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Conceptualising Information Culture in Developing Countries

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Abstract

To date, both strategies and perspectives for informatisation in many developing countries have tended to be very techno-centric. The purpose of this paper is to conceptualise a more holistic framework for understanding the "information society" in development. This seeks to move not only beyond techno-centrism but also beyond the determinisms and other limitations of earlier informational and cultural responses. The framework is built around the idea of an "information culture" in developing countries, using Giddens' structuration theory as a point of departure. This is subjected to an exploratory application based around a single developing country – China – including a particular focus on its healthcare sector. The paper concludes that information culture can be conceived at multiple levels in terms of three interlinked dimensions – information literacy, information openness, and information norms. These provide the basis for a broader understanding of positioning vis-à-vis informatisation than earlier frameworks. Field data shows how actions can be seen to reproduce and reinforce a country's information culture. However, it also identifies broader tensions that affect many developing countries: marketisation/state-collectivism, globalism/nationalism, technology/manual, and other potential contradictions. These create a reflexive space for agency that helps to explain the dynamism and evolution of information culture.

Introduction

During the 1990s in some cases and in greater earnest during the 2000s, many developing countries have placed information and communication technologies (ICTs) high on their national development agendas and high on their list of investment priorities (UNCTAD, 2008). The assumed model has been one in which ICTs are the means to deliver an "information society" which is itself a means to economic and social development. However, while there are strong signs of ICT investment and diffusion in many developing countries, the actual developmental effects are currently much less clear (Heeks, 2005; Furuholt & Ørvik, 2006).

The limitations of the techno-centric view of ICTs' role in national development are already familiar to information systems (IS) researchers (Avgerou, 2000). Empirically, too, this view has been challenged by evidence from developing countries of the informational, organisational, cultural and other challenges that ICT implementation in those countries faces (Avgerou & Walsham, 2000; Walsham, 2001, Heeks, 2002a). Our main intention in this paper, then, is conceptual – seeking to move beyond the techno-centric view that has dominated developmental strategies in many countries, to a more holistic understanding; one that is able to combine both arguments for a more information-centric perspective on national development (e.g. Heeks, 2002b) and those for a more socio-cultural-centric perspective (e.g. Walsham, 2001).

This more holistic understanding argues the need to view development from the perspective of "information culture". Conceptually, this seeks to move not only beyond techno-centrism but also beyond the determinisms and other limitations of some previous non-techno-centric perspectives. Practically, it provides mainly a tool for analysis of a nation's progress towards the goal of "informatisation" but also a sense of which conditions and capacities are to be addressed in pursuing such a goal. To achieve this, the paper first reviews previous work on information and culture before explaining the construction of an information culture framework, developed from a starting point of Giddens' ideas on structuration. Next an exploratory application of the framework, focused on China, is reported before some final conclusions and implications are outlined.

A. Previous Perspectives on Information Systems and Society in Developing Countries

As just noted, there is a recognition that, in practice, developing countries have often adopted a significantly techno-centric approach, yet that development "cannot succeed by focusing exclusively on technology" (Davison *et al.*, 2005:66). As a result, although plenty of writings on information systems and society in developing countries still follow a techno-centric approach, many writers have been adopting alternative perspectives. Two sets of writings will be used as the starting point for our own conceptualisation.

One strand of alternatives takes an informational path. Despite the inescapable importance of information within information systems and ICTs, there is relatively

little literature that analyses information systems or information society in developing countries from a truly information-centric angle. What work there has been draws mainly from information economics in a Stiglitzian tradition (e.g. Acemoglu & Zilibotti, 1999), often with an interest in financial markets or services (e.g. Agbetsiafa, 1998; Bailey *et al.*, 2004; see also Jagun *et al.*, 2007). This work exposes foundational information issues affecting developing countries, such as asymmetries of information provision and information skills. In all cases, though, there is an either implicit or explicitly-recognised limitation of such approaches: that they rely on a determinism of individual agency and actor-rationality that represents a significant over-simplification.

One reaction against the individuality, actor-determinism and assumed universality of such a micro-level approach is to turn instead to cultural explanations. These appear to have been somewhat more popular among researchers looking at developing countries, including those researching information systems and society. Some writers incorporate a set of structural factors, of which culture is but one, to explain the trajectory of information systems implementation (e.g. Morales-Gomez & Melesse, 1998; Sheu *et al.*, 2004). Others give culture a more central role (e.g. Zhang & Angell, 1990; Galliers et al, 1998; Ardichvili *et al.*, 2006). Such work contributes by moving beyond techno-centric views, and also beyond universalist views that adopt a global "one size fits all" attitude to information systems and society.

However, we can identify three simplifications or limitations in the use of culture to study developing countries' information systems and society. All of these show the strong influence of what one might call a "Hofstede-style" approach to culture; not surprising given his frequent citing in the works just identified:

- Structural determinism: whether culture is conceived as just one part or the dominant part of contextual structure, it is that structure which is seen as the determinant of behaviour. Such a view arguably overemphasises the role of structure as much as it is underemphasised in agent-centred explanations (Granovetter, 1985).
- Uniplanar perspective: culture tends to be treated as something that exists at a single, typically national, level. This fails to allow for culture as a phenomenon acting at different levels of collectivity (e.g. region, organisation, work group) and at the level of the individual (Straub *et al.*, 2002).
- Static perspective: culture tends to be treated as a given, with the inhabitants of particular developing countries seen as having particular enduring norms, for example related to authority, uncertainty, rationality and so forth. Yet it seems more appropriate to view culture as something that is dynamic and emergent (Westrup *et al.*, 2002).

