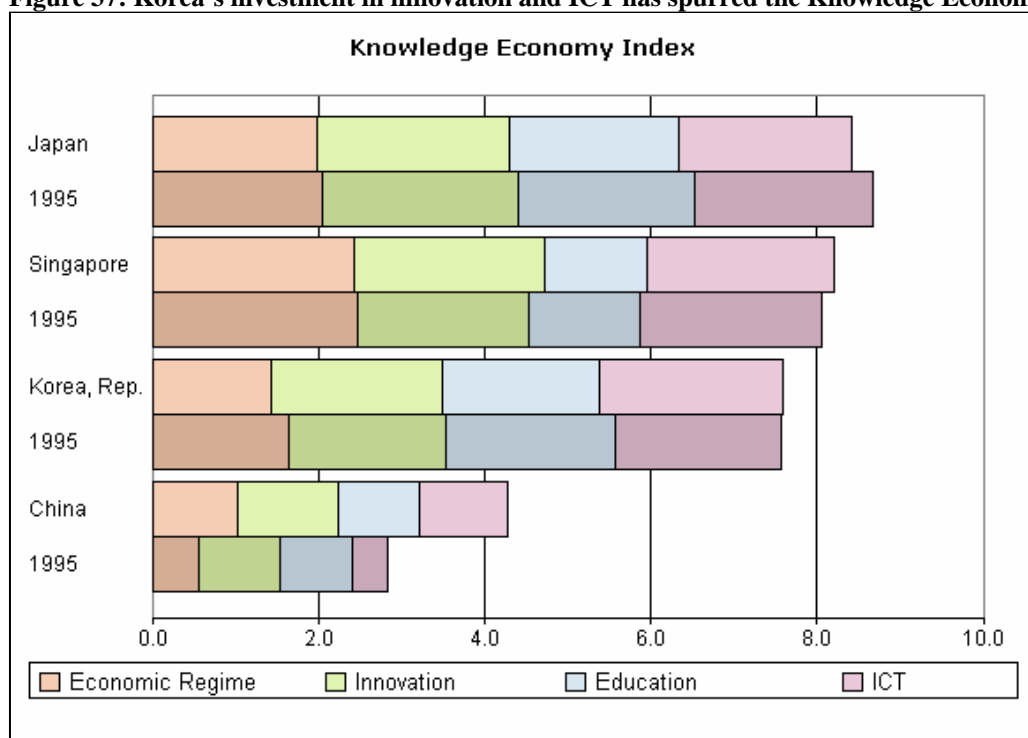


## I Korea: Coordination as the Key to the Knowledge Economy

**Korea's sustained rapid growth rate is due to its strategic use of knowledge for development.** The Republic of Korea has had consistent growth over the past four decades which has enabled it to overcome the economic and social damage caused by World War II and the Korean War. Korea's past left many with the notion that it would take decades to recover and rebuild from these events. However, after 45 years, Korea's GDP per capita has increased to over \$12,000. Korea's growth is said to be significantly accredited to its ability to use knowledge effectively in all sectors of the economy. Although Korea had not conceived an explicit knowledge economy development strategy, its commitment to strengthening each pillar through a focus on coordinating knowledge according to industry needs, led the country to immense growth in following years (Figure 37).

**Figure 37: Korea's investment in innovation and ICT has spurred the Knowledge Economy**



### Economic, Social and Industrial Coordination

**Korea's growth has been the direct result of its ability to strategically reform various sectors in accordance with industry trends.** From 1950 to the present, Korea has focused efforts on all four pillars of the knowledge economy. Government has prioritized achieving sustained productivity growth by consistently increasing the domestic value addition of its goods.<sup>68</sup>

**Korea began with investments in education and the use of licensed technology.** In the 1960's, Korea began investing in both export and import substituting industries, starting with subsistence agriculture and labor intensive light manufacturing sectors such as textiles and bicycles. In order to meet the industry's current needs, considerable amounts of capital were invested in primary education. And the use of

<sup>68</sup> World Bank, 2006c, p.4

technologies, obtained through foreign licensing, were adapted for domestic production, allowing for a gradual shift up the value-added chain toward more sophisticated products.

**Moving up the value chain required investments in technical and vocational training.** In the mid-1970's, Korea began the development of its heavy industries such as chemicals and shipbuilding and policies were subsequently enacted to improve the technological capabilities of the country. This transition was further facilitated and supported by Korea's incentive to improve the access to and quality of technical and vocational training.

**Deregulation and further investments in higher education continued to spur growth.** In the 1980's, Korea attempted to ensure a market conducive environment by deregulating various sectors and liberalizing trade. The government also expanded higher education while investing in indigenous research and development through the establishment of an R&D program. The country continued to pursue high value-added manufacturing through the 1990's by promoting indigenous high-technology innovation.

