

## The Paradox of it Development in a Developing Country: as Case of a Land-related it Programme in Malaysia

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**Abstract:** Malaysia has undergone radical social, economic and political development over the last four decades. The information systems put in place to provide informational support for managing development projects have also changed from manual systems in the 1960s and 1970s, to computerised systems based on batch and on-line processing and networking in the 1980s and multimedia in the 1990s. The year 2001 saw Malaysia leaping even further into the IT world with a determination to be the centre of IT excellence. Notwithstanding the stated achievements remain questionable is how many of the implemented programmes have able to meet its objective or manage to take-off successfully. The study presented in this article is on land-related IT programme, named for the purpose of this article as CALIS (Country land Information System). The planning for CALIS began in 1987 and in 1994 it was officially endorsed as a national programme. The main objective of CALIS was to provide the government with an information and technology infrastructure to support interrelated aspects of strategic planning and land-use management, resource management, environmental management, and physical infrastructure planning management. As of 2000 CALIS has not been able to meet its initial objectives – to share, to exchange and to lessen information collection duplication among major land related agencies. Two theoretical frameworks the Web models and structuration theory guided collection of information and the subsequent analysis of that information. The study concludes by demonstrating how organisational behaviour, and socio-political culture influenced by economic interests and personal ambition, can complicate information systems development.

**Key words:** Information Technology (IT), Geographic Information System, Development, Structuration, Web Models

### Introduction

The selection of specific case studies for this study was influenced by the present government's motivation to use IT as a means of reaching advanced development status. Government made two levels of emphasis: first, public agencies are entrusted to initiate maximise use of IT, that was, to be used not only by officers but also supporting staff, to avoid duplication of information collection efforts by various government agencies and encourage extensive sharing and exchange of information both within and among agencies. Second, information systems were to be the means to overcome the friction of distance between geographical areas. Better communications were being sought to minimise the present disparity between East and West Malaysia, and between the east coast (dominantly poor States and Malay ethnic groups) and west coast (dominated by rich urban States and non-Malay ethnic groups) of West Malaysia.

Countrywide land information system (CALIS) was one of the major initiatives that were proposed to meet these goals. CALIS was to provide the government with an information and technology infrastructure to support interrelated aspects of strategic planning, land and landuse management, resource management, environmental management, and physical infrastructure planning and development. Further CALIS was also expected to provide the necessary organisational and management infrastructure to support the development, maintenance and dissemination of land-related data and information. In March 1994 CALIS was formalised and the Ministry of Land and Co-operative Development was assigned the task of setting up the programme. The Ministry initial action was setting up a task force, which consisted of members from major land-related agencies at both state and national levels. Subsequent to that a public corporation (Consultant) was appointed to carry out a nation-wide feasibility study for CALIS. The Consultant team whom principally were IT professionals

from an advanced country took about a year (December 1995) to produce a nine volumes report on the state of land-related IT development in Malaysia. Among the Consultant findings, two were highlighted as most critical, for without it CALIS could not be implemented or will be delayed. The first was on the lack of digital maps for both topographic and cadastral data. Second CALIS requires an adequate communication infrastructure for inter-and intra-information exchanges. The Consultant estimated an upfront sum of about RM1 billion to meet up with the projected expenses. Nonetheless the Consultant suggested that the cost could be made less obvious if it was spread over a period of time. The suggestion was accompanied by an alternative implementation plan. Consultant suggested to phase implementation by stages, taking states with facilities first (namely Kuala Lumpur, Pulau Pinang and Johor), follow on with states with fairly adequate facilities (namely Selangor, Perak, Terengganu, Sarawak, Kedah, Melaka, Pahang and Sabah) and lastly take on the least facilitated states, Kelantan, Perlis and Labuan. The rationale in state selection was based strictly on technical reason, the already existing information gap between the east and west Peninsular Malaysia and the consequences of such decision on national development vision were conveniently ignored.

Malaysia is a peaceful complex State. It is complex because it is made up of large number of differentiated ethnic and cultural groups. In Peninsular Malaysia alone, for example there are the Malays, Chinese, Indians and several minor groups including Thai, Vietnamese, Eurasian and European. In Sabah are the Murut, Bajau and many other less prominent groups. In Sarawak are the Melanau, Iban, Bidayuh and about few dozens other less prominent groups. The differences and culture, religion and beliefs, however, have rarely come in the way of development. Albeit in some cases ethnic differences relate with social and economic inferiority or superiority. For example the Malays and other

bumiputeras (son of the soil) generally are concentrated in rural areas, and form a direct link to agricultural activities. The Chinese dominate the commercial sector and are directly associated with urban living and higher incomes. However through time ethnicity by employment patterns has changed to some extent. The bumiputeras are provided with various types of business opportunities and saving schemes, for example, the National Saving Scheme, and investment in government business ventures with guaranteed yearly interest. Nonetheless, since the Chinese have dominated commercial and urban-related businesses for many generations, government efforts to penetrate in commercial sector proved to be difficult (except for selected few politically well connected bumiputeras). In thriving major cities like the Federal Territory of Kuala Lumpur and Pulau Pinang, Chinese dominance remains. The disparity and imbalance has been and always will be placed the highest in the government development agenda. For example at the end of 1990 when the bumiputeras favourite policy (New Economic Policy) reached its provided period the government quickly extended the policy by giving it a renewed and enriched a visions. The promise includes: to reduce poverty and relative income inequalities;

- to address on employment and the rapid development of the bumiputeras' commercial and industrial community;
- to emphasise growth in the private sector to achieve restructuring (i.e. balancing ethnic and poverty disparity); and
- to address human resource development to achieve growth and distributional objectives (i.e. expand training in major sectors, in particular IT).

In the context of Malaysia needs and requirements of the complex society are matters that have always top the development list. Then in the context of CALIS is rather odd that it could conveniently ignore the nation leading agenda. Follow on I found another idea of the Consultant report, specifically on CALIS design, that was also considered inconsistent with national vision.

Broadly the CALIS programme was designed to function on a single window concept, that was, electronic information sharing architecture that allows users access to land-related data in government agencies, regardless where the data were located. Specifically the system was designed to function as follows. Access to data is provided through user software: interested users can browse through and search a central directory to identify which data are available for a specific geographic location. On recognising the data that are required users instruct a purchase order by means of a specific regulations. The purchase order is then routed through a gateway to the data repository (data custodian). On approving the purchase, the custodian sends to the requester or purchaser.

The design though with many loopholes and vague terminology was accepted almost in total by CALIS team (technical and steering committee). Perhaps the acceptance was based on the confidence the team has on the design. For a working version of the same design had been illustrated to CALIS team members during their educational trip to British Columbia Canada. Rather British Columbia was one of the destination visited by CALIS team members (thirty-three federal and state officers excluding seven from the Consultant team) to learn about land-related information system namely those that used Geographic Information System.