We are presented, then, with two potentially-interesting ways to move beyond the techno-centrism affecting developing countries today – an informational and a cultural path – each of which offers insights into information society aspirations but each of which also suffers some limitations. Our next step is to seek to combine these perspectives via the notion of "information culture", and to do so in a way that may address some of the limitations.

B. Conceptualising Information Culture

The term "information culture" is not new, though it has not been very widely used to date. Where it has been used, its conceptualisation tends to be some fusion of informational models (for example from library/information science (e.g. Ramirez, 2003; Oliver, 2004) or from information/knowledge management (e.g. Widén-Wulff, 2000; Curry & Moore, 2003)) and cultural models (for example from literature on organisational culture (e.g. Curry & Moore, 2003; Martin *et al.*, 2003) or from national-level/Hofstede work (e.g. Oliver, 2004). The current paper drew particularly from this past literature the importance of incorporating into information culture notions of information literacy (e.g. Ramirez, 2003) and of informational norms/values (e.g. Curry & Moore, 2003).

While there are exceptions to individual issues, however, the difficulties identified above for IS work on culture and developing countries tend to recur in the information culture literature. Information culture is envisaged in a one-way, independent-variable-to-dependent-variable relationship to individual behaviour (e.g. Widén-Wulff, 2000; Martin *et al.*, 2003). Information culture is applied at a single level – the organisational or intra-organisational level – with information culture seen as one component within broader organisational culture (e.g. Dutta, 1996; Khan & Azmi, 2005). Some work has a sense of the dynamism of information culture (e.g. Curry & Moore, 2003; Khan & Azmi, 2005) but other work does not (e.g. Chepaitis, 1994; Widén-Wulff, 2000).

This therefore provided the impetus to seek an alternative approach to understanding information culture in developing countries. The choice of starting point was Giddens' structuration theory, which has been applied by a number of information systems researchers (see Jones & Karsten, 2003 for a review). In addition to this generically-demonstrated applicability to information systems issues, structuration theory was also chosen because of a perceived potential ability to address some of the difficulties of earlier IS-in-development and information culture literature, as discussed below. First, a summary of Giddens' ideas will be presented, though recognising that these should be seen as a point-of-departure or foundation for the framework of information culture rather than as the all-encompassing structure.

A central core of structuration theory is the duality of structure, which refers to the "essential recursiveness of social life, as constituted in social practices: structure is both medium and outcome of the reproduction of practices" (Giddens, 1979), and equally human action is both shaped by and shapes structure. In this way, structuration may therefore address the limitations of earlier work that assumes a determinism of structure over agency or vice versa. In investigating the structure—action relation, structuration theory provides a categorisation – for analytical purposes only – of structure into three dimensions of signification, domination and legitimation, interacting with human action of communication, power and sanctions through the three modalities of, respectively, interpretive schemes, resources and norms, as illustrated by Figure 1 (Giddens, 1979). As seen later, these will form the basis for an analytical categorisation of information culture in developing countries.

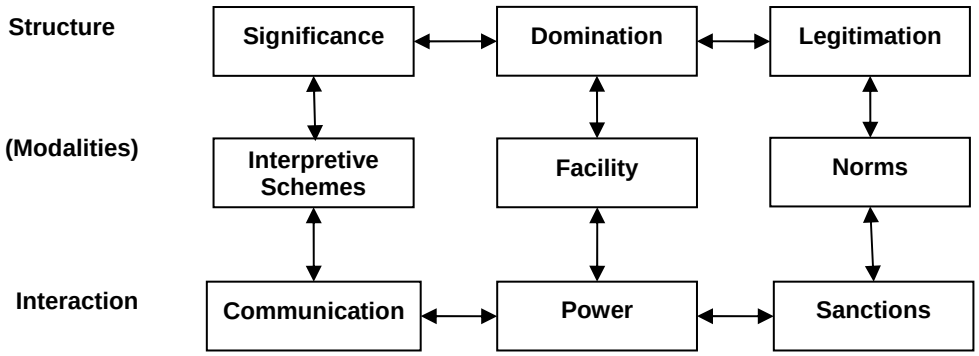

Figure 1. Dimensions of the Duality of Structure (Giddens, 1979)

A further key feature of structuration is the emphasis on the individual since the identified structural properties "exist only as memory traces, the organic basis of human knowledgeability, and as instantiated in action" (Giddens, 1984:377). In other words, structure is not some set of factors that are "out there"; instead, structure exists as a set of properties within the minds of individuals. However, it would be wrong to then take a sense that any derivations from structuration theory – such as information culture – are only conceivable at the level of the individual, with actors' influence on social life *only* occurring by means of mundane, routine, and particularistic day-to-day social practices. Instead, the object of agency can be not only individual social interactions, but also "social structures", thus counterbalancing any tendency to narrow the attention only to "situated actions".

One way in which Giddens explains this is through the distinction between social integration and system integration. Social integration refers to "reciprocity between actors in contexts of co-presence" (Giddens, 1984:28) via face-to-face interactions. System integration refers to "reciprocity between actors or collectivities across extended time-space". It is at this level that actions may be conducted by "strategically placed actors" in social life, not following the "routine" of daily life but seeking to reconstitute the conditions within which that daily life takes place. Actions of system integration include, for instance, political decisions, public policies, and institutional arrangements. This emphasis on the notion of higher-level action and collectivities thus, for example, incorporates broader notions of information culture beyond the level of the individual; something on which Giddens (1976) is explicit: "when related to a totality of collectives, as an integrated system of semantic and moral rules, we can speak of the existence of a common culture".

