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A Conceptual Model for ICT Diffusion in the Republic of Kazakhstan

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ABSTRACT

The research presented in this paper reviews the current state of ICT in the Republic of Kazakhstan, identifies successful and less successful ICT practices, and describes a conceptual model as a tool to effectively diffuse ICT in the country. One way to diffuse ICT is by stratification, where the government provides resources, the public sector can take the lead and the private companies can provide efficient marketing and market management. Applicability of this model can give big advantages for successful ICT development where the private sector can coexist with government and community areas in the country.

1. Introduction

ICT development is high on the agenda of the Government of Kazakhstan for national economic and industrial development and for political and social stability. With regard to economic and industrial policy, Kazakhstan enjoys strong growth in primary product exports; for example oil and minerals. The country aims to increase the local value-added content to processing and manufacturing by upgrading domestic production as part of the Industrial Innovation Development programme (IID). ICTs are seen as a critical development tool within the IID. For example, local software development for the mining industry is being targeted as an area in which Kazakhstan can develop a competitive advantage. More generally, providing a modern and ubiquitous telecommunications infrastructure based upon Next Generation Network (NGN) IP-based technologies is seen as a national priority, including the development of a national backbone network or 'information superhighway' which is also seen as extending the political and social reach of the Government. For example, state-owned Kazakh Telecom is using the backbone network to connect polling stations as part of a countrywide e-Election project called 'SAILAU'. Stage One was completed in 2004. A project to set up 16 national cultural centres linked to a website to represent Kazakhstan's over 130 ethnic groups is being overseen by the Academy of Information Technology in Almaty, together with its seven associated technology universities across the country. The Academy is also taking the lead in connecting 50 community centres across the country to provide access to e-Government, and is providing free training for the public in the use of PCs through a joint programme with Microsoft and the UNDP (United Nations Development Programme). Non-government organizations are also active, although they face major funding difficulties. But without direct government support, such NGOs are highly dependent upon overseas donors.

The public and community sectors are important for the information economy and two developments underline a growing political attention on the sectors. First, the recent years spread of internet access among individuals and private sectors has proven a potential for digital services but also a demand from the users. Second, improved ICT-usage in the public and community sector is supposed to offer a better utilization of resources. Yet little official and comparable statistics are produced on the public and community sector compared to other statistics on the information society. An obvious reason for this "information gap" is that it is more difficult to survey the public sector than private sector or individuals. A fundamental problem is to delimit and describe the entities of the community sector.

2. Best Practice Approach

The 'best practice' approach would suggest the most advanced economies of the OECD (Organization for Economic Co-operation and Development) member countries; Japan, Korea, etc. The countries that have the most advanced and widely diffused ICT technologies are driven by highly competitive markets and liberal economic and industrial policies. The gap between these countries and the Republic of Kazakhstan seems too great to make very meaningful comparisons. High-income countries stand out in this study because they have laid the foundation for ICT development since the 1970s. In Japan, the phrase "johoka" is usually translated as

“informatization” and denotes change to an information-oriented society. It has been a slogan of Japanese government policy since the 1970’s. Singapore’s first IT master plan was formulated and implemented between 1980 and 1985. Korea’s first national computerization project was initiated in 1987. Japan, Korea and Singapore started the debate on the role of ICTs in development much earlier than the other countries in this study. They also developed and successfully implemented a number of ‘integrated’ ICT for Development (ICT4D) master plans – plans in which telecommunications and IT policies were not developed separately but constituted one coherent design. The most developed nations may provide a range of ‘ideal types’ to which developing countries can aspire, but the key issues are about the practical steps the developing and transitional economies can take right now with very limited resources at their disposal.

Building the broadband infrastructure is in the agenda of developing nations. However, highly-developed countries, where governments took an activist role in the construction of national broadband networks, are not necessarily the only models to consider. In a global survey of national efforts in broadband deployment, James Savage has identified three distinct roles that governments play: the light touch approach; the cooperative approach, and comprehensive national broadband plans.