After the production of the Consultant report CALIS took a slower pace of progress. The 1987 financial crisis was argued as one of the reason that upset CALIS strategy. But rather difficult to accept that the external financial

factors as the main reason that has defer CALIS implementation programme. The present study therefore sets out to explore the intertwining relationship between the obvious and the hidden factors that cause failure or delay in a government programme. In the case of this article the focus was on land related information system, CALIS. And, to seek answers to the above curiosity I have listed the following objectives as guide:

- to explore the strategy (if any) of making information technology choices;
- to assess adaptation issues, that is, how much the adopted information technology has been adapted by the organisations;
- to explore the broader contextual factors, external and internal to agencies, that may have affected IT programme development;
- to assess has IT improved communications within and between organisations; and within areas in Peninsular Malaysia and between the regions of Peninsular Malaysia and East Malaysia.

Further I found that to understand the non-obvious it was also necessary to review and compare ideas and suggestions of others that have devote years investigating IT/IS implementation problems. Below are views from some of these researchers that I have used to support and understand research investigation:

- Many authors (Cartwright, 1991; Masser and Campbell, 1991; Taylor, 1991b) have argued that developing countries often have a tendency to embark on ambitious IT planning rather than adopting a small-scale and gradual approach. But because of the cost and complexity of advanced systems many IT programmes have been abandoned or have failed to meet their desired objectives. This study seeks to evaluate how far this assertion is true in the case of Malaysia's IT programmes initiatives. In addition, some (Bawden, 1989; Masser and Campbell, 1991; Goodman, 1993; Campbell and Masser, 1995) have argued that in the implementation of IT programme many organisations have failed to draw management information strategies to identify, for example, user requirements, the types of information available and ways of sharing data. This has often resulted in a mismatch between user needs and what they receive. This problem is viewed as the reason for agencies' reluctance in co-operating with an IT programme. This article evaluates how far this issue is relevant to Malaysian organisations.
- Malaysia has implemented several large-scale computerised information system programmes but very few have managed to survive beyond their pilot study stage (Chee, 1989; Han, 1991). Similarly, many individual information systems have been implemented but few have managed to achieve their planned objectives. Some authors for example, Campbell (1991), Hastings and Clark (1991), Hutchinson and Toledano (1993) and Sahay and Walsham (1996) argue that sometimes organisations are more interested in demonstrating the technology than in solving real problems. This article assesses how far this problem extends to the Malaysian IT development context.

### **Materials and Methods**

CALIS programme has involved participation of about 356 land-related agencies at federal, state and local levels. The information collection exercise carried for my study had been sampled from the same group of agencies. A total of 91 public and 12 semi-government and private agencies were sampled. The public agencies

represented by 45 federal level agencies a combination of 9 ministries, 27 departments, units and offices located in Kuala Lumpur and 55 located in the states, district and local authority levels. Information collection was carried out in two stages; one month was allocated for a pilot study and six months for the field study. Notwithstanding the fieldwork, several of the issues, which concern this study, have been followed since 1981 in my capacity as an officer in a Federal agency, and from 1990 to the present as an academican in a higher education institution. These roles proved highly advantageous for the present research in terms of gaining access to government agencies. My experience in the government service helped in understanding networks (both formal and informal) of government agencies and key actors in projects and programmes.

A major objective of the fieldwork was to gather information that could provide descriptions of government organisational behaviour in administering and implementing departmental computerisation, and consequently to observe efforts towards meeting national information system goals. At both the levels of government (policy level) and departmental computerisation, the study of processes and actions and how these were conditioned by (and in turn condition contexts) were at the very heart of this research. 'Process' or 'action' is both historical and idiosyncratic and, as Becker (1967) asserted "what the case does best is study process". A historical element was involved in the research in order to understand the influence of organisations, which re relatively stable and enduring on actions. The sequence of action and how action relates to organisations and vice versa can be traced in a longitudinal fashion. As it was not possible to conduct a full-scale longitudinal study within the time-scale of this research project, a historical reconstruction and analysis of events was carried out. The inclusion of a historical dimension was crucial, both to an understanding of how organisation influence actions, and their actions, and their leverage in generating management and policy prescription that would be socially and politically acceptable. As Tilly (1978) puts it, "we live in history and cannot escape it by assuming it away when something happens, what has happened before shapes how it happens".

Structuration theories and web models were used to guide both the empirical and analytical aspects of the study. This theoretical framework was used a general guide to direct the fieldwork, and in attempting to explain what was found in the empirical work. The theoretical framework chosen provided a balance to the risk of over emphasising the idiosyncratic and ignoring the extensive work done in the area of social analysis of information systems. On the other hand, it has to be noted that an over-emphasis on theory would have risked missing important individualities of the case and the influence and interpretations of real life actors, this is likely to distract from discovering new knowledge. The case study was guided by the theoretical framework to the extent therefore that the research does not become an accumulation of anecdotes.

Since a primary aim was to devise a methodology whereby Malaysia can learn from the experiences of large-scale information systems operation, it was necessary to capture the specifics of the contexts of the case before the relevance of prescribed intervention strategies could be judged. The case study's intensive approach to research helped to explain causal relations more effectively through rich description. In addition, its potential for developing what Stoeker (1991) called theory of the idiosyncratic, by bringing all possible

theoretical perspectives to bear and discarding and weighing each until valid and useful explanation of important idiosyncrasies of the case was obtained, holds promise for informing prescriptions that were likely to have impact on decision and policy makers.

**Approach to information collection:** Government information system programmes are multi-level phenomena, with multiple units of analysis at the levels of the individual, organisational and society. In order to obtain a better understanding of the interaction of these different levels, equal attention was devoted to policy and information systems in the empirical work interviews, both structured and semi-structured, and extensive use of archive and other secondary information was adopted. Information was derived from multiple levels with agencies and between agencies extending across region and states. The types of organisational actors involved in contributing information were also from several levels of professional and administrative hierarchies.

Focal agencies were identified on the basis of two factors. First, in terms of the presence of a programme co-ordinator. Second, in terms of the supply of information, focal agencies were those which provide information at the most basic level, such a creating of foundation for land information, using topography or cadastral databases. Forty-nine agencies nation-wide was selected as actively land-related. The key methods employed to collect information for the study were first, structured and semi-structured interviews, guided by set of pre-established questions. Responses for both types of interview were tape-recorded and, additional notes were taken. Second, direct observation was carried out at seven agencies at federal and State levels. Third, secondary information collection was undertaken involving archive searches, internal and external departmental publications archive search, memos, minutes and letters.

**Interviews:** Names and agencies that were planned to be interviewed were divided into five convenient sectors: Sector 1 for Sarawak and Sabah; Sector 2 Johor, Melaka, and Negeri Sembilan; Sector 3 Kelantan, Terengganu and Pahang; and finally Sector 4 Pulau Pinang, Kedah, Perak, and Perlis. A total of three weeks were spent in Sarawak and one week in Sabah. During that time appointments were made for other states in Peninsular Malaysia. For practical reasons the intention was to plan complete interviews in a single sector, within one single month. However, for some agencies separate visits had to be arranged due to previous commitments of officers to be interviewed.