Finally, alongside Giddens' emphasis on routinisation and reproduction, there are also conceptual underpinnings to explain how structural properties such as information culture could be changed, rather than merely reproduced, thanks to the central focus on reflexive agency: actors' ongoing monitoring of their conduct and its consequences. As well as allowing for change through unintended consequences, this also allows for change through intended agency based on reflection. A potential source for such change may come from "one further element in structuration theory, that has not been widely referred to in the literature … conflict and structural contradiction" (Walsham, 2002:262). Giddens (1984:198) sees contradictions as

typically involving "divisions of interests"; something that may be particularly emergent in a developing countries today.

How, then, shall we conceive information culture as started from a structurational perspective? First of all, the concept "structure" serves to holistically encapsulate the notion of information culture as the totality of structural properties experienced by an individual or a collectivity (e.g. an organisation or a nation), related to the understanding, views, norms, and patterns of use of information. Information culture, as a structure in a structurational sense, is a set of "structural properties" which "can be understood as rules and resources; recursively implicated in the reproduction of social systems" (Giddens, 1976). In this sense, the greater emphasis would be on the instantiation of information culture through social practices of actors, rather than seeing it as a static property of social systems. In addition, to talk about information culture is not to talk about a unified, unambiguous set of norms and values shared by its constituent members: there must be recognition of internal heterogeneity and complexity.

Giddens' divergent and pluralistic concept of agency (Whittington, 1992) helps to distinguish and correlate information cultures at different levels. For example, the information culture of an organisation is embedded in the societal information culture in the sense that the members of the organisation share with other members of the society some major characteristics of information norms within the historical, cultural, and social-economic settings. Likewise, an individual's information culture will be embedded in wider systemic notions of culture at various different levels and it will both reflect and shape those wider levels.

Third, information culture is seen as dynamic and cultivated, arising from its ongoing enactment. The cultivation of information culture is thus embedded in the existing information culture, drawing upon existing rules and resources, but also shaping and reshaping that culture through social practices. There is space for agency and change brought on by the reflexivity of actors, including awareness of systemic contradictions that provide a basis for "contested" interpretation, application and cultivation. This occurs both at the social integration level, i.e. individual interactions on a day-to-day basis, and at the system integration level, that is, institutional changes and macro-level actions.

In the abstract, then, Giddens' ideas seem to provide a basis for conceptualising information culture in a way that transcends a number of the difficulties that have beset previous work on information systems and society in developing countries and previous work on information culture. What has always been more difficult with structuration theory's application in information systems work is to then operationalise these abstract conceptualisations into a framework for investigation (Rose, 1998). Such operationalisation is likely to require simplifications and compromises, yet is an action on which Giddens himself offers little guidance, operating instead at the level of grand narrative and "sensitisation" of researchers (Giddens, 1989).

With this caveat in mind, we move to a first attempt at deriving a framework, drawing on the three dimensions in structuration theory and the contributions of past literature on information culture to explore the content of information culture in developing

countries (see Figure 2). Abstract and general as these are designed to be, they do enable us to view information culture as embodied in three dimensions of structure. It should be noted that the three dimensions are three interrelated and interactive aspects of an integrated whole, and each dimension contains structural properties which are engaged in a structuration process as well.

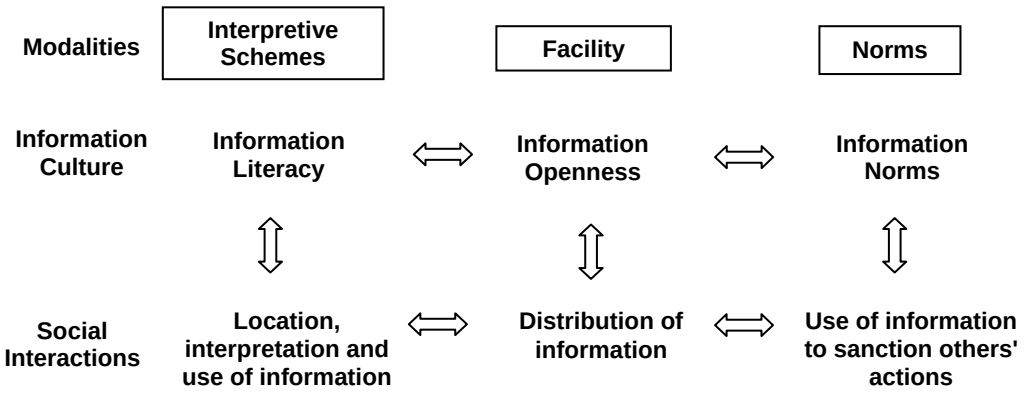

Figure 2. A Structuration-Based Framework of Information Culture

Translating *signification* into a concept for information culture is probably the most difficult of the three dimensions. Signification and associated communication and interpretive schemes relate to the systems of meaning that are the foundation for understanding. Within structuration theory itself they are thus strongly related to information; particularly to the communication and interpretation of information. We may therefore translate this into a concept of information capacities: what it is that both enables and constrains individuals not only to communicate and interpret information but also to access that information and to make use of it. Drawing from the information culture literature (e.g. Menou, 2003; Ramirez, 2003), we can characterise this as "information literacy", defined as "the ability to gather, organize, filter, and evaluate information, and to form valid opinions based on the results" (Bertelsmann Foundation & AOL Time Warner Foundation, 2002:4). This structural capacity sits alongside the actual social actions of finding, interpreting and using information to make decisions and create meaning. These, in turn, develop and amend the structural components of information culture. Information literacy should be distinguished from IT literacy, which is seen as a rather different and potentially shorter-lived set of capacities, constraints and related action (Virkus, 2003).

