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ENTRY INTO THE INFORMATION SOCIETY: THE VIEW FROM TAJIKISTAN

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ABSTRACT

The pervasiveness of information technology is evident from both the popular and research literature. Electronic commerce, in particular, has recently captured the attention of the popular media as a way of conducting global transactions with a perceived minimum of cost and infrastructure requirements. Researchers and professionals alike have been quick to proclaim a global trend towards a new information age. Historians observe the tremendous benefits arising from the advent of mechanised production in the late eighteenth and early nineteenth centuries led to the Industrial Society. Similarly, contemporary sources envisage a halcyon Information Society wherein information production and use will alleviate many socio-economic problems. The paper discusses this overall societal transformation process with respect to a recent systems development engagement in Tajikistan. The paper argues that whereas many countries are embracing new technology, there are still states that lack the necessary economic, social and cultural requirements to take appropriate advantage. Based on analysis and supporting anecdotal evidence, it is considered that a digital divide is arising between states in a fashion similar to that, which divided states during the Industrial Age. Avenues for further research are explored.

1. INTRODUCTION

In earlier times there were significant barriers to the wider dissemination of information. Such barriers consisted essentially of physical boundaries imposed by geography, mountains, deserts, oceans and seas; temporal, imposed by the lifespan of a human before writing; technical in the requirements for mass producing informative materials; and social created through political and religious dogmas and varying educational levels. The first formal civilisations of China, Egypt and the Fertile Crescent developed the means for storing and retrieving information through libraries. Techniques have changed and barriers overcome as time has passed from the early Greek general libraries associated with Aristotle through the famous Alexandrian Library to the great libraries of modern times.

Castells provides a glimpse of the modern world and the changes therein.

“In the last quarter of the twentieth century, a technological revolution, centred around information, transformed the way we think, we produce, we consume, we trade, we manage, we communicate, we live, we die, we make war, and we make love. A dynamic,

global economy has been constituted around the planet, linking up valuable people and activities from all over the world.” (Castells 2000)

The importance of technology among developed countries suggests that this topic would merit further research. This paper documents the efforts of a consulting engagement within the Republic of Tajikistan. Information was gathered through interviews and observations were made within the framework of a feasibility study associated with the analysis and design of a management information system for a national social security system.

It is the thesis of this paper that the “digital divide” is much more than a simple lack of Internet access, global network connectivity or technical expertise. In reality the condition includes many other factors including economic, infrastructure and social stability. The paper further contends that before the world can move into the much vaunted “information age”, areas that suffer from this technological discrepancy require attention and support.

This paper is structured as follows. The next section briefly outlines the qualitative research method. The next section discusses the nature of technology and the “information society” as covered in the literature. The following section gives an overview of Central Asia and Tajikistan in economic, social and political terms. The paper then applies the framework of the information society to Tajikistan in order to assess the degree to which the state conforms to those principles. Finally, the paper discusses the implications of this analysis, supporting the discussion with anecdotal evidence from the consultant engagement.

2. RESEARCH METHOD

This paper takes an established model from Zwass (1997) and endeavours to compare the model against a current state of affairs in order to describe convergence or divergence. This approach could best be described as one of action research, as discussed by Galliers (1992), Baskerville and Pries-Heje (1999), Braa and Vigden (1999) and employed by Lau (1997) and Mathiasson et al (1991). The benefits of such a research method are numerous. First, it allows the researcher to examine the behaviour of a group or an organisation and supports theory building and testing Galliers (1992). Second, action research is oriented to the analysis of change (Baskerville and Pries-Heje 1999). Additionally, action research supports researcher participation and intervention (Baskerville and Wood-Harper 1996).

More traditional research techniques, such as surveys or research experiments, could not be employed in the situation under review because of time limitations. There was however the more critical issue of language barriers as potential recipients understandably had only a poor grasp of the English language and all technical issues required intensive explanation with translation through three languages.

3. TECHNOLOGICAL REVOLUTION AND THE INFORMATION SOCIETY

The technological revolution is based on information, itself the expression of human knowledge. Technological progress enables more developed states to process, store, retrieve and communicate information in a variety of forms, often unconstrained by distance, time and volume. This revolution has changed the way humans work together (Bangemann 1994) and some argue that it is no longer possible to separate IT decisions from decisions about business strategy, organisational structure, human resources, or management control systems (Cash *et al.* 1994). Development of this technology moves so fast researchers and managers alike must carefully evaluate and re-evaluate their technological interaction so as to make the most efficient use of it.

