Chapter IV

Information Technology in Construction: How to Realise the Benefits?

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ABSTRACT
Advancement in the utilisation of computers has, in recent years, become a major, even dominating research and development target in the architecture, engineering and construction industry. However, in empirical investigations, no major benefits accruing from construction IT have been found. Why do the many IT applications, which when separately analysed seem so well justified, fail to produce positive impacts when the totality of the construction project is analysed? The objective of this chapter is to find the explanation for this paradox and to provide initial guidelines as to what should be done to correct the situation.

INTRODUCTION
Advancement in the utilisation of computers in construction has in recent years become a major, even dominating research and development target. This is clearly reflected in the number of related research undertakings, published scientific papers and in educational curricula. There are numerous conferences specifically address-
ing construction computing and integration issues. This Zeitgeist may well be illustrated with the following quote from an editorial of the ASCE Journal on Construction Engineering and Management (Farid, 1993, p. 195): “The productivity and competitiveness of the construction industry can only be improved with the transfer and implementation of computing and other advanced technologies.”

Although the ground for this optimism is seldom explicitly stated, it is easy to understand it. We all are using software, for word-processing, spreadsheet calculation or drawing, that clearly makes us more productive. Sending a letter by e-mail is speedier and less costly than using conventional mail. Indeed, there are countless information technology (IT) applications which, when the task it supports is only considered, seem to be perfectly efficient and to promise a major productivity increase.

On the other hand, investigations into the actual impacts of IT in construction reveal a not very flattering picture. Especially regarding site construction, the use of information technology has not brought any major benefits—on the contrary, it is claimed that the impacts may have been negative. Thus, the rhetoric and visions associated with construction IT have turned out to be alarmingly distant from the reality of construction IT usage. Why do the many IT applications, which when separately analysed seem so well justified, fail to produce positive impacts when the totality of the project, firm or industry is analysed? The objective of this chapter is to find the explanation for this paradox and to provide initial guidelines as to what should be done to correct the situation.

**BACKGROUND**

**The Baseline**

It is interesting that communication in the construction industry has been analysed from a socio-technical angle before the wide introduction of computers into this industry. In a pioneering study carried out by the Tavistock Institute (1966), characteristics of the structure and functions of the industry were empirically analysed. The overall approach was to consider building from a communications point of view. Interdependence and uncertainty were found to be the two important characteristics of construction. It was found that the building industry depends to a large extent on the application of an informal system of behaviours and management to work adequately. As the root cause of problems, the disparity of the characteristics of the formal and informal systems in relation to the needs of the real task with which they are concerned is put forward. The formal system (contracts, plans, etc.) does not recognize the uncertainty of and interdependence between the operations of the building process. On the other hand, the informal system of management is geared towards handling uncertainty and interdepen-