The *domination* dimension of structuration relates to power and control of one over another. It can be seen for the purposes of information culture as bound up with the asymmetries of access to information implicated in the power structure of a social collectivity. We here use the term "information openness" to label the rights, authorities, and capacities governing the distribution and accessibility of information. In terms of social interactions, this will be bound up not merely with distribution of information but also with the literacy-related capacity and action of finding, interpreting and using information. As noted earlier, we conceive information culture and, hence, aspects such as information openness at various levels. Information openness has, perhaps, been most readily conceived at the level of the nation-state, in terms of freedom of information. This can be an analytic concept, defined in terms of

elements such as access to particular types of information or the ability to distribute particular types of information, but it is often a normative concept that reflects particular assumptions and values (Islam, 2003; Zinnbauer, 2004).

Finally, the *legitimation* dimension of structuration theory can be translated into a notion of "information norms" for the purposes of conceptualising information culture. By this we mean the perceived institutions that both enable and constrain information-related behaviours. Analytically, information norms fall into two categories: more formal institutional norms such as laws, regulations, and formalised organisational arrangements (Boisot, 1995); and more informal norms such as values and conventions (what in lay terms is often associated with the concept of "culture") (Martin *et al.*, 2003). We can relate this directly to normative actions that seek to enable or constrain the informational actions of others but norms also underpin both information openness and information literacy. Thus, as per Giddens' formulation, the three dimensions are more of an integrated whole than three separate entities, and their division is indeed more for conceptual and analytical purposes than a reflection of real-life experience.

Although recognising the complexities within this outline, we will nevertheless attempt to move to a working definition of information culture, as: *the general capabilities, views, norms, and rules of behaviour, with regard to accessing, understanding, and using information in a social collectivity*.

C. Analysing Information Culture in A Developing Country: China

Having laid down the basis for a framework of information culture, we can now undertake an exploratory application of the framework. We chose to focus at the level of a single developing country, and selected China, recognising that this was not a selection that represents a "typical" developing country but recognising that China does have a strong theme of techno-centrism in its development strategies and perspectives (Davison *et al.*, 2005) yet that there has been a marked contrast in the country "between the magic-bullet assumption of the new medium's power and the unconvincing empirical evidence." (Zhu & Wang, 2005:53). There are tensions between the individualism often associated with Giddens and this type of national-level perspective. The compromise of focusing on a single major sector in China – healthcare – was augmented by drawing on both national-level data and individual experiences.

Although presented in this paper in a somewhat deductive manner, the actual research process was more reflexive and iterative, with initial data gathering inspiring reflection on information culture, and leading to the preliminary conceptualisation, and then later fieldwork exploring that conceptualisation. Given the nature and intention of the research process, and the basis in structuration, a data-gathering process based on a combination of qualitative methods was seen as most appropriate (see, for example, Trauth and O'Connor, 1991). In the end, three two-month periods of fieldwork were conducted by author Zheng between March 2002 and March 2004, involving twenty open-ended interviews conducted with health and health information

systems (HIS) staff in hospitals in Guangdong Province and in Beijing, with officials in the Ministry of Health and other public sector health bodies; and with staff in HIS companies. Other interviews were also conducted to follow-up on issues raised within the healthcare sector; for example in educational institutions. In addition, there was a period of participant observation working with one of the HIS companies; observations during hospital visits; and analysis of secondary documents from government, hospitals and other sources as well as the media database of City University, Hong Kong. The latter was analysed particularly for data on the SARS (Severe Acute Respiratory Syndrome) outbreak of 2003, which was a key event for the health sector in China during the period under study, particularly given that lack of information was implicated in the spread of the disease which, ultimately, led to some 800 deaths.

C1. Background

The Chinese government adopted a developmental policy of "informatisation" in 1992, actively promoting ICT development in major sectors, including healthcare, via a series of "Golden" projects. Continuing commitment to this ICT-centred vision was demonstrated in 2001 when the strategy of "driving industrialisation with informatisation" was formally presented by former Premier Zhu in the State Council Report at the 9th People's Congress, reinforced by actions of the National Informatisation Steering Committee, created in 1999 (CIIA, 2004). This strategy has triggered a number of concrete measures: heavy public investment in ICT infrastructure; heavy investment in use of ICTs in the public sector; public—private partnerships underpinning the development of key ICT corporations; new legislation in the areas of intellectual property; and national education and training programmes to diffuse ICT skills (Lu, 2000; Khan, 2002).

This strong emphasis on ICTs has been reflected in rapid expansion of ICT infrastructure and use. As shown in Figure 3, for example, the number of Internet users and hosts more than doubled during the period of study from 2002 to 2004 (CNNIC, 2004).[1] Alongside this has been strong growth in China's IT sector, posting growth of more than 20% per annum during the early 2000s, with total sales of more than US$200bn in 2004 (Khan, 2002; China Daily, 2004).

[1] Latest figures available at the time of writing were for December 2007 and indicated c.210m users (of whom 78% were broadband-connected) (CNNIC, 2008). No figure is provided for overall number of Internet-connected computers, but there were 78m domestic Internet-connected computers, and 135m IP addresses.

