The Use of Information Technology in Public Information Services : an Interpretative Study of Structural Change via Technology in the Indonesian Civil Service

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Abstract

The article is based on a research with the main intention of making sense of the government of Indonesia's enterprise in the application of information technology, especially with regard to the provision, disclosure, and dissemination of information to the public, and how IT application plays a role in this process; how it affects, and is affected by, the process. The result of the study substantiates the fact that IT-based public information services in Indonesia is characterised as spurious and uncoordinated, resisting innovation, more concerned with automating the work process, without direct relationships between government and the equipment industry, impaired by tension as changes in some practices are resisted, and by uncoordinated efforts to resolve the problem. These should be seen as interrelated aspects affecting each other, as opposed to separate factors having their own independent characteristics. They also conceal the underlying process and interaction that make up the dynamic, the source of which should be located in the interrelations between those who represent the innovative constituent within the bureaucracy and those who prefer to stay within the predefined and formalised framework of the government. Also, the combination of the preoccupation of Indonesia's bureaucracy with its own internal dynamic, and the nature of the state as a massive apparatus which has been largely immune to pressures and scrutiny from the general public has been significant in the introduction of IT in public information.

Introduction

Before the recent deeply-rooted crisis in Indonesia, for 20 years the country managed to emerge as one of the fastest growing economies in Asia-Pacific region. As clear evidence of this progress were the consistent and rapid increases in the level of industrialisation, particularly in the application of high technology to traditional industries. Technological innovation and diffusion has been a significant component of the country's development which also includes the advances in information technology (IT)[1] applications (Hill, 1998). Although the focus of development has been the modernisation of agriculture and manufacturing sectors, Indonesia has included IT in its program since the beginning of its First Long-Term Development Period (1967 - 1996). In 1976 the country launched one of the first communication satellites in the world. In the ten years that followed, the government had also turned to computer technology by introducing mainframes into various data processing facilities.

Like many developing countries, the development of IT in Indonesia has been characterised by two noticeable aspects, namely the seemingly impossible task of building a massive infrastructures from scratch, and the overwhelming role of the government in all aspects of the development. In particular, Indonesia's progress has been hampered by lack of human resources and by financial scarcities. In terms of the rate of development of information

[1] The term *information technology* is initially applied here liberally to include any electronic devices that can be used to create, capture, process, and disseminate information. Subsequently, as the discussion focus on the particularities of the research, narrower definitions will be used.

infrastructure, the country also lags behind comparator countries in the region, and ranks below all countries except India. Surveys conducted by the United Nation show that PC availability in the country is still below that in its more developed neighbours such as Hong Kong, Singapore, Malaysia and Thailand. With only 3.8 PCs for every 1,000 people, Indonesia is only slightly above the lower rank countries such as China (2.1 per 1,000 people), India (1.2) or Vietnam (0.4) (see UNDP, 1998). In terms of the rate of development of information infrastructure, the country also lags behind comparator countries in Asia, and ranks below all countries except India, and other countries like Viet Nam, Pakistan, or Lao. Surveys show that PC availability in Indonesia is still below that in its more developed neighbours such as Japan, Hong Kong, Singapore, Malaysia and Thailand. The figures also show that Indonesia still has so much to catch up with in terms of telephone lines penetration and the use of Internet (*see table below*). The lack of a regulatory framework for the development of information applications, inadequate intellectual property protection, and insufficient policy to build an informatics workforce, have been listed as serious barriers to continuous progress in the information technology industry in Indonesia (World Bank, 1997).

Table 1 ICT indicators - Selected Countries - 2001

	Telephone lines per 100 inhabitants	Internet hosts per 10,000 inhabitants	Estimated PCs per 100 inhabitants	Internet users per 10,000 inhabitants
Japan	59.69	559.03	38.47	4,547.10
Hongkong	57.66	573.52	38.46	4,586.14
Taiwan	57.34	764.34	22.32	3,490.20
Singapore	47.14	479.18	50.83	6,051.51
Korea(Rep.)	47.60	92.14	25.14	5,106.83
BruneiDarussalam	24.52	259.91	7.46	1,044.78
Malaysia	19.91	31.10	12.61	2,394.96
Thailand	9.39	11.32	2.67	556.11
China	13.81	0.69	1.93	260.00
Philippines	4.02	4.00	2.20	259.30
Indonesia	3.70	2.13	1.07	186.19
India	3.38	0.81	0.58	68.16
VietNam	3.76	0.06	0.99	49.31
Pakistan	2.35	0.78	0.41	34.49
Lao	0.93	0.29	0.28	17.73
Cambodia	0.25	0.46	0.15	7.44

Source : ITU, www.itu.int/ITU-D/ict/statistics/

Statistical sources and comparative international indicators for the availability of the infrastructures, policies, and skills quoted above can provide a reasonably comprehensive view of trends in the development of IT in Indonesia. However, the picture is still incomplete and, as a publication of the United Nations (1998) warns, use of such indicators involves a huge task of surveying and scaling the installation of computers throughout the country, and yet it tells us very little about how computers are actually being used.

However, while IT diffusion in the community in general is slow, the global pressure of the new information technology has spurred Indonesia's government to make strenuous efforts to improve information infrastructure. Accompanying the decade of economic growth has been an awareness of the significance of wide-area communications, manifested amongst others in the form of massive telecommunication infrastructure building. Together with this, various computer-based information systems have also been developed in many government ministries with the support of donor agencies such as the World Bank, various institutions of

the United Nations, and the International Development Research Center (IDRC). This financial and technical supports has been provided in the believe that government entities in Indonesia must have the capacity and structure to absorb the technology (Mody and Dahlman, 1992). Together with the introduction of structural adjustment programs, often as part of 'conditionality' for loans, PCs are rapidly being introduced in many areas of public administration to enhance control of key resources, notably finance and personnel, and to improve efficiency. According to Hanna and Schware (1990), in many lending operations of the World Bank the information management system components constitute the primary means for addressing the institutional development and managerial improvement objectives.

The government of Indonesia have played and will still play a significant role in defining how IT will eventually be absorbed by the entire society. The government is seen not only as facilitator of the information society but also as a major participant. In particular, as the use of new technology has not been limited to efforts to improve public administration but also has penetrated the public services arena, the government has spearheaded IT infusion to everyday life. Computerised systems were sprouting in several government departments, not only to modernise their office routines and administrational activities but also to offer new services to the general public. All of these developments, especially those which happened in the mid-1990s, occurred at a time when most Western governments moved not only to promote the coming information age but also to embrace the idea that new technology might be exploited to 'reinvent' their own activities. It is not by coincidence that many developing countries, including Indonesia, have also started to identify themselves with the idea. Along with many of its neighbours which have already devoted considerable resources to formulating national IT policies, the government of Indonesia has recognised the importance of the new technology for national competitiveness and social development.