The light touch approach requires minimal government intervention, focusing on transparent regulatory frameworks to encourage private sector activity and competition. Switzerland and New Zealand practice this approach. The cooperative approach to broadband development sees government activity in rural areas and/or applications (e.g., telemedicine for the poor). The private sector takes the lead in providing broadband services in business centres, cities and major urban areas, with little or no government support. The UK and the US follow this approach. In contrast, Japan, Korea and Singapore are practitioners of the all-inclusive national broadband plan, which calls for a comprehensive national ICT infrastructure and skills development requiring government and industry-wide coordination.

An alternative approach is suggested, based upon ‘good practice’. Good practice is the best that can be achieved within the constraints imposed by current circumstances. Therefore countries that suggest themselves for direct comparison are those with similar or slightly higher levels of per capita income that are also landlocked and in transition to market economies, in other words the landlocked countries of the former Soviet Union: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Georgia, Hungary, Moldova, Romania, Serbia & Montenegro, Slovakia, Slovenia and the Ukraine.

3. Potential of ICT and Challenges

There is great optimism in policy-making circles that the new technologies, more specifically ICTs and biotechnology will benefit the less-privileged sections of the world’s population. According to many of the ongoing policy discussions, the real potential of ICTs lies in the fact that ICTs have revolutionized the means for transmission of information and communication of knowledge. Information and knowledge are going to be the basis for economic development in the coming decades, as per these policy discussions.

No doubt, information aids the process of development in several ways. Information about markets and technology can lead to increase in incomes of poor households in rural areas. With the opportunities offered by communications technology, a small business unit in a remote town can establish commercial links with distant corners of the world and update itself with the latest developments in production technology. In developing countries, poor farmers and craftsmen have traditionally been exploited by middlemen because of the former’s lack of information about prices. By providing information about prices, ICTs can be powerful tools for empowerment of the disadvantaged sections of society.

ICTs can be instruments of participation for the excluded sections of society. For instance, members of an isolated community can voice their development needs through the Internet. ICTs have great applications in health and education. With the emerging area of telemedicine, medical advice and advanced medical services can be delivered to patients in a village dispensary through satellites. Applications of ICTs such as multimedia are used in programmes of distance learning for working adults. ICTs can considerably improve the efficiency of governance and state intervention, particularly of local bodies. They can, for instance, aid the speedy issuance of government certificates to citizens, and the sending of e-mail complaints by citizens to the administration.

However, there are several reasons to believe that the above-referred policy discussions are overly optimistic of the impact of ICTs on development. It will be argued in this paper that there are two major concerns with respect to the potential of ICTs for rural

development. These concerns are related to, first, whether people in rural areas have the *capabilities to use the new technologies*, and secondly, whether people in rural areas have the *capabilities to use the information provided by the new technologies*.

A major factor that impairs the capabilities to use ICTs by people in rural areas is the poor level of physical infrastructure, including deficient telecommunication networks, low penetration of personal computers and poor Internet connectivity.

In the last five years the ICT field in Kazakhstan has been developing very rapidly. For example, in 2002 there were 400,000 private computer owners in Kazakhstan, then in the first quarter of 2007 the percentage rapidly increased 27.8% compared to the same time the previous year, and contained 96,100 computers. The level of sales in the computer market is 15-20% every year. The reason of this situation are not only investments from foreign companies, but the increased standard of living in Kazakhstan and is one of reasons of high level ICT in Kazakhstan these days. Information education in all regions reaches the level to provide a stable formation of the demand for computer technologies.

One of the problems of ICT level in rural areas is a language barrier. On the software market there are almost no products with domestic Kazakh language. The value made by Kazakhstan software companies is not enough to satisfy the demand for this product. The numbers which are released annually are very small. Even if there is demand for software with Kazakh language there is no clear information about how many users are ready to buy it. For example, it's not profitable to make the electronic books costs approximately 1,500,000 Tenge (\$12,500), to cover price for production. Many users are already used to using the illegal software copy, because the illegal software is cheaper than legal software, so users are not ready to spend large amounts of money to buy legal software. Only in countries where the protection of authors rights for software is a high priority, making business by making software is profitable.

