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Research on construction industry development at the crossroads

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Work in the area of knowledge concerning the improvement of the construction industries of developing countries is about a generation old. Some progress was made in its initial stages, and the prescriptions offered have been applied in several countries. However, achievements, in practice, have been disappointing. Some of the approaches used, inferences made and conclusions reached have been criticized. Moreover, whereas many current issues make the need to improve upon many aspects of the construction industries of the developing countries more pressing, interest in the field has waned. This paper considers the present state of affairs in 'construction industry development'. It discusses the reasons for the lack of advancement in the field and proposes measures which can be taken to improve upon the situation. It is suggested that key changes in approach are necessary. Some topics for *appropriate research* are suggested. The formation of a global body dedicated to the promotion, coordination and dissemination of works in the area is proposed.

Keywords: Construction industry development, appropriate research, dissemination and coordination.

Introduction

Definitions

In this paper, *construction industry development* refers to the application of the principles of economics and management to the construction industry, especially in the context of the developing countries. The construction industries of all countries face many difficulties and challenges (Gale and Fellows, 1990; Ofori, 1990), and research continues to be undertaken in order to address the situation. However, the problems facing the construction industries of the developing countries are infinitely more fundamental, more serious and more complex, and their solution much more pressing than those confronting their counterparts elsewhere.

Construction industry development finds effect in the broad field of research, policy formulation and programme implementation undertaken with the view to improving the construction industries mainly in the developing countries. Although a useful generic term, the title 'construction industry development' is not universally accepted. For example, Kirmani (1988) refers to a 'construction industry project', the main

objective of which is '... to develop the *capacity* and *efficiency* of a country's construction industry for implementing its investment programmes effectively' (p. 8).

The nature of construction industry development

Origin and impetus

Research and published works in the field of construction industry development followed the advent of studies on socio-economic development in the late 1950s. The first of such works were in national development plans (Government of the Gold Coast, 1951; Ministry of Finance, 1961) or reports of special committees (Commission of Inquiry, 1960; Department of Economic and Social Affairs, 1962). These publications mainly reviewed the performance of the construction industries, identified the problems confronting them, and offered shopping-list type recommendations for their improvement. However, the little interest there was in the field appears to be waning, not only among researchers, but also among sponsors. For example,

local construction industry studies undertaken in the 1970s and early 1980s, in some cases sponsored by donor agencies (Ministry of Works, 1977; Ofori, 1981), have fallen out of favour.

The impetus for research in construction industry development, at various points in time, has come from several sources including: (a) the need to address the appalling housing conditions in many countries (Department of Economic and Social Affairs, 1962; Abrams, 1964; UNCHS, 1990a); (b) recognition of the role construction plays in national economies and socio-economic development (Turin, 1973; Edmonds, 1979; World Bank, 1984; Ofori, 1990); (c) concern about the poor performance of the construction industries compared with their counterparts in the industrialized countries (Ofori, 1990); (d) desire of donors to obtain best value for their development assistance (Ministry of Works, 1977; Ofori, 1981; World Bank, 1984; Kirmani, 1988); (e) realization that buildings and infrastructure require maintenance during their life-cycle (School of Building and Estate Management, 1991); (f) potential for using construction programmes to alleviate poverty (UNCHS, 1984; 1990a); and (e) the role of construction in achieving sustainable development (UNCHS, 1990b).

The reasons for the noticeable decline in interest include: (a) the failure of earlier attempts in construction industry development to succeed (Ofori, 1990); (b) shifts in the attention of donors (UNCTAD, 1990); and (c) the decline, since the early 1980s, in the demand for construction in most developing countries (although needs have risen) (Ofori, 1984).

Problems facing the construction industries in the developing countries

Earlier writers identified several inter-related problems facing the construction industries of the developing countries (Department of Economic and Social Affairs, 1962; Abrams, 1964; United Nations Industrial Development Organization, 1967; Andrews *et al.*, 1972; Turin, 1973; Ministry of Works, 1977; Edmonds, 1979): (a) frequent shortage of construction materials resulting from the preference of users for conventional materials, most of which were imported; (b) low level of technological development of most of the industries, with shortages of plant and equipment, inadequate R&D facilities and programmes, and poor linkage between research and practice; (c) lack of skilled construction personnel, and a poor social image of construction; (d) an unfavourable operating environment for construction enterprises, with complex procedures and regulations, delays in payments, and unsuitable contract documents; and (e) low and fluctuating overall levels of construction activity.

