



Sustaining infrastructure through enterprise

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PERHAPS THE MOST disadvantaged of the 'unreached' are low income urban groups, who suffer inadequate housing and infrastructure and have no way to mobilise their limited resources so as to create a market demand that could be met within their communities. Although unreached, they have not been completely forgotten. Numerous individual development projects have aimed to provide low cost housing and infrastructure, and there have been successful attempts to upgrade squatter areas and to establish building maintenance capacity.

Despite this attention, the global problem continues to grow. An ILO paper entitled *Room for Improvement* described the problems faced by women working in the construction industry in Bombay, for whom "a shed on a building site can be a desirable residence in a city where it is not even possible to sleep on the pavement without paying an unofficial "rental", and who accept sub-standard wages and working conditions just for the opportunity to have some kind of roof over their and their families' heads."¹

This paper is founded on the proposition that the creation of some form of market demand and equilibrium is a prerequisite for any form of sustainable solution to the problems of the urban poor. The immediate beneficiaries of an attempt to reach this substantial and growing number of the unreached will be the individuals (and their families) who obtain employment with the various contractors who will undertake tasks to meet the newly-channelled demand. However, an increased role for the private sector will also help public sector agencies and municipal authorities to serve their constituent communities more effectively.

Following a discussion of the interaction of market forces with the process of urbanisation, this paper draws upon four strands of development thinking; the emerging discipline of urban engineering, the development of small-scale construction enterprises, the scope for employment creation through the utilisation of labour-based construction technologies and the need to understand and interpret the complex interplay of institutional pressures through the application of the open systems theory of organisation. It also draws upon the author's experience as Director of the Loughborough-based *Management of Appropriate Road Technology (MART) initiative*, and proposes a tentative approach to collaboration on a parallel initiative entitled *Sustaining Infrastructure Through Enterprise (SITE)* to reach the urban unreached.

Market forces and urbanisation

It is an illusion to suppose that the growth of urbanisation can be forecast, planned and controlled with precision by governments, and the experience of the past decade confirms that substantial reliance on continuing public sector funding is not a realistic option. A partnership of authorities, enterprises and beneficiaries must be developed that optimises the available labour, material and financial resources. There is a growing realisation that decision-making should be decentralised and that implementation is most likely to be effective where market forces are mobilised.

Markets do not solve all problems. Although markets allocate goods efficiently, they often also entail substantial transaction costs. Discussing the work of economist Ronald Coase, Francis Fukuyama notes that "market transactions entail costs of matching buyers and sellers, negotiating prices, and finalising deals in the form of contracts."² Fukuyama goes on to argue that trust and "sociability" are variables between societies, and that the effectiveness of markets depends heavily on these qualities.

Nevertheless market economies are here to stay, and the evidence accumulates from around the world that a split of responsibilities between purchaser and provider yields real cost and quality benefits for clients and customers. The alternative of command and control economies has had its chance, and had its day. The challenge is to find a way to make markets work fairly and equably for all the parties concerned. A market needs clients, and, perhaps, independent regulators but above all it needs competent and competitive contractors.

What type of contractors are required? Experience shows that the promotion of small, labour-based private contracting firms to construct and maintain urban infrastructure offers a number of advantages:

- It encourages competition and challenges inefficient public sector monopolies.
- The improved maintenance and condition of the urban infrastructure eases constraints to industrial development.
- The growth of local small scale and flexible private sector capacity encourages local decision making and management of works, and renders the system less susceptible to manipulation through large scale procurement of contracts.

- Labour-based works provide the unskilled poor with employment opportunities. The resulting infrastructure improvements enable other poverty reduction initiatives to be implemented.
- Labour-based programmes provide opportunities for the development of transferable skills.
- Labour-based programmes generally have a good record in providing employment opportunities for women.
- Small-scale operations using local resources tend to be relatively environmentally friendly. The emphasis on maximising the productive use of local skills results in a significant positive environmental impact.
- Small local enterprises tend to be more productive and to make more effective use of local materials, while minimising reliance upon expensive and inappropriate or imported equipment.

Four strands of thought

At this stage it is helpful to briefly review four strands of development thinking, which we can draw together to propose an integrated approach:

- Urban engineering
- Contractor development
- Labour-based construction technologies
- Organisation theory

Urban engineering

This topic has predominantly been approached from the standpoints of development economics or physical planning, and has been relatively neglected by engineers, management and organisational development specialists. One useful practical guide is *From Want to Work: Job Creation for the Urban Poor* which argues for a *dual strategy* with a clear distinction between **major works** (main roads, storm drains, new housing etc.) and **minor works** (minor infrastructure, lateral drains, house improvement and maintenance, etc.). This guide emphasises the link between employment and infrastructure and the scope for promoting gainful employment through three groups of small businesses:

- Small-scale enterprises (construction);
- Small-scale enterprises (building materials); and
- Small-scale enterprises (recycling).³

Urban growth involves a network of complex inter-relationships, and there is a challenging role for the professional engineer in understanding and meeting the problems posed by this growth.