Although there appears to be a common understanding as to what this new technological revolution might be, there is no accepted nomenclature and authors seem to have mixed views on how to describe this technological revolution. The literature has offered several alternatives with varying degrees of exposure in recent times. These terms have included the “the Post-Industrial Society” (Bell 1973, Wood 1998), “the Wired Society” (Martin 1978, Theys 1998), “Megatrends” (Naisbitt 1979, Blind *et*

al. 2001), “the Telematic Society” (Nora and Minc 1980), “Third Wave Societies” (Toffler 1980), “the Information Revolution” (Engelbrecht 2001, Rai and Lal 2000), “the Digital Revolution” (Levy 1999, Tennenhouse *et al.* 1996, Negroponte 1996), “the Information Era” (Inayatullah 1998), “the Information Age” (Engelbrecht 2001) and the more contemporary label, “the Information Society”¹ (Cattai 2001, West 1996, Kasvio 2001, Garfinkel, 1999, Rai and Lal, 2000, Fountain 2000, Koga 1998, Goppold 1998). Castells (1996) also makes the distinction between an “information society and an “informational society”: specifically, he argues that whereas information has historically been common to many societies, the social dependence upon technologically-sustained information is a relatively new phenomenon. It is interesting to observe that some authors use these terms interchangeably. Additionally, the range of terms used to describe the phenomenon supports the contention that this issue spans disciplines.

Terms such as the “information age” and the “information era” appear to suggest that the power and effect of this technology are available to every state, regardless of geographical location or political profile. However, this is not the case: while many developed nations possess significant technological infrastructure, many do not exhibit this feature. Such areas may include whole countries, or even regional and rural areas of otherwise well developed nations (Grimes 2000, Lentz and Oden 2001).

A number of authors have already recognised these differences in technological ability and strength. The phenomenon has been called the “digital divide” in both the academic and popular literature, and has been related to a number of technologies including the Internet (Parker 2000), the electric telephone (Fisher 1992), wireless networks (James 2002), advanced digital networks (Chalmers and Duxbury 1996), mobile phones and telecommunications networks (Wellenius *et al.* 2000) and computer hardware and software (James 2002). It is argued that such a divide creates a barrier to entry into the Information Society.

It is interesting to note, however, that this digital divide is not solely related to higher technology. James (2002) describes the implementation of a low cost, low maintenance digital network in India, concluding that maintenance costs and degree of technology fragmentation are persistent causes of this technology asymmetry. Further, while many have seen technology as a salve for common ills, its administrative requirements can have significant economic and social consequences (Kasvio 2001). To some degree, the recent Year 2000 bug (Y2K) preparations attest to this.

4. CHALLENGES TO GLOBALISATION AND IT DEVELOPMENT

Zwass (1997) identifies a number of challenges to globalisation. These are important considerations as several of these challenges may also contribute in a significant way to the degree of IT development within a state. Particular challenges to internal development are such issues as uneven economic development and skill shortages, telecommunication capabilities and language barriers. Such challenges may be seen as impediments at the techno-political level to domestic stability and consequently contribute in a significant way to the “digital divide”.

4.1 Nationalism

A state may have difficulty integrating with other states in the region, or the society as a whole if it pursues a steadfastly nationalist foreign policy. States that are unwilling or unable to recognise the need for compromise, change or adaptation when dealing with other states may experience significant difficulty in their pursuit of globalisation. Additionally, groups holding differing and incompatible nationalistic beliefs may clash.

¹With respect to the nomenclature of the term, “information society”, (West 1996) quotes (Ito 1996): “*In the early 1960s, the phrase joho sangyo (‘information industry’) was coined by Tadeo Umesao (1963), while joho shakai (‘information-oriented society’) was used in ...a follow-up article*”. Additionally, Kasvio (2001) writes, “*.. it has sometimes been said that the concept “information society” (Yohoka shakai) has been one of the few theoretical terms that have been adopted from Japan to the international social scientific discussions during the post-war decades*”.

4.2 Language barriers

Differing languages or dialects may also impede the process of globalisation, for a number of reasons. First, the state may have difficulty interacting with other states. Second, much of the computer software (and, indeed, hardware support documentation) is written in English. While some software manufacturers release language updates for their software titles, the process of translating this material into other languages may be expensive, and could result in expensive software or no software at all. Indeed, Goppold (1997) observes that, to a significant degree, the development and use of most technology has been determined by communicational tradeoffs and decisions made thousands of years ago when “alphabetic writing...became the universal cultural memory system of Western civilisation”.