Structured and semi-structured interviews were used to capture two levels of information. Structured interviews were used to obtain, first, an inventory of computerised facilities in each organisation; and second, to seek clarification and elaboration of issues particularly related to technical matters. Structured interviews were carried out with technical staff such as system analysts, systems engineers and urban planners, all of who managed daily transactions of information. Responses were tape-recorded and at the same time written notes were taken. In general each interview lasted between one and a half-hours.

Semi-structured interviews were used to provide qualitative depth by allowing interviewees to talk about a subject in terms of their own frames of reference. In other words the researcher did not apply a rigid set of questions beforehand because the purpose is to "*understand the issues in the interviewee's own terms*" (Valentine 1997). This methodology still calls for guiding themes; however, a list of themes was therefore

prepared to obtain details from individual offices and officers. These included offices at decision-making levels, such as the Directors of Economic Planning Unit, The Treasury, the Manpower and Management Planning Unit, the Multimedia Development Corporation, and the Ministry of Land and Co-operative Development. Themes related not only to the specific agency, but were also used to explore views of the programme in relation to national development.

The officers at an operational level, such as the Director of Survey and Mapping, Town Planners, and Agriculture and Valuation officers, questions were guided so as to understand their office relationships to a programme and how they perceived the benefit of the programme to their agencies and themselves. Emphases were placed on skills in handling new technology, such as GIS, the training provided to support the programme development; problems of communication between and across agencies; and how the introduction of new system (CALIS) affects the daily routine. For officers at state agencies, in addition to questions about generalised operational problems and issues, special effort was made to elicit of opinions on state development preferences. This was necessary because of the differences in administrative practice between state and federal agencies. Semi-structured interviews on average each took about one to one and half hours, totalling about 225 recorded hours of interviews usually administrators and decision making level officers.

Secondary information collection was carried out to understand events and relationships of past and present situation. For example, before carrying out interviews searchers were made to develop appropriate questions for selected issues. After the interviews were conducted, further documentary searchers were required to compare the interviewee's interpretation and those recorded in documents relating to those events. The activities in fact were carried out as a continuous process. A total of 143 agency documents and reports were collected for the study. They consisted of agency annual reports including statistical reports from Educational Departments, Statistics Departments and Human and Resource Departments, economic and financial reviews; legal documents; and historical literature IS-related development and land development.

The final phase of the fieldwork involved gathering comparative information on Malaysia's information systems in the context of its neighbours, in particular ASEAN countries. The search was conducted at the end of the seven months of fieldwork. Several visits were made to the Asia Pacific Development Corporation, the Institute of South East Asian Studies, the Commonwealth Secretariat and the School of Oriental and African Studies. Documented materials on development and technology (in particular on Information technology) were searched as further secondary sources.

**Evaluation:** The evaluation framework was guided by the concepts of web models, and was committed to the exploration of the intertwining social relationships between participants, the social infrastructure and the history of a programme's previous commitments. Web models suggest viewing the relationships between the focal study's concerns; that was, agencies that were directly involved in IT programmes and the broader contextual boundaries, which include the wider political and socio-economic contexts within which the agencies were located. The dynamics of these relationships have helped to answer the study's central research curiosity - to understand the relationships within the programme's social contexts - participants, the infrastructure and the previous commitments to the broader environment, such

as social and political elements.

The findings of the research showed that in adopting new technology like GIS, consideration of the requirements of all users was paramount. Sharing of implementation ideas, however, as illustrated by CALIS, was not easily achieved since each user agency (the co-ordinator and end-user agencies) had a different interpretation of the benefits of information technology. The finding supported previous studies, which indicated that many failed information systems projects were traceable primarily to human, and other non-technical factors (Campbell and Masser, 1991; Crowell, 1991; Garson, 1993; Nedovic-Budic, 1993) and were often enmeshed in a variety of political and organisational issues (Niemann and Niemann, 1994).

Critical in the findings of the research was the dominance of a 'top-down' approach, attributed to a tradition of management dominated by a bureaucratic-elite. Such an approach, especially in the context of development projects that have differentiated interests, as with CALIS, has been argued as being fundamental to project failure (Kottak, 1985; Harrison, 1987; Little, et al., 1987; Hutchinson and Toledano, 1993). Despite many development impediments the programmes studied as part of the research are, nonetheless, still accepted as 'functioning'. Difficulties in measuring success or failure arise because CALIS was an administrative programme, conceived by government for the purpose of improving government performance. In other words, government was an end-user of these programmes, and thus programme failure was seldom open to public knowledge. Except for inquiries made by external researchers and a few local academicians (for example, see Jomo, 1989; Chee, 1990; Jomo, 1994) cases of project failure in Malaysia tend not to be highlighted. However, it should be stressed that the broad GIS literature also shows a very low percentage of papers discussing failed projects.

As I have mentioned in the earlier section reason for CALIS development delay or perhaps failure could not be understood by merely examining the obvious facts. This was because CALIS was a programme with a highly ambitious plan, which implies it has various critical agenda to fulfil perhaps both obvious and hidden. Consequently high-level plan usually called for high-level decision-players. I have used Giddens' structuration theory to assist my understanding of the non-obvious factors or the unconscious actions by policy-makers and implementers. For example in the words of Giddens (1984) although generalisation is possible in explaining social change, the explanation will be *incomplete* because there are no "patterns of universal causation in the social sciences...because all causal connections in human social life are mediated in one way or another by agents' knowledgeability and agents' reasons".

The findings of the study were interpreted and analysed by considering the behaviour of actors at two levels; national policy level and programme level. The two levels were combined in the discussion because the relevant actors operate in the same 'social context' and their actions undeniably intersect with one another, and act as a vital means of social reproduction. As illustrated by fig. 1 there were interrelationships between the various dimensions of structure and action and (vertical arrows) and between meaning, resources/facility and norms (horizontal arrows).

Three analytically separable dimensions of structure (signification, domination and legitimation) and three equivalent dimensions of action (communication, power, and morality/sanction) were mediated by three 'modalities' of meaning (or interpretative schemes),



resources and norms. The implementation of CALIS was considered with respect to these interactions across since its initiation to implementation stage.

Structuration refers "abstractly to the dynamic process whereby structures come into being" (Giddens 1977). Structure involves generative rules and resources produced and reproduced by actors in patterning a social system. Structure was highly dynamic and open to changes through time and space (factors external to the participants' control). For example, if an information programme co-ordinator decides to adopt a new technology, the success of the adoption will depend upon participants' willingness or ability to accept, learn and adapt the new technology. A participant's willingness to accept a new technology was dependent on the time when the technology was proposed. Other external factors, for example, a weakening economy, may directly or indirectly influence decisions regarding acceptance of the technology. Should participants be unable to change, old relationship patterns will be maintained and the intended objective of the co-ordinator will not be achieved. As Giddens (1994) puts it, structure as "external to human action, as a source of constraint on the free initiative of the independently constituted subject".