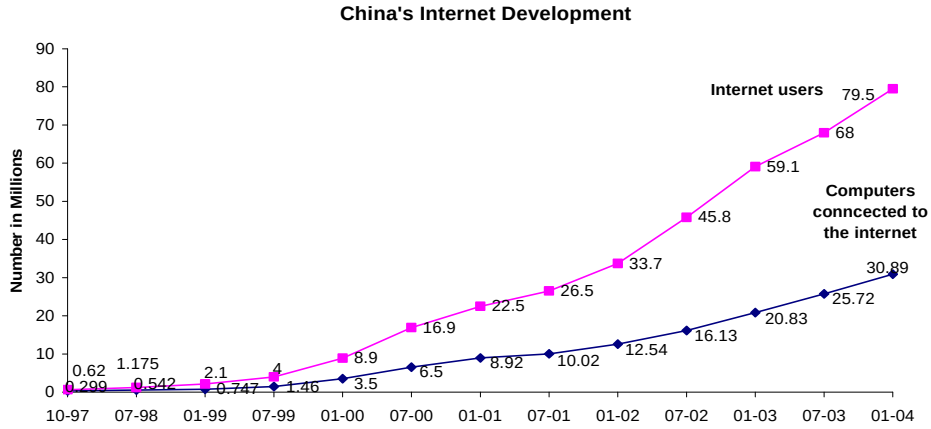

Figure 3: Growth of Internet Diffusion and Use in China

This rapid growth of new technology within China can be seen as an important force shaping the country, including its information culture. It should be seen alongside marketisation and globalisation as the key forces for change since China's change of policy direction in 1979 (Martinsons, 2005); key forces that are found in most developing countries (e.g. Huchet & Ruet, 2006). Rather than seeing these simply as exogenous forces, they are better recognised as systemic contradictions in Giddens' terms: emergent tensions within this developing nation between new/automated and old/manual practices; between market-individualism and state-collectivism; and between globalism and nationalism (Bowles & Dong, 1999; Kaplinsky, 2005; Suttmeier, 2005). Seen in this way, we can understand how they may create opportunities not merely for conflict but also for individual agency and change.

Having described a pattern of values nationally, we can observe a similar pattern within the healthcare sector. For example, a technology-driven view has dominated. From 1994, the presence of a hospital information system was included by government as a major criterion in its national ranking scheme for hospitals. The result of this techno-centrism – due to a lack of affordable and effective systems in the market and due to skill and other shortages – was rushed implementation of low-quality, makeshift financial, payroll, or outpatient registration information systems in hospitals all over the country.

From the late 1990s onwards, tensions between market- and state-led visions of healthcare began to increase. The outcome of that tension has been uneven and complex but part of it was a perception of greater competition and less government protection. Many hospitals reacted to this by further ICT investments given what was expressed as the notion that ICTs signify a modern, competent (hence competitive) healthcare provider. However, interviews suggested that the state-led techno-centrism of the early 1990s had merely been replaced by a more market-oriented techno-centrism. Hospital managers regarded information systems as the responsibility of technicians, and clinical and other non-technical staff were typically excluded from processes of IS development and implementation. Not surprisingly, this appeared to continue the earlier disappointing results of informatisation. As an HIS manager in one of Beijing's largest hospitals stated, "Our HIS development has gone too far ahead

of our management; too many expectations have been put on information systems, which are unrealistic without managerial, institutional and cultural support."

This quote touches on information culture issues, and it is therefore appropriate to move on to a more in-depth look at China's information culture, using the three dimensions discussed above but noting again that this division should best be seen as for analytical purposes only.

C2. Information Literacy

There is an extensive literature on what constitutes information literacy, from which three important and recurrent aspects will be analysed here (Mutch, 1997; Menou, 2003; Ramirez, 2003). Two elements are foundations but not integral to information literacy: one old – basic literacy, and one new – IT-use skills. The third is a core of information literacy: information-handling skills. Lack of space prevents a more detailed discussion of this, beyond noting that more interpretive elements of information literacy get much less attention in both literature and in national analytical reports/documentation of the type this study had to partly rely on.

In the 1950s, China began its nine-year compulsory education scheme, aiming to cover all children aged seven to fifteen. The scheme was gradually strengthened through various legislative or promotional acts of government so that, by 2003 just under 90% of scheme-age children were receiving the nine years of education (People's Daily, 2004). As a result of such educational programmes, the adult literacy rate in 2003 was 91% (UNDP, 2005); although, being China, that still left more than 100 million illiterate adults in the population. The more-than-doubling of Internet users from 2002 to 2004 cited above suggests strong growth in ICT use. However, that did still leave more than 90% of the population without Internet access or, presumably, skills. The association between Internet use and effective Internet use is also unclear. Certainly China has a history of under-emphasising skills investments and over-emphasising technology investments, spending 2.5% of GDP on the former and 30% of GDP on the latter (Heckman, 2003). "Ironically, this policy undermines the strategy for promoting physical capital investment. There are too few skilled workers to effectively operate the new technology that is being rapidly introduced into China." (*ibid.*:802). This was certainly reflected in hospitals, where the lack of IT-use skills was a generally perceived constraint to the effective utilisation of ICT-based information.

Yet a more fundamental challenge faces informatisation in China: the lack of information-handling skills and knowledge – the competencies "to locate, evaluate, and effectively use information" (ALA, 1989) – that are the core of information literacy. Healthcare sector staff therefore reported under-use (partial failure) and non-use (total failure) of information systems, particularly those that provide managers with information. The experience in one South China hospital was symptomatic: "We have three affiliated hospitals and each has implemented two generations of hospital information systems. We have spent RMB30 million [*c.US$3.5m*] on these systems. None of them has worked effectively. Now the directors don't even want to talk about it." The link to information literacy was often explicit, with one HIS developer, for example, reporting the cancellation of a decision support system in his hospital,

"because the directors did not know what data to look at" (even though "the directors usually have the best computers with the biggest screen on their desks" – symptomatic also of norms that value the symbolism of technology over the utility of information). Health managers therefore retain alternative approaches to decision-making, thus reinforcing the lack of need for information literacy.