4.3 Cultural Traditions

This challenge to globalisation may manifest itself in terms of varying or incompatible approaches to time measurement, community behaviour and structure, social interaction. To some extent, markedly differing currency models may also impede the globalisation process.

4.4 Political (Country) Risks

States that are experiencing instances of civil unrest may have difficulty maintaining global interaction. Again, there are a number of reasons for this. First, the state must devote precious resources to managing and quelling this unrest, in addition to reorganising the state once the unrest has passed. Second, foreign organisations may be reluctant to invest in an area with a high level of risk. Third prolonged exposure to political risk may make the entire region unstable, resulting in depleted infrastructure and resource management.

4.5 Uneven Economic Development and Skills Shortages

High technology typically requires skilled personnel to acquire, manage and maintain the equipment. If skill shortages exist in these areas, the development of information management procedures will be stifled.

4.6 Differences in Tax Laws and Accounting Procedures

One important aspect to the globalisation process is the behaviour of foreign firms with respect to the state. There are considerable financial and political benefits to be had from the engagement of foreign commercial investment. In order for these firms to invest domestically in this manner, the state should ideally have compatible and robust taxation and accounting legislation. Such legislation is not always in place, however, because of political disagreement, inadequate regulation or a lack of legal precedent². The accounting literature has given substantial discussion to the problems posed by differing local accounting standards (Pownall 1993).

4.7 Legal differences

Legal shortcomings may impede the smooth regulation of commercial, governmental and civil behaviour. The effect of this could be compounded if there is no regulatory body in place to enforce the existing legislation. Commercial organisations may also be reluctant to invest in areas where they are not assured of legal protection against fraud or financial risk. Additionally, given the importance of

² It is important to note that in some cases there may be considerable debate as to the exact nature of the legislation required. Indeed, authors in the accounting literature have been debating the nature of Generally Accepted Accounting Principles for some years (see Bouwman *et al.* (1995) for further discussion of this issue).

networking in today's technological environment (Chalmers and Duxbury 1996), legislation over transborder data flows (and, hence, interaction with other states) may also be affected.

4.8 Different technology standards

More developed countries around the world have been able to develop technologically partly by drawing on a technical and professional education base in order to produce a continuous group of personnel for operations at all levels of system complexity. Additionally, much of these countries' technological strength comes from system interaction (such as EDI). Countries that are unable to develop a technical skill base or maintain adequate technology standards risk being unable to foster internal IT connectivity or interact with other countries.

4.9 Differences in telecommunication capabilities

The recent rise in technology popularity has been due in part to the concomitant rise of the Internet and other global networking technologies (Parker 2000). Indeed, the World Wide Web itself was, to some extent, borne out of the need for a homogenous method for global electronic communication. If a state is unable to make use of this global network connectivity, they may experience obstacles to globalisation and interaction with other countries or areas.

It is interesting to note that the effects of these barriers to globalisation may be heightened if more than one is in effect at a given time. For instance, in circumstances of prolonged civil unrest, the state may not be able to devote enough resources to education and health, resulting in uneven economic development and skills shortages. Without this latent skill set, the state may not have the required domestic knowledge to develop appropriate technology standards or telecommunications capability. This would be consistent with Tsoukas (1997).

5. AN OVERVIEW OF CENTRAL ASIA

Central Asia is the broad name given to the north and north west of the Hindu Kush mountain range. As a region it is difficult to clearly define due to the complex social interactions with surrounding areas of Russia, China and Iran but it contains a number of newly independent republics. The core member countries are Tajikistan, Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyzstan. Figure 1 shows a political map of the area.



Figure 1: Central Asia Political Map 1999 (<http://www.askasia.org/>)

Most of the countries in the region are former colonies of the old Soviet Union, brought into the Russian Empire during the turbulent years of the mid to late nineteenth century. Prior to that time the area was largely a patchwork of independent Khanates under the sway of autocratic rulers (Hopkirk 1991). Table 1 illustrates that the region comprises an estimated seventy two million people, of whom approximately twenty six million are under the age of fourteen. The Muslim religion is dominant throughout the area and standards of living for the majority are basic although there are pockets of relative prosperity.

