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A Case Study of British Construction Consultants Involvement with
Technology Transfer in Developing Countries

by

Nigel Mansfield
University of Strathclyde
A CASE STUDY OF BRITISH CONSTRUCTION CONSULTANTS 

IN VolVEMENT WITH 

TECHNOLOGY TRANSFER IN DEVELOPING COUNTRIES

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Dr Nigel Mansfield

Postgraduate Supervisor Construction Management
Department of Civil Engineering
UNIVERSITY OF STRATHCLYDE
107, Rottenrow, Glasgow G4 0NG
UNITED KINGDOM

SUMMARY: The paper introduces various forms of internationalisation occurring in the construction consulting sector. Networks come into play in this process and joint ventures are common. The local consulting sector in many developing countries has been slow to develop, leading to incoming Western firms carrying out much of the work. Joint ventures are encouraged by client governments and to some extent this has suited the incoming firms. Technology transfer is a continuing long term objective in developing countries. Consulting firms who can learn to adapt to these requirements are likely to fare best. A case study (derived from interviews in 1989/90 with several British consultants who worked overseas with some 10 host country clients) is described. This illustrates many of these aspects by explaining the nature and extent of technology transfer, the types of project and firm so involved, the cooperative arrangements operating and the long term implications for these firms. There are several possibilities for wider involvement of consulting firms in technology transfer activity and in future these could well be fruitful for their business.
A perspective on internationalisation

There is a variety of literature which has developed on the subject of internationalisation in recent years, much of it emanating from Scandinavia (Luostarinen & Welch 86) (Joong-Woo 87) (Mansfield 86, 87). Johanson & Vahlne (75) showed that expansion into overseas markets proceeded as a series of steps or stages, although they later reckoned that there could be exceptions to this, where the firm had multiple resources to dispense in reasonably stable conditions and when it had already learnt much from a similar market (Johanson & Vahlne 90).

While the eclectic paradigm assumes that perfect information is available to decision makers who are reckoned to act rationally (Dunning 87) (Mansfield 88 a,b,c), the stages-of-development approach adopts a behavioural view assuming that firms will want to limit uncertainty. The perception of what their transactions costs will be in the future tends to reduce over time as further international experience is gained. In future both language and cultural issues are more likely to increase their influence (Johanson & Vahlne 90). The appropriateness of technology transfer in a cultural context is of relevance at this point, and it may be that this activity will provide a greater facility for firms to establish themselves abroad.

It is also worth examining the manner in which firms have internationalised their business through various stages and organisational routes in the construction consulting sector (see Figure 1). It is important to remember that parts of the service may need to be provided at the point where this can be delivered to the client most effectively. Since there is a need to supply
some of the consulting service in the market, this has a bearing on the nature and forms of internationalisation that occur.

Overview of internationalisation in construction consulting

Firms begin to engage in international work by first developing their contacts through informal networks of relationships with other parties in the industry. Consulting firms who are not able or willing to work abroad on their own are likely to join together in consortia or link up in semi-permanent associations. Piggy-backing may be an alternative with larger organisations who already have experience of overseas projects.

Alternatively a firm may elect to conduct overseas work on its own or establish links in the host country through an overseas agent in the first instance. It may then see fit to develop a partnership in a joint venture with a local consultant. This could be an ad-hoc arrangement for the occasion or a more formal sharing of equity over the medium term. Alternatively a firm would endeavour to establish its own wholly owned subsidiary if the circumstances in the host country were favourable.

Foreign direct investment (FDI) would be deemed to occur when a firm had a separate productive design operation in the host country, from which it could also carry out marketing and information scanning. In such a situation the firm would be investing in the productive phase of the consulting process overseas rather than in its own home offices and this would involve a full subsidiary office.

There are various other forms of organisational arrangements, in
which consulting firms are active when carrying out international projects. Licensing and franchising are sometimes touched upon but they are not to be found very often in consulting. Package deals, turnkey, "boot" and management contracts are all used invariably in response to a client's perceived requirements in this respect. However, joint ventures are a more common route for consulting firms to adopt and these receive further explanation later in the text.

