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**DONOR-FUNDED INFORMATION
TECHNOLOGY TRANSFER PROJECTS:
*Evaluating the Life-Cycle Approach in Four Chinese
Science and Technology Projects***

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Abstract

Information technology (IT) forms an increasingly important component of donor-funded development projects, yet there has been very little structured analysis of the IT transfer process. This paper presents and evaluates a structured framework for analysis of IT transfer – the information technology transfer life-cycle – based on a study of four Chinese technology projects. The life-cycle framework helps to structure both data-gathering and analysis, and it is used to highlight a number of shortcomings within the Chinese projects. However, several broader project and environmental issues are also identified that impinge on the technology transfer process. The life-cycle framework must therefore be viewed within a broader contextual model, which is presented within the paper.

1. Introduction

Information technology is becoming an increasingly important component of projects undertaken by international development organisations (Moussa & Schware, 1992; Newsum, 1994; Roche & Blaine, 1996). Such projects cover a very wide array of activities and sectors, but most involve the transfer of information technology from Western to developing nations.

Technology transfer has long been identified as a key issue within the development process, with the realisation that transfer is problematic. Problems are seen to arise from a number of issues, which include:

- *Technology is more than just equipment.* It also incorporates a surrounding shell of infrastructural requirements, technical and managerial skills that are needed in order to operate it. Whilst the transfer process has been good at 'shifting boxes' from the West to developing countries, making those boxes operational at the other end is generally much harder because necessary elements in the surrounding shell are missing. Odedra-Straub (1992), for example, cites a case in Zambia in which computing equipment remained unused due to a lack of necessary systems development skills within the recipient organisation.
- *Technology also incorporates even less tangible factors.* For example, technologies developed in the West incorporate particular social and cultural assumptions that may not apply in developing countries. Lind (1991), for example, blames failure of some information systems introduced into Egypt on their Western assumptions of a business environment in which formal information was valued, goods supply was relatively certain, and there was legislative stability.
- *The objectives and interests of technology source and recipient are often mismatched.* In particular, the Western source of technology may seek an immediate profit from the sale, but have little interest in helping the developing country recipient make the technology work. Heeks (1996), for example, describes the furore and problems that arose when Western multinationals provided obsolescent, second-hand computing equipment to Indian clients.

Studies of technology transfer in the 1950s and 1960s focused particularly on agricultural and industrial technologies. However, with the transfer of the first computers to developing

countries in those decades, the focus of study came to encompass information technology too, as each of the cases just cited exemplifies. Many cases of IT transfer to developing countries have now been reported (see, for example, Huskey, 1978; Mavaddat, 1986; Pfeiffer et al., 1992; Cain 1999), but such cases have often been more anecdotal than analytical or have regarded the transfer process as being of secondary interest. As such, ‘relatively little effort has been made to understand the process of IT transfer and its impact’ (Avgerou, 1996, p. 107). This paper – whilst still rooted in case study material – therefore presents and evaluates a suitable framework for understanding and analysis of major events related to IT transfer.

2. The Information Technology Transfer Life-Cycle

The conceptual framework evaluated here – derived from praxis rather than theory – is that of the information technology transfer life-cycle. It was developed on the basis of fieldwork evidence gathered by both authors whilst engaged in an evaluation of four donor-funded IT projects in China. The four projects (anonymised as A to D) can be classified into two groups.

- *Type 1: general development projects.* These have general development aims. Project A’s overall objective was to map Beijing’s geology and seismic activity with a specific aim of improving earthquake prediction. Project B’s objective was to establish a complete, operational information system for the retrieval and management of meteorological satellite data.
- *Type 2: IT-specific projects.* These aim to directly raise the technological capabilities of local producers of information technology. Project C’s overall objective was to increase the availability of China-specific IT, particularly by developing Chinese language operating systems and applications. Project D’s objective was to establish a central institution to help increase the quantity of high quality software being produced in China.

