hand, were eager to find better and more economical solutions. They believed that the introduction of new technologies into the manufacturing process could not only improve product specifications but also enable their products to be prepared more economically. The only factor mitigating against this was the relatively poor state and prospect for the industry. This did not encourage long term investments to be made.

Anticipated percentage cost reductions without effecting value.

		Percentage
Consultants		0-5
Contractors -	General	10-20
	Subcontractors	5-10
	Housing	5-15
Component manufacturers		5-10
Clients		0-40

Table 3 Percentage cost reductions

Whilst clients thought that costs could be reduced, without detrimentally affecting quality, they expected real costs to increase, especially when the recession was over. They did accept that there was always likely to be a better way of achieving the same objectives, but that consequent cost savings would be balanced against prevailing tender conditions. Any boom in construction activity would have the effect of artificially increasing prices Some of the larger clients have already been reported as suggesting that a 30% reduction in costs would be insufficient to meet their own needs.

Expected areas of greatest savings

	Percentage
Design	30
Component manufacture	25
Procurement	20
Construction	40
Management	10

Table 4 Areas where savings are likely to be achieved

Inevitably the different organisations surveyed expected cost savings to be made by one of the other parties involved in the process. Consultants wanted a more precise brief from clients and better organisation from contractors. Contractors wanted more completeness in the designs with less interference from consultants and through consultants from clients during the construction process on site. Overall, the suggestions that there are scope in design cost reductions indicated that value analysis applications had still some way to go and that the lessons derived from buildability had not been fully realised.

All of the different parties involved wanted more ideal circumstances and situations to exist, in order to effect cost reductions. A more buoyant industry with long term horizons that would encourage investment in the industry from all quarters. The stop-go nature of the industry was incompatible with achieving the best buildings. Others argued that such a

requirement was incompatible with the nature of the industry and an aim that would not be easily achieved. Any attempt at smoothing out the workload pattern would be welcomed, even if this meant an industry of reduced size.

Important areas where savings are likely to be achieved

	Percentage
Design readiness	85
Single point responsibility	60
Standardisation of components	70
Standardisation of designs	45
Off-site manufacture	55
Continuity of workloads	90
Increased mechanisation	45
Teamwork	85

Table 5 Specific areas of savings

Many of the specific areas where cost reductions could be achieved have been well rehearsed in recent times. All of the parties involved had a desire to reduce unnecessary waste and its consequent expenditure. A co-ordinated industry wide approach would help to solve the problem in the quickest and in the most effective way. Some contractors argued, that in the past that some of their good ideas and suggestions at reducing building costs and shortening the contract period had frequently been dismissed by designers under traditional contractual arrangements.

7 Conclusions

The role and work of the building economist has changed considerably since it was first conceived over 250 years ago. A role that was heavily biased towards building costs is now focused clearly on adding value to the whole process from inception, construction to in-use. The emphasis of adding value to the construction process is to seek out ways of doing more for less. This is now a fact in many areas of our lives, where emphasis is placed upon the balance of efficiency and effectiveness with economy. The belief that there is likely to be a better way of achieving the same objectives encourages us in understanding that we have not yet achieved the optimum cost and value solution in the construction of buildings. The continued importance of the economic choices associated with limited resources will encourage further changes to be applied in the future.

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