Networks

Many consulting firms from different parts of the construction sector have come to cooperate and interrelate with each other in networks in order to conduct their business at home and overseas. This contact network embraces the clients, subconsultants, contractors, supplier and equipment producers and each of these can provide a certain amount of information on projects. Such contact between the parties can occur effectively at both a company and a personal level. Each firm would expect to interact with other parties and any common orientation would manifest itself in a "common language regarding technical matters, contracting rules, and standardisation of processes, products and routines" (Johanson & Mattson 87). This interaction also has to extend to clients in the developing world, who are crucial to their construction activity there.

The limited extent of local consulting services

Sapir has indicated there has been a lack of a centralised body of data on consulting services but he did seek to redress this balance by highlighting some differences between developed and
developing countries, using information from the World Bank on the local and foreign inputs to projects. During the period 1971-80, project disbursements amounted to $30 billion of which just under half was allocated to equipment suppliers, a third to construction, 13% to miscellaneous goods & services" and 7 % to consulting (Sapir 86).

While the developing country local sector possessed certain comparative advantages in the "construction" phase with slightly more than half of the market, the position of consulting services and equipment suppliers was relatively weak, representing only around 15 % of the market (Sapir 86). Although there were increases in the share of local suppliers to construction over the period, there was no comparable increase in consulting. He observed that at the early stages of a country's development, activity tended to be "concentrated in construction and civil engineering as well as in preinvestment services in general". As industrialisation progressed the scope of consulting widened to include a greater number of industrial projects.

Development of a local capability in consulting services

By the eighties, Dickerson (84) expressed the policy of the World Bank as "supporting the development of local capability and the promotion of the intellectual and practical development of a country's human resources". One evidence of this was that "25 % of the Bank's disbursement for consulting services went to local consultants". This supported the figures of Sapir and suggested there had been some significant increases even in the early eighties (from 15 to 25 %). Despite this trend, the Bank was reluctant to oversupport "local firms who had not yet acquired
the necessary skills and experience" (Dickerson 84).

Taking as an example one particular country (Indonesia), a review was made of government contracts there and for medium to large projects in 1983 it was found that, in terms of man-months, just over half of all engineering work was done by foreign consulting companies, but in terms of money the foreign companies share was almost three quarters of the value of the engineering work. Where local consultants were used, most of the good consultants were overloaded with work; and much of the capability that was left was split up between a variety of small firms who on their own lacked the capability to carry out even a medium sized project (Kartasasmita 84).

According to Abbott, the development of a local construction sector in the host country has been more difficult to achieve for consulting than for (construction) contracting, since they have to face the same kind of constraints and many more, "such as lack of work continuity & consequent cash-flow problems, a lack of commercial knowledge, irregular selection procedures, inadequate rates of pay and payment delays as well as the tendency for the government to use in-house technical departments rather than private sector firms" (Abbott 85). Obtaining track record and experience also seems to take far longer than the equivalent in the contracting sector. None of this has been helped by the fact that government clients have often paid lip-service to the improvement of local industry, and yet have persisted in directing demand to international firms (Abbott 85) (Dickerson 84).

Faced with this situation overall, it is not surprising that many
developing country clients and aid agencies continue to call for technology transfer arrangements to be incorporated into their projects, often involving a joint venture with a local organisation.

Joint ventures

According to Wells (86), considerable investment on infrastructure has been going on for some years in many developing countries. Even given some of the problems experienced by some local consulting firms, many host government countries have tried to encourage the formation of joint ventures so that they could be less dependent on foreign firms. In response Western firms have been prepared to accept local consultancy firms as partners mainly to gain access to local decision makers. Increased competition had also led to a greater emphasis on lower prices, leading to local staff sourcing for some of the more routine tasks, (Johanson & Sharma 83). Cooperation has taken place occasionally at the feasibility stage but more often at the detailed design phase, once it has reached the stage of clear definition. This means that when and if a local firm can be relied upon to fulfil this function, a measure of work can be done locally.

The process of linking-up with local entities when incoming consultants arrive in a country seems to be a fully acceptable way of conducting business. However when there are large numbers of international firms competing, the quality of the local firms with whom each incoming firm agrees to collaborate can be far from uniform; some are local firms in their own right and others are more "opportunistic agents, or front-men", who can bring
influence to bear in the right places of government (Berger 79) (Dickerson 79).