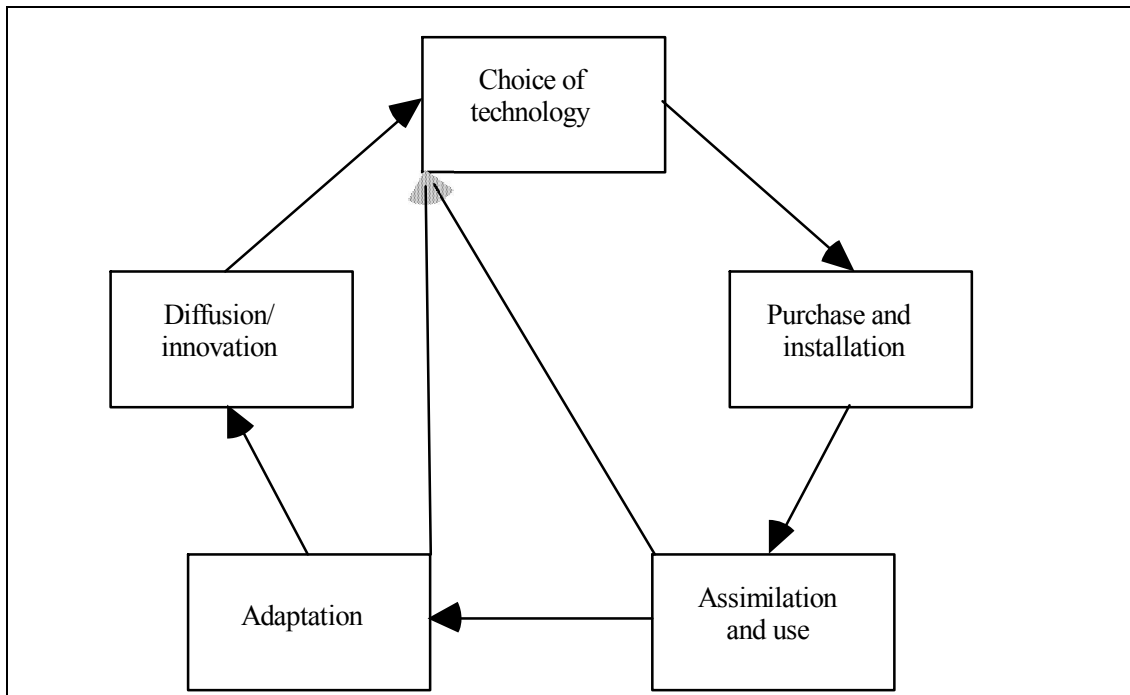
From these projects, the typical life-cycle that emerged – around which planning or evaluation can be structured – included the following phases, as summarised below in Figure 1:

- *Choice of technology.* During this phase the technological requirements are identified, the various alternatives for new technology surveyed, and the decision made to purchase or otherwise obtain a particular technology. Under normal conditions this phase would be

undertaken during the formulation of the project, but it may also extend into the first years of implementation.

- *Purchase and installation.* This phase involves the actual procurement of the hardware and software technology. It will often include some training and consultancy to assist in the installation.
- *Assimilation and use.* The main activity of this phase is to ensure that the people who work with the new technology fully understand how it works, how they are to use it for various purposes, and how they will maintain it on a regular basis.
- *Adaptation.* In this phase the recipient alters the technology transferred. The purpose may be to improve existing performance; to add new functions; or to match local conditions, inputs or needs. Adaptation is frequently present, but not always (hence, Figure 1's line from 'assimilation and use' direct to 'choice'). Adaptation was found in both the type 1 and type 2 projects described above. However, only in the latter case was it seen as a fundamental part of the project, since it helps to build local IT capabilities.
- *Diffusion and/or innovation.* After the recipient organisation masters the technology transferred, it can undertake diffusion to other organisations. In some cases technological innovations will be generated, producing new technologies that the recipient can market locally or overseas. Even more than with adaptation, the innovation element may not always be present. Whilst it would be an intended component of most type 2 projects, it would be unusual in a type 1 project.