4. Current Condition of ICT in Republic of Kazakhstan

Kazakhstan, inherits several networks from state corporations in addition to the PSTN of Kazakh Telecom. The technical priorities include digitization and therefore Internet access, building a national optical fiber backbone network with modern international gateways, and adopting cost-effective technologies to extend the network into rural areas as part of the universal service commitment. Digitalization reached about 70 per cent by late 2007, including 100 per cent in five cities, and averaged 69 per cent in urban areas and 35 per cent in rural. An 11,000 km East-West-North-South crossed loop of fiber-optical communication lines (FOCL) has been completed as the National Information Super Backbone (NISB) with three International Switching Centers (ISC) installed. The western section is especially important, despite distances, because large oil and mineral extraction companies are located there. Fixed, fixed-wireless (CDMA-450) and satellite solutions (using Dynamic Assignment Multiple Access or DAMA technology) are being used or developed to provide rural access.

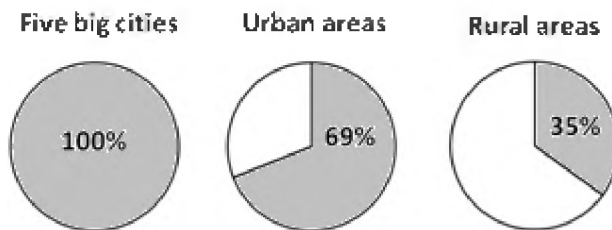


Figure 1. Current Digitalization rate of ICT in Kazakhstan

Besides cable (coaxial and fiber) there is almost no local production of telecom equipment in Kazakhstan and \$ 274 million was spent on imports in 2006, an increase of around 40 per cent over 2003, representing around 97 per cent of domestic equipment needs. Increasingly, cell phone manufacturers are creating lower cost handsets for import. For example, an LG (Korean) handset can sell below \$ 200, and these prices are expected to fall.

On the hardware side, locally assembled computers represent around 65 per cent of the market, with branded imports making up the rest, but discussion is underway for a joint venture to produce notebook computers locally within a technology park zone. Customs duties paid upon imported products and components would be waived in such cases.

On the software side, all major players are represented in Kazakhstan. For example, Microsoft reported sales in 2006 doubled, and Oracle expected to double sales in 2007. Ninety per cent of Oracle's sales are with 200 customers.

Also under the IID programme a series of "technoparks" is being developed under the authority of the Engineering and Technology Transfer Centre. These include the proposal for an IT Technology Park outside Almaty. To encourage multinational ICT companies to invest in R&D and production facilities the park will be declared a Special Economic Zone exempt from customs duties on imported inputs, and from VAT, land and property taxes as outlined above. Whether these investment incentives will be sufficient to overcome some of the constraints currently facing Kazakhstan, such as transportation costs, the small size of the local and regional market and the small number of local IT graduates remains to be seen. An incremental approach is advisable, building up synergies between foreign and domestic resources in a way that ensures good linkages with the local economy.

5. Conceptual Model for ICT Diffusion

ICT development can refer to different things. These range from the manufacturing of components and products, writing of software programmes, and the use of software programmes to develop content and applications; the widespread adoption or diffusion of ICTs throughout the economy and society; the creation of value through ICT services, such as telecommunications. In the case of the Republic of Kazakhstan's economy there is very little of the manufacturing of components and products and/or the manufacturing of software programmes to develop content and applications while the widespread adoption or diffusion of ICTs throughout the economy and society remains largely confined to the private sector, to government agencies, international organizations and donor-funded, NGOs funded, to some schools, hospitals and community centres and to a growing number of internet cafes. Only the creation of value through ICT services, such as telecommunications, the spread of ICT services, especially mobile telecommunications, is currently showing strong growth and attracting some foreign investments, mostly Russian, Japanese and Korean. However the spread of computing and computer networking is slowly gathering pace in both state and private commercial sectors, growing it seems at between 50 and 100 per cent per annum but from a small base. One way to conceptualize the diffusion of ICTs is by stratification, as shown below. Where the state has resources, the public sector can take the lead if that is the policy preference and judgment of planners. This model can be implemented in Kazakhstan.