The first official reference to "information system" in Indonesia appeared in the 1993 Guidelines of State Policy (*Garis Besar Haluan Negara*), providing a mandate for the government in embarking on further development of various systems in its offices. Although the Guidelines has never been translated into specific policies on operational levels, the IT-based modernisation of governmental offices in Indonesia fits into the already flourishing idea of transformation, reform, and better utilisation of the public administration as the country enter the Second Long-Term Development Period (PJP II). Better use of modern information and data processing technology, together with the implementation of modern management techniques, have aspired many efforts in this area (Rohdewohld, 1995, p. 133)

The Guidelines on State Policy also witnesses the first appearance of the term "informatics" in the following paragraph:

> The development of telecommunication and informatics should be accelerated to provide for reliable means of distribution of news, information and data, which is not only continual, but also clear, fast, accurate, save, and accessible throughout the nation and internationally. In order to sustain this enterprise, the extent and scope of telecommunication network should be expanded using sophisticated and reliable technology, to cater for a more efficient and effective service (Majelis Permusyawaratan Rakyat Indonesia, 1993)

In full awareness of the vastness of the country, it also stresses that any effort to expand information and communication infrastructures should "comply with the recent advances in science and technology which will provide the means for a wide-spread information distribution in an even way throughout the nation." This policy direction in particular has been reflected in the initiative to rely on modern telecommunication technology by updating the satellite. During the last ten years of the previous regime, the government was very enthusiastic about deregulating telecommunications thereby involving the private sector in meeting the high cost of the technology (Rudner, 1994).

The Guidelines reflect the political culture of the nation when they state that while the use of new technology will ensure accountable, responsible, dedicated and professional services to the public, it will also "conform to the establishment of communications which motivate and mobilise people's participation in the development of the nation". Every venture towards modernisation of the information infrastructure should also conform to the overall objective of creating an " operative and constitutional political platform as the basis of a sound and dynamic democracy which conform to the Five Principle of the state ideology (*Pancasila*)".

This brief account leads to the premise that IT development should be seen as not only a deliberate and intentional, but also a systematic and focused appropriation of technologies by their users, in this case the government of Indonesia. Various government departments in Indonesia will increasingly adopt IT and that the deployment will become a significant feature of their attempt to adapt to the changing situation within the government itself and in the wider community. Despite current upheavals in the country there has been no major change to the government's policy in respect of modernising its office infrastructure, although many projects involving IT applications have been postponed as the crisis curtails much of the government's budget. Almost all the recent developments in IT application are based on the already established infrastructure, and the state has constantly upgraded its capability to maintain the flow of information within its offices and between the government and the general public.

Further Clarification : Information Technology and Governments.

The above discussion briefly touches two significant aspects in studying IT applications in the public arena. Firstly, it relates technology to changes in the institution that applies it, and secondly, it sees the changes as an integral part of efforts towards a better government. Before attempting to particularise the questions of the present research, these two aspects need to be further clarified.

The use of information technologies in government has long been at the center of discussions about the relationships between advances in technologies and the social and political significance of communication and information in a particular society (Innis, 1950). Dutton (1990) summarises the perspectives underlying this interest into two categories: those that emphasise the dominance of technology, and those that believe on the dominance of social arrangements. The opposing perspectives reflect both causal or deterministic models based on the idea of one thing impacting on another to cause change. Both models have been the subject of extensive criticism. Technological determinism, according to Bryan, Tsagarousianou, and Tambini (1998), gave birth to high hopes for the new media which consider the technology in an abstract sense, divorced from its socio-political and economic context. Alexander and Pal (1998) warn that technological determinism can also create disillusion over the absence of simple solutions to complex social and political problems. Seneviratne (1999) concludes that the introduction of IT hardly changes the existing formal structures and political alignments in public agencies. At the other end of the spectrum, social determinism has also been criticised for pushing technology out of the picture altogether. Tehranian (1990) argues that IT has at least six features that might account for its potential, and they should provide for at least a "cautiously optimistic technological perspective". Lievrouw (1994) insists that technologically speaking the new IT is as powerful as discursive or "conversational" technologies because of its switching capacity. One study on research findings in 16 journals over a 6-year period concluded that many empirical research studies showed that IT in general has decidedly positive impacts, especially regarding the enhancement of capabilities such as efficiency, effectiveness, and information quality (Anderson and Danziger, 1995).

The research on which this article is based shares the disappointment felt over the two deterministic approaches. A third approach has emerged to argue that neither technology nor social arrangements can account for or explain the impact of IT and the changes it brings to government and politics. It believes that both factors should be equally analysed, and be placed in relation to each other. Thus Dutton (1996) asserts that the course of change in politics as far as IT application is concerned is influenced by "a combination of the processes of both social and technological innovation" (p. 5). Likewise, Castells (1997) talks about "dialectical interaction between technology and society" (p. 5). More specifically, Margetts (1999) points out that "not only does information technology shape government; government also selects and shapes information technology" (p. xvi)

The third approach challenges both the scenarios that forecast an increasingly divisive impact of the diffusion of advanced IT, and those that would disregard the potential of IT (Mansell and Silverstone, 1996). In this new approach, IT is recognised as having significant transformational capabilities but the trajectories of technical change are also malleable in the hands of different technology producers, users, and policy makers. In moving away from decontextualising IT, this approach also rejects the view that reduces "users" to a common status absent of any social or organisational context that defines them. Thus Salzman (1998) talks about IT as being socially shaped or constructed, part of a larger network of things and people. This does not mean that technology impacts are entirely the result of users' perceptions, since the features and functions of a specific technology or system are designed to operate in ways that shape the work process in a particular way, in accordance with a particular set of values. Lastly, the third approach sees the outcome of IT application at any particular time as being a complex, interactive and ongoing process. It is a basic assumption of this approach that the relationship between technology and society is "genuinely an interaction, a recursive process" (Edge, 1995).

Information Technology and Democracy

The debates are not only about whether or not there is a link between IT and politics or acts of governance but also about which areas are most affected and which are considered fairly untouched. According to Andersen (1991) modern information technologies shape the structure and functioning of government, and therefore influence politics in general, in four ways:

> First, new technologies can change the detailed process of government operations. Second, they subtly shift the relationships between elected leaders and technical experts within government. Third, government takes on new characteristics as a source of public knowledge. Fourth and finally, technological advances transforms government's responsibilities as a trustee of public information, placing new demands on agency operations (p. 79)

While separating the four issues is possible and helpful for academic analysis, it would be misleading to regard them as clearly demarcated areas in reality. However it is also true that the order of these issues somehow reflects chronologically both the growth of interest in the area and the advances in IT in general. As the technology advanced, there was talk about even newer forms of managerial-ism in public administration, particularly in relation to the patterns of organisational change which are so commonly associated with the information age. Discussions about NPM (new public management) prompt obvious questions about whether there is now an entirely new form of public management for the information age (for an extensive discussion about aspects of NPM, see for example Bellamy and Taylor, 1998).