Figure 1. The Information Technology Transfer Life-Cycle



Our analysis of the Chinese projects indicates that all the projects went through this technology transfer life-cycle. The process is depicted as cyclical rather than linear because there was a regular infusion of new technologies into the projects. The transfer process is therefore continuous rather than one-off.

3. Findings and Issues at the Life-Cycle Stages

The life-cycle model helped to identify major IT transfer issues, as described and illustrated below. In presenting issues here and in the next section, the small number and particular contextual focus of the four Chinese projects (for example, their scientific emphasis) is recognised. Some issues and solutions may be specific to the projects described here. Equally, application of the life-cycle model to other types of project is likely to raise additional issues not yet identified here. However, as with the model, a number of the particular issues and solutions described here are likely to be generic, and found in many other projects with IT transfer components.

3a. Choice of Technology

In IT transfer projects technology choice is sometimes inadequate or inappropriate, and not enough time is spent assessing either the technologies available or their match to project needs. Partly, this reflects a lack of specification, assessment and choice skills within project organisations. Partly, it reflects problems with external assistance from consultants and agencies.

In project A, for example, it is likely that the technology procurement consultant compounded the problems of choice rather than expediting them. The consultant advised the Chinese institution to buy a complete, turnkey system from a small software development firm in his own country. When the firm failed to develop and deliver the system in compliance with the contract, the consultant became involved in new negotiations which led to higher prices and more delays. In the end, the system delivered in the early 1990s contained many bugs and relied on hardware dating from the early 1980s.

It was also clear that internal skills, external assistance and more thought overall need to be focused on the 'make or buy' decisions which face all project managers. Purchases of new technology are hardly ever subjected to a cost-benefit analysis or even a simple assessment of whether it would be more effective to:

- buy technology as a whole package,
- try to make it all within the organisation,
- integrate the system from a variety of bought-in components, or
- integrate a mixture of bought-in equipment and components developed in-house.

This decision-making process needs particularly to be applied to software. In many type 1 projects, for example, in-house development may be seen as the least effective route since the outcome may be software of poor quality that takes a long time to produce. For such projects, the main objective is generally rapid use of good quality information systems that will provide inputs to the (non-IT-oriented) project objectives. For type 2 projects, on the other hand, in-house development may be a more effective choice because the software program may be of

less importance than the indigenised software production and maintenance capabilities that in-house development creates.

Other issues that could be identified from explicit recognition of technology choice as a life-cycle stage included:

- *Compatibility between existing and newly-purchased information technology.* This issue was frequently ignored during choice. The result was incompatible systems with data having to be shared by complex, time-consuming data conversion routines and interfaces.
- *Duplication of information systems.* Technology was chosen on some projects that duplicated that held by sister institutions of the recipient organisation. Some donors have made inter-institutional co-operation a pre-condition for release of funds in order to reduce the dangers of duplication.
- *Consideration of operational factors.* Very little thought or funding was given to risk planning and purchase of infrastructural equipment such as anti-virus programs, spare parts, fire or burglary detection/prevention systems, uninterrupted power supplies, etc.
- *Hardware focus.* IT choice was often seen as synonymous with just hardware choice. Yet, in the actual projects, it was clear that software represented the more important part of IT.

3b. Purchase and Installation

Recognition of technology purchase and installation as a life-cycle stage helped identify purchase as a cause of significant delays in the technology transfer process. Sometimes this had beneficial side-effects, in allowing the Chinese organisation time to develop its own technological solutions and capabilities. However, such outcomes should be the result of positive choice rather than being the incidental consequence of delay.

By contrast, installation presented relatively few problems. The recipient organisations made serious efforts to ensure that IT was installed properly, and staff were sent on relevant installation and maintenance training courses.