The process of production and reproduction of social change can be understood further by referring to elements of 'action' and 'consciousness', which act as constraints and enabling factors (Giddens, 1984). Each of these elements is said to operate at three levels (Fig. 2).

The three layers of action (reflexive monitoring of action; rationalisation of action; and motivation for action) were coupled with three layers of consciousness: discursive consciousness (what actors were able to say about the conditions of their own action); practical consciousness (what actors tacitly know about the conditions of their action but cannot articulate); and motives (in part unconscious). The layers of actions and consciousness make clear that in the production and reproduction of a social system the feedback to an action was affected by actors' knowledge; this happened despite the existence of unacknowledged conditions and unintended consequences.

The blending of enablement and constraint in the production and reproduction of social change involve the properties of structure: signification, domination and legitimation (Fig. 1). Structure as signification involves semantic rules. Under the heading of signification Giddens includes all types of rules that actors could draw on to offer reasons for their actions. Structure as domination refers to the facilities (materials and non-material resources) which actors bring to a situation of interaction. Structure as legitimation relates to moral rules and here Giddens includes all types of rules that actors use to justify their conduct.

The interpretative schemes (meaning), resources and norms were modalities, which Giddens describes as the "mediation of interaction and structure in the processes of social production and reproduction" (1976). Interpretative schemes refer to standardised shared stocks of knowledge that actors draw on to interpret behaviours and events, in achieving meaningful communication. Facility or resources were the means through which intentions were realised, goals were accomplished and power was exercised. Norms were the rules and values governing appropriate conduct, and they therefore articulate and sustain the established normative order. These modalities were drawn upon by actors in their constitution of interaction and also form the media for the reproduction of the institutional

properties of social systems. The three modalities provide the linkages between the level of inter-personal interaction and the levels of the organisation and its environment. The findings of the study were considered below with respect to these interactions.

CALIS was developed at a time when computerisation among agencies has reached a level of maturity. Many agencies in Malaysia have surpassed the barriers of basic computer use and were proceeding towards developing individualised information systems. Similarly, at the policy-making level there were several IT committees that have developed comprehensive development guidelines for IT-related programmes. Members of IT committees were experts in the field, and each committee had a designated role towards an IT development programme. To illustrate the importance of the government's view on IT, a body, the National Information Technology Council (chaired by the Prime Minister) was established specifically to monitor and evaluate the effectiveness of IT programmes. The Automatic Data Processing Committee was reformed employing committee members that were mostly bureaucrats with IT skills. At the land agency level, major land custodians (the Department of Survey and Mapping and Registry Offices) have started to implement procedures, which move towards building an integrated system. Subsequently, Telecommunications Malaysia Berhad were aggressively promoting the use of Local and Wide Area Networks for intra- and inter-agency communication.

The above factors, combined with the rapid pace of development in Malaysia, and an urgent need to have a better information system to help resolve land use conflicts, all encouraged the establishment of CALIS. The Ministry of Land and Co-operative Development was institutionalised to carry out co-ordinating duties. While CALIS was in its preparation stage, the Multimedia Super Corridor (MSC) was introduced and at the same time government announced a shift in its national development strategy towards services and multimedia or Information Technology. A focus on manufacturing industries was found no longer to help Malaysia's development towards advanced country status. At the activity level, the Prime Minister himself used his position to reinforce power relationships over individuals and agencies (private and public) across the country and worldwide, thereby reproducing the resources necessary for implementation of MSC. In order to administer MSC's development, rather than using the regular agencies that was, agencies in the Prime Minister's Department, a separate agency (the Multimedia Development Corporation) was institutionalised and incorporated under the Companies Act. The agency was legally independent of civil service rules and regulations, yet since it has been established by the government it has the same power as a government body.

Introduction of the MSC saw government outwardly change the existing 'bureaucratic paradigm'. A new 'version' of government was created; government 're-invented' itself, working around the notion of empowering rather than serving; replacing bureaucratic processes with market processes; meeting the needs of customers, not the bureaucracy; earning rather than spending; preventing rather cutting and moving from hierarchy to participation and teamwork (Osborne and Gaebler, 1992).

The co-ordinator of CALIS (Information System Division - ISD - of the Ministry of Land and Co-operative Development) wholly engineered CALIS based on the government's new wave of ideology. CALIS reinforced the use of advanced high technology in its system design

and approach with the view that the major part of the duties would be carried out by the private sector.

The preliminary cost estimate for implementing CALIS which was about RM1 billion for example was expected to be supported through a combination of financial support: government, franchising and privatisation. The proposal was as such: central government should supply infrastructure and communication facilities to link participating agencies to the system. Individual states wishing to participate in CALIS should then provide their own funding for the purpose of data acquisition and conversion, purchase of hardware and software, arrangements for staff training and for the necessary communication linkages.

Further CALIS working committee recommended that the private sector should carry out as much of the work of acquiring, and converting and processing data as possible through franchising. Individual states and agencies were encouraged to franchise data acquisition, conversion and processing to private sector. In addition, clearinghouse operations, management and administration could be privatised, as could the bulk of converting topographic, cadastral data and associated attribute data.

The CALIS working committee also identified sources of revenue, which could be generated by CALIS itself. Among these sources were services, including data exchange services, research and development (R&D) and product enhancement. Data exchange services refer to commission earned by clearinghouses through the management of data exchange. Consequently, data providers can earn their returns from the price charged per transaction based on the cost spent in producing the required data. With regard to research and development, the team assumed that new products developed through R&D could be a source of potential revenue.

However, unlike MSC, CALIS clients were government agencies. Consequently, the CALIS co-ordinator was not mandated with similar resources as the co-ordinator of MSC. In addition, unlike the MSC co-ordinator, the co-ordinator for CALIS had no direct access to the Prime Minister for enforcement. Rather, CALIS faces similar problems previous IT programmes' co-ordinators. These co-ordinators oversee development in a variety of ministries, departments and agencies that have differentiated objectives and differentiated interests and levels of capability in the use of IT. In addition, the co-ordinator had no administrative or budget control over these agencies that were thus able to develop their own systems without the co-ordinator's consent. Control over growth of individualised information systems was exaggerated when MSC announced both the possibility for upgrading of telecommunication and communication services for agencies nation-wide and the availability of a large expenditure budget for IT purposes. Within a year of CALIS' announcement agencies at Federal levels started establishing organisational or State level GIS systems. At the time of the fieldwork for this study these agencies and States were at the planning stage of establishing the following systems: at Federal level, Kuala Lumpur City Hall GIS (KULGIS) which covers Federal Territory and Kuala Lumpur; Geological Survey GIS, covering the whole country with respect to geological data and information; Indah-Water Consortium GIS (GIS-IWK) which covers the country's sewerage system. At State level, major GIS systems included: Kedah GIS; Melaka Land Information Infrastructure; Perlis GIS; Terengganu GIS; and Pahang State Executive Information System.