While the incoming firm sometimes adopts joint ventures because they feel they will be more favourably placed with clients, more often they are entered into in response to the client's own insistence (i.e. as a second best alternative) (Cantwell & Dunning 84). Dickerson considered that by the mid-eighties in most developing countries the days of mandatory joint ventures were over and that "few foreign firms would operate in a developing country without a voluntary association with a local firm". Such a voluntary joint venture brought with it "the motivation to put time and effort into developing a practical business relationship and the trust to make it work" (Dickerson 84). Although the World Bank has encouraged joint ventures between developed and developing consulting firms, they have been very much against "forced marriages" (Dickerson 79). In the Bank's view, the firm acting in the lead "should be able to do the job virtually by itself, and should possess not only managerial ability but most of the technical ability". Token leadership at the top of a joint venture purely for idealistic or nationalistic aims is unlikely to yield more than patchy results (Dickerson 84).

In discussing global strategy Porter (86) has noted the role of "coalitions" in this process. By this he meant "a whole variety of arrangements that include joint ventures and many other kinds of inter-firm relationships". Choosing and managing coalitions has been considered by Porter to be among the more interesting questions of international strategy from the mid-eighties onwards. Although there are many reports of disaster indicating
that success is not easily attained yet they continue to proliferate. He also considered that "there is a great need for research into coalitions at the level of both the academic community and the corporate world" in view of the fact that they are "increasingly being forced on firms by new competitive circumstances" (Porter 86). In the case which follows, certain aspects of coalitions are addressed for consulting firms involvement on technology transfer projects internationally. Before doing so however it is necessary to examine some of the objectives for technology transfer which developing countries have set themselves in the recent past.

Technology transfer and developing countries long-term objectives

In 1975 the United Nations Industrial Development Organisation (UNIDO) set as a goal "that 25% of the world's industrial production should emanate from Less Developed Countries (LDCs) by the year 2000" (Contractor 81). The bargaining power of these countries was to be increased along with the transfer of technology to these countries. Many of the objectives of the developing world were identified and some of these appear in a Commonwealth Report on technological development, where Mordell (82) explained further some of the drive for technology transfer. He laid stress on the large number of engineers who are continually required in the developing world just to keep up with the expectations of development and population growth. Part of the problem has been compounded by the high numbers of engineers leaving engineering altogether at or before mid-career level.

Throughout these years, most developing countries have pursued active policies of industrialisation while legislation was being
introduced in a number of countries for control and direction of foreign capital and technology. (Wallender 80) (Mansfield & Sasillo 90). However there were barriers to this such as lack of risk capital, lack of entrepreneurial talent and lack of technological know-how. Also there were problems of overpopulation and surplus labour, which could all contribute to an undermining of the best laid economic plans. At the same time some of UNIDO's objectives were being frustrated by distribution problems in the host country due to lack of infrastructure, energy deficiencies and balance of payment & debt service problems (Contractor 81).

At the end of the seventies, Wallender foresaw further moves in the eighties which would require "local participation with foreign enterprises, greater diffusion of foreign technology and increased internal self-help capability for science and technology". International firms who could bring themselves to understand how to relate their technology to the perceived needs of host governments would achieve not inconsiderable success and continuity for their operations. Such firms would go in for thorough "technology audits" which would ensure that their own technology was being adequately communicated to clients in a relevant fashion. (Wallender 80).

To the incoming international firm, developing countries have displayed a number of attractive characteristics. Sometimes governments have sought to unbundle the technology package being offered to them in an effort to remove inappropriate or too costly elements and also to allow them to compare one competitor's package offer with another (Contractor 81). Stoever (85) questioned how much a developing country could change its
policies on technology transfer without driving investing firms away. A developing country had to get the balance right: on the one hand it could try to extract too much from the investing firm who might then go elsewhere or it could offer too much in the way of incentives and find it had paid too high a price for the exchange. For the consulting firm too, it is just as necessary to strike a correct balance in the way they conduct themselves in new forms of their business which includes technology transfer.

The various ways in which this might best take place are examined in the case study which follows. The material is discussed under the headings of the nature and extent of technology transfer; the types of project and firm that are involved; the extent of any cooperative arrangements; and the long term implications arising from TT. (Throughout technology transfer is abbreviated to "TT")

CASE STUDY

This case relates to aspects of TT from the perspective of four different individual UK consultants who had been employed in an executive or advisory capacity within host country client organisations in the countries of Malaysia, Papua, Belize CA, and Nepal with accompanying experience from Thailand, Bangladesh, Sudan, Falklands and USSR. The disciplines of work covered roads, railways, bridges, buildings and marine works.