3c. Assimilation and Use

Recognition of this life-cycle stage led three main techniques to be identified that assisted the process of assimilating new technology into the organisation:

- First, staff were sent on external training courses to learn about operating, using and maintaining the technology.
- Second, consultants were called in to help assimilate the technology into the organisation and improve its operational use. Because of the short time of visiting; unfamiliarity with the organisation; and the medium of interaction specified in terms of reference, this sometimes proved ineffective. Instead of acting as a support to develop local skills, consultants too often acted as a substitute for such skills.
- Third, and normally following the other two techniques, technology was assimilated in the long term through its day-to-day use. It is this which is the crucial guarantor of 'success' with the technology. From the projects, this was seen to be a long process, with equipment only being used efficiently after many months or even years of operation.

Some equipment was never used as efficiently or effectively as it might. In part, this relates to problems of training. In all four projects, training had helped raise the level of staff skills and knowledge and, hence, of organisational performance. Where training was absent, relatively poor levels of performance were noted. Nonetheless, training problems were identifiable, including:

- *Questionable relevance of training content.* Training focused too much on hardware operation and maintenance, rather than software. Training focused too much on IT rather than the broader field of information systems. Finally, following Braa et al.'s (1995) analysis, training was seen to focus too much on technology as an isolated artefact rather than on technology transfer as a process of organisational learning and change. The latter would require training on a much broader range of organisational and managerial issues to help recipient staff manage the whole process of technology transfer rather than simply know which buttons to press in order to operate their computers.

- *Excessive diversification of training.* While diversified training provided a wide spread of skills and knowledge more or less vaguely related to project objectives, it meant that there was no critical mass of skills within projects that could be applied to particular outputs.
- *Redirection of training expenditure.* Project directors tended to save money on training and spend it on equipment instead because of a concern with using funds to acquire material possessions rather than intangible assets.
- *Loss of trainees.* Some trainees went abroad and did not return. Both projects C and D had lost around half a dozen staff each to this 'brain drain'. These staff had already acquired substantial capabilities working on the project and their loss appeared to have significantly affected project progress.
- *Lack of clarity on study tours.* Study tours overseas have become an accepted part of many donor-funded technology projects. While they undoubtedly serve a valuable incentive function for senior project staff, their role in raising the level of knowledge in the projects must be questioned. Too many staff seem to go on tour, with objectives that are too broad and shallow, and with no clear plan of how any skills or knowledge are to be applied in the achievement of project outputs.

3d. Adaptation

In all the projects, investigation of this life-cycle stage revealed that there was some kind of technological adaptation taking place, sometimes a result of problems with acquiring technology from abroad. The adaptations covered three areas: performance enhancement, new functions, and match to local conditions.

Most of the adaptations could be characterised as adding functions unique to the Chinese organisational context rather than as having any external orientation. This intra-organisational focus also meant that adaptations often required quite specialised 'insider' knowledge, and did not have the kind of user-friendly interface necessary for use by others with a lower level of skills or knowledge. Overall, one may say that while some of the adaptations were 'deep' in the situational knowledge required, they were also very 'narrow' and often required a relatively shallow level of adaptational skills.

3e. Diffusion and Innovation

Once it had been identified as a life-cycle stage, technology diffusion from the projects was seen to be limited. Five main channels existed for technology diffusion:

- direct technology transfer;
- staff turnover;
- training and advice;
- publication; and
- outsider access to internal technology information.

None of these was particularly well exploited, and there was a lack of focus on the barriers to diffusion and adoption of technology.

Commercialised forms of technology diffusion have attracted a great deal of interest, and there are strong pressures to increase such diffusion. All the projects had undertaken some kind of commercialisation. As an example, project A had set up a commercialisation unit and sold a dam water level monitoring system and some seismic systems in other parts to China.

However, the commercialisations had mainly been rather haphazard. The purchasers were almost all organisations with which there was some pre-existing relationship, or which were known through some informal friendship link. The main skills of commercialisation – such as raising production levels, pricing, marketing, and post-sales support – were almost entirely absent. So was any wider framework of understanding how and whether commercialisation should be undertaken.