The writers considered the solution of these problems to be necessary if the construction industries of these countries were to make progress, and in the 1960s and 1970s, hopes were high among researchers that this could be achieved relatively easily, quickly and inexpensively. Turin (1967) observed that: '... in many African countries a satisfactory human environment in urban areas could be obtained at half the present cost' (p. 213). Bhalla and Edmonds (1983) remarked that it was:

... paradoxical in view of the industry's undoubted potential for employment creation that on average the proportion of the population employed is five or six times lower in the least developed countries than in the developed ones (p. 201).

Now, as discussed below, some writers tend to be more sanguine. But it would appear that not all of them are. For example, Wahab (1990) observes:

Nigeria is blessed with many raw materials ... that can easily be transformed into new building materials affordable by its teeming population. Nigeria does not have to spend its reducing foreign exchange earnings on importation of building materials to satisfy a taste acquired during the oil boom. The action to be taken is urgent and should be decisive to salvage the construction industry from its present low ebb – retrenchments, under capacity and consequent dampening of [the] national economy (p. 184).

As can be surmised from Wahab's comment, the problems which have recently been identified as facing the construction industries of the developing countries are no different from those pointed out in the earlier works.

Recommended solutions

Most of the recommendations made by writers concern policies, programmes, schemes, techniques, and so on, but invariably fail to consider the methods, procedures and administrative systems by which these can be implemented or the resources which would be required (Kirmani, 1988). Among recent works, Rau (1990) provides a shopping list for India which is reminiscent of those of the 1960s and 1970s (Abrams, 1964; Ministry of Works, 1977), and not dissimilar to the list prepared by the Asian Productivity Organization (1983) after it had studied the construction industries of a number of Asian countries, as well as that of Kirmani (1988).

The recommendations concentrate on what the government should do, and do not give due consideration to the possible role of the industry itself (Ofori, 1990). They also dwell upon the government's role, with inadequate discussion of how the construction industry itself can contribute towards its continuous development. Moreover, they are presented as a total packages,

without any attempt to prioritize them. None emphasize the need to implement programmes on a rolling basis, with appropriate monitoring, control and periodic review.

The UNCHs (1990a) is one of the few recent writers to adopt, and advocate, a realistic approach. It emphasizes the need for realism, foresight, comprehensiveness, gradualness and flexibility. It proposes a practical and integrated approach, based on achievable targets and realistic courses of action formulated on the basis of an appreciation of the prevailing situation the available resources and the operating environment, with provision for periodic review of progress to enable consideration of any issues and problems which might have emerged, and further action.

Practical achievements

In some developing countries the recommendations offered for the improvement of the construction industries have not been implemented, and many policies and regulations are not put into effect. However, in most developing countries, policies have been formulated, agencies have been set up, and programmes and schemes have been implemented to improve upon the construction industries, with less than encouraging results. The UNCHS (1985) observed that the construction industry in most developing countries has inadequate capacity, has high costs, and is import dependent while failing to utilize local resources. The World Bank's programme of construction industry development, launched in 1973, has been reviewed on many occasions. By 1988 there had been 169 projects, including 56 studies of construction industries in various countries, 85 operations of financial assistance to individual contractors, 22 operations for promoting labour-based construction and 6 free-standing construction-related projects. In a review of its assistance programmes, the World Bank (1987) found that:

... despite a sound policy, comprehensive guidelines, numerous operations and almost a decade-and-a-half of operational experience, the Bank's goal of promoting the construction industry was still elusive (Kirmani, 1988: p. 1).

The very few countries where construction industry development has been successful include Singapore, where efforts continue to be made to further a relatively sophisticated industry (Ofori, 1988; Miles and Neale, 1991).