This issue derives at least in part from the broader nature of the Chinese education system, in which the emphasis has been on memorisation of answers rather than on development of analytical skills or critical thinking. In informational terms, students are thus likely to come to see information as something provided, rather than something to be located; as something with an accepted intrinsic value, rather than as something to be independently evaluated and interpreted; and as something to be used via regurgitation, rather than as something with broader potential value (NEC, 2001). The particular type of information literacy this often develops is reinforced by a systemic cycle that sees both teachers' income/job security and schools' performance judged on exam scores, and those exam scores dependent on repetition of given, textbook-based information (Xu, 2002; Xiao, 2003).

The introduction of new technology could provide an opportunity for change and a move away from the simple reproduction of this aspect of information culture through informational actions. Signs as yet are that this will be a complex and uneven process. Interviews in educational institutions, for example, suggested that the introduction of ICTs had been associated only with addition of IT-use skills to the curriculum rather than cultivation of students' information literacy. As already noted, this was mirrored in most hospitals where the introduction of ICT-based HIS was an activity isolated from any broader development of informational skills or changes in informational behaviour.

However, this sense of reproducing – even reinforcing – current information literacy structures can be contrasted with the experience of SARS and other cases where information is not forthcoming through traditional channels. In such cases, those citizens with access turned to alternative channels: "For the first five months, there was little coverage of the epidemic in the mainstream media. Tens of millions of Chinese residents learned about it through phone calls, SMS messages, email, unofficial Web sites, and other channels." (Zhu & Wang, 2005:52). This demonstrates a widespread information-seeking behaviour at odds with traditional information literacy and hard to achieve before the advent of ICTs. But it may also – by presenting contradictions between information from traditional and information from non-traditional sources – create a reflexive change by which Chinese citizens develop a more critical perspective on information and its interpretation. As an editor for one of China's main news websites commented, "It is clear that there is a higher demand for information about public events, not only in terms of quantity but also in terms of perspectives. Websites give them the opportunity to express their views and feedback on issues that interest them, thereby generating questions, discussions, and debates. The traditional media is much more restricted in serving these functions." Hospital information systems can also shows signs of this, not just being cast aside as failures due to a lack of information literacy but, by their presence, prompting reflection on the dissonance between the informational requirements and potential of information systems, as compared to the actual informational competencies available, and thus prompting action.

C3. Information Openness

The conventional view of China is of a society characterised by a lack of information openness and by a presence of strong information asymmetries, particularly between state and citizens. The public have traditionally been seen as passive recipients of censored information via state-controlled media. The main narrative around ICTs is the reproduction of structure and action within the new channels. Some websites and discussion groups are blocked; ICT actors such as cybercafés, Internet service providers, and search engines are co-opted as agents of the state to block access to information, keep users under surveillance, and remove "sensitive" information; those who fail to comply are closed down or even jailed (RSF, 2003; CACM, 2005). Such structures of domination and control impinge on action, with Internet users observed to self-censor their online activities (Huang, 1998).

Reproduced information concealment/secrecy could also be seen in the healthcare sector, with actions reflecting and even reinforcing structures. The lack of sharing of information was enacted in the design of HIS that themselves did not share information outside particular work groups or departments thus, in turn, strengthening this aspect of information culture by setting it in "electronic concrete". It was also enacted in those information systems that were <u>not</u> designed: for example, those which might challenge the control of particular health information by clinicians. Alongside the absence of such systems in the hospitals visited during fieldwork, a more general survey reported only 10% of hospitals in China to be even "exploring" clinical information systems, let alone implementing them (CCIDNET, 2002).

The broader national underpinning for this reproduction of information asymmetries can be seen in the importance attached to the concept of "social stability"; something seen as of paramount importance during rapid economic development, and manifested in comments like that of Deng Xiaoping that "stability overrides everything" – a sentiment subsequently endorsed as policy (People's Daily, 2001). The power of this as a structural property was reflected in the explanation offered by a senior official at the Centre for Disease Control for the initial secrecy within hospitals, local governments and central government around the SARS outbreak:

> "In the past, information on epidemics was indeed highly classified. The main purpose was to maintain social stability. Of course, the SARS incident indicated a lack of information communication in the public health sector. But the media also exaggerated the situation. The common way of handling information was 'intense internally, relaxed externally'. We have to consider the psychological tolerance of the public, e.g. in June, July last year [*2003*], in some areas in Guangdong, there were many rumours about a deadly epidemic, which caused public panic."

It was in the name of social stability that information on epidemics was classified as state secrets, with local authorities unable by law to reveal information unless so authorised by a central government official.

However, alongside a sense of stability and reinforcement, the SARS episode also reflects change in information at systems and society levels in China, as the same official noted: "SARS, a disaster as it was, indeed stimulated the improvement of

information communication." It did this in the short-term, through a greatly increased flow of information to the public, particularly from the Ministry of Health, and through lowering the classification (i.e. secrecy) levels of various types of public health information. In the medium-term, SARS was the trigger for five new national-level information systems that aimed to increase the sharing and/or openness of health information. In a few hospitals identified as special treatment centres, necessity was the mother of invention, with computerised systems built rapidly to reduce the amount of face-to-face contact previously required by normal communication and transfer of files (e.g. CCIDNET, 2003).

At the moment of the final fieldwork period, the depth and sustainability of these changes – such as their long-term impact on structures and actions of information openness – could not be judged. Perhaps the best we can do is cite some straws in the wind that suggest there has been some sense of change. In the broader arena of information openness, the response to a number of disasters has been to hold regular press conferences, contrasting with earlier discouragement of reporting such events (e.g. China News Service, 2004; see also e.g. Xinhua News Agency, 2008). Some local governments – for example in Guangzhou and Shanghai – introduced freedom of information provisions in late 2003 and early 2004. In specific relation to health, a new national reporting system for epidemic disease was designed and built in six months, becoming operational at the start of 2004 and basing itself on a sharing of data between many hospitals. During interview of a system manager in Beijing, a hospital official from a small town in a poor area of Inner Mongolia telephoned to discuss a problem with logging on – just a single vignette but one illustrating the reach of the new system.