Location	Population (July 2000 est.)	Pop % under 14 years	Birth rate
Tajikistan	6.4 million	42%	2.12%
Kazakhstan	16.7 Million	27%	-0.5%
Kyrgyztan	4.7 Million	36%	1.43%
Uzbekistan	24.7 Million	37%	1.6%
Turkmenistan	4.5 Million	38%	1.87%

Table 1: Relevant Comparative Statistics (CIA 2000)

The physical features of the area are outstanding. It is a region of immense mountain ranges, in particular the Pamirs with peaks soaring to seven thousand metres, literally the roof of the world. Burning deserts, such as the Karakum and the Taklimakan lie in contrast with huge inland lakes and seas. It is subject to huge seasonal variations in temperature which dictate specialised life styles for the inhabitants.

Many major reference works cover the history of this area. From these various sources we learn that civilisations have come and gone over the centuries as conquerors have risen and fallen. The famous Silk Road, route for Marco Polo into China, traversed through the region cutting through such fabled cities as Bokhara and Samarkand. This latter city was the home of Tamerlane; conqueror of India, founder of the Mogul empire, and acknowledged successor to Genghis Khan. Tamerlane's armies reached the shores of the Mediterranean Sea and laid much of Christian Russia to waste. North-western Tajikistan, the home of Roxanne, was the furthest distance reached by the armies of Alexander the Great. This makes for fascinating reading but is out of the scope of this paper. For further coverage of these topics, the reader is directed to Hopkirk (1991), Manz (1999), and Soucek (2000).

6. AN OVERVIEW OF TAJIKISTAN

Within the complex of countries that makes up Central Asia lies the Republic of Tajikistan, the subject of this paper. It is a country of an estimated six and a half million people, of whom forty two percent are under the age of fourteen years and more than seventy percent live in remote rural areas. The country has a GDP per capita of US \$1,000. It lies on the south-eastern edge of the former Soviet Union and existed very much as one of the most remote of the Russian republics. Today it is bounded by Afghanistan to the south and China to the east.

Tajikistan became an independent republic in 1990 after the collapse of the former Soviet Union. Within eighteen months "Tajikistan suffered a devastating civil war Regional divisions in this small country, exacerbated during the Soviet period to enhance Soviet control, exploded into violent conflict soon after the dissolution of the Soviet Union signalled that economic and political spoils were potentially "up for grabs." The war was particularly brutal, with summary executions and the mutilation of victims shockingly common. Especially vicious were the uncontrolled paramilitary groups that generally fought on behalf of the established power structures that had benefited during the Soviet period against those seeking change in the economic and political status quo. Tens of thousands were killed and hundreds of thousands fled into neighbouring countries, including Afghanistan. In addition, leaders of the opposition factions, which represent various Islamic, democratic, and other movements, have been forced into exile and their parties or movements banned."(Roy 1995). The war, which continued until 1997, almost completely destroyed the social infrastructure. So much

destruction was enacted that almost all basic services came to a standstill and only within the last four years have attempts been made to repair the damage.

7. TAJIKISTAN AND THE INFORMATIONAL SOCIETY

7.1 Nationalism

After many years of Russian rule and the concomitant imposition of government regulations, associated social mores and customs, there was a backlash amongst a proud people to move into a situation that more aptly reflected indigenous styles and values. As a direct consequence of the civil wars in the area there were opposing nationalist groups vying for power. Some accession between the warring factions was achieved through the principle of a shared government with different portfolios being allocated to representatives from each group. General observations and discussions revealed there was some dissatisfaction with these allocations that, it was felt, would eventually lead to further problems. This tension has been amplified by recent assassinations of senior government officials.

The one thing that both groups had in common was a desire to move away from Russian management into Tajik nationalism. This manifests in a national currency, a Tajik national language that is in use at government level and of course in National Television and Radio. However, this presents wider problems with the need to adhere to a universal lingua franca in a global society.

7.2 Language barriers

There are more than ten different languages spoken in Tajikistan. The national language is now Tajik, a branch of the Farsi language spoken in Iran. Prior to 1990 the official language (and, consequently, all governmental documentation) was in Russian. The Cyrillic alphabet is in common use, however it exists in two languages. English, the lingua franca of the Internet, is used in Tajikistan in only a very limited capacity. English is taught in at least one major University, however all instruction is by non-English speakers. These language differences manifest themselves in areas such as keyboards, which are multiple keyed in Cyrillic and English, machine labelling and documentation. Technical translation is almost impossible as there is a lack of technically knowledgeable English speakers.