Despairing of a solution, but anxious at least to attempt to ameliorate unsatisfactory living conditions, those responsible for formulating and directing programmes for the poorest of the poor usually fall back on social programmes of one kind or another, where cost limits can be set simply according to the amount of funds that they have at their disposal. These programmes certainly 'do

good', in the sense that better housing, better health and better education are all real benefits, but they do not address themselves to the basic need for capital formation that would in the long run help these people to help themselves.

Are there any pointers towards a solution? It does seem clear that direct inputs of cheap, simple technologies will be effective only if they are made within the framework of a workable market in which the providers of products and services have a reasonable prospect of a continuing demand. Unfortunately there remains a dearth of conceptual work, practical research and case studies on the task of urban engineering, and there is a need for a network to facilitate interchange of experience on the engineering and management aspects of urban growth.

Contractor development

The earlier arguments imply that governments must work with and through the private sector. International recognition of the important potential role of small-scale construction enterprises has evolved gradually over the past quarter century, as has the appreciation that small enterprises and communities can - and should - be mobilised to meet realistic market demands with minimal continuing external control and regulation.

Clearly the small enterprise sector is not in itself a new phenomenon. Small contractors have been a part of the construction scene for as long as there has been anything of a market economy for infrastructure. The difference is that the fashion for centrally controlled and planned economies led policy-makers to regard small entrepreneurs as, at best, a nuisance. Now there is a growing appreciation that a network of competent and competitive small contractors is a key resource, and if the network does not already assist it must be created. With this major change in development thinking in mind, it is instructive to briefly review some international experience in the development of small infrastructure contractors.

In 1969 the ODA supported a pioneering project of the recently-formed Intermediate Technology Development Group (ITDG). This project, entitled 'Building for Development', included field work in Nigeria and Kenya and resulted in three business-oriented books for the small Building Contractor.⁴ The ITDG initiative stimulated interest in construction industry development among international agencies, and in 1980 the ILO initiated its Construction Management Programme (CMP).

The genesis of the CMP is described in the ILO book *Building for Tomorrow*.⁵ Over the years it has produced a series of studies which include an examination of the special constraints facing indigenous construction industries entitled *Foundations for Change*⁶, a review of the problems facing small contractors in *Guide-lines for the Development of Small-scale Construction Enterprises*⁷, and a range of training material including the *Inter-active Contractor Training (ICT)*,⁸ *Improve Your Construction Business (IYCB)*⁹ and *Routine Maintenance and Regravelling (ROMAR)*¹⁰ modules.

Labour-based construction technologies

Interest in labour-based technologies has grown steadily over the past 30 years, since the publication of the ILO study *Men Who Move Mountains*¹¹ and was further stimulated by the work of E.F.Schumacher and ITDG on 'economics as if people really mattered'. Desk and pilot field studies followed in the 1970s, leading to publications such as J.J.de Veen's study *The Rural Access Roads Programme*¹², based on Kenyan experience, and practical execution of field projects (predominantly by direct labour, but more recently involving local contractors).

The use of appropriate road construction and maintenance technologies was hitherto generally ignored, except in countries, such as India, where they were already integrated into engineering practice. But, even in such countries, their use tended to be a cause for shame rather than pride, mainly because of the belief that labour-based technologies are backward and inferior in terms of quality and productivity.

In addition to this negative attitude, there were a number of institutional constraints. First a serious shortage of local technicians. Second, the administrative systems in the construction industry, such as personnel management and procurement, were often geared to the use of capital-intensive methods. Third, research on the improvement of traditional technologies was (and to an appreciable extent remains) very limited, which is reflected in the fact that tools and equipment are often not suited to heavy construction work, and organisation and management techniques have not been adapted to suit the use of labour-intensive methods. Finally, financial assistance to development programmes is often tied to the purchase of foreign equipment.

The initiation of the Kenya Rural Access Road Programme led to a major breakthrough, because it provided an opportunity to test the results of earlier research on a large scale and to prove that labour-based technologies are not inferior.

Since then the results of these controlled experiments has stimulated an increased interest in the potential of labour-based methods, and an appreciation of their role in the repertoire of technologies available to the professional engineer. In countries which have always made use of appropriate technologies, there has also been an understanding that the application of these technologies presents demanding and useful topics for research and development.