The nature and circumstances of technology transfer

TT was regarded as an exchange of know-how on the coordination & management of projects and the coordination of infrastructure development. Equipment and material technology was being
transferred, which had been developed in other locations: examples being piling systems on bridges, waterproof membranes on buildings etc. TT was almost mandatory in South East and Central Asia but less so in Central America. The World Bank and ADB often wrote it into their proposal documents. TT was "certainly in vogue" and most consultants had seen that TT was working and knew they "had to have a meaningful TT proposal to be considered seriously by the client". Such clients were not always clear in their requirements; sometimes they "wondered why they needed expatriates to help them run projects when they had sent people away on University courses".

Host countries recognised that donor countries who contributed to aid agencies wanted TT and they went along with this. In one Asian country, Japan had some "30 or 90 supernumerary technical advisers in the works ministries", who had all been sent free of charge. Some host country staff; however, felt that "they had not requested the product" and this led to much underutilisation. Part of the explanation was "conscience money" for adverse balance of payments but they were also known to be "scouting out the market". There was also criticism of an Aid and Trade Provision (ATP) project in Asia, which the British government were considered to have latched onto without the fullest of detailed briefs. The grounds of ATP appraisal were viewed as being much less rigorous than equivalent aid projects; one major aspect being that "there was competition".

Large project packages were not seen as the answer for developing the potential of host country staff, although large dams and docks usually needed to be carried out as one-off projects. It had to be accepted that many developing country personnel were
most familiar with a system which moved at a different pace. Sometimes projects were designated as 2 year projects for no apparent reason, when a longer period would be more likely to achieve the aim of TT with just the same expenditure. Central Asian countries with enormous populations were often unimpressed by plant intensive methods as used for instance in concrete trains on highway projects; the reason being that the cheaper cost of labour in plentiful supply made such methods inappropriate.

Usually budgeting of projects allowed for 10% add-on for TT, over and above that provided for the project. Some countries were criticised for not being prepared to pay the costs of TT at lower operational levels, which perpetuated a "dearth of experience at the sharp end of construction". Master degree courses at Universities abroad were often seen by client managements as "cheaper and more prestigious options". Sometimes short courses were also used as a pre-retirement perk for senior government officials. In other countries it was the norm to travel abroad at regular intervals for short visits throughout a senior manager's career.

Care had to taken in insisting on proper expenditure of aid money for the purpose to which it was allocated. Too easily the money could become syphoned off "without anything concrete being achieved". In remote locations it was difficult to recruit well suited expatriate staff; some people could spend half their time "just trying to survive at a standard of living that they considered as essential". Russians tended to keep to themselves; mainland Chinese integrated well in contrast to the "Swiss who adjusted with difficulty". One Canadian aided project worked well
in Nepal, with a very low number of expatriate staff.

The influence of the type of project and firm

Projects which generated the deepest relationships between the parties involved in TT were those which "encompassed an ongoing commitment", such as "road maintenance" or "specifically structured TT projects" which enabled information to be exchanged as part of a prearranged plan. "Routine" projects were seen as giving opportunity for understanding what was going on but they could also lead to the parties becoming more remote from each other. "Complex creative" projects were more likely to catch the imagination and retain the extended interest of the client for a longer period.

TT did influence the head office organisations of some incoming consulting firms. Frequent trips were often made abroad, which meant that other senior personnel had to be available in the firm to fill the gaps they had left. Some organisations participated in transferring "intermediate technology" to the poor end of developing countries. They knew this business and performed it adequately, although it was not seen as part of any main sector of expertise.

One or two firms were referred to as having set up training units for conducting TT round the World. Those who performed this service best were those who had "set themselves up from an overseas base". A number of smaller firms had also become committed to the less developed countries. They had their own advisers in client ministries and knew that their budgets could not stand that much" but they had segmented a market which went
on year after year. These clients were also helped on a "day-to-day basis rather than project by project".