7.3 Cultural Traditions

This country is essentially a Muslim nation, with tribal groups or clans laying ownership claims to particular regions. The region carries a long history of letters and philosophy but it is one that has evolved in comparative isolation from the rest of the world. This isolation continues by and large, particularly in the more rural areas. The clan system has existed for millennia and cuts across national boundaries with rivalries between clans occasionally breaking out in bloody encounters. The situation here is little different to Afghanistan.

7.4 Political and State Risks

The civil and political unrest, which led to the long civil war, is still endemic in the country and there are occasional bombings in the main population centres. Many of the country areas are virtually “no-go” zones and visitors must be accompanied by a strong military presence. Clan-based fundamentalist Muslim organizations are still resident and active in the country. Armed guards are omnipresent in government departments, shops and on the streets. Indeed, the first person one meets in many official visits is an individual carrying an AK47 automatic rifle. Many western governments have declared Tajikistan a “no-go” area for their citizens.

7.5 Uneven Skill Markets and Economies

As mentioned above, there are economic problems in Tajikistan. Many of these may have arisen from the destruction of much of the country's infrastructure during the civil war. Subsequent lack of maintenance has led to problems with basic infrastructure components such as roads, water supply, sewerage, electricity supplies and the provision of public health.

One sees half completed buildings and tall construction cranes standing idle. Half completed service stations occasionally adorn the roadside, alongside which individuals stand in sub-zero temperatures selling litres of petrol in plastic soft-drink bottles.

It is quite apparent in Tajikistan that the former professional class has been hard hit by the changes brought about through the collapse of the old Soviet Regime. Qualified professionals are out of work throughout the country and in many cases are the recipients of meagre pensions from the government. The Universities suffer tragically from this situation with staff, many without pay, eking out an existence, and teaching in institutions with no practical resources to develop even the most rudimentary professional level courses in areas such as Information Management. Buildings are in a sad state of repair with electrical wiring hanging out of holes in the walls, light bulbs missing or entire light assemblies gone. Equipment, when available, is in short supply and in contemporary terms largely antiquated and out of date. There is no apparent evidence of a system to develop skills internally within the foreseeable future. There is and will be a continuing requirement for adequately trained trades in many areas ancillary to the computer field.

Anecdotal evidence offers some more colourful explanation of these economic problems. At one small country hospital, modern x-ray facilities have been installed at great expense. A trained radiographer has also been retained to operate this machinery. However, radiological analysis cannot be conducted because the requisite x-ray plates cannot be obtained. The electricity and heating problems were obvious to one of the authors whilst sitting in a small restaurant in overcoat scarf and gloves, huddled with two colleagues over a single bar radiator with outside temperatures at -16°C . This use of electricity was somewhat of a luxury: in some country areas, electrical power is only available for two hours in the morning and evening. Although battery powered computer units do exist, the state of battery technology is such that constant 110 or 220/240-volt supply is required to keep the majority of systems in operation over the long periods of time they are in use. This in turn requires appropriate supplies of electrical energy at what is deemed reasonable cost at the time of use.

No computer manufacturing support structure exists in Tajikistan. There are import agencies who operate in a strictly cash environment, carry no stock and will import all required items from Russia at agreed rates. Several of these importers have developed limited support capabilities and no doubt this will expand over time in keeping with the new entrepreneurial spirit of the region. Special provisions can and are made by major government departments to obtain stocks of equipment for future use.

Tajikistan possesses huge hydroelectric potential from the vast water resources in the mountains. Indeed it has been claimed that the country has the largest hydroelectric power station in the world. However, it still imports electricity into the country and cannot maintain constant electricity supply in wide regions through constant breakdowns in equipment and infrastructure. As Olimov (1996) writes, "The energy system of northern Tajikistan largely requires energy supply sources in Uzbekistan and is not directly connected with the rest of its own republic. The region itself produced 575 million kilowatt-hours in 1995 while consuming 3,770 million kilowatt-hours. In other words, it is almost completely dependent on Uzbekistan in the sphere of electric energy."