To the extent that there has been some reflexive change rather than simple reproduction of existing information openness, where might the space for such change come from? We can return to the three tensions or contradictions described earlier. Fieldwork provided no definitive answers but field data plus other sources (e.g. Huang, 1998; Jones & Karsten, 2003) would seem to support the idea that technology is not the imperative to change; instead, individuals in China perceive potential and opportunities through new ICTs but are only driven to change by other tensions. These seem to arise from some combination of systemic contradictions: first, between the traditional properties of state paternalism and the individualism of growing marketisation; second, between old insularity of the "Middle Kingdom" view of China and the new imperatives of globalisation. It is not so much that these create an awareness of information asymmetries – such awareness may be ongoing – but that they provide the basis for reflection on the tensions and downsides of asymmetry, and on the alternatives.

That such contradictions provide the basis for contestation rather than a uni-directional drive can be illustrated by the attitude of senior officials. The globalisation perspective was forced on these officials by China's many global links – financial, media, and in the specific form of the World Health Organisation which took a clear normative view on information openness: "panic is fuelled when information is concealed or only partially disclosed" (WHO, 2003:8). These elements helped create the basis for the changes in information openness described. But senior Chinese officials also demonstrated a counter-reflexivity by interpreting events that took place after greater openness about SARS (mass departures from Beijing, rumours

about people dying after speaking a recipe for SARS) as evidence of the negative impacts of openness, and thus in favour of a more "status quo" mode regarding information openness: "I believe we have to do it step by step. It has to be a long process to achieve transparency. It is impossible to change things overnight."

C4. Information Norms

The conditions of information literacy and information openness in China are related to prevalent information norms. We can, for example, partly understand the profile of information literacy and some of the problems of implementing information systems in healthcare by reference to information-related norms that are variously described as based on intuition (Redding, 1990), subjectivity (Zhang & Angell, 1990) and personalism (Redding, 2002), and lacking in embedded economic and administrative rationality (Boisot, 1995). Such values would be at odds with development and enactment of the type of information-handling skills normally associated with ICT-based information systems especially management information systems of the type many hospitals were seeking to implement (Heeks, 2006). Similarly, we can partly understand the "traditional" profile of information openness by reference to information-related norms that are variously described as based on authoritarianism (Zhang & Angell, 1990) and paternalism (Martinsons & Westwood, 1997), or as "fief-like" (Boisot, 1995). Such values would be enacted in distributional behaviours favouring secrecy and asymmetry of information, serving to legitimise those actions.

We can also see how such structural properties would themselves be reinforced by the very actions that they shaped. The "reproductive" examples given above are demonstrations, and another that arose during fieldwork was the observed attempt by a hospital official to seek personal rewards from an HIS company as a condition of supporting adoption of their particular HIS. This helped reinforce the sense for the company that the norms of competition in their market place were ability to offer rents rather than technical features, and that secrecy and asymmetries of information should be adopted norms within the process of negotiation and system development. Such norms, in turn, are further enacted and legitimised through future actions.

However, we began by seeking to move beyond a commonplace view of norms and culture, though acknowledging the value of such a perspective in discussing information culture. We can start by exposing two general points derived less from fieldwork than from secondary literature. First, there has been a tendency to talk about "Chinese culture". There are undoubted commonalities within Chinese communities worldwide, but we note that other Chinese-dominated locations – Taiwan, Singapore, Hong Kong (accepting the complexity of separating Hong Kong from the rest of the PRC) – demonstrate rather different information cultures to those found in mainland China. In particular, they have greater degrees of media freedom, information openness, and government transparency (e.g. RSF, 2005). Alongside the common "Chinese-ness" of information norms, we therefore need to recognise the likely impact of area-specific political-institutional arrangements on those norms. We should also take care to distinguish our interest in "information culture in China" from an interest in "Chinese information culture".

We also want to restate the idea that culture should be understood at multiple levels. In a country as vast as China, for instance, there have always been discrepancies of culture and norms among regions. Just like the discrepancies of ICT infrastructure and use[2], these have been reinforced by the forces of marketisation and globalisation, especially between coastal regions and inner regions of the country (Child & Warner, 2003).

Both of these can be taken as illustrations of another point: the dynamism of information culture. The SARS history provided examples of this, such as the reorientation of individuals' views about the value of ICTs in those special hospitals that were forced into "emergency computerisation". We argued above that such dynamism comes partly from tensions within processes such as marketisation and globalisation, but we can find other examples of internal cultural contradictions that may create a basis for change under conditions of reflexivity. Dong and Engeström (2004) provide a generic example, of tensions in the informational actions of Chinese workers and managers between the principles of "Confucian authority chains" and the principles of *guanxi*. In the case of SARS, this was reflected in the different attitudes to top-down information delivered via formal information channels from government, and information from peers delivered via informal channels.

SARS also provided a pivotal example of such tensions in the actions of Dr. Jiang Yanyong, the retired military surgeon who – because of his contacts with staff in military hospitals – contested the version of events promoted in the Health Minister's televised press conferences. Although steeped in "traditional" informational norms of secrecy and deference to authority, Dr. Jiang was conflicted by the contradiction now faced with his norms of medical ethics. His action was to react against the former in favour of the latter, writing a signed statement about the extent of infection and the attempts to under-report that extent. Publication of his statement in *Time* magazine is credited with spurring WHO intervention into China's SARS reporting systems and with the removal two weeks later of the Health Minister and the Mayor of Beijing (Jakes, 2003).