The Information System Division (ISD), as the facilitator of CALIS, was unable to establish co-ordinated working

efforts among the individualised systems. Perhaps the situation was caused by two major factors. Firstly, the committee which was assigned to standards' development (common referencing, data exchange and other related standards) was not functioning. Participating agencies were left to develop their systems without any guidelines. The agencies only choice, therefore, was to continue their existing practice of data collection and management, and thereby the problems of data and information duplication have remained. Secondly, CALIS' design and approach were not effectively translated to participants. Many were not familiar with the terms and concepts used in the design and were therefore unable to provide the necessary support to CALIS with respect to data models and standards. Thirdly, the ISD officer lacks the necessary advanced IT knowledge, which was necessary to manage, and co-ordinate the sharing and exchange of land information. The ISD had depended on local experts (officers from major land custodian agencies) and consultants although the ISD was weakened when some of the experts they relied were recalled back by their respective heads of department or agencies. This withdrawal of skilled staff paralysed the ISD, which in turn directly affected the implementation schedule for CALIS. The CALIS operational plan was further weakened when the idea of nation-wide communication promised by the MSC programme was disrupted due to a lack of resources (financial and skills). The ISD continued with their ideas for CALIS, but the scale of operation was readjusted. CALIS' new operation centred on major producers of land information. CALIS' approach in other words was significantly simplified, meeting the needs of several participating agencies only.

### **Results and Discussion**

The state's behaviour, and the consequences of that behaviour, are being scrutinised like never before. The scrutiny might lead to better government. But if states are unable to respond constructively to the challenges they face, the result could simply be further erosion of the state's credibility, as the gap between what the state can do, and what people ask it to do, widens even further" (World Bank, 1997b).

Despite efforts to improve social living standards Malaysia's national IT strategy was moving further away from basic societal issues. This article has explored the history of an information system development programme from its early beginnings, and has shown the types of changes which government has produced how they are produced and why they were produced. The message was clear that government can meet development demands, but only by matching what it tries to do to with what it can do, and by working to increase the number of things that it can do capably.

Malaysia lacks a clearly identified and consistent information strategy. What Malaysia really has is objectives in terms of the intention of policy-makers regarding which programmes should be introduced and why. Definitions of how a specific programme should be implemented or consideration of the real value of an information system to the potential users (Bawden and Blakeman, 1990; Campbell and Masser, 1995) tend to be missing. Factors relating to the function which information technology should play in the overall life of an organisation and users; whether the users are capable of understanding the technology; how integral IT is to the users' objectives; and whether IT is seen as a strategic tool have not been given proper consideration. As Bawden and Blakeman (1990) argue: One of the most important roles for IT planners is to see that these

factors are decided upon, and clearly stated; otherwise a degree of chaos...is the most likely result". Campbell and Masser (1995) also find that without clear strategy guidelines "[the] chances of systems becoming redundant would seem to be high without a widely accepted sense of the information needs of both the organisation as a whole and individual members of staff".

Difficulties in devising appropriate strategies were compounded when the organisers of a programme themselves seem to be unsure of the prerequisites required in setting up a large scale information system, in particular in terms of the appropriate technology and skills. Generally such decisions in Malaysia were based on a 'belief' of what is needed by the users. This belief was not based on the decision-maker's own understanding of Malaysia's IT needs; rather through knowledge being passed on to decision-maker by consultants.

One key reason for the inability of local decision-makers to make informed judgements for their targeted programme(s) occurs when the operational structure of the programme was imported from another society, usually an advanced country. This approach has led to a continuous process in Malaysia of dependency of the organisers (and, indirectly the users) on consultants - from the inception of an idea through to the design, planning and implementation phases. Typically, although consultants can have expert knowledge of information technology, they were less likely to understand the organisation's (client's) objectives, and its political and economic environment. Indeed this finding was in accordance with the view of many researchers who have argued that lack of attention to political, organisational and psychological issues, was the cause of deficiencies in many information system developments (Bostrom and Heinen, 1977; Mumford, 1981; Zmud, 1983; Freidman et al., 1984; Kumar and Welke, 1984; Campbell, 1991; Masser and Campbell, 1991; Nedovic-Budic and Godchalk, 1996).

Such shortcomings may not be recognised by the consultants nor were these issues often addressed by the clients. Usually in Malaysia a number of committees were established in an attempt to overcome these inconsistencies in knowledge. Typically two levels of committee are formed - steering and technical. The steering committee was made up of policy-makers, usually represented by the most senior members of the programme office. The steering committee, for CALIS, for example, was headed by the Secretary General of the Ministry of Land and Co-operative Development. The committee's role was to monitor the progress of the consultant and to provide the consultant with appropriate assistance. The technical committee was made up of officers with expertise in information technology and their main duty was to assist the consultant in terms of information relevant to their offices and related development factors. This approach in fact relies almost totally on the consultant's professional values; local staffs (the technical committee) were merely feeders of information to the consultant. The necessary detail unique to Malaysia's organisations and which could be identified only by local staff, can be overlooked in this process.

As the CALIS programme illustrated, this type of approach may look impressive as a presentation paper to the Cabinet but it was not viable in a long-term, practical context. Consultant input works well at the advisory level, but the broader planning and implementation arrangements are best understood and decided by local organisers. The consequences of failing

to acknowledge the need for appropriate supporting resources were revealed during the pilot study. At the time of implementation CALIS had no data for the system to operate on, GIS skills were inadequate and, except for few agencies in major centres, a communication systems for data transfer were lacking. Policy guidelines for planning for new information systems were rarely lacking in Malaysian organisations; rather there can be too many. Often the guidelines were vague and changeable and add confusion to a situation. The World Bank outlines the consequences of drawing up uncertain and unclear guidelines:

"If the state changes the rules often, or does not clarify the rules by which the state itself will behave, businesses and individuals cannot be sure today what will be profitable or unprofitable, legal or illegal tomorrow. They will then adopt costly strategies to insure against an uncertain future..."(World Bank, 1997b).

Notwithstanding the issue of changing policies, government has had a major influence on structural change in the demand for technology. For example, the rapidly growing demand for a wide range of technologies used in information technology production stems directly from major government initiatives to develop that industry (notably the Multimedia Super Corridor). However, although technology objectives were clearly associated with such initiatives, these forms of government policy were primarily concerned with broad issues of information technology development strategy, and they were implemented primarily through aspects of trade policy and the range of mechanisms for information technology promotion. A more specific information technology development strategy should now follow from this general policy.

An organisation should have its own strategy related to its true objectives. In order to avoid unnecessary purchase of technology, which does not fit organisational needs and capability, this strategy should then be translated into the requirements of those who will use the systems. This is to overcome unnecessary purchase of technology, which does not fit organisational needs and capability. As exemplified in CALIS, in the excitement of establishing a sophisticated system, organisers have allowed themselves to be driven by technology, which led to the introduction of a system for the wrong reasons. This study argues that one of the most important duties to those who have to plan for the introduction of an information system is to decide when a computerised information system should *not* be introduced. In some circumstances computerisation can be inappropriate to an agency for many reasons, for example, if the agency is too small to maintain a computerised system, or if staff are unwilling to install it because most information is classified. As exemplified in CALIS, some agencies simply resisted the installation of Local Area Networks (LANs), not because of maintenance or installation costs, but because they were not ready to share their information with others.