Debates on technical aspects of the impact of IT on public administration sometimes conceal a more subtle concern over the perceived working of bureaucratic machines against democratic foundations of Western civilization. Kitahara (1995) writes about hidden desires for technologies that can check the growing power of bureaucracies which have fundamental

characteristics that are incompatible with the idea of democracy, equality, and freedom. With this view, the possible role of government in supporting electronic or digital democracy has been on the agenda of a growing number of scholars. Hague and Loader (1999) suggest two factors that justify the recent interest in digital democracy: a growing perception that current political practices are in a frail condition, and there has been much hope placed in the potency of IT to radically overhaul or replace those practices. The new technology has also sparked visions about new forms of campaigns, elections, voting, public opinion polling, communication among elected representatives and their constituencies, wired legislative bodies, and legislative processes that encourage greater citizen participation. A recent survey in Europe (Caldow, 1999) concluded that despite considerable uncertainty about IT capabilities across the democratic spectrum, political leaders intuitively know it is important to move ahead. Schultz (1994) argues that at its most banal microelectronic technology is simply a tool which aids the efficiency with which tasks can be completed. At its most far-reaching it has the capacity to change what we know, what we believe in, what we do, how we do it and even who we are (p. 106).

The Situation in Developing Countries

With regards to IT application in developing countries, two common features immediately stand out: the dominant position of governments vis-a-vis other components in society, and the total reliance on technology transfer from developed countries.

Computers made their first appearance in developing countries in the 1960s; in India in 1960, in Kenya (1961), Indonesia and Egypt (1962), and Malaysia (1965). Like their counterparts in developed countries, governments in these countries spearheaded computer applications in public administration and in scientific and technological research. However, while private enterprises soon caught up with, and even surpassed, governments in the West, most developing countries still rely on the initiative of their governments in developing advanced information infrastructures.

Unlike their counterparts in the developed world, many governments of developing countries operate almost unchecked by opposition from other elements in society. Some of the features of public administrations that influence the diffusion of IT in society through policy making and technological change are in fact common to third world countries. For example, there is considerable centralisation of administration power at all levels, and the civil service is politicised (see Subramiam, 1990). Even in the so called Newly Industrialised Countries (NICs) which have been heralded as examples of success stories in IT application, public administrators hold positions of privilege that make it possible for them to dominate the planning and engineering in the growth of the society (see Huque and Lam, 1996).

From the beginning the diffusion of IT in developing countries has been characterised by heavy reliance upon technology transfers, both as an element in independent efforts at modernisation or as a part of loans and government-to-government cooperation. More recently, the transfer of IT to developing countries has been a significant part of a move to realise the idea of a world of societies linked by advanced telecommunication facilities, to create a world-wide communication system that promote a global and borderless economy. Already the United Nations believes that Marshall McLuhan's 30 year old vision of a "global village" girdled by mass communications networks has turned into universal reality allowing communications across all geographical and cultural divides (UNDP, 1999). Multinational companies that produce IT share the vision (IBM, 1999). The idea of ever-decreasing cost and rapid improvement in hardware and software technology has also convinced international money lenders to urge every governments, even in the poorest countries, to spend more of the money they borrow on information infrastructures (World Bank, no date).

However, such optimism is also guarded by considerable doubts regarding both the approach taken by donor agencies and the capabilities of developing countries to exploit the potential of IT. According to Baark and Heeks (1998), with technology transfer as a key issue within the development process, comes the realisation that the transfer itself is problematic. Cunningham and Sarayrah (1994) underline the human dimension to technology transfer failure in the form of threat posed by IT to the receiving organisation's internal status structure. Cross-cultural issues are being given much greater consideration in systems development and transfer (Cukier and Middleton, 1996; Venkatachalam and Shore, 1996). One author in particular (James, 1999) argues that IT tends to create new problems, such as exacerbating rather than ameliorating the degree of technological dualism within developing countries, widening the gap between the modern and traditional technological systems.

Problems of technological transfer in general and IT deployment in developing countries in particular are seemingly classic examples of what Arnold Parcey (1983) calls "a view of technology which began and ended with the machine" (p. 4). Both developing countries and their helpers often start their efforts on the grounds that something need to be fixed "technically", even when they speak about "technological" breakthroughs. Technical fix leads to "tunnel vision" which restrict people's approach to a problem. Examples of this came from Africa (Cain, 1996), in particularly from Kenya, (Peterson, et. al., 1997), but also from Malaysia. For example, Nain and Anuar (1999) suspect that the Malaysian government is in no mood to realise immense potential of IT in promoting more transparent and accountable government. In the case of Singapore, to take another South East Asian examples, some questions have been raised regarding the inherent conflict between the government's long-standing determination to control IT and the democratisation of information creation and access through the very same technology (Gurbaxani, et. al, 1990).

Not unlike their counterparts in developed countries, governments of developing countries face similar pressure from a growing aspiration towards a more democratic society. Needless to say the dominant and central position of the government in developing countries will present different pictures of how these pressures affect the day to day operation of public institutions. In Indonesia, in particular, high expectations on the part of a rising middle class for greater individual autonomy and increased participation in government have resulted in demands for democratisation. The government has responded to these demands, but often in ways that appear more cosmetic than substantive (Surbakti, 1999). The government is willing to change, but reform efforts have been largely pragmatic and incremental (Legowo, 1999).

Research Problem

Against the background discussed above, the research investigated:

- How the government of Indonesia adapts to the changes both within itself and outside, especially with regard to movement towards information society, and
- The role of IT in this process; how it affects, and is likely to be affected by, the process.

Fletcher and Foy (1994) suggest that there are three aspects of IT application that are related to the nature of government organisations: geographic information system (GIS) which combine database management systems and computerised mapping; records management systems used by government agencies for the collection, maintenance, use and storage of voluminous amount of data; and the emerging citizen public access technologies which cater for both increasing public demand for more information and the eagerness of public offices to promote access to their information.

Regarding the latter issue, Dutton (as quoted in Taylor et al, 1996 p. 267) ascribes four main tasks to public electronic service delivery application, namely narrowcasting, transactions,

information retrieval, and remote communication. This study believes that these areas are closely associated with the actual relationships between government and its citizen. Marcella and Baxter (1999) provide an example of the extensive literature in this particular area, defining "citizenship information" as,

> ... information produced by or about national and local government, government departments and public sector organisations which may be of value to the citizen either as part of everyday life or in the participation by the citizen in government and policy formulation (p. 161).