The lack of practical progress in construction industry development is discussed in greater detail in another (forthcoming) paper by the present author. It is clear, however, that the failure of the research undertaken so far to advance the field of knowledge is a contributory factor.

State of affairs in the field of study

The study of construction industry development has made remarkably little progress in the past decade or so, although, as discussed below, the problems it seeks to address have widened in extent, scope and depth, and their solution has become an even more pressing matter. In this section, the current state of affairs in the study of construction industry development is discussed.

Lack of progress in research

A few signs of progress are evident in the study of construction industry development, as some of the original ideas have been amended somewhat. For example, after a long period in which the role played by the construction industry in national development and the need to expand its output were stressed, it has become clear that:

... construction cannot simply be given a boost in order to promote growth, or carefully nurtured into the role of 'leading sector', unless it is as part of a planned strategy of the process of *creation of an indigenous construction capacity*, with minimal reliance on imports (Wells, 1985: p. 69).

However, there are indications that the field of study has failed to develop. Some of these indications, and their underlying reasons, are now discussed.

Context

Most writers fail to investigate the problems facing the construction industries to identify factors lying at their root(s). For example, with regard to building materials, the more obvious difficulties and constraints are usually referred to. These include reliance on conventional materials despite abundance of raw materials for local varieties, resulting in reliance on imported materials and high building costs, and the continued application of building regulations forbidding the use of local materials resulting in the low level of their utilization. However, the issue is much more complex: Abrams (1964) had observed that it was difficult to wean clients and users from the conventional varieties which they associated with progress. Ofori (1985) and Chemillier (1988) made similar comments. Figure 1 shows the factors underlying the problems facing the developing countries in relation to building materials.

The construction industry is often studied in isolation, and analysed in terms of its (internal) strengths and weaknesses. The many studies which have shown that construction has complex horizontal and vertical linkages to many parts of the economy (Germidus, 1974; World Bank, 1984; Toh, 1988; Park, 1989; Ofori, 1990) are not used by researchers. In most countries, many of these related sectors of the economy are also undevel-

oped and Ofori (1990) suggests this is an important contributory factor to the obvious difficulties facing their construction industries. To improve construction, many other sectors of the economy require attention, and some of them need to be given a boost earlier than construction, and others later. There is the need for a complex synchronization of policies and initiatives (Hillebrandt, 1984), but few studies consider this.

Need for country specificity

Writers often fail to consider each country as a separate entity with peculiar problems, resource endowments and operating conditions. A typical *construction industry in a developing country* has emerged. The solutions offered are the same, although Abrams (1964) had warned that such prescriptions made for a number of countries had failed to work owing to problems with their implementation in the countries' peculiar conditions. Moreover, such deterministic approaches to socio-economic development have been discredited (Ofori, 1991). Owing to the different economic, social, historical and political factors prevailing in each of the countries and influencing its construction industry, the factors underlying the problems and issues – and thus the possible solutions – differ from one country to the next (Kirpich, 1987). Imbert (1990) suggests:

... the opinions, prejudices and values prevailing in a particular society, the existing organisation of the construction industry, the vested interests of builders and materials suppliers and the system of education and training of professionals and craftsmen exert a powerful influence and need to be carefully and extensively studied before action is taken (p. 223).

Thus, Walker (1990) observes:

Strategies for enhancing construction industries in developing countries have proved problematic for many years. It is now widely accepted that each country represents a distinct problem with its own constraints and opportunities (p. 225).

Statistical analyses

As discussed above, statistical data on construction are analysed and used to highlight the importance of construction, to underline the linkage between construction and economic growth and development, and to suggest that national policies should accord construction greater importance (Edmonds, 1979; Edmonds and Miles, 1984; World Bank, 1984; UNCHS, 1986).