Figure 2. Stratification model for ICT diffusion.

The role of donors has been mainly at the public sector and community sector levels, with international NGOs (Non-Government Organizations) and local NGOs especially focused on the community level. Local NGOs, sometimes with donor support, have also been active in the private sector along with local industry associations, and in some cases they are being invited to participate in the ICT policy making bodies.

One of the factors after adapting the conceptual model can be expected that ICT product's prices will decrease a lot and the amount of companies who are working in the ICT area will increase. Because of competition level on market, companies will try to offer the optimal choice of price and quality for potential customers. These days the number of companies in ICT market in Kazakhstan is over 300, and that number is expected to grow exponentially. Applicability of this model can give the country big advantages as a private

sector can overcome government corporate area. The realization of ICT products on market is approximately expected to increase 35% compared to 20% in 2006.

Another factor which can be expected after embedding this model into ICT market will increase the variety choice of ICT goods on market and will increase the demand for goods; this can be achieved by the partnership between local and international companies in the ICT market. The relationship between companies and second level banks can provide short and long term loans to buy the goods for home or official use. These days, private loans are more demandable among the customers and loans are presented by many second level banks in cities and regions. For the last 3 years the loans of ICT goods for private using is increased by seven times.

In Kazakhstan, as in all countries all over the world, computer technology is embedding in all aspects of life, and day by day the service is increasing. But the development of ICT in Kazakhstan is happening almost exclusively in big cities. The percentage of covering rural areas and small villages are still low.

6. Conclusion

A problem as pervasive and complex as the diffusion of ICT cannot be solved with a single program or by a single entity. It requires an innovative, collaborated, multi-sectored approach. The private sector alone spends millions of dollars each year on ICT-related education and assessments. Within this sector, competitive dynamics produce an environment, ripe with creativity and innovation, generating practical, cutting-edge educational solutions.

We believe that national government policy plays a key role in creating a legal framework and a creative, economic and social environment that will encourage further investment in ICT infrastructure, and uses as well as a wider public education about the benefits of technology and its use. It would be difficult if not impossible to bridge the gap without an overall, consistent governmental policy that would encourage and support ICT development. The choice of which sector to bridge may actually be strategically important in order to maximize the impact of the investment on the entire system.

Civil society and NGO's are also engaged in much needed efforts to both address the diffusion of ICT and ICT development. With all of these entities-and many others-actively engaged in the diffusion of ICT and development work there is no shortage of "best practices". It is only through the coordination and focus of these often disconnected efforts that truly transformative results can be achieved. It is this vision of creating a multi-sectored alliance of like-minded organizations and motivated individuals that serves as the foundation for the diffusion of ICT for the ICT Alliance Foundation.

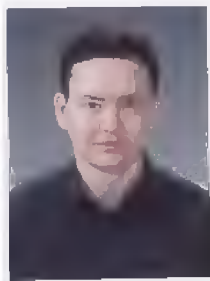
The private sector should not be viewed as heartless or uninterested in making a difference in humanitarian projects, and the public sector cannot afford to attempt to solve digital illiteracy in isolation. The ICT Alliance Foundation is beginning to bridge the diffusion of ICT, providing capacity-building, vocational, ICT skills to marginalized populations, in-country aide organizations, NGO's and governmental agencies.

An important guiding principle of the ICT Alliance Foundation is the commitment to advocacy, and coalition building through strategic partnerships. As previously mentioned, the diffusion of ICT and its resulting impact on emerging economies is a multifaceted issue being addressed by a multitude of organizations and sectors. It is therefore important to not only raise awareness of this important concern, but also establish meaningful strategic alliances and partnership to leverage existing resources and capitalize on the knowledge and experience of others. No single individual or entity can address the digital divide in isolation.

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