D. Conclusions

ICTs will no doubt play a key role in future socio-economic development, just as they have played an increasingly-important role in the past 10-15 years. However, many developing countries at present shows clear signs of techno-centrism at national, sectoral and organisational levels. Moving to a normative mode, we might say that this is an over-emphasis on technology which, if not addressed, may leave developing countries information-poor even though they may develop technology-rich pockets. They may thus be increasingly digitally-connected but largely information-illiterate, information-asymmetric, and adhering to norms that conflict with at least some of the opportunities offered by ICTs.

In an attempt to push beyond technology-centred views and beyond some of the limitations expressed in earlier informational and cultural perspectives, we have opted

[2] Roughly 30% of the population in the main coastal regions are Internet users, compared to roughly 10% in the country's inner regions (CNNIC, 2008).

for the exploratory development of a more holistic framework, that of "information culture" developed from Giddens' structuration theory. At a simple level, this framework has offered two things. First, further empirical evidence of the importance of understanding information and structural properties when analysing the role of ICTs in development. Second, a relatively straightforward means of categorising and characterising information-related social practices in developing countries. The division of information culture into three dimensions of literacy, openness and norms was seen more as an analytical device than a reflection of experienced structuration, and the interweaving of the dimensions can be seen in the impossibility of neatly compartmentalising discussion of any one dimension without reference to the others.

Our exploratory application of information culture focused on a single developing country: China. We do acknowledge the specificities of China and hope that applications of information culture in other developing countries will follow. However, we would also argue that many of the features described in this case are found in many other countries: rapid growth (albeit from a small base) of ICT infrastructure (UNCTAD, 2008); increasing use of market mechanisms including their use to reform the public sector (McCourt & Minogue, 2001); increasing imperatives from globalisation (Dicken, 2003); lack of information literacy and information-handling skills (Ramirez, 2003); widespread information systems failure (Heeks, 2002a); rote-learning within the education system (Bloom & Rosovsky, 2003); increasing use of new media channels (AFA, 2001); information asymmetries between citizen and state alongside some signs of change in those asymmetries (RSF, 2005); cultural norms of relevance to information described in terms such as subjective, personalised and authoritarian (Kirlidog, 1996; Grzeda & Assogbavi, 1999) alongside a recognition of the dynamism of culture (Westrup *et al.*, 2002).

The emphasis here has been on conceptualising and analysing rather than prescribing. Nonetheless, the evidence about the relevance of information culture and its relation to ICTs does suggest a potential problem for developing countries. ICTs seem often to have been pursued as an agent of change in isolation, without any wider agenda to improve the capability and space for people to access and use information. Yet we have seen that technology enacts and reproduces or amends information culture, while information culture frames and constrains the use of technology. It is thus reasonable to argue that visions of an information society need to broaden from that of ICT infrastructure and diffusion to a more holistic vision that also encompasses information culture. This would imply a greater concern with the trajectories of information literacy and information openness, recognition of the way in which information norms impact the economic and social utilisation of information, and an interest in social institutions, social practices and social innovation alongside technological innovation.

Structuration theory was a point of departure rather than complete superstructure for the information culture framework. We have drawn in part on two aspects of Giddens' work that do not appear to receive so much attention in information systems research: conceptual support for analysis of collectivities, and for analysis of systemic contradictions experienced by members of those collectivities (Walsham, 2002). In seeking to provide a narrative at national level, though, it is acknowledged that this study has necessarily been limited in the extent to which it has engaged with some

key aspects of structuration, such as its interpretivism and the duality (as opposed to simply dualism) of structure and agency.

Despite this limitation, we can understand information culture in developing countries partly through the notion of situated agency that is not determined by structure but is both constrained and enabled by structure and also instantiates that structure in the act of social practice. So this information culture is conceived as "the structural properties of social systems [*which*] are both medium and outcome of the practices they recursively organise" (Giddens, 1984:25). Thus we should not see information culture in terms that others have argued, as something that can be "created" or "established" (Chepaitis, 1994; Simwanza & Church, 2001). Instead, it must be understood as something that is always present which can be reproduced through social practice but which evolves and may even be cultivated.

Hence, alongside the micro-level basis for the reinforcement of information culture, we also find the basis for its dynamism: both the unintended and the reflexively-determined outcomes of individual actions. In this paper, we discussed the latter, identifying broader tensions found in China but also in other developing countries – marketisation/state-collectivism, globalism/nationalism, technology/manual – that create a reflexive space for agency that, in turn, may incrementally affect information culture. We also identified more specific tensions that may impact individuals, and we interpreted the SARS episode as an occurrence that served to particularly focus and even intensify some of these tensions, thus providing a particular opportunity for change in information culture.

That the dynamism of information culture in developing countries can be understood at the level of social collectivities like the nation-state comes partly from recognising the common patterns that can be observed stretching beyond the individual. It also comes from recognising the different levels at which space for agency can exist. Thus, the evolution of China's information culture was seen to be the outcome of social integration – the social practices of individual doctors, HIS professionals, hospital managers, etc. But it was also seen to be the outcome of system integration – the actions of strategically-placed agents with power to affect a collectivity. Examples included decision-makers within the Ministry of Health but also individuals like Dr Jiang whom circumstance granted the role of strategically-placed agent. Hence it remains appropriate to conceive of something called "information culture" at the national level in developing countries even while we recognise its complexity and its dynamism.

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