BUILDING ECONOMICS: THE USE OF ECONOMICS IN THE BUILT ENVIRONMENT

by Gary Mulligan

IN THIS SHORT report I shall provide the reader with an introduction to some of the principles of building economics. We will begin by taking a look at the development of this fascinating subject.

INTRODUCTION AND BACKGROUND

Building economics emerged as a distinct field in the mid-1970s induced by the so-called energy crisis. Nearly two decades later, it is still in its infancy. The economics profession does not recognize it as a field in its own right even though building is one of the most important activities in any economy.

The "built environment" is the term used to describe buildings, works and other modifications which the human race makes to the natural environment. Shelter costs most households, firms and other organizations significant proportions of their income or revenue and also creates a substantial proportion of their wealth. Since developing and sustaining the built environment is such a large user of resources and creator of wealth, it is not surprising that these activities have a considerable impact on the functioning of the national economy. The scale, quality and distribution of built facilities effects the level of efficiency with which producers of goods and services operate and the quality and shape of the environment in which we live.

Annual national expenditure on the built environment is substantial. Most of the built environment already exists, but annual construction modifies it and can make a profound difference over several decades. Once constructed, built facilities may last for many years, sometimes centuries. Individual developers can generally have little conception of the way in which their development contributes to changes in the built environment, or of what its economic or social consequences will be in the long run. The economics of buildings attempts to remedy this lack of knowledge by integrating and analysing both economic and social interests over the life-cycle of the facilities concerned.

The objectives of practising economists and building economists are different. Put simply, mainstream orthodox economics is the study of how people and society choose to employ scarce resources (which may have alternative uses) to produce and distribute various goods, services and factor incomes. Building

economics is conventionally said (by UK based practicioners) to be about helping clients to achieve frequently mentioned, but rarely defined 'value for money' from their new or rehabilitated buildings. This is sometimes misunderstood to be about cost minimisation. In fact in both public and private sectors it may be said to be about maximising the difference between the cost of the building to the owner, and its value, either in use or exchange. It could be argued that these two objectives are not compatible.

We have now come to a point where we can formulate a definition:

Building Economics is about economizing the use of scarce resources throughout the life cycle of a building. The most "Economic" building is the one that provides the values required at the lowest cost.

The three key words in the discipline are Life-cycle, Value and Cost. Indeed it could be said that it is the relationship between these three concepts which distinguishes building economics from related disciplines. For instance, while there have been subjects which deal with these issues separately (ie.Construction Economics, Valuation, Quantity Surveying etc.) there has been no other subject which has tried to integrate them in a logical, theoretical and yet practical way - until now that is.

THE ECONOMICS OF BUILDINGS: PRINCIPLES

Building economics is concerned with identifying optimal allocations of resources for building owners and developers. However, optimal allocation for an individual vis a vis one project will not necessarily lead to an overall optimum across his or her portfolio of investments, nor will such a local optimum have any direct bearing on the optimal allocation for a society. To put it more simply, decisions regarding the achievement of economy in the built environment must be taken very carefully due to the vast array of complexities that go to make up this environment. In my view, the two main difficulties that arise when attempting to make economic building decisions are those of heterogeneity and subjectivity. No two buildings are the same and peoples needs and tastes in buildings vary greatly. Clearly, this presents problems in attempting to formulate generic techniques for attaining economy across the building realm.We will return to this point later.

The word investment has already been mentioned. This is a very important subject in the study of building economics, for buildings are largely investment goods which are a constituent of real capital. For this reason, the theory of investment and the theory of capital are inextricably linked to the principles of building economics. However, these theories do not give the full picture. As noted by Bon: "Thus far building economics has applied standard investment decision criteria to buildings as a special class of capital assets. However, this approach is

largely ad hoc and the theoretical foundation is still lacking". He continues to say (and I agree with him) that without a clear link to economic theory, building economics will neither develop beyond a narrow domain of project evaluation (including capital budgeting and cost benefit analysis) nor gain recognition as a field of economics proper. While there are many texts on the techniques of building economics, there are very few on the underlying principles.

Time Profiles and Intertemporal Choices

The literature on 'cost planning' which grew up in the UK in particular during the 1960s was, and to a large extent still is, primarily focused on the planning of capital cost. In the early 1960s the professional institutes of architecture, engineering and surveying adopted specific procedural approaches to cost planning. These are now fully incorporated into professional practice and are used by design teams to plan and control the capital cost of building. Standard texts on the techniques of building economics include chapters on life-cycle/cost-in-use techniques.

