

MEXICO

E-MEXICO - BUILDING ON SUCCESS, FOR SUCCESS

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When considering the growth and role of information and communication technologies (ICT) for capacity building in México, and its ability to meet the challenges of the emergent Information Society and the Global Knowledge Economy, it is necessary to address the social and economic contexts of the country, which define the particular problems of México and affect its ability to deal with them. By many standards, México has a strong economy. In terms of total GDP, the combination of a population of 100 million and GDP per capita over US\$5,000 makes México the tenth largest economy in the world. With US\$232 billion in trade in 2002, it is the USA's second trading partner (after Canada), and far ahead from the third trading partner (Japan with US\$184 billion). Moreover, the OECD *Economic Survey: México* undertaken in November 2003, showed that México's economic performance improved during the 1990s, with vigorous growth in GDP, and steadily falling inflation. Since the 1995 peso crisis, the financial system has been strengthened, so that, when compared with many other Latin America countries, the Mexican economy has been stable.

However, despite this improving situation, México's economic growth performance has been poor, and potential GDP growth estimates have been revised down to below 4%, which is too slow for a country with low levels of income and productivity and high rates of population growth, and hence too slow to narrow the gap in living standards relative to other countries. México's GDP per capita is equivalent to about one quarter of that of the United States. Over the 1990s, it increased by only 1% per year,

preventing México from catching up with more advanced nations. Over the same period, GDP per capita rose by 3% or more in Greece, Portugal and Korea, three other nations with comparatively low income levels. Economic growth in México is constrained by low levels of human capital development, and additional finances are needed to improve and expand the inadequate physical infrastructure, and combat widespread acute poverty that leads to poor health and social marginalization. Hence, in the short term, targeted programs are needed to attack poverty and ensure that basic needs are met, but in the longer run, poverty can only be addressed systematically through improved access to a more effective educational system, which will improve the skills base of the workforce and thereby strengthen human capital. However, despite major improvements over the past decades, especially in increasing basic school enrolment for a rapidly growing school-age population, the level of the skills base of México's human capital lags behind many other countries. The quality of education services and training is below OECD best practice, so that many school-leavers have poor literacy and numeracy skills, and the cost effectiveness of education programs needs to be improved.

However, data from the OECD *Information Technology Outlook* reveals that the growth of the ITC Sector in the Mexican economy has been substantial. The largest exporters of communication equipment in 2002 were the U.K. and the USA, followed by Germany, Korea, and México. Of these countries, exports for Korea and México increased most rapidly from 1996 to 2002, by 32%

and 23% per year respectively. Moreover the share of ICT Manufacturing in Total Manufacturing Value added is greater in México than that in many European nation states, and from 1995-2001 this share grew faster in México than all other OECD countries apart from Finland. Similarly, the share of ICT manufacturing in total manufacturing employment has been very high in México when compared with other OECD countries.

Not only has ICT manufacturing increased in México, so has the purchase and use of ICT equipment. Data from the OECD *Communications Outlook* shows that the number of cellular mobile phone subscribers in México is below average by international standards, but it is growing very fast. Similarly, the proportion of households with access to a home computer is low, but is catching up with European nations. In 1997 the number of PCs in México was 3.5 million, but exceeded 8 million by 2002. In addition, more people are accessing the Internet - the number of internet users in México rose from just over half a million in 1997 to over 7 million by 2002, and was expected to reach 15 million by the end of 2004. As the OECD *Science Technology and Industry Scoreboard* for 2004 shows, the number of Mexican registered websites, although low, is growing at a faster annual rate than the OECD average. This growth has been aided by the liberalization of the telecommunication industry in the 1990's, starting with the privatization of TELMEX and the emergence of new providers like TELCEL.

Hence, in terms of building ICT capacity, the situation in México is one of successful growth in the ICT manufacturing sector, and in the purchase and use of ICT equipment, albeit from a small base, and despite an economic climate characterized by low growth. Building on this success requires political will, and another important factor in the last decade has been the election of President Vicente Fox. The effect of the election of Fox after 71 years of rule by the PRI was both symbolic and substantive, as the new

administration recognized the need to address the impact of new technologies within society. This led to a major policy initiative in the form of e-México (<http://www.e-mexico.gob.mx/>).