While, in a few cases they have been tested by being applied to data on particular countries (Ofori, 1988; Fox, 1990), the statistical analyses first undertaken by Turin (1973) have been repeated (Edmonds and Miles, 1984; World Bank, 1984; Wells, 1984; 1986; Cochrane and Wali, 1986), and the same inferences and not dissimilar conclusions reached. However, as discussed

above, many of the approaches have been shown to be invalid. More recently, Low (1990) has analysed construction data from several countries and reached several relevant conclusions, and Al-Mufti and Cochrane (1987) have offered a simple simulation tool to aid economic and construction industry planning. The authors have also generally failed to extend their studies, comparative or otherwise, to offer useful suggestions as to appropriate policy and measures. For example, the implications of the following findings which the studies make are not discussed: (a) the total world output in construction has grown considerably (Bon, 1990); (b) the developing countries account for a disproportionately small part of global construction output (Andrews *et al.*, 1972; Bon, 1990; Low, 1990); and (c) the rate of growth of construction output in the developing countries over the past decade is higher than that for the industrialized countries (Low, 1990).

Research versus practice

One of the reasons why little progress has been made in practical efforts relating to construction industry development is the gap between basic and applied research, and development in construction, and practice (Chemillier, 1988). Berhane (1988) laments the inadequate dissemination of research which hinders the implementation of their results, and ultimately, technical cooperation among the developing countries. Thus, the body of knowledge on construction materials and technology sits in juxtaposition with unmet construction needs of all kinds.

A major factor is the way in which R&D is undertaken. Construction R&D in these countries has little commercial orientation, and concentrates on technical issues. The development of 'local materials' and 'appropriate technologies' is pursued in isolation from the potential users, with little consideration of such economic realities as quality, productivity, efficiency and commercial attractiveness of the material or built item to potential clients and users. Moreover, there is little conscious effort to integrate local procedures, documentation, techniques and so on, with those acquired from abroad (Chemillier, 1988).

Over-extension

Some writers on construction industry development use data or observations relating to a few countries to reach conclusions on all or 'most' of the developing countries. For example, a recent writer verifies a hypothesis that:

... every nation passes through a more-or-less similar lifecycle of investment behaviour [the] basic stages of [which] may be illustrated with the aid of the following ... measures:

(A) the ratio of gross fixed capital formation to gross domestic product;

(B) the ratio of construction investment to non-construction investments; and

(C) the ratio of housing construction investments to non-housing construction investments (Batten, 1990: p. 4)

with information from three countries: Canada, 'an industrialized country with a capitalist regime'; Sweden, 'a post-industrial society with a socialist regime'; and Yemen Arab Republic, 'a developing country with a tribal society led by a benevolent military dictator' (Batten, 1990: p. 6).

There are also many cases where the conclusions made by researchers are too sweeping. For example, after studying labour/capital combination patterns adopted in a number of countries for the construction of a basic dwelling unit, Strassman (1985) offered suggestions not only for choice of technology in construction in general, but also for national labour and wage policies for a country as it develops.

Duplication

The earlier writers' warnings are not being heeded, and their achievements are not being built upon. Many writers, while claiming to be pioneers in certain aspects of the field, add little to what was known in the 1960s and 1970s as a result of work done by, among others, the United Nations *Ad Hoc* Group of Experts (Department of Economic and Social Affairs, 1962), Abrams (1964), Andrews *et al* and Turin (1973). For example, papers in the field continue to repeat the observations of earlier writers (without always referring to previous writers) by reiterating, usually with statistics, the important contribution the industry makes to the national economy, to capital formation, and to overall socio-economic development (Edmonds and Miles, 1984; World Bank, 1984; Bon, 1990; Rau, 1990). Thus, the level of analysis has remained basic and rather simple. A major state-of-the-art article by Kafandaris (1980) has not since been built upon. In some aspects of construction industry development, notable R&D into *appropriate* construction materials and techniques, it is clearly more pressing to document and disseminate work already done than to undertake more research (UNCHS, 1988).

Gaps

Many important issues have not been addressed. One of these is the role of the construction industry in a developing country facing medium-term economic stagnation or decline, or one with severe adjustment problems, a common enough situation (Ofori, 1984). The existing paradigms assume a situation of continued economic growth as they suggest increased and stable investment in construction, further spending on training, support for R&D, expanded contractor-development programmes, and so on (Ofori, 1990).