The line between adaptation and innovation is not always easy to draw, but Table 1 sets out a continuum of technological capabilities that includes both of these. In some of the projects, new technologies had been developed which were not previously produced by the project organisation; thus clearly moving beyond mere adaptation. Sometimes this had arisen as an unexpected development through local development of technology which was either not

available or regarded as too expensive. In the case of the two information technology projects, there were specific objectives to produce such innovations.

Table 1. Scale of General Technological Capability

Level 1: Non-production operational capabilities

- 1a: Using the technology
- 1b: Choosing the technology
- 1c: Training others to use the technology

Level 2: Non-production technical capabilities

- 2a: Installing and troubleshooting the technology

Level 3: Adaptation without production

- 3a: Modifying the finished product to meet local consumer needs

Level 4: Basic production

- 4a: Copying technology
- 4b: Assembling technology
- 4c: Full production using existing products and processes

Level 5: Minor production modification

- 5a: Modifying the product during production to meet consumer needs
- 5b: Modifying the production process to meet consumer needs

Level 6: Production redesign

- 6a: Redesigning the product and production process to meet local consumer needs
- 6b: Redesigning a product and production process to meet regional/global consumer needs

Level 7: Innovative production

- 7a: Developing a new product to meet local consumer needs
- 7b: Developing a new product to meet regional/global consumer needs
- 7c: Developing a new production process
- 7d: Transferring a production process to other producers

Source: adapted from Narasimhan (1984), Lall (1987), and Schmitz & Hewitt (1991).

Although ranging from simple to complex, few of the developments could be regarded as substantial, original innovations. At best, they lay around level 5 in the table of technological capabilities. It was clear in some cases that the 'innovations' had been largely copied from imports, from the products of other Chinese organisations, or from textbooks. However, such a finding is not unique to these projects. Most supposed innovations from Western companies have similar roots.

A more critical issue is that discussed above: the limited diffusion of these modifications, and the haphazard and limited nature of commercialisation. Several of these new technologies remained at the level of prototypes and this underscores the lack of planning in much of the innovation. As part of the limited consideration about 'make or buy', projects did not think about the costs of developing technologies for themselves; how these might be sold in the market; and what competition they might face.

4. Issues Beyond the Life-Cycle

Use of the IT transfer life-cycle, as described above, seems to have provided a valuable structure for data-gathering and evaluation of key issues in donor-funded IT transfer projects. However, this can also create too narrow a viewpoint since it was clear that there were other broader and/or longer-term issues affecting the transfer process which the life-cycle alone did not bring out. Some of these are discussed below.

4a. Project Design: Objectives, Outputs and Roles

The overall nature of the technology transfer process was, to some degree, pre-determined by the way that projects had been designed. The objectives of all the projects studied were valid, important and worthy of donor funding. However, there was often a discontinuity between the social validity of project *objectives*, and the narrow focus of project *outputs*. The outputs were often overly technical, too heavily focused on processes within the recipient organisation, and too little focused on beneficiaries and the external social environment.

Intended outputs and project roles were also frequently too diverse, encouraging projects to try to do ‘a little bit of this, and a little bit of that’. Technology transfer efforts therefore became dissipated. By contrast, project achievements were greatest where there had been a clear design focus of staff and resources on a very small number of roles and outputs.

4b. Project Monitoring and Evaluation

Beyond the immediate technology transfer life-cycle, there were major problems with the monitoring and evaluation of all the projects. This had been systematically undervalued, under-resourced, done with no rigour, and even avoided at times during all the projects. Review meetings and reports occurred once or at most twice during the entire project lifetime, instead of bi-annually as intended, and despite the fact that all the projects had some easily identifiable, ongoing problems that should have been dealt with. Monitoring and evaluation exercises were seen as a chore that no-one – not project staff, not project authorities, not executing agencies, not even donor staff – was keen on undertaking. The exercises were also seen as an end in themselves, since there were no mechanisms by which recommendations from evaluations could be discussed, decided upon and followed up.