Joint venture arrangements

Joint ventures with local consulting firms were becoming more numerous in Asia and there were also taking place in such parts as Botswana and Ghana. In Central America a one-off project for a large port was carried out by an American design & construct company. This was seen as a lost opportunity for TT to host country personnel because of the rapidity with which the port was built. In Malaysia, one British consultant had worked in the lead in association with a local firm but these roles were reversed on the next project. Advantages of the joint venture were described as "access to local resources in accounting and procurement". On some TT projects British firms took on board personnel who then transferred to their head office as permanent staff. Their multilingual abilities and experience of operating in a developing situation as nationals were seen as advantageous to the firm in future projects elsewhere. Joint ventures usually needed to be fully integrated to have the most chance of success. For TT to occur this also meant the "project had to be overstaffed".

A consulting firm needed a local office in the host country because they would then "become known and be seen around". A local association could act as the equivalent in some Asian countries. In terms of obtaining new business, the influence of one well-known committed individual who was resident in a region could not be over-estimated. The label of an office had to be backed up by an active and visible presence.
Implications for the long term

Consultants were reckoned to be involving themselves in TT because it was demanded of them, although relationships were strengthened and reputations enhanced, if it was done well. One consulting firm had been in danger of being "cast in the mould of low technology" by the World Bank, because of the reputation they had built up in labour intensive road projects, whereas this was only one part of their overseas portfolio.

Self sufficiency was occurring gradually in most countries. Modest advances had been made in India and Bangladesh; even more were being made in Thailand and Malaysia, and less in countries like Ghana. TT did not have a reputation for being a high earner for consulting firms but it could be profitable. There were notable successes in TT projects; one instance was an infrastructure project where ten expatriates and two visiting academics from a UK university were working with 150 local staff. On a later stage of the project, the same host country personnel were implementing what they had gleaned earlier, mainly because there had been emphasis in ensuring a follow-on of this sort. Self sufficiency was being hindered by a fast birth rate in some regions and excessive graft and corruption in others. The latter made aid agencies understandably more cautious in the way they set up and approved projects.

TT was giving consulting firms more of a chance to "knock on client's doors for future work". Clients could also judge better the current contribution being made by these firms. In Papua, they needed to be willing to work on smaller projects before larger projects would be released to them. A good reputation with
a client did not always ensure that the aid agency would see them in the same light on the next project. In Nepal one firm "produced a good project for the client but fell out of favour with the agency". Laying stress on the "use of counterpart staff throughout the period of the project" was a point worth noting in writing proposals when contemplating TT work in new markets. Some countries were best not entered from a neighbouring territory: Kenya was not a viable base to enter Uganda for reasons of interrivalry. However "airline communication links" usually determined which countries would be most attractive to consulting firms contemplating expansion.

CONCLUSION

In construction consulting, technology transfer was mainly tied up with management know-how. Projects, which were mostly aid funded, were not always that well defined from the outset. Provided there was a sensitive introduction of personnel to the country, technology transfer projects could lead to a satisfactory relationship with the client. There was evidence that some firms had established units to tackle technology transfer in a focused manner and this seemed to be benefitting firms and clients alike. Joint ventures were taking place in several of the countries but in some of the smaller countries, incoming firms were able to operate alone. In one newly industrialised country, a joint venture was leading to less of an involvement on later projects. Nevertheless firms could sometimes recruit national staff on a permanent basis into their organisations by this means. Complications could arise if firms sought to extend their business from rival neighbouring territories; also aid agencies and clients did not always agree
on the selection of a firm. However technology transfer was slowly leading to self-sufficiency in several countries and it was opening up long-term introductions to clients in many instances. Throughout the stages of internationalisation, therefore, various inputs for technology transfer appear to be sought from consulting firms. In the knowledge that the construction sector is weak in many developing countries, and even more so for the local consulting sector, this suggests several possibilities for fruitful involvement of consulting firms in technology transfer activity in future years.

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SIMPLE MODEL OF INTERNATIONALISATION
OF CONSULTING FIRM

CONTROL

HEAD OFFICE
DOMESTIC OPERATIONS ONLY

LOCAL AGENT

JOINT VENTURE
WITH LOCAL FIRM

LOCAL OFFICE
FOR MARKETING

AUTONOMOUS LOCAL OFFICE
SERVING LOCAL REGIONAL AREA

TIME

RISK

SOURCE: Author

FIGURE 1