**Government coordination was the key to Korea's early growth.** Korea's early growth has been a direct result of the country's ability to coordinate government policies and investment in education and innovation with market needs.<sup>69</sup> But there came a time when the government's mechanism of resource allocation that had been effective when the economy was growing quickly was no longer effective. When the economy became larger and more complex this approach no longer produced stellar growth outcomes.

**The Asian crisis of 1997 prodded government into undertaking widespread economic reforms.** The old policy framework and institutions that had led Korea in the early high growth era turned out to be liabilities for sustained economic growth in the new economic environment. In response, Korea began undertaking reforms in the public and labor markets in order to overcome the crisis and ensure rapid economic recovery. Following the crisis in 1998, Korea launched a national campaign to make the transition to an advanced knowledge based economy in which domestic innovation would thrive. By using the framework developed by the Knowledge for Development program of the World Bank, Korea has since evolved into a mature knowledge based economy by assigning priority to and investing in knowledge inputs, rather than physical capital.<sup>70</sup>

## **Reforming the Korea's Market Structure through Deregulation**

The Korean government, in an effort to progress the institutional regime, improved the rule of law through greater transparency, disclosure of information, and increased accountability for both the public and private sectors. Since the 1997 crisis, the Korean government has relied more on market mechanisms and the private sector to take a lead in generating economic activity. Government has deregulated the economy, and promoted competition and entrepreneurship.

After the crisis, in order to rehabilitate the financial system, the government liquidated troubled institutions, wrote off nonperforming loans, and recapitalized promising financial institutions. In the corporate sector, the Korean government implemented initiatives to improve corporate governance systems, revise bankruptcy procedures, and remove anticompetitive regulations. Korea created more flexible labor markets. For example, labor laws were revised to legalize layoffs, and a legal framework for manpower-leasing services was introduced. Unemployment insurance, a well functioning pension system, and properly targeted poverty programs were all developed as part of the insurance package. In addition, the government promoted the formation of a venture capital market, which has grown rapidly

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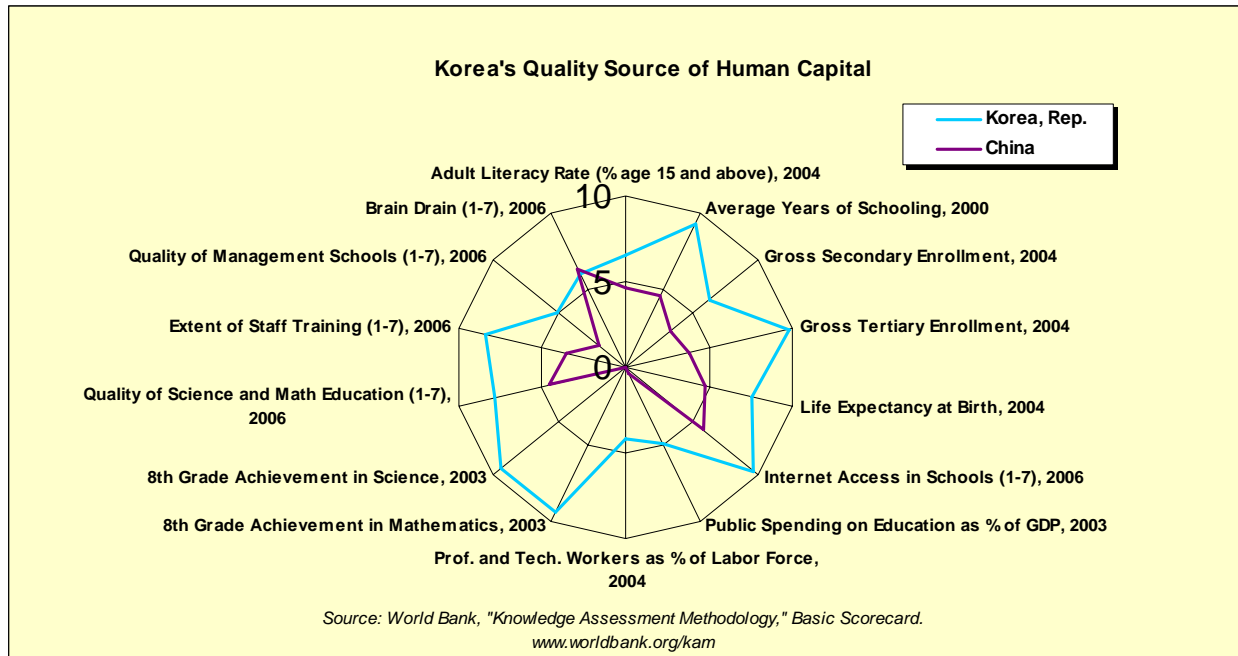
<sup>69</sup> World Bank, 2006c

<sup>70</sup> Ibid.

since the late 1990's. Korea is now one of the leading countries in terms of venture capital investment as a share of GDP.<sup>71</sup>

## Developing a Demand Driven Education System

Figure 38: Korean and Chinese Education



**Korea's education system was nurtured and expanded according to the manpower needs of the economy.** In the 1950's and 1960's, education policies focused on the expansion of primary and secondary education, which was critical to supply at least a literate workforce to the soft manufacturing industries. Vocational high schools were also established and developed in the 1960's to provide training in craft skills for the growing labor-intensive light manufacturing industries. Junior vocational colleges were set up in the 1970's to supply technicians for the heavy and chemical industries.