Therefore, the main question of this study deals with the introduction of electronic information services to the general public. This study concerned with what can be termed as "government information" or "public information"; with "any information produced by the government that is available for public examination and use" (Hernon and McClure 1988, p. 8). In line with Sprehe (1999) this research categorises "government information" into "accessible information" (awaits requests from public), "disclosed information" (ie public reading room), and "disseminated information" (the government actively hands on the information to the public)[2].

The meaning of "information service" itself needs to be somewhat expanded so as to include not only the end-users side, but also to emphasise the organisational aspects. Regarding this, Saracevic and Kantor define it as "the mechanism or organisation which provides the information (about the state of the world or public knowledge) to a user" (1997, p. 533). A more specific attempt to distinguish the "digital library" from the traditional library can also be useful for its more distinctive definition of information service. (see Bishop and Star, 1996). In this research computer-based information services are seen as integrated systems. However, like many other emerging technologies, they are not easy to define as discrete entities. In reality many different configurations of computer applications are being applied in different ways. It is also conceivable that the working definition of these systems varies across their actual user domains. By concentrating on "information services" as described above, the present research will also distant itself from researches on the use of IT in overall management (to name a few, the work of Campbell, 1984; Sacco and Ostrowski, 1991) or the use of specific application in decision-making (for instance, Snellen, van de Donk, Baquiast, 1989).

Research Methodologies

As suggested by Bellamy and Taylor, the present research pays attention to the information polity as "a heuristic device for analysing the ways in which the institutions of governance are shaping, are shaped by, new information flows and new modes of communication which are commonly associated with information age technologies" (ibid., 151 - 152). As such, this is also a study of IT application on an organisational level, as opposed to individual level or community level (Walsham, 1995), to focus on "organisational transformation" (Orlikowski, 1996). In so doing, the study follows the newly established path of "organisational informatics" (Kling, 1998, p. 49). Moreover, how IT is being interpreted by social actors who implement and use it in organisational context is the main focus of the study which therefore can be categorised as "interpretive study" (Orlikowski and Baroudi, 1991). In principle, the present research is characterised by the 4 points as by Klein and Meyer (1999) which, among others, assumes that our knowledge of reality is gained only through social construction such as language, consciousness, shared meanings, documents, tools, and other artefacts,

[2] At least in the US, but also becoming more common in other countries, "access to information" is defined separately from "dissemination of information". While "access" is the process of providing, upon request, information to which the register is legally entitled, "dissemination" refers to general distribution of government information to the public. (see Levitan and Barth, 1987).

The research strategy of this study is "case study" which consists of several detailed investigations. This strategy was chosen because, as Yin (1994) suggests, it has a distinct advantage when 'a "how" or "why" question is being asked about a contemporary set of events over which the investigator has little or no control' (p. 9). Following Cavaye (1996) the study investigated a pre-defined phenomenon, but did not define *a priori* constructs to generalisable theory. The data were collected over a period of time, with a view to providing an analysis of the context and processes involved in the phenomenon under study (Hartley, 1995). Interviews and unobstructed observations were utilised as the main method for data collection, to produce qualitative data in the form of words. As noted by Miles and Huberman (1994), this type of data are inevitably framed by the researcher implicit concepts. All the recorded data from the fields cannot be considered as purely descriptive "fact" (first order fact) since during each visit the researcher was continuously ramifying them out into interpretations of "what's going on". This also means that although the researcher has no control of events under investigation, the issues and topics being discussed in interviews are constructed around certain concepts and theories as prescribed by the interpretivist paradigm in information systems studies. Interviews were conducted by providing the interviewee (informant) with freedom to introduce materials that were not anticipated by the interviewer, and which combine a correct mix of descriptive, evaluative, and non specific questions (Whyte, 1984).

Results of the field study were analysed using Giddens's structuration theory (Giddens, 1976), with particular reference to the theory of adaptive structuration developed by Poole and DeSanctis (1990). The present research is focussed on specific jobs and routines that make up the task of the unit that provides information services to the public. These jobs and routines are an observable pattern of activities pursued by the unit as a group or a social entity. In order to generate and sustain these activities, members of the unit will need to use rules and resources. According to Giddens's theory, the unit and its activities comprise a system, while rules and resources are structures that sustain it. Moreover, structures have a dual nature because they are both the medium and the outcome of action. They are the medium of action because members of a system draw on structures to perform their activities. They are the outcome because rules and resources exist only through being applied and oriented to in those activities.

Giddens's theory, and Poole and DeSanctis' attempt to particularise it for a specific study on technology application in a social setting is considered relevant to the present research because they enable an inquiry into the particular dynamics of changes as new technologies are introduced into, and later used in, complex organisations and institutions. They also underline the dialectical characteristic of the relationship between technology and changes in organisations.

The circumstances in which the research's topic evolved and the lack of earlier research in this field in Indonesia also necessitate an approach that enables a broad sweep over several cases, rather than a single in-depth study. Although the government of Indonesia can be seen as a singular entity, it provides a myriad of different information services to the public. An exploratory study over several cases representing these services is needed to enable an across-case verification. The choice of sites of study (or the 'sample') was determined by, first of all, the nature of the data provided in the services: numerical, textual, or graphical. The last category of information services is not really available in Indonesia, as the use of geographic information systems in public information service is still at a rudimentary stage. The first category is represented by statistical information services which, in the public domain, is solely provided by the Central Agency for Statistics (formerly, the Central Bureau of Statistics). Textual information services are provided by several departments and can be further divided into: bibliographical (or indexed) information services, and fulltext information services. For the present study, the Centre for Scientific Documentation and

Information (CSDI) represents the former category, while Centre for Legal Documentation (CLD) represents the later.

The author's knowledge of the three institutions was a determinant of the choice of sites for study. To the author's personal knowledge, the three institutions are the most respected amongst general public in their respective fields. CBS is the oldest of the three, and CLD is the most recent. In terms of the number of people employed CBS also ranks first and CLD last. Naturally, the extent of IT applications varies from institution to institution, with CBS again the one that makes use of the largest number of machines and CLD the least. After selecting the institutions to be studied, a locus of the field study was decided. The research does not seek to make statements about the use of IT in the organization as a whole, instead it focused on IT-based information services, both in electronic and printed forms, provided by the Government of Indonesia.

The data analysis in this study is a 'thematic analysis' as an inductive approach to seek themes from the narrative of the interview or written word (Kellehear, 1993). Generally speaking, there were 6 steps involved in the analysis, from affixing codes to a set of field notes drawn from observations or interviews (and documents), to confronting generalization with a formalized body of knowledge in the form of constructs or theories. The present research relied heavily on interview data. However, the analysis of the data is not merely focused on the content of interviews. Following Tajla (1999), the "specimen perspective" was used instead, allowing respondents' expression to be examined from not only the point of view of their content and meaning, but also from their implications and effects in constructing different versions of reality.