4c. Project Sustainability

Beyond the life of individual technology transfer projects, the issue of sustainability of capabilities is crucial. Donor funding of such projects is of limited value if organisations collapse and capabilities wither away after the withdrawal of donor support.

Unless entirely undertaken by project consultants, every action within the project life-cycle helps to create or reinforce skills. Thus, despite the fast-changing nature of information technology, the mere act of taking part in equipment procurement provides project staff with the abilities to make a somewhat better choice of technology next time round. From the project evaluations, the following range of capabilities created could be seen, most of which follow the life-cycle:

- analysing needs, choosing technologies and identifying technology sources,

- buying equipment and installing it,
- operating equipment,
- using equipment to achieve desired objectives,
- maintaining and repairing equipment,
- adapting technology to local conditions and needs,
- diffusing technology and related skills to other organisations,
- modifying to produce new technologies,
- producing equipment locally then marketing, selling and supporting it, and
- project management: budgeting, scheduling, reporting, evaluating, making decisions, etc.

Naturally, there are deficiencies: too much continuing dependency on outsiders; lack of reflection and evaluation on what has been learned; and a lack of formal training inputs to these capabilities. However, the capabilities are worth emphasising; they can easily be overlooked because they are intangible and because they may not be included in project objectives. The projects therefore contributed to strengthening institutional capacity in terms of technological and other capabilities. Even if the institutions themselves do not sustain, the capabilities will because they are embodied within individuals. So long as these individuals continue to work in roughly the same area, the capabilities are likely to be maintained and utilised.

4d. The Nature of Information Technology

The life-cycle described here can be seen as generic, but IT has particular characteristics – such as its increasing centrality in all walks of life and its high rate of technological obsolescence – that have a particular impact on the technology transfer process.

For example, in the type 1, general development projects there was a clear danger that the perceived importance of IT would lead the technology to become an end in itself for the project. In these projects, information technology was being mistakenly shifted from an enabling to a core function. IT seems to have some deep allure for the both the technically- and non-technically-minded, at times driving them to forget that IT is intended to be just a tool for

achieving some other goal. This has been a characteristic of type 1 projects for the following reasons:

- For a number of such projects, IT represents one of the few tangible, modern outcomes of aid agency investment. In recipient organisations that have often been starved of funds and attention, the agency-funded IT comes almost to represent the delivery of foreign goods to a cargo cult.
- Far more pragmatically, employees in (normally public sector) recipient organisations believe – often quite correctly – that IT skills attract a high premium in the local labour market. They therefore fight hard to spend time working with the new technology in the hope that this may be their ticket out of the public sector into a better-paid job.
- Organisational pragmatism also plays a role. At least in the Chinese context, software developed by the organisation represented an asset that could be sold in the open market for hard cash at a time when the organisations were under pressure to become more commercial and more financially autonomous.

The results of such factors were clear in the Chinese projects investigated. In project B, for example, quite a substantial human resource, technological and management effort was being directed at the development of new information technology, especially software. While these programs were intended to serve the project objectives, they were placing an increasing volume of resources at one step removed from those objectives. Yet there was no intention of separating the information technology function into an autonomous sub-unit, let alone outsource it, in order to preserve clarity of purpose within the main organisation.

IT's high rate of technological change is also a particular problem for technology transfer.

There were examples within all projects of the impact of obsolescence. For example:

- Large minicomputers which were delivered late and lay unused because they had less power than one current small desktop microcomputer.
- Substantial inputs of resources pumped into local maintenance and even production of spares for equipment which was no longer supported by its original manufacturer.

Obsolescence can be a particular problem for aid-funded technology transfer projects because of time delays between decision-making and installation. Such delays add to the tension that may exist between the desire to have the latest technology and the need to choose IT that is as 'future-proofed', open, flexible and compatible as possible.