In discussing the role of construction in the econo-

mies of the developing countries, writers fail to follow up observations with relevant further investigation or consideration of wider consequences or policy implications. For example, having 'discovered' the 'middle-income country bulge' (Strassman, 1970), the issue of what would happen beyond the 'bulge' (i.e., after the period of high construction activity) has not been discussed. The case of Singapore shows that this may not be what is expected. After Singapore had used the construction industry as a 'motor' of its economic development, construction experienced a prolonged recession (1985–88); the industry has become a 'problem sector', as low productivity in construction is considered one of the four main difficulties of the national economy (Economic Planning Committee, 1991); and its reliance on foreign workers is a national concern (Construction Industry Development Board, 1988).

Existing paradigms on the 'structural' changes in the construction industry of a developing country as the national economy develops over time are based on cross-country data rather than any one country's time-series statistics. They relate mainly to: (a) levels of activity (Strassman, 1970); (b) mix of demand (Turin, 1973; Hillebrandt, 1984); (c) contribution to the economy (Turin, 1973; Edmonds, 1979; Edmonds and Miles, 1984; Wells, 1986); and (d) contribution to overall employment (Turin, 1973; Edmonds and Miles, 1984). These works have been criticized, mainly in terms of the basis of analysis adopted (Drewer, 1975; 1980; Ofori, 1990). Moavenzadeh and Hagopian (1984) provide a rare paradigm of the stages of growth of a construction industry from 'sectoral underdevelopment' to a stage of 'maturity', based on the development of the capability of local construction companies to undertake projects both at home, and, later, abroad. However, the model concentrates on contractors, and also its consideration of the ability of local construction enterprises to undertake projects abroad as the ultimate aim of construction industry development may not be appropriate everywhere. Realistic and useful conceptual constructs of the structural changes in the construction industry of a developing country would provide a useful basis for policy formulation, as the policies and measures which would be required to effect progress at different stages of the industry's development would, naturally, differ.

The way forward

Need

To a certain extent, the development of the field of study relating to construction industry development is hindered by the lack of advancement in the area of

knowledge on the economics of the construction industry in general (Construction Industry Development Board, 1988). Considering the urgency of the problems facing the developing countries research works should be undertaken with a greater sense of purpose and a desire to contribute positively to the field of knowledge, to create its building blocks of theories and concepts, to verify and prove them, and to apply them to further advance the field. Greater sympathy with, and feel for, the problems of, and issues facing, the developing countries should permeate the work of all researchers in the field of specialization. Whereas country- or project-based case studies are useful, they should: (i) attempt to conceptualize key findings to develop (or test) paradigms, principles or axioms; and (ii) consider policy implications. Occasional state-of-the-art, stock-taking papers would help to assess progress in the field, review emerging theories and paradigms, and indicate suitable areas for further research.

In this section, an attempt is made to outline some ways and means by which the field of study can be advanced further. Necessary changes in direction in ongoing research are first considered by discussing relevant current issues relating to the developing countries. New areas of research are then suggested.

Relevant current issues and research directions

The circumstances of the developing countries should be taken into consideration by researchers in the field of construction industry development. Some of the relevant issues are now considered. After the discussion of each issue, key new directions of research are identified.

Economic considerations

The condition in, performance of, and prospects for, the economy have implications for construction (Hillebrandt, 1984). Thus, construction industry development should be considered in the context of the national economy of the country (or countries) concerned. In most of the developing countries, governments, with the assistance of external lending agencies, are taking action to address their severe structural economic problems (World Bank, 1990). Governments' budgets are being trimmed, and construction is not being spared in these exercises. In Nigeria, the government has reviewed its low-cost public housing policy as finance is short following the sharp decline in oil revenues, opting for cost recovery (Agbola, 1990). Indeed, considering the desperate nature of the situation in many countries, some writers urge a fundamental rethink of many construction-related issues. The UNCHS (1987) advocates self-help programmes, informal sector participation, privatization of services, user-charge and cost-recovery financing.