After the final visit to the field which lasted from January 17 to February 7, 2000, the author confronted all the results of the study to a formalized body of knowledge in the form of constructs or theories, in this case Giddens' structuration theory and its adaptation by Poole and DeSanctis. To this end, the present research was much informed by ideas associated with the transition from an object-centred approach in which a technology itself is the object interest, to a social-actor-centred approach, in which the focus is on the use of technology by members of a social system.

Results of the study

In terms of relationships within the machinery of a government institution, the cases of the CBS and the CSID revealed the presence of spurious and uncoordinated developments amongst different bureaus. Obviously the dispute over who should control the new technology and, consequently, the fierce competition for budget allocation, has hampered efforts to standardize approaches. However, in the case of the CLD, the smallest of the three institutions being studied, a combination of strong leadership and the concentration of manpower and technology in one unit served to tone down the competition. In a situation where each institution was busy with their own internal problems, there was very little that could be done to map out a national integrated approach, despite the availability of networking infrastructure such as the IPTEKNET. Lack of a national policy, which could have been effective in coordinating inter-departmental activities, further aggravated the problem. However, there was apparently a similar lack of concern about the national situation within each institution. Political resources in the form of laws, regulations, and decrees were sought more as justifications for internal efforts at maintaining organizational stability than for pursuing national interests. Although public officers are aware of IT and its potential, and despite the inclusion of investment in IT in reform plans, the overall undertaking is not linked in any systematic way to the process of reform in public information services.

This is not to say that in each institution there was fierce resistance toward innovation in IT-enabled services. On the contrary, in each institution there were groups with a genuine eagerness to experiment with various information services involving the general public. Many members of these groups viewed IT as a technology with the potential to support them in realising their ideas for better services. They had also managed to position themselves as prominent and progressive groups within the bureaucracy vis a vis other groups who had tended to downgrade the importance of IT in their jobs. Even among those who seemed to oppose the progressive groups, the general perception was not about IT being unproductive or unusable but more about IT being used as a means for establishing internal power by a certain group. While it has been almost a truism that the introduction of a new technology will disrupt the balance of power within an organization, the cultural uniqueness of Indonesia's bureaucracy further complicated the problem. For instance, it was always apparent in all cases, but especially in the CBS and the CSID, that efforts were made by top management to play down the struggle between competing groups and to hide the conflict behind diplomatic gestures. In some cases this resulted in a rather awkward situation whereby the potentially progressive development of an IT application, such as the use of web sites to provide direct information services to the general public, was slowed down by the ambiguous decision of the top management about who should administer it.

The case of the CLD is an example of how in the absence of internal conflict over the control of the technology, a group of civil servants who did not have any formal background in computing was capable of developing a fully digitized information product and of providing a continuous service over a wide-area network information infrastructure. The fact that in terms of the size of the bureaucracy the CLD was smaller than the other two institutions being studied, may well have played a significant role in providing more flexibility to the institutions. However one can not take for granted the role of the quite rigid leadership of the now retired head of the CLD in ensuring that only one unit within her department was responsible for the entire project. Her decision to practically disregard any disapproval from other units, and to neglect other units' request for access to the technology, was crucial in the creation of the cohesive and coordinated efforts needed to produce such massive electronic resources as Indonesia's legal texts. However, the strategy could also be the main cause of the delays in the actual provision of information to the general public. While concentrating on the production of CD-ROMs, the CLD did not pay much attention to its on-line or off-line services.

The emergence of new groupings and new attachments when a new technology is introduced into an organization is a phenomenon that has both concerned and fascinated many researchers in organization studies. Although the present study was not initially designed to address this specific issue, it is apparent that the use of IT in public information services in Indonesia has brought to the surface the issue of a new identity to which many public officers like to refer themselves to. This new identity provides them with relatively stable characters regarding their core beliefs or assumptions about how to best utilize IT in their work. All three cases in this study accurately illustrate how a group within the massive Indonesian bureaucracy, because of their proximity to the technology, managed to develop what Giddens calls a set of rules and resources that may be drawn upon by a member in his or her interaction with other existing groups in an organization.

The research process for the study did not go deeper into the underlying issues of multiplicity of identities and identifications, or the relationships between identification processes and the situated activities during which members of one group interact with members from other groups. The present study, however, makes use of the Adaptive Structuration Theory (AST) as a heuristic framework for discussing the emergence of the "computer group" as a part of the appropriation of the resources offered by the new technology available to them. According to AST, the structural features of a technology are the rules, resources, and capabilities a system can provide (ease of use, networking, speedy processes, etc.). Spirit is a property of a

technology and refers to "the general intent with regard to values and goals underlying a given set of structural features" (deSanctis & Poole, 1994, p. 126). The spirit reflects designers' intentions, users' interpretations, and other stakeholders' perceptions of how the technology is to be used. It was apparent that the "computer group" emerged as the one that instantiated the structural features and the spirit of IT in their interactions with other groups. In Giddens' structuration perspective, these structural properties are rules that can be regarded 'as techniques of generalizable procedures applied in the enactment/reproduction of social practices' (1984, p.21). They are not necessarily codified sets of sanctions, such as laws or etiquette, but rather implicit assumptions that Indonesian officials share about how to 'get along' in their daily interactions with each other and in the working out of how to implement computers in their work. By explaining the emergence of new groupings in the context of internal conflicts when a new and progressive technology is applied in public information services in Indonesia, it is hoped that the present study has properly elucidated the complexity of the dynamic change of Indonesia's government. This view challenges the attempt to look at technology implementation issues as a simple "adopt-or-reject" matter.

Thus, using Giddens' structuration perspective, all cases but especially the CBS and the CSID cases illustrated how leaders and their staff used and reproduced the structured properties of social systems embedded in the Indonesian bureaucracy in the course of their interaction (i.e loyalty in patron-client relationships, a top-down approach, avoiding open conflict, etc.). At the same time they were trying to appropriate the resources offered by the new technology available to them (ease of use, networking, speedy processes, etc.). It was apparent that, as each group in the organisation differed in their familiarity with the technology and in their choice of resources in the technology to be appropriated, the use of these resources did not always result in the positive outcomes anticipated.

As government institutions, all of the organizations investigated for the present research operate in a controlled environment in which external forces (e.g. the legislature, the president/political leader) determine constraints or appropriate funding. The situation in Indonesia during the time of the study provided a rare opportunity to investigate how these external factors were perceived by civil servants and how, in turn, these perceptions were related to their efforts to apply IT in their jobs. Until the end of the present study, the political situation in Indonesia was unpredictable and most respondents agreed that their future as civil servants was at stake, especially because of the tainted image of the bureaucracy as a corrupt and cumbersome institution under Suharto's presidency. The pressure from the general public to reform the entire mechanism of the bureaucracy was recognized by many respondents as real and needing a quick response.