In type 1 projects, such tension may be more limited, with an onus on purchasers to choose IT that is market-proven, as opposed to 'leading/bleeding edge'. In such projects, an information system that works may remain satisfactory from a user perspective for a considerable period of time, especially given the flexibility of IT to be reprogrammed for different tasks. In type 2 projects, by contrast, there is constant pressure to innovate and keep up with technological frontiers. This means the IT acquisition process is more likely to be led up 'blind alleys'.

4e. The Donor Agency

There were a number of challenges faced by the international development agency that had financed the technology transfer projects. One challenge was the constant difficulty that staff – both at programme officer level and above – had to deal with too many projects to do as fully effective a job on any individual project as they needed to, and would have wished to.

Given the pressures – often political – to spread aid money to as many different projects in as many different sectors and regions as possible, and given pressure to reduce administrative costs (which may rise proportionately if wage inflation outstrips aid budget increases, let alone cuts) by intensifying staff workloads, the donor had begun to suffer from the 'More is Less' phenomenon. That is, as the number of projects rises they are handled less and less effectively, and the overall development benefits diminish rather than rising.

4f. Underlying Project Agendas

Picking up an issue described earlier, one can place the blame for spending project funds on hardware rather than software on attitudes to piracy and availability of pirated programs. However, there is a deeper rationale that this suggests, which touches on many of the issues of

technology transfer. This is the tacit complicity that can exist between funders and recipients about the use of project funds and, more, the objectives of aid projects.

For the recipients, funding can be spent on a wide variety of things but, in situations of capital shortage and, perhaps, import constraints, what recipient managers want more than anything is imported equipment which is flexible enough to be used for a variety of purposes other than just meeting project objectives. Computer hardware fills this niche perfectly and represents a solid contribution to organisational sustainability. It is an input to organisational efficiency or income generation that will survive well beyond the narrow confines of the project at hand and that will thus create a mechanism for organisational sustainability. As a result, all project budgets had seen a greater or lesser transfer of money from other budget heads into hardware.

Funders comply with this hardware focus, even if it may not exactly match the requirements of the project at hand because they know two things. First, that contributions to organisational sustainability may be of critical importance in the volatile polity that characterises the public sectors of many developing countries. Second, that aid funding seeks to win political influence as well as achieve immediate project outcomes. Acceding to the desire of recipient managers to buy hardware is one way to ensure that local stakeholders are satisfied by the project and, hence, by the aid agency. Political capital for the agency therefore ensues from investments in IT capital for its projects.

From this revelation of the economic and political factors present within aid projects, we can understand two things about such projects. First, why evaluation of such projects is relatively rare – because recipient managers will strongly prefer that funds spent on evaluation are, instead, spent on 'kit': on physical equipment; and because evaluation will tend to expose shortcomings in the rational and objective purposes of such projects when, in fact, the projects serve other, more covert and subjective purposes.

Second, it can help us to understand why recommendations from evaluatory exercises are often difficult to implement. Evaluation tends to take a rational approach, which will miss out

subjective/political factors that are critical to understanding how and why projects operate. Recommendations may therefore be inappropriate to the 'real world' of the project.

5. Conclusions

The IT transfer life-cycle approach – tested here on only a small number of particular projects – is not intended to be a contribution of theoretical depth to the process of technology transfer evaluation. As Saxena & Wagenaar (1996, p. 397) note, such frameworks ‘are *not* theories; they are only a classification language.’ What the life-cycle does provide, however, is a clear and logical structure around which data may be gathered, and information presented, about IT transfer. Because it is dynamic, the life-cycle framework provides an understanding of process. Because it is both simple and open, the life-cycle framework can be applied to a wide variety of situations; not just those involving donor agencies and developing countries.