Willingness to develop a clear organisational strategy depends on the behaviour of an organisation's leaders, in particular the programme co-ordinator; how they perceive participation of its members and their task to introduce IT where it is appropriate and not wherever it can be forced in. Successful implementation of IT is a process that works gradually; there must be specific recognition of the potential for interaction and integration between the technology and the people who are to use it.

In the cases of CALIS, a large majority of the officials interviewed felt that their influence on the choice of technology was minimal. From a typical desk officer's

viewpoint, an agency enters the programme cycle, that is, the process of identifying, preparing, appraising, modifying, approving and implementing a programme, when it receives a programme proposal. Most agencies take the view that by then the basic questions of programme design have already been settled, and they can hardly propose substantive modifications, partly because of a lack of information, but more so because of in-built organisational (political) constraints inherent in an 'arm's length' relationship.

In Malaysia, as in a number of other developing countries, provision of true grass-roots participation in project planning is rare. As argued by Thomas-Slayer (1987) some programme organisers assume that people at grass-roots level know very little and therefore not allowed to have a 'voice'. In the case of CALIS, participation was undertaken by co-ordinating agency but was conducted half-heartedly. For example, from over 356 agencies (and thousands of participants) about 14 major agencies (represented by, at most, one or two officers) were selected to participate in discussion. These agencies are generally categorised as a technical group; their duty is to 'feed' consultants or organisers with their agency's information. The organisers were usually made up of appointed high-ranking civil servants that serve to hold control in discussions and decisions. Discussions were carried out quite regularly but technical representatives' usually only listen and follow, in what civil servants refer to as 'monologue meetings'.

Information technology programmes cannot easily be planned based on selective representation. Introduction of new technology depends crucially on the nature of the organisation and agency in which it operates. In most cases representation left to an individual may seem unfair, for the person selected may not necessarily be devoted full-time to this work or may not have the mix of skills required to: understand planning the implementation and use of a large-scale information system; have a thorough knowledge of their agency and its aims; and have a sensitivity to the needs of its users. In an agency it is not possible for one person to have this mix of skills and knowledge (though one can be assumed to have it). It is safer therefore for every agency to form a team with a mix of technical skills and knowledge of the technologies, knowledge of the organisation and its staff, and awareness of the information and communication flows and the management operation.

A programme should be able maintain its effectiveness if its establishment is supported or needed by the people. A programme, which evolves through people's, needs will usually need minimal effort to sustain support. On the other hand, a programme that is imposed on people (without first taking into consideration their particular circumstances) may generate scepticism. Essentially the programme organiser or management would benefit from adopting a learning attitude at the outset and from establishing a culture of learning with respect to all aspects of the specific development programme so that participants are included in the whole programme development process. Participation provides a valuable source of knowledge and insight, which can serve as a basis for innovation, and adjustments formulated on this basis, will be far more easily implemented. Participation reduces the risk of inappropriate methods being imposed on users, ensures that the agency's resources are a foundation for development and checks that its capacities are expanded to include new options.

In principle, participation involves putting decision-making where the information is. This is in order to

reflect the fact that the staff has a lot more information in their heads than management usually recognises. While it is true that staff often have information they do not share with management, the converse also applies. Indeed, a critical objective should be to supply feedback information throughout the organisation, as it relates to the achievement of specific organisational goals. Moving information down through the organisation by a strategy of information sharing is one approach. Clearly, it is also important to move information up.

However, the process of moving information upward through an organisation could be set-up but how far could it be realised? In other words, how much is information from the grass-roots level taken seriously by decision-makers? This issue was illustrated with the design of CALIS, for example, was brought to Malaysia based on decisions made by a few individuals prior to a formal decision-making process. Such choices made through informal means are not uncommon practice in the Malaysian government. Realistically, when one closely examines the process of decision-making one finds that the person(s) who makes the decisions may not need the information at all. Rather their decisions are made on the basis of other factors, which are unrelated and foreign to that of Malaysia's context. The design of CALIS, for example, was brought to Malaysia based on decisions made by few individuals prior to a formal decision-making process. Such choices made through informal means are not uncommon practice in the Malaysian government.

Choice of technology and design of information system should involve a clear understanding of organisational structure, information flows and communication pathways, and user behaviour (Bawden, 1989). In order to avoid misjudging potential problem areas recommendations must be tailored to the scale and significance of the technology change proposed. As Goodman (1993) suggests, the goal of such planning "is for diagnostic purposes. That is, it is the mechanism for identifying impediments to successful implementations". The present study discovered that government research for development programmes often viewed merely as a formality to demonstrate to the general public that the government is 'concerned' about public views. The products of such studies often are vague, and impediments are often not identified. During the development of CALIS, for example, a feasibility study was conducted to identify potential problem areas and to collect information on existing levels of computerisation. But the feasibility study was carried out with pre-set ideas for the design of CALIS. The idea for CALIS had been in the mind of the technical committee's chairman since 1989 when organising the Computerised Land Information System for registry and land officers with the Central Board of Real Estate Data from Sweden. The idea was further developed in 1994 through views provided by various international GIS and LIS experts at a seminar on land management held in Kuala Lumpur. The seminar was followed by field visits by senior members from major land and policy planning agencies to Sweden, the United States of America, the United Kingdom and Canada to strengthen ideas for CALIS. This was followed by a feasibility study led by Malaysian consultants in collaboration with several international consultants, in particular those from Canada and Sweden.

I believe that agencies cannot be treated as objects; they have their own views and objectives. Programme co-ordinators (through the advice of consultants) may be well informed in terms of the latest land-related information technology, but in many instances unless an



appropriate feasibility study is made, a co-ordinator may have little understanding of users' interests and capabilities in a selected information system. Ignoring this issue will result in disinterest and a reluctance to learn and adapt to the new technology. It is in fact, very difficult to make realistic suggestions for major improvements, unless there is shared knowledge among every group about the state of the technology and its practicality. Getting users involved in planning for new information technology systems and in achieving smooth implementation requires very specific skills, which could only be learnt incrementally. Essentially, this involves a sensitivity to the true complexities of users' work patterns, and an ability to match their requirements to the new technologies, rather than to force the users into the pre-conceived idea of a new system.

Thus, although there is a clear objective for Malaysia to be an advanced country by year 2020, a balance can be achieved only by understanding the problems within itself and through examples of those most closely related to it, economically, politically and socially. Even though it could be argued that it is fast reaching a developed stage, Malaysia is still susceptible to various factors that are found hampering development progress, such as a volatile environment including corruption and political instability. The voice of a government may, however, differ. According to the World Bank (1997b) Thailand's government, for example, considered their business environment as generally stable (1995 to early 1996) despite various coups d'état and changes in government. Attitudes in the Malaysian government appear to be not dissimilar. Thus, despite the views of economists and academicians on the weaknesses of Malaysian investment and development strategies, the Prime Minister believes these views to be purely academic and theoretically based.