However, when the conversations switched to IT applications in the provision of the service, issues of "reformation" were not as readily incorporated. For instance, in discussing services provided on the Internet, respondents related the advance of the new technology mostly to the opportunity to disseminate to more people. In the case of the CBS, for example, the priority of the new bureau in charge of information provision (B-SPS) was to fully utilize the Internet as a means of communication to increase the scope of dissemination, and to enhance the quality of information presentation. Moreover, many respondents' perception of the general public as users of IT-based information services was dominated by a pessimistic view of users' capabilities in using the technology. The new technology had somehow given an excuse for civil servants to position themselves as 'educator of the masses', and in some cases justified the argument to slow-down the development of IT applications so as to allow the general public to catch up with the technology.

The second major issue is related to the new technology being seen by civil servants as justifying the commercialisation of some information services. Many respondents realised that for the time being the central government would be severely curtailed in its capabilities to provide financial support for IT development. There was a sense of urgency in some

conversations regarding fees for services, and the new technology was often referred to as a source to generate some income. To this end, the Presidential Decree Number 38 of 1991 on Self-Financed Units[3] was seen as the major stumbling block which need to be revised and some respondents, especially in the CBS, mentioned their intention of bringing this issue to the central government's attention.

Another dimension of the new technology that in Western countries is often related to the democratisation of society was also lacking in the view of Indonesia's civil servants. During conversations respondents were more comfortable with official terminology like *pembangunan* (development), *musyawarah* (compromise), or *penerangan* (guidance and enlightenment), when they talked about IT in general or the use of IT applications in information services. The new technology such as the Internet was first seen as an instrument of controlling the flow of information over an extensive network. For some respondents, computers were just a means of doing everything that had been done before; only this time faster and on a wider scale. There were apparent difficulties for respondents to readily relate concepts like 'democracy' or 'free access to information' to IT applications, especially because for many respondents IT was mainly infrastructure, and like many other public infrastructures it "belonged" to the government. This again shows how habit, routine, and standard practices as the basic elements of Indonesia's bureaucracy, and as a background that provide a sense of normalcy, were called on when a situation required some changes in those practices. As the crisis unfolded in Indonesia, the capacity to overturn existing practices was met by an equally great capacity to retain old patterns, habits, and customs. In a limited study like the present one it was not possible to investigate how the two conflicting capacities affected each other.

Interestingly, the conflicting standpoints between the "computer group" and the "non-computer group" are not as readily observable when it comes to their perception of how the overall services should be provided to the general public. Although the "computer group" position themselves as the more progressive faction in pushing ahead with modernising the facility and in drastically changing some working procedures within the organisation, they are seemingly more tolerant towards preservation of standard practices as the basic elements of Indonesia's bureaucracy. At administrative levels or tiers the "computer group" may have played a significant role in determining the success or failure of IT applications, but the motivation and interests of the top administrators and top state officials still determine the final and overall construction of the public information services.

Meanwhile, the present research also witnessed three major observable changes in the three institutions being studied, all of them involving re-positioning of personnel within the organization responsible for the provision of public information services, and one of them involving a change of director. In all cases the changes were made according to plans drawn up by the top management. At first glance, the changes seemed to reflect a "normal" transitional cycle in the bureaucracy, something that had happened according to plan without much organisational turbulence. When further scrutinized, however, the state of flux behind the impression of stability started to appear. The creation of a new bureau at the CBS introduced a new dimension to the existing concept of information services, necessitating a series of new political alignments within the organization. The rotation of middle managers at the CSID continued regardless of the fact that the long-standing internal conflict between groups remained unresolved, giving the impression that what was being rotated was the problem. The new head of the CLD was installed just at the time when the six years of financial support that had enabled the organisation to digitise its information services came to an end.

[3] The decree regulates the income generating activities in government institutions.

All this happened at a time when an entirely new technology like the Internet was introduced, and when the external context was changing in an unpredictable way. To remain organized, all three institutions were compelled to manage what McLaughlin et. al. (1997) called the 'organizing practices' of their members. As discussed in the previous two sections, conflicts between existing practices and new ways of doing things as the consequences of changing technology, and between contrasting interpretations of both technological and organizational structures, complicated the seemingly stable environments of the three public institutions being studied. In all cases, management always tried to regulate the actual process of IT implementation in information services by imposing formal orders and directions. The rigid bureaucratic nature of public institutions facilitated these efforts, and in the cases of the CBS and the CLD management was further supported by external structure in the form of a law (CBS case) and a presidential decree (CLD case). However, as it turned out, the outcome of these exercises of formal power was not always a coordinated, predictable and planned set of activities. In spite of the presence of formal regulations, middle managers and their staff members exercised their own style of management of change. All of them by and large correspond to what Orlikowski and Hofman term as emergent changes - changes that arise spontaneously from local innovation and that are not originally anticipated or intended (1997, p. 13). These types of changes are made possible by what Orlikowski calls 'malleable technology' (1992) whereby over time the technology can be flexibly used to enact a number of significant changes in the nature and distribution of work, the form of interaction, the coordination among units, etc.

Being exploratory in nature, the present study cannot claim to have empirically established the proof that the above illustrations represent transformative actions that overcame persistent practices and structures in Indonesia's bureaucracy. However by deliberately paying attention to changes that not necessarily occured according to formal planning, and by avoiding the tendency to equate organisational changes only to changes in formal structures, it is hoped that this study presents a contructivist view as an alternative to the technologically deterministic one. In terms of Giddens' structuration theory, organizational practices reflect how a set of rules and resources enable some actions while constraining others, and are in turn shaped by those actions over time. Within this perspective, bureaucratic and formal intentions alone cannot exclusively determine how a certain technology will be applied, nor can the technology have a fully predictable effect on the organization. Being malleable and user-friendly, the technology has apparently inspired some elements in Indonesia's bureaucracy to venture confidently to unfamiliar areas. However, as these new undertakings were often perceived as involving possible disruption of the status quo which the bureaucracy and the civil service system serve to protect, the overall performance of IT-based public information services in Indonesia has always been marred by inconsistencies and sporadic or short-lived innovative programmes. By highlighting emergent changes as opposed to concentrating only on formal changes in the organisation's chart, the present study views Indonesia's bureaucracy as what Harris and Taylor (1998) call "a web of interrelations" that describe organisational activities and structures as processes or sets of interacts.