Construction should contribute to the effort towards improving upon the national economy. It should also play a role in the urgent attempt to alleviate poverty. It should create income in both the urban and rural areas, and especially the latter. In this regard, the features of construction can be made better use of. For example, the need for constructed items to be fixed to their locations and the possibility of using a wide range of technologies can be exploited to create jobs directly among the populace wherever new construction works are undertaken, as well as in the maintenance of existing facilities. Moreover, there is scope for jobs to be created in the manufacturing of materials, tools and simple equipment. Harper (1988) describes a scheme which successfully transformed a settlement of ostracized lepers in Nigeria into a commercially successful and nationally renowned unit which produced high quality bricks. New approaches are required in such areas as: the organization of self-help construction projects (Derrier, 1985; Yap, 1987); community involvement in housing (Materu, 1986; Rakodi, 1990); development of cooperatives (Harper, 1988); extension services and creation of markets for the surplus manufactured items (UNCHS, 1984).

Global trends

Most of the current construction-related issues in the industrialized countries, such as *the environment* (discussed below), technology development, productivity enhancement, restructuring of the industry through appropriate procurement arrangements (discussed below) and management of sectoral recessions are also of interest to the developing ones. Indeed, Lansley (1990) observed that the line often drawn between the issues concerning the construction industries of the two groups of countries is arbitrary.

Globalization of construction has scope for being exploited for the benefit of the developing countries. The business opportunities relating to it are most often stressed nowadays (Rashid, 1991), after earlier references to its technology transfer potential (Cockburn, 1970; Abbott, 1985). Emphasis also appears to be put on firms from industrialized countries operating abroad, whereas the process is far wider and much more complex. For example, firms from such developing countries as China and India have featured prominently on the international construction scene. The concept of globalization in construction requires further study and development with the view to maximizing its potential benefits to the developing countries.

Restructuring

The structure of the construction industry of each developing country (in terms of the role of the partici-

pants) is based on that of the former metropolitan power. Some changes have been made to the basic structures (or are being advocated) in the countries from which they originated (Gale and Fellows, 1990; Lay *et al.*, 1991). However, the structures seem to have been frozen in the developing countries. The UNCHS (1981), Wells (1986) and Ofori (1990) are among the few writers who highlighted the need fundamentally to restructure the construction industries in the developing countries, in Wells's case, with state-dominated, industrialization-based design-and-build. In the light of recent world events, such an approach is unlikely to find favour in many countries. Nevertheless, restructuring remains a relevant issue. Such restructuring would have implications for education and training. The developing countries should produce professionals and technicians relevant to their needs. In each country, work is required on the structure and syllabi of suitable construction-related courses.

Environmental issues

The construction industries in the developing countries should contribute towards the overall effort to achieve sustainable development (Ofori, 1992). In these developing countries, inadequate physical infrastructure poses considerable environmental problems. It is estimated that some 55 per cent of rural and 40 per cent of urban populations lack access to safe water, and that a high proportion of diseases are attributable to the ingestion of contaminated water (UNCHS, 1990b). Moreover, over 2 billion persons may be without sanitation by the year 2000 (UNCHS, 1990a).

The environment-related tasks facing the construction industries in the developing countries are legion. Among other things, there is a need for appropriate, low-cost and easily maintained coastal protection and drainage systems, sanitation technologies based on non-water borne systems and a general public infrastructure network (Ramachandran, 1990). Construction projects in these countries should be planned, designed and constructed with due consideration to sustainability (Ofori, 1992).

New areas of research

Ideas are required which will help the construction industry in each developing country to perform to its full potential within the constraints prevailing in its operating environment which, from all indications, are unlikely to be resolved soon (and may get worse). A new kind of applied *appropriate research* is required. These should seek to recognize the circumstances of the developing countries, and to adapt and use the available analytical techniques to help solve the difficulties facing their construction industries.

It is necessary to conceptualize the construction

industry and to develop a sound common theoretical framework for its analysis to provide a basis for research, policy formulation and management of its development. Another study would relate to the development of conceptual models of the stages through which a typical construction industry passes as it progresses from 'sectoral underdevelopment' to 'maturity' – based perhaps on the experiences of the few industries which have completed the transition, such as Singapore and Brazil. It is also necessary to analyse the role construction can play in helping nations out of long-term economic problems, and how the industry can be improved in such circumstances.