Where research of this kind has been carried out, it has been shown that the quality of labour based works can be comparable to equipment based works. However, good performance and low costs require the establishment of suitable motivation and human resource management, as well as the development of appropriate forms of organisation.

Technology options

Road construction and maintenance technology in developed countries tends to be based on single activity, high

cost, sophisticated items of equipment that maximise the use of their most expensive resource - manual labour. The alternative technologies discussed in this section have been, or are being, established in a number of developing countries. Alternative technologies make better use of the low cost and flexibility of labour to be trained and deployed to carry out a range of activities, using appropriate handtools and intermediate equipment.

Organisation theory

The Tavistock Institute pioneered the development of the open systems theory of organisation and an important early study by Eric.Miller, *Integrated Rural Development: A Mexican Experiment*¹³, has recently been published in English for the first time. Although this related to rural development, the idea of seeking to model the complex interplay of economic, social and political factors is equally - if not even more - relevant to understanding the process of urbanisation. Miller's *From Dependency to Autonomy: Studies in Organisation and Change*¹⁴ is also very relevant in pointing the way to self-reliance and sustainability.

It is interesting to note that, within most of the Tavistock Institute's organisational clients, attempts are currently underway to change multiple aspects of organisation and technology.¹⁵ Executives and senior managers would like to implement strategic plans that will maintain or improve performance in an increasingly challenging political and economic environment. Such strategic change, sometimes called a 'cultural change', usually involves realignment of organisational structure, work design, decision-making flows, communication procedures, and employees' attitudes and behaviours. As nearly all significant aspects of organisation are implicated, leaders face the challenge of organising for the task of managing comprehensive developments and change.

In the new era, organisations have 'no choice but change'. It is not surprising that the individuals concerned complain about 'too much change, too fast'. In an era of change, the strand of organisation theory must be woven into our suggested solutions.

Time for a new initiative?

What is to be done? Perhaps the first step is to codify and extend existing knowledge on the interaction of technical and organisational development issues for private infrastructure development. To this end it may be helpful to draw draw some lessons from the Management of Appropriate Road Technology (MART) initiative.

MART

Many developing countries are characterised by deteriorating economic conditions, a crippling scarcity of foreign exchange and an abundant supply of cheap labour. Efforts have consequently been directed towards developing and disseminating technologies which make more effective use of local resources (particularly human resources). Over the past twenty years, labour-based road

construction and maintenance technologies have been proved to be effective and economic in a wide variety of countries, and demand for advice and assistance on their implementation continues to grow.

Since the focus has been on individual country projects, there was a need to draw together project experience and undertake generally relevant research on appropriate tools, equipment, training materials, documents and routines. The ODA-supported MART initiative is a joint venture between Loughborough University and specialist consultants Intech Associates and I.T. Transport. The main 3-year MART project aims to ensure that these lessons are widely applied so that project interventions will not each have to retrace the same learning curve. Furthermore there is an emphasis on private sector involvement, so as to mobilise entrepreneurial skills and create enterprises which are sufficiently flexible to provide lasting employment opportunities while reacting promptly to changing client requirements.¹⁶

The MART initiative is working in the four key areas of:

- handtools;
- intermediate equipment;
- private sector development; and
- institution building for sustainability.

In its first year the MART initiative has concentrated on drawing together both published and unpublished field experience in its four topic areas, and also commencing the process of assembling a network of practitioners. The intention is to work closely with recognised international bodies, such as the World Road Association (PIARC), in order to ensure that the outcomes of its research are widely disseminated and are recognised as being of relevance to all professional road engineers in low and middle income countries.

SITE

The acronym for the title of this paper is SITE, and we are currently working with our potential partners (Intech Associates, Cambridge Architectural Research and the Tavistock Institute) to prepare a proposal to establish a SITE initiative to work alongside the MART initiative, focusing on enabling activities to support the promotion of enterprise development in urban areas. This would eventually lead to the establishment of a network of international partner institutions to collaborate on practical research and exchange experience. The goals are:

1. Greater use of local private contractors in housing and infrastructure projects and programmes.
2. Improved contractor performance and capacity.
3. Municipalities adapt to new role as promoters and commissioners of projects.
4. Local institutions deliver support to local initiatives.
5. Establishment of an international SITE network to service national institutions.

The initiative will emphasise action learning with partner institutions to mobilise specialist small enterprises to sustain investment in low cost housing and infrastructure, to prepare and disseminate guidelines, and to provide training and ancillary support.

Experience shows that the involvement of small entrepreneurial firms is essential so as to harness their motivation and skills to seek out enterprise opportunities that would otherwise be overlooked. It is only by reaching and enabling these enterprises that we will secure a sustainable solution to reaching and enabling the millions of urban dwellers who themselves remain 'unreached'.

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