However, the predominant perspective of building economics taken by the industry professionals is still concerned primarily with the initial cost of the building, with often little more than lip service being paid to life-cycle approaches in the UK. The practice of building economics is, in this respect, more advanced in the USA where some form of discounted cash flow life cost-benefit appraisal is required for all public sector building decisions. Reasons for agreeing in principle but not actually carrying out life cost analysis are usually to do with lack of data on running costs; failure rates and replacement cycles; the 'impossibility' of predicting the future; arguments over interest, discount and inflation rates and the tendency for decision makers to overvalue the present. This lack of application in practice is rather surprising considering the increasing evidence that the time-adjusted subsequent running, occupation and functional use costs of buildings may dwarf the initial capital costs.

If we are seriously concerned with the economic use of resources in the production and in the use of the built environment then we must take as our starting point the life cycle of the built asset. In effect, our economic model must encompass all of the costs and benefits extending over its economic life. Conceptually, this can be ex-post as an historical account or ex-ante as a tool for planning and making decisions among competing alternatives. As building economists, not historians (or accountants) we are naturally concerned with the latter case. This view has been proposed by Bon(1989) in the form illustrated below which constitutes an intertemporal input-output profile for a typical building.

The fact that there are difficulties in estimating the actual magnitude of the cost or benefit flows is not sufficient reason to ignore them completely or to confront them only in the presence of perfect information or of specific client pressure. At the end point (right hand side) of the diagram the input-output profiles intersect. This point marks the end of the economic life of the building. The benefits (outputs) derived from the production process, of which the building is a part, no longer exceed the costs (inputs) to that process. If the building remains in use after this point, it will involve a net loss to the owner. This of course is a theoretical optimum. In practice the building may have a shorter or longer life.

Buildings are long-lived capital assets. The period between decision and action, inception and occupation, use and obsolescence is rarely measured in months, usually in years or decades and occasionally in centuries. More than in almost any other aspect of human activity, time is central to the design, production and use of the built environment. The passage of time is intimately connected with social and environmental change. On a philosophical note changes in the built environment over time are one of the ways in which we gain clues to our past and its relationship to our present. These are notions which are critical to our sense of self.

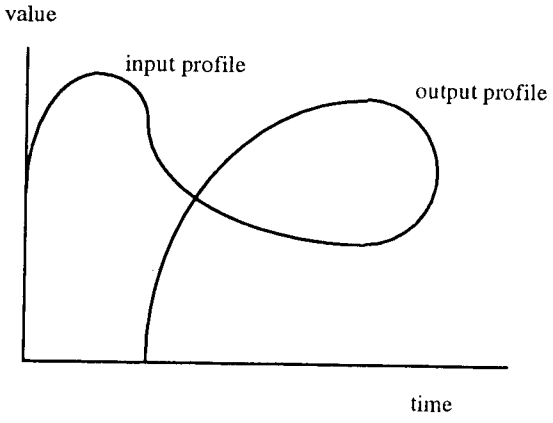

Figure 1

The time dimension has traditionally been neglected in the writing on building economics. Where it has been treated, it has usually been in the narrow realm of comparative 'cost-in-use' or 'life-cost' studies. Investment appraisal techniques which take into account the time value of money are well-known and are applied in the appraisal of construction projects.

Firstly, investment appraisal techniques which take account of the time dimension have been adopted and used in a rather ad-hoc fashion by building

professionals. Secondly, the techniques themselves are subject to criticisms, in particular due to their psychological assumptions regarding preferences as regards the future and thirdly, the recognition of the centrality and pervasiveness of the time dimension leads logically to an entirely different approach to the subject of building economics. Namely, we are forced to concede that there is little basis for deterministic plans and forecasts in an endeavour which takes place over a long time-frame in an economic environment which is itself volatile.

CONCLUSION

The fragmentation of the building professions, the building process, and the built environment is one of the fundamental problems affecting the building industry today. The underlying interconnections require systematic analysis. Building economics may not remedy all that ails in the building industry, but it may be used to diagnose what is happening around us. An economic understanding of building activity as a whole is a precondition for further improvements in economizing the use of building resources. One of the main tasks of building economics is to explain the economic causes and consequences of human action, as manifested in the built environment. Building economics provides a unifying framework for the study of building as a rational and purposeful human activity.

Buildings undergo continual alterations as they are adapted to the needs of their owners. In turn, these needs evolve in a response to continually changing economic conditions. As these changes cannot be fully foreseen, buildings must be designed and constructed so they may be adapted to a wide range of conditions that may be encountered in the underlying economic process.

The contribution of the economist so far to the problems of the building process has been small and mainly in the field of the macro-economics of the construction industry. Other large areas which should interest the economist are the economics of planning, of design, of sites and of maintenance. Economists have barely touched the realm of the built environment, although it should be an area in which they could give substantial help. After all it possesses all the ingredients (i.e.scarce resources, alternative uses and a wide area of choice) which makes economic analysis useful.

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