**Development, government and geography:** Since information is power, nations that establish their information infrastructure will have tremendous competitive advantage over those that lag behind (Bangemann, 1994; World Bank, 1997a). Many developed and developing countries are working toward this end. Early beneficiaries are the economically viable areas since these are the groups that are able to support development and maintain its services. In the case of CALIS, for example, the organisers were frightened by large up-front fixed costs for facilities deployment and have drastically reduced coverage of the programme. The programme covers major areas such as Kuala Lumpur and Georgetown; agencies that were with support facilities, or areas and agencies which were capable of developing themselves in the first place. The argument that "*high technology can put unequal human beings on an equal footing, and that makes it the most potent democratising tool ever devised*" (Pitroda, 1993, p. 2) is difficult to justify in the case of Malaysia when distribution of high-technology is concentrated in highly urbanised areas and diffusion of IT to the poorest groups has been slow. This is in line with Harris, et al., (1995) argument relating to issues of access to GIS:

- "The establishment of a GIS database and the acquisition of hardware, software, and trained personnel is an expensive process. These costs usually limit GIS technology to state agencies or large private corporations. The conditions, or preconditions, that regulate access to that information also usually reside with the same agencies...Without equitable access to GIS data and the technology, small users, local governments,

non-profit community agencies, and non-mainstream groups are significantly disadvantaged in their capacity to engage in the decision-making process".

This study showed that there was a clear imbalance between the government's IT development vision (that is, equal access to IT services for all areas), and IT support capability. Malaysia's vision for information technology was based on an anticipated supply of IT skills from the foreseeable future (expected to be achieved by the year 2020) and development of infrastructural support from foreign investors. The importation of high-tech design and technology was seen as a way of reaching the desired vision as quickly as possible. This has parallels with the argument put forward by some for India's GIS programme, that is, to demonstrate the use of a certain technology like GIS for its own sake rather than to use the technology to solve real development problems (Taylor, 1991b; Hutchinson and Toledano, 1993; Sahay and Walsham, 1996).

Nonetheless, for Malaysia, the government has undoubtedly made substantial efforts to improve access to IT, but for both political and technical reasons, ranging from differences in political ideology to a lack of computer trainers, distribution of even basic computers has largely remained concentrated in urban areas and selected rural areas.

In an economy that still maintains an unequal development pattern (unequal income distribution, and a large gap between rural and urban development) and limited resources, the vision to promote IT use for all areas requires conscious development objectives, that is, objectives that answer the needs of the majority of the population rather than the selected few.

**Human resources and development:** When Malaysia made a shift from agriculture to industrialisation in the 1960s accompanying initiatives were arranged for education and training. The failure of these sectors to keep pace with industrial progress was not addressed because a skill base was maintained through foreign expertise. By the 1990s Malaysia began to feel threatened when other developing countries, such as Bangladesh, Thailand and the Philippines were able to produce similar incentives to foreign multinationals. A higher priority was therefore given to IT training and education, including the giving of incentives to the private sector to set up training centres. Nonetheless such schemes take time to mature and there remains a skill shortage in Malaysia.

A focused and coherent R&D programme is clearly imperative for Malaysia, although interviews with officers from Malaysia Science And Technology Information Centre (MASTIC) indicate that there is no definite estimate for Malaysia's R&D level (based on the office's most recent industrial and innovation survey, in 1996). These officers stressed that they found Malaysia's level of R&D to be well below the set target of 1.5% of GDP. The National Council for Scientific Research and Development, as well other public research institutions such as SIRIM and MIMOS, however, has set up working groups to develop specific measures to promote and facilitate the development of indigenous R&D, although their effort's have been fragmented and ad hoc. The MSC programme is one of the ways in which government was trying to encourage foreign R&D staff to co-ordinate with local researchers. But the initiative came too late; the 1997 weakening financial situation has discouraged foreign R&D staff to explore research opportunities in Malaysia.

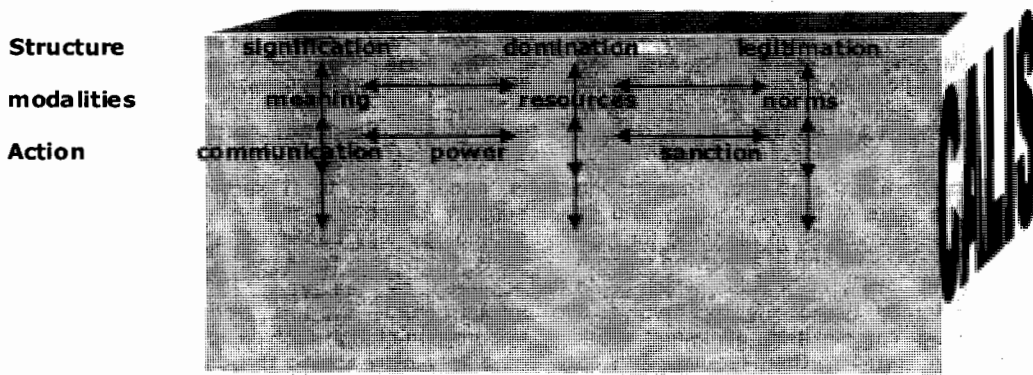


Fig. 1: Dimensions of the Duality of Structure  
Source: Adapted from Giddens (1984)

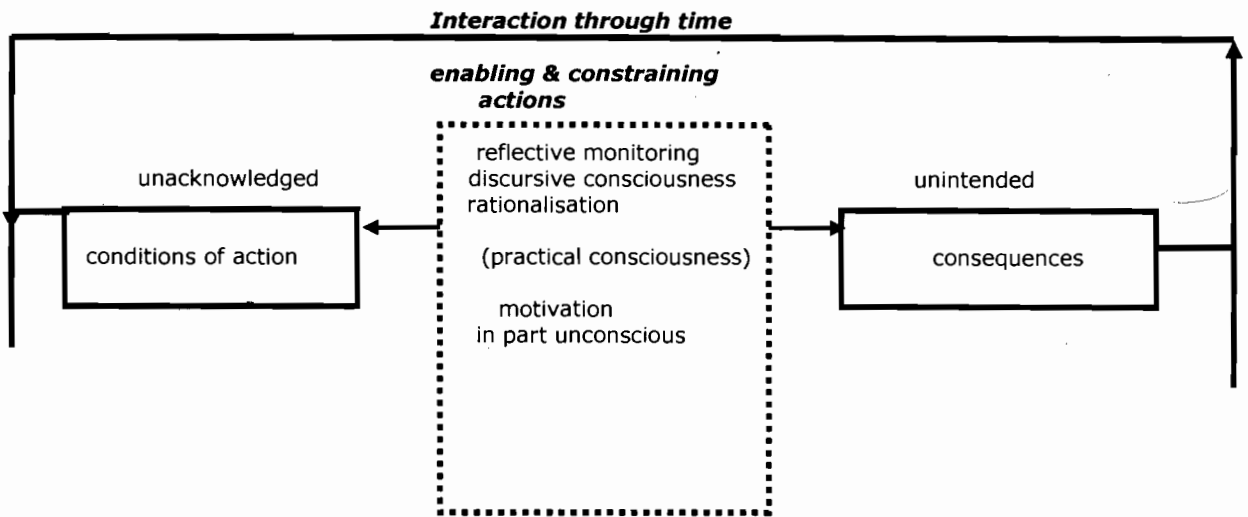


Fig2: Stratification Model of Consciousness and Action  
Source: Adapted from Giddens (1984)