Comprehensive studies of national construction industries should identify the basic factors influencing such issues as prevailing levels of productivity, costs, technology development, and so on, and thus provide the basis for policy formulation and corporate operating tactics. Research is also required into the best way in which the recommendations made for any particular country or for the developing countries in general can best be implemented. Some of the topics include: the nature, functions and relationships among the appropriate agencies; suitable schemes and the related regulations; the necessary resources and ways of mobilizing and/or developing them; and the role of the industry and how to effect cooperation across disciplines.

Studies are required into appropriate construction materials and techniques which, again, go to the roots of the issue, develop the relationships among the relevant factors and propose suitable policies. The design of suitable educational courses for producing essential technical personnel is another relevant area of research. Also pertinent is research into ways and means of making R&D more effective, improving the dissemination of results and effecting their application.

Further research is required at the level of individual construction-related subjects as well. For example, in construction management, studies are necessary to develop construction project management techniques which take into account the existing constraints in the industry. These include: (a) risk analysis and risk management, estimating and tendering approaches which are applicable in a field of imperfect information, unpredictable client behaviour and uncertain project circumstances; (b) cash-flow techniques which allow for delays in payments; and (c) scheduling techniques which consider shortages of materials, labour or plant, and facilitate relevant materials procurement, storage or stockpiling practices.

Coordination and dissemination

There is a need for the consolidation, promotion and coordination of research and practice in construction

industry development on a global basis with a view to positively helping the body of knowledge to advance and to achieve progress in practical application. Whereas the UNCHS, which seems to have assumed this responsibility, has a section devoted to the construction industry and its work generally focuses on the needs of the developing countries, its tasks are much wider. Some aspects of the issue are also 'dealt with' by other agencies such as the United Nations Industrial Development Organization (development of materials manufacturers), the International Labour Organization (management development) and the World Bank (development of the entire construction industry) which, again, have much wider portfolios and tend to pay very little attention to construction industry development. Some non-governmental organizations, such as the Intermediate Technology Development Group (ITDG) include construction among their areas of interest and activity. Yet others, such as the Technology and Development Institute of the East West Centre in Hawaii, are only regional in their coverage.

The establishment of an international body devoted solely to construction industry development appears necessary. It should be a *practice-based research* body which would be a central point of focus and dynamism for research and practice in construction industry development. It would act as the 'client' for such research, setting broad directions, stimulating, promoting, monitoring, coordinating and, in some cases, arranging sponsorship for, research. Also necessary is a permanent global discussion group similar to the Association of Researchers in Construction Management (ARCOM). This could be a Working Commission of the International Council for Building Research Studies and Documentation (CIB). The coordinating organization and discussion group would require seed-capital grants from donors, and can finance their activities from consultancy and R&D services, and from publications and conferences and short courses.

Information on research and practice in construction industry development is currently found in a number of journals, in each of which the coverage is clearly inadequate. An international refereed journal devoted entirely to the field – and with an emphasis on applied research of immediate practical relevance – is required.

Conclusion

Efforts to develop the construction industries of the developing countries have generally failed to succeed despite, in many countries, perseverance in the implementation of what appeared to be 'correct' policies, measures and schemes (based on the recommendations of researchers), and the allocation of considerable

resources. From the experience of the developing countries so far, it is clear that construction industry development is a long-term task.

The study of construction industry development has not advanced: there is an ironic juxtaposition of overlaps in some areas and gaps in others. The field lacks an articulated theoretical basis. Interest in the field, which was never high, also appears to be on the decline. On the other hand, many issues have made even more pressing, the need for an effective and efficient construction industry in each of the developing countries. The construction industry should play its role in economic restructuring and regeneration in the developing countries, and in the effort to achieve national self-reliance. As the economic, social and technological prospects of these nations are generally not bright, the industry should make this contribution, despite the continued existence, and in some cases worsening, of the difficulties which were once considered to be relatively easily soluble. There is a need for research work in the field of construction industry development to be intensified. Realistic new approaches are required. There is also the need for works on the field to be coordinated and better disseminated.

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