7.6 Different Tax Laws and Accounting Procedures

The country has inherited the old Soviet taxation and accounting systems which, although undoubtedly effective within their own situation, are not easily transferable into westernised systems. This is of particular concern when coupled with the comparative low level of English use amongst professional workers. Allied to the tax and accounting systems are the conditions for basic monetary transfer

between domestic and foreign organizations. At the time of writing it was very much a cash economy in Tajikistan. Credit cards are unknown and fund transfers in and out of the country practically impossible at business level. Cash in US dollars must be carried on the person and travellers are subject to draconian customs inspection. When carrying significant amounts of cash, one feels quite unsafe, particularly in the darkened streets around the airport as young teenagers begging for money prowl the streets.

7.7 Different technology standards

During this visit it was not possible to determine the existence of any technology standards. The country is still having problems conforming to basic living standards and it could be some time before there is the consideration of higher-level issues such as technology infrastructure.

7.8 Different Telecommunication Capabilities

On initial appraisal there is an established telecommunications infrastructure. However, this infrastructure is not universal throughout the country, nor universal within heavily populated areas, and is poorly maintained. One is often confronted with huge lengths of cable lying in the gutters, over walls and across courtyards. Recent research estimated just four telephones per hundred head of population (Bakhtijar 2001). It is possible to gain access to the Internet through modifications to the existing system. This manifests in the establishment of specially installed and comparatively expensive leased lines, which provide high-speed access to outside locations via direct communication satellite. One finds evidence of this use within government departments, missions of international organizations, diplomatic sites and large commercial organizations. The equipment was delivered to Tajikistan by the Turkish government but because of the high cost only a limited group of subscribers use this service, including one or two Internet cafes in the main population centres. Outside of this limited area of application on-line capabilities are practically non-existent. The basic telecommunications structure upon which one must rely for internal communications is patchy and in many areas extremely unreliable.

In one government office allocated for use by consultants it was impossible to make telephone calls as the local exchange was simply not functioning. It must also be considered that a further factor prohibiting universal use is the low income of workers at all levels within this country.

8. DISCUSSION AND CONCLUSIONS

The infrastructure that provides such basics as medical services, postal services, roads, power, clean water, is in a parlous state. Electricity blackouts are common in the populated areas and almost constant in country areas. Major highways between large population centres in the north and south are blocked by snow for six months of the year.

Entrepreneurs exist here as they have from time immemorial but they are severely handicapped by lack of capital both for themselves and the potential marketplace within which they might operate. All the ingredients required for entry into an Information Society covered above are either missing or require significant input of what are obviously scarce resources.

For the moment, researchers can only speculate as to what might happen to Tajikistan and similar states. Castells identified the problem in the former Soviet Union and provided a view.

“Russian people, and the people of the ex-Soviet societies, will have to muddle through the reconstruction of their collective identity, in the midst of a world where the flows of power and money are trying to render piecemeal the emerging economic and social institutions before they come into being, in order to swallow them in their global networks. Nowhere is the struggle between global economic flows and cultural identity more important than in the wasteland created by the collapse of Soviet statism on the historical edge of the information society”.(Castells 2000)

However, to “muddle through” may not be enough. Points of view like that of Castells’ paint a bleak picture of this and other “black holes” within society’s framework and fabric. Clearly, these problems require further attention.

This paper presents a number of avenues for further research. First, Tajikistan is not alone in suffering the aftermath of civil war and infrastructural rot. Castells (1996) identifies similar areas of civil decay to Tajikistan such as the “American inner-city ghettos, Spanish enclaves of mass youth unemployment, French banlieues warehousing North Africans, Japanese Yoseba quarters, and Asian mega-cities’ shanty towns”. Former Russian dependencies, or countries with close economic ties, have experienced similar problems. Mongolia is one such country and interesting developments have been taking place in that area. and other regions of Asia through funding initiatives from the Canadian based International Development Research Centre (PAN 2001). Investigations are continuing in Mongolia in a number of related areas based upon the use of Internet services via satellite (Datacom 2001). Given that capabilities exist to commence such developments one may take a step back from the pessimistic conclusions in this paper and wonder if a black hole is inevitable in at least some of these states. Perhaps there are alternatives to this situation such as those being developed in Mongolia and elsewhere.

Globalisation of business and the supporting technologies are a powerful force and with appropriate direction might be utilised to provide solutions to many of the problems outlined in this paper. One important area for future research would be the development of a prescriptive model of the barriers to entry into an informational society and possible solutions utilising some of the capabilities now available within that society.

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