The findings of this study also support the application of Giddens' conceptualisation of agents by situating managers within structure (Sarason, 1995) and therefore recognising that management is part of a social system, and that neither managers nor structure can be viewed independent from the other. The above discussion clearly illustrates that, being knowledgeable and being aware of social rules, managers of public information service in Indonesia know a great deal about the conditions and consequences of what they do in their day to day work. They possess and apply knowledge in the production and reproduction of everyday encounters, albeit in some cases unconsciously. It is also clear that to get a more complete picture of how managers manage change in their organisations, Giddens' notion of reflexivity in the definition of agents should be incorporated. The present study found enough evidence for the ability of managers to not only monitor their behaviour, but also to monitor their monitoring, and to later adjust their actions accordingly.

Conclusion : Dynamics Of Information Age Reform

The present study juxtaposed the four-eyes model of Heeks and Davies (1999) with the information-polity model of Bellamy and Taylor (1998) to produce a model comprising four elements depicting approaches to reform (ignore, isolate, idolise, integrate) and five other elements depicting relationships between governments and various other entities (within the machinery of government, between governments and customers of government services, between political leaders and citizens, between governments and equipment industries, between information flows and the institutional order). The model enabled the present study to initially categorise the IT-based public information services in Indonesia as:

- Spurious and uncoordinated in terms of relationships within and around the machinery of government,
- Resisting innovation in terms of relationships between governmental organisations and customers of their service,
- More concerned with automating the work process than with facilitating relationships between governmental organisations, political leaders and citizens of the state,
- Without, or with minimal, formal and direct relationships between government and the equipment industry as technology acquisition is mostly achieved through donor agencies; shadowy dealings between bureaucrats and vendors.
- Impaired by tension as changes in some practices are resisted, and by uncoordinated efforts to resolve the problem.

The five points described above should be seen as interrelated aspects affecting each other, as opposed to separate factors having their own independent characteristics. Thus the tendency of the bureaucracy to resist innovation may be closely related to its present absorption in the technical and internal organisational aspects of automating its work process, which in turn may also cause tension within the machinery of the government resulting in uncoordinated and spurious activities. The present study suggests that any attempt to categorise and characterise the ongoing development of IT-based public information services in Indonesia has to recognise this interrelatedness. In fact, the dynamics of reform through the introduction of IT in Indonesia's bureaucracy is too hectic and multifaceted to be tidied up in only five separate points. More importantly, the above depiction of IT-based public information services in Indonesia conceals the underlying process and interaction that make up the dynamic.

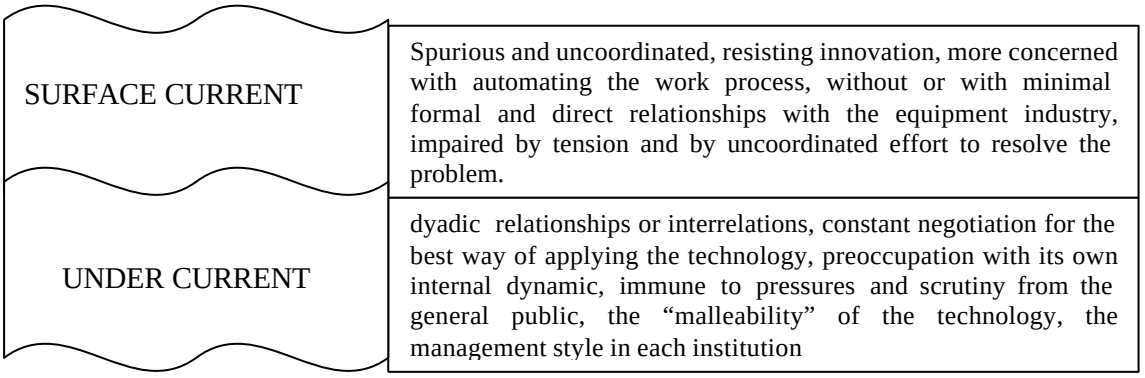
Firstly, the source of the dynamic nature of the service should be located in the dyadic relationships or interrelations between those who represent the innovative constituent within the bureaucracy and those who prefer to stay within the predefined and formalised framework of the government. Each of them relate differently to the introduction of IT to public information services as a social system where they work together; the two are in constant negotiation for the best way of applying the technology, all the time drawing upon resources from past practices and understandings. At one stage of this interaction, the rapid development of the technology may provide the drive for one faction to expand the boundary and to experiment with new ways and procedures, but afterwards this acceleration will always have to be accorded with other factions who may have an equally strong inclination to constrain any potential disruption to routine processes. These routines are enacted through actions which reflect the government of Indonesia's official view of information services as mainly one-way and mass-distributed communication between the state and the general public. Although the introduction of IT to public information services does not directly alter this standpoint, it provides an impetus for an internal dynamic.

Secondly, the combination of the preoccupation of Indonesia’s bureaucracy with its own internal dynamic, and the nature of the state as a massive apparatus which has been largely immune to pressures and scrutiny from the general public has been significant in the

introduction of IT in public information services being regarded as a "state matter" devoid of public involvement. This can be seen as a proof that, contrary to some positivist views towards the technology as democratising tools, the use of IT in the three cases in Indonesia tend to support the existing structure of state domination over the public. In terms of Adaptive Structuration Theory this phenomenon can essentially be regarded as "ironic" use of the technology. However, some closer inspections of how units in the three cases of this study manage the relationships between conflicting groups, and how they navigate themselves through changes, provide another way of looking at this phenomenon: the possibility that the use of IT does not necessarily yield "fixed" or "pre-determined" consequences. It is possible that some units in Indonesia's bureaucracy employ IT without having a full insight into the technology's modes of operation. In other words, it is the "malleability" of the technology itself, and not only the structural constraints of Indonesia's bureaucracy, that is responsible for whatever outcomes the utilisation of IT in public information services in Indonesia have produced.

Thirdly, the management style in each institution is a much more flexible factor compared to the rigidly formalised Indonesian bureaucracy which determines, among other things, the system of power distribution. Thus the erratic and spurious characteristic of IT-based public information services in Indonesia can be seen more as a consequence of management caution over the cultural and symbolic factors associated with change projects, rather than of technical problems or procedural complexities inherent in the introduction of a new technology. In relation to the malleability of the technology as discussed in the previous paragraph, management style plays an even more important role as it can be the only aspect within the organisation which can bridge the technical and the non-technical component of IT-based services. Like all sociotechnical systems, IT-based services by definition have a technical component which will require the presence and participation of a technically knowledgable individual to "run" the systems. In all three cases of the present studies, whether or not a certain IT-related change project proceeded as intended was often associated more with management style, especially that of the top manager, than with the complexity of the project itself in terms of techniques and technical procedures.