The objective of e-México is to create a technological system with social content, which can offer all the tools and opportunities that are available through the use of Information and Communications Technologies, in order to increase the quality of life for all Mexicans.

e-México is being developed through five thematic areas, as follows:

e-Learning - will provide new options of education and training which will stimulate learning as a means of integral development for Mexicans, promoting education for all, while respecting identity and cultural diversity;

e-Health - will increase the level of health and well-being of society by placing within the reach of the entire Mexican population general medical information which will promote human development and the development of the health institutions, eliminating barriers to the access of information and the health and social security services;

e-Economy - will accelerate the process of development of the digital economy within businesses, specially micro, small and medium size businesses (MSMBs) thereby increasing the competitive position of the Mexican economy; as well as developing a computer culture within society, particularly amongst consumers;

e-Science, Technology and Industry - will integrate and develop an information society and knowledge economy, facilitating a greater level of development by focusing on the needs of Mexicans to strengthen their industrial infrastructure, and by direct linkage with the research sector, thereby enabling the achievement of highly competitive quality standards as measured in world markets;

e-Government - will provide full information on, and access to, all State services offered at Federal, Regional, National or City level, thereby guaranteeing that all Mexican people can access and take full advantage of all public services.

The success of the e-México initiative in improving human capital will depend on its success in raising the level of education. This in turn depends on the willingness of the educational and training sectors to adopt new technologies. This will be vital first, because global competitiveness will depend on the extent to which people leaving education have acquired high level ICT skills - so teachers will need to know how to use ICT, in order to use it to teach more effectively themselves, and teach others how to use it. Secondly, and more critically, the current population growth is outstripping economic growth. México does not possess the resources to increase the level of education by increasing the physical number of schools and universities, and therefore needs to turn increasingly to using new technologies in teaching and the greater use of open and distance learning, which are more cost effective.

México is one of the countries with the greatest experience in the field of distance education in the world. The main purpose of the SEP (Ministry of Education) National Distance Education Program (PROED) is to raise the level of educational opportunities by incorporating electronic and computer technology media into education. Its intention is to expand its coverage, combat educational backlog and regional disparities in educational opportunities, and promote training programs for human resource development through a series of initiatives including:

Telesecundaria - launched over 31 years ago, the Telesecundaria, a televised based distance secondary program, currently has more than 14,000 schools totaling approximately 1,200,000 stu-

dents and 40,000 teachers.

Red Escolar - a computerized system of information and communication based on the Internet for México's student community, which has 4,000 units installed in more than 1,000 educational units

Edusat - Educational Satellite Television Network - is a closed-circuit system based on the most advanced digital technology. Its 12 video and 24 audio channels broadcast all over México, and it reaches over 30,000 educational centres in the country, through receivers in secondary and technical schools and public and private universities.

Enciclomedia - has enabled the digitalization of primary education textbooks in CD-ROM format. Along with the material from the textbooks themselves, a plethora of resources, including videos, complementary information and the use of the Microsoft Encarta student encyclopedia, are available to teachers and students. The system began as a pilot in the 2003-04 year, is now in place in close to 22,000 fifth- and sixth-grade classrooms around the country, and is expected to expand to thousands of schools during 2005-6

Hence e-México will develop new initiatives within México to build on previous successes in open and distance learning, and take up the challenge of new technologies to move both conventional and open and distance education forward. There will be a need to use new technologies to create high quality intensely supported active learning environments for students, both on an off campus. The technology already exists to provide these new environments. However, the major challenge lies in trying to use new technologies to shift the educational process away from a passive didactic transmission model of teaching to an active constructivist conversational model of lifelong learning. This requires changes, not just in pedagogy but across the entire educational institution. To be successful, this new generation of e-learning will require teachers to

adopt a new educational and pedagogic paradigm based on learning and to change their role radically from being deliverers of subject content to facilitators and promoters of learning.

The role of universities as catalysts for change will be vital in this process. First, because they will supply high level training necessary for both continued growth in the development and manufacture of ITC, and its integration in all aspects of the economy and society. Secondly, because universities' research activities put them at the cutting edge in the development of new technologies. Previously the role of universities in the industrial economy was to supply highly trained workers for the manufacturing sector. By contrast, in the information society global knowledge economy, universities are primary producers of the main product, knowledge, and so are crucial in the process of building learning regions within the global knowledge economy. This has led to a convergence between universities and high tech companies in the knowledge economy, often facilitated through the development of university science parks. Whether or not México manages to use the

e-México initiative to accelerate its successful growth in the manufacture and use of ITC remains to be seen. Making international benchmarking comparisons is very difficult. However, it is worth noting that one nation which has been able to transform itself through the use of ICT in the last three decades has been Finland. The defining benchmarks in Finland's success have been a strong ICT manufacturing base lead by Nokia, the deregulation of the telecommunications industry, consequent high usage of ITC, a strong tradition of open and distance learning facilitated by technology, collaboration between universities and industries (facilitated via technology transfer and science parks), and a national policy initiative which put the development of ICT at the heart of its economic and educational strategy. By adopting similar benchmarks, México can build on its current success to expand its ICT industry and infrastructure, and use policy instruments like e-México to promote the widespread use of information and communication technologies, in homes, schools and universities, and business and industry, with substantial social and economic benefits for all the Mexican people.

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