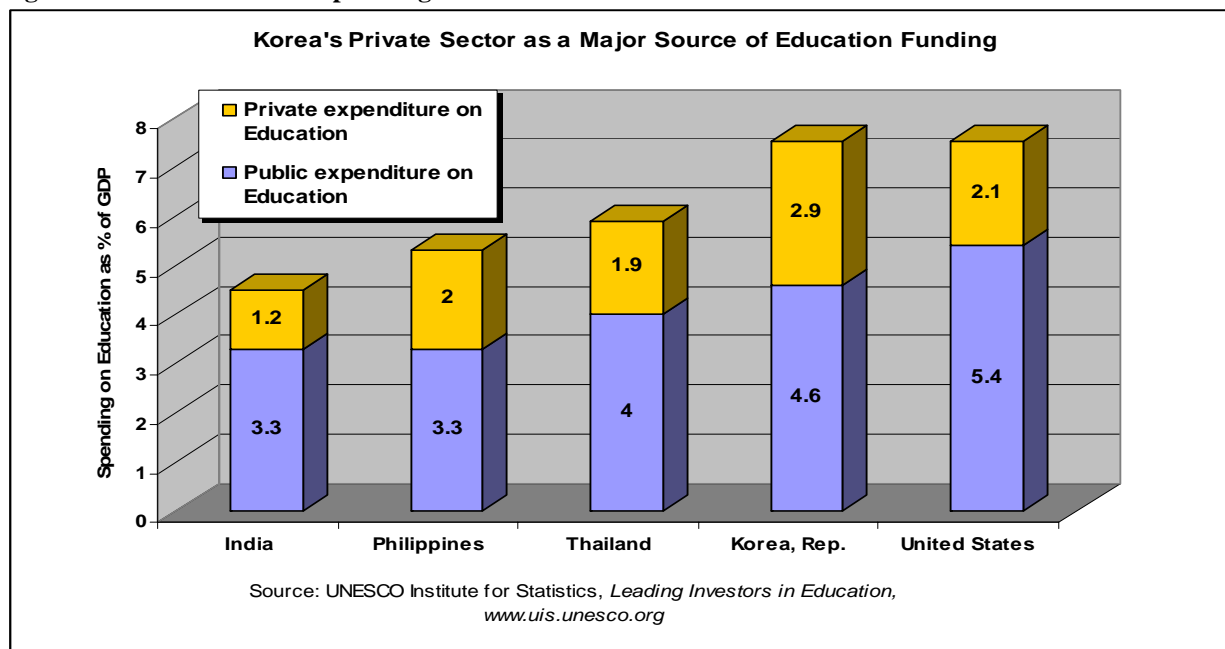
In the 1980's, the higher education expansion policies adopted by the government were instrumental in supplying high quality professional workers and R&D personnel that were required as Korea began developing its domestic innovation system.<sup>72</sup> Each level and entity within Korea's education system has been strengthened, demonstrated by Korea's scorecard for education (Figure 39). It shows that enrollment is extremely high at the tertiary and secondary levels, and achievements in math and science subjects are even more remarkable. Korea has also been able to advance quality inputs with high levels of internet access in schools and high qualities of science and math education.

**Korea's progress in creating an efficient education system is the result of significant investments by both the public and private sectors.** In 2002, 7.1 percent of GDP was spent on education, a level much higher than the OECD average of 5.8 percent. The only OECD countries to surpass this figure are Iceland, the US, and Denmark. Public financing of the education system increased more than 27-fold in real terms between 1963 and 1995, whereas Korea's GDP increased only 14-fold during the same period.

<sup>71</sup> Ibid.

<sup>72</sup> Ibid.