**Conclusion**

Since the introduction of the first computer to the government sector thirty-two years ago, computerisation in Malaysia has continued to grow significantly. In the 1980s computers became commonplace in public agencies and took over traditional application areas such as revenue collection and information management. By the 1990s computer applications had expanded from transaction processing (management information systems) towards helping to improve organisational performance and productivity. Systems Library operated by the departments of Environment, Immigration, Road Transport and Inland Revenue, as well as the Royal and National Malaysian Police, for example, have all been successful. However, thusfar, success stories have been limited to individualised information systems operating at the departmental or ministerial level. Those systems applying an information sharing approach between departments and ministries have not, as yet, achieved

similar success, largely because of difficulties caused by having several different organisational leaders, and because of the needs of multilevel staff and differential end-users. Such problems are not unique to Malaysia; rather problems in integrating isolated systems and in gaining a consensus for sharing information are common to developing and developed countries alike, although, clearly, such difficulties may be enhanced in poorer countries as a result of inadequate infrastructure or less well-developed management systems (Fox, 1991; Masser and Campbell, 1991; Yeh, 1991; Hutchinson and Toledano, 1993; Campbell, 1994; Masser, 1996; Sahay and Walsham, 1996). For Malaysia, such problems were recognised by government and efforts to address system weaknesses began in earnest in the early 1980s. These efforts have been less than successful, however, since the programme co-ordinators themselves (notably the Economic Planning Unit, the Implementation Co-ordination Unit and the Ministry of Land and

Co-Operative Development) have been unclear of how a programme's objective were to be accomplished. The finding of this study showed that such difficulties were less attributable to gaps in knowledge and more explicable in terms of lack of time to carry out realistic planning.

In addition, some programme co-ordinators attempted to fit programmes to political leaders' agendas by adopting policies such as the New Economic Policy and Vision 2020 as programme strategies. Such policies though vibrant in approach, are broad and philosophical and carry no operational practicalities. Many organisational leaders have been unable to separate their professional and politically oriented duties and, indeed, many have similar ambitions to politicians. A speech by the Prime Minister indicates the respect that is afforded to Malaysia's organisational leaders:

- "Malaysia does not face the kind of problems encountered by many developing nations because its administrative system is well-organised and forward looking...It has succeeded where many countries, which achieved independence after the Second World War had failed...Malaysia should be proud of its success and its efficient administrative system. Because of our success in the administrative system, we have earned the respect of others and are able to stand tall even among the developed countries" (Mohamad, 30 April 1993).

Whether such respect is justifying extended to IT programme administrators is, perhaps, open to debate. Through the course of this study, but especially from the end of 1997 with the worsening financial situation in the East Asia region (worsen by the 11 September tragedy in the United States) unexpected changes to the national economy have directly affected information systems programme development. With the economic growth rate dropping to 1.8% as of January 1998 from 8% during early 1996 organisational issues have started to become secondary in importance to economic forces and organisational actors have become more minor players. By 1998 the focus clearly turned to political leaders and their development decisions, not only in terms of organisational programmes such as CALIS, but also for the destiny of Malaysian development in general. Issues such as plans for a new high-tech capital city, the shift of industrial focus to advanced technology, and continued reliance on foreign aid and experts dominate Malaysia's development debate.

At the outset of this study the author firmly believed that Malaysia differed clearly from other developing countries, especially in the context of its financial stability. Indeed, many Malaysians (in particular the new generation officers of the 1980s) have had no other reality of Malaysian life because their working life has been conditioned with the development ideology of one Prime Minister and his administration. Malaysians are trained to believe that they are different from neighbouring the developing countries because they have the economic strength and political will to be a 'successful' country. This seemed highly acceptable to government servants who, in general, were provided with a comfortable life. Malaysians have, therefore, chosen to leave development strategy to political leaders. For many government servants, the Asian financial crisis (and the 11 September attack on World Trade Centre in the United States) has been the first real understanding of Malaysia's development political vulnerability. The crisis clearly revealed that, like other developing countries, Malaysia is highly susceptible to external factors.

This research, however, finds that the external financial crisis is but one of Malaysia's development problems. The theoretical context applied in this research has helped to identify other critical issues that is, organisational and political issues that have been dampening Malaysian development progress. One of the most important characteristics that this research adopted from Giddens' structuration theory is that there is no universal causation in a certain action. The conditions in which certain circumstances happen are mediated in one way or another by knowledgeable actors. Government actors (political and organisational leaders) generally motivate others to follow their actions. In addition, political and organisational actors, and their actions, have independent influencing power over one another. Although sometimes these actions seemed to overlap with one another, they are analytically distinguishable and have divergent consequences. These concepts helped to illuminate the actions of these actors and showed how they were mediated by aspects of meanings, power relations and norms. The initiation and implementation of IT development programmes in Malaysia can be identified as a continuous process whereby effective development management was progressively enlarged as a result of influence from broader environmental factors, including experience of previous programmes. Organisational leaders in particular and programme participants in general interpret their experiences differently. Each actor uses the horizontal inter-link of rules and resources, and the vertical inter-link of norms and power relations to increase their chances of influencing the outcomes they desire for themselves and their organisations. Similar explanations could be provided for the action and reaction of political leaders in suggesting development strategies for Malaysia. Political and economic criticisms from within and outside the country was taken by government leaders as challenge of their 'competencies' to manage the country. The rapid industrial shift from heavy to light industry and services, and then to multimedia industries; dependence on multinationals and foreign aid to assist industrial development; and excessive spending on luxury projects to support multinational infrastructural demands were few examples of development motivated by such challenges.

This research began when development in Malaysia was at a peak and ended when national development is at stage of uncertainty. In this way the findings of this study draw attention to the need for follow-up research on the progress of information systems programme development, in particular CALIS since it is a new undertaking. Should the economy recover, will CALIS maintain its conservative approach or begin to start yet another grand undertaking? And will government leaders continue with their currently cautious approach or turn back to old approaches such as pursuing ambitious projects? In the meantime, how competently could organisational and political leaders share the knowledge and hence the capability to keep Malaysia's development programmes going; how could political leaders overcome personal differences for the state of national development objectives; and how far could this attitude be maintained?

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