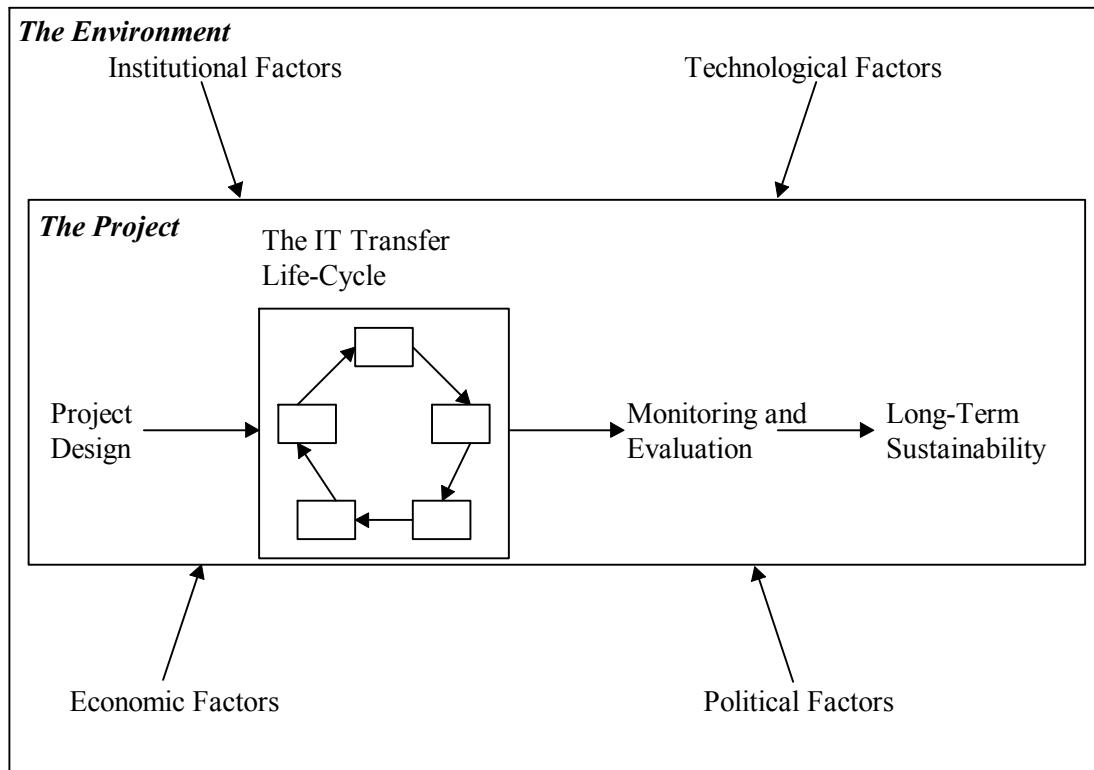
For example, taking the case of IT acquisition and use in a Western private sector organisation, technology is still being transferred into the organisation and the process will follow a similar pattern to that outlined above. It is therefore hoped that the life-cycle approach will prove to be a framework of practical value to all those involved in IT evaluation: external and internal consultants, organisational managers, and IT professionals.

In addition, the life-cycle stages provide a framework for the design and planning of IT transfer projects. The stages create a structure for the conceptualisation of forthcoming projects, and for the more practical work of planning the resourcing and scheduling of project interventions. Project intervention recommendations structured according to the life-cycle stages can be relatively easily understood and applied at appropriate moments.

However, it is equally clear from the foregoing analysis that an understanding of the life-cycle alone is not sufficient to fully understand IT transfer projects. In addition, the process of transfer must be seen as part of the broader project cycle, encompassing the issues of project design, monitoring and evaluation, and sustainability. The project, in turn, must be understood to exist within a broader environment of technology, institutions such as the donor agency, and

economic and political drivers. We can therefore extend Figure 1 to create a broader picture of the IT transfer process, as shown in Figure 2.

Figure 2. The Broader Context of Information Technology Transfer



The life-cycle framework must therefore be used with a sensitivity to the fact that:

- it focuses mainly on the implementation part of the project cycle, not so much on pre- and post-implementation activities, and that
- there are wider factors that shape the context within which all donor-funded technology transfer projects are situated.

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