Taking the three aspects discussed above into account, the present study suggests that the dynamic of information age reform in public information services in Indonesia is akin to a river in which surface current is murky and uncertain, and the undercurrent is dynamic and turbulent:



It is also hoped that the river analogy is more appropriate to depict the change process associated with the introduction of IT as processual, rather than fixed and rigid. Finally, the analogy is also best to illustrate the fact that in order to comprehensively study IT-related changes in such a complex organisation like the Indonesia's civil service, continuous and longitudinal studies need to be done, and that -because we never step on a river twice- each of the study should be treated as a "snapshot".

Future research

This study represents only one aspect of the seemingly inexorable advance of IT in the business of governance and in the development of information societies. Internationally, these developments have been well documented among others by Cross (1998) in Canada, Tsagarousianou (1998) in Greece, Margetts (1999) in Britain and America, Ranerup (1999) in Sweden. Nor have these developments occurred in Western and developed societies, because research has also been conducted in developing countries: Nidimolu, et.al (1996) in Egypt, Raman and Yap (1996) in Malaysia, Walsham and Sahay (1999) in India, Odedra (1993) in Africa, Abdul-Gader and Alangari (1996) in Saudi Arabia, Montealegre (1999) in Latin American countries. The impetus for these research is diverse and emenating from the need to fully understand how computers can be effectively and efficiently applied in public administration, to skepticism regarding issues of privacy and electronic surveillance; from the diminishing power of the nation-state in the wake of vigorous and wide-spread privatization, to how best government could regulate the market in order to support emergent IT industries. It can also be said that the various studies of IT applications in government have been driven by two opposing general forces identified by Garson (1997): the potential of computing to threaten democratic values (ranging from the vision of a technocratic elite to the potential of computers to generate alienation and dehumanization), and the potential of computers to democratize the society (the vision of electronic democracy and a network nation).

With regard to developing countries, the above issues have also combined with the realisation that advances in IT and the emergence of a new mode of development based on the ability to process information effectively and efficiently coincide with the emergence of a new perception of national development among developing countries. In particular, the attention of many developing countries has also been drawn to the potential of computer-based information systems in supporting the planning and implementation of development programmes.

The study in which this article is based on was inspired by all the foregoing topics and concerns. It focuses on IT-based public services because it is believed that advances in IT provide an opportunity for more people to access information which will then increase the pressure on governments to provide a guaranteed, statutory right of access to government information. This in turn will reinforce the drive for more freedom of information based on a democratic tradition which believes that well-informed citizens, together with an accountable government, are the pillars of a democratic society. It is in this particular area that more studies need to be conducted in developing countries in general, and in Indonesia in particular. The study is very limited in both its scope and depth with regard to this topic, and therefore suggests that the following issues be dealt with in future research:

- **The fit between the rapid advances of IT and the development of national policies on information infrastructures and services**. Three bills are being prepared in Indonesia for freedom of access to information, on cyberlaws, and nation-wide library services. All of them address the issue of IT application and its consequences for social life in Indonesia. It would be interesting to study how, in the wake of the reformation movement and with the availability of more advanced technology, the government of Indonesia is able to coordinate its bureaucracy to adjust to these rapid developments.
- **A micro study should be conducted on a specific project that utilises IT for innovation within public information services**. For instance, the WARINTEK (technology information cafe) which initially was conducted only by a sub-unit in a non-departmental government institution (the CSID) is now a ministerial level project

under the auspices of the Ministry of Research and Technology with outlets in several cities.

- **The manner in which Indonesian government departments utilise Internet technology in order to extend their reach across the country**. In the past, during Suharto's authoritarian rule, satellites were mainly used to give the government almost total control of communications in the archipelago. The same technology is now making Internet access available to common people relatively independent of government rules and regulations as the present government has yet to draft any Internet related bills. Meanwhile, with the Internet cafe business flourishing in a society hungry for more access to the Internet there has been some attempt by the government to control the business - a move which is facing a fierce resistance both from the general public and from the Association of Internet Cafe Owners[4].

Beside the above issues, it is believed that further in-depth studies similar to this one should be pursued to try and obtain some verification and elaboration of its findings, for example:

- *The emergence of the "computer group" as a part of the appropriation of the resources offered by the new technology*. As Garson has noted (i b i d, p. 2-8), there has been a tendency to associate technology with the rise of technocratic elites, and therefore with the power that is seen to accrue from control of information systems. For a more impartial views of the rose of various grouping as a new technology is introduced to a social setting, researchers often use the term "relevant social groups" (see, for example, Sahay and Robey, 1996). While the present study did not inquire further into this matter, it has sufficiently analysed the emergence of the "computer group" within the context of internal conflict and power struggles between different groups in the Indonesian bureaucracy. In her analysis about microcomputer adoption in Tanzania, which had been greatly influenced by government initiatives, Lewis described how the frustration of computer personnel with government policy provided a major impetus to the professionalisation of computer personnel. (Lewis, 1992).
- *IT-based public information services in Indonesia retains its "government-dominated / propagandic character" when a technology based perspective would suggest its disappearance.* While this finding can be considered as further testimony to the belief that IT serves to reinforce existing power, the present study suggests that in reality the picture is much more complex and conceals within it what Loader (1998) calls "the competing social forces of innovation, competitive advantage, human agency and social resistance" (p. 15). Therefore, further studies should be conducted to focus on the above issue, but in the context of the possible conflict between modern development management versus third world bureaucracies. Studies like Hirschmann's (1999), although not related to IT application, should help the research by providing some insights into how, for example, Western modern management theory is often perceived by the third world bureaucracy more as a problem than as a challenge.
- *The change management style of IT-based public information services in Indonesia is improvisational in nature and is continuously being negotiated.* Presently, this type of change management is regarded as problematic in a rigid, control-oriented bureaucratic culture. Being exploratory in nature, the present study did not delve further into the many aspects of IT-related change management in a particular setting of the government of Indonesia. One of the most interesting aspects which merit further study is the fact that, as a sociotechnical system, IT-based public information services will require the presence and participation of technically knowledgeable

[4] This information about the Internet cafe was obtained by the author through an informal channel, by joining a group discussion called "Telematika" (telematika@egroups.com).

individuals to run the technology for other people, namely the system users. Andersen and Dewes (1991) proposed that three distinct roles be identified with regard to the implementation of new technologies, namely technology experts, technology leaders, and technology followers. Nambisan, Agarwal and Tanniru (1999) maintain the importance of the rule of users of technology in fostering information technology innovation. Amstrong and Sambamrthy (1999) also found that the knowledge of senior leadership, the knowledge of line management and IS staff are critical in IT-related innovation ventures which are both risky and consume significant organisational resources, and therefore require championship and executive support. All of these findings have, with different approaches, focused on how the management of politics in technically related organisational change can help an institution to reap the full benefit of IT. The present study has highlighted a range of evidence in the three institutions under investigation in which the management style determined the success or failure of a particular IT implementation.

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