**Figure 39: Korea's leadership through education**



Private expenditures on education are significant, accounting for 2.9 percent of GDP compared to the OECD average of 0.7 percent.<sup>73</sup> The Korean government has been tremendously successful at encouraging the private sector, either households or private foundations, to bear a significant portion of total education costs (Figure 39). The cultural factor also plays a large role in this funding as Koreans generally value education highly, and are often willing to pay more to educate their children privately. Private foundations have established a number of secondary schools and higher education institutions, in which expenses are paid for by user fees. At the secondary level, enrollment at private institutions accounts for more than 40 percent of total secondary enrolment, whereas private enrolment for tertiary education is over 70 percent. Primary education in Korea has been treated as a public good and has been mostly publicly funded, with 99 percent of primary school students in 2005 enrolled in public schools.<sup>74</sup> By encouraging the private sector to bear a significant portion of total education at the secondary and tertiary levels, government resources have been spent on key priority areas, such as offering universal primary education.

## Developing Korea's Science and Technology Sector

**Korea has developed its R&D sector by increasing the total amount of investment whilst simultaneously reducing government involvement.** In the early post-war period private sector R&D spending was insignificant. But growth of the innovation system required corresponding investments in technology development. Government encouraged private investment in R&D, resulting in substantial increases in R&D spending by private firms over the past four decades (Figure 40). Consequently, the government's share of GERD has been gradually reduced and currently accounts for less than a quarter of the total. Korea's GERD has grown both in size and as a share of GDP, increasing from 0.25 percent in 1963 to 2.48 percent in 2004.<sup>75</sup> These increases in R&D investment have led to corresponding increases

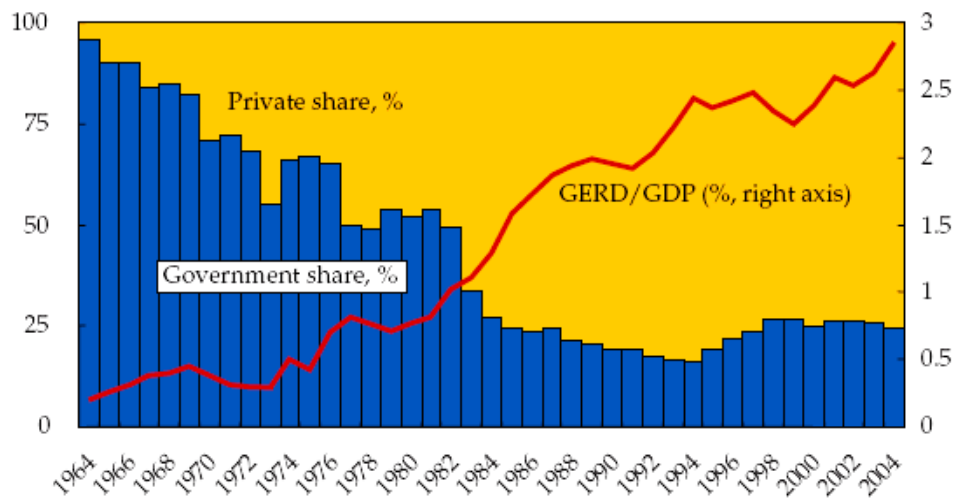
<sup>73</sup> World Bank, 2006c, p. 14

<sup>74</sup> World Bank, 2006c

<sup>75</sup> UNESCO, R&D Statistics

in indigenous innovation and adoption of foreign technologies, making the country's innovation system on par with many high income countries.

**Figure 40: Significant Increases in R&D Investment by Korea's Private Sector Over Time**



Source: World Bank, "Korea as a Knowledge Economy"

**Korea's ability to absorb foreign technologies, improve upon, and adapt them to domestic production has allowed Korean industries to become internationally competitive.** In the 1960s, when Korea launched its industrialization drive, it had to rely almost completely on imported foreign technologies. By doing so, the country promoted inward transfer of these foreign technologies and developed the domestic innovation and production capacity to digest, assimilate, and improve upon the transferred technologies and to adapt them to domestic production. This integration process allowed Korea to reduce its dependence on FDI and avoid control from multinational corporations. By the 1980's, Korean industries had increasingly become potential competitors in the international market making foreign companies significantly reluctant to transfer technologies to Korea. As a result, Korea would have to develop indigenous research and innovation and did so by investing heavily in domestic R&D. This transition required highly trained scientists and engineers as well as the financial resources necessary to support such R&D activities.

**Korea's government research institutes helped meet the demand for large scale and sophisticated R&D.** In the 1960's, the Korean government borrowed heavily in international capital markets. The money was allocated to selected industries to enable firms to import capital goods, build turnkey plants and obtain the latest technology and foreign experts needed for its technological assimilation strategy. In the 1970's, when the economy was moving into heavy industries, the government created Government Research Institutes (GRIs) in the fields of heavy machinery and chemicals to compensate domestic industries for their technological weakness. The GRIs worked with companies to enhance technological capabilities for further industrial development. Government's outward looking, export driven development strategy forced domestic industries into international markets, exposing them to intense global competition. To stay competitive, firms within these industries had to keep pace with technological changes by investing heavily in R&D.<sup>76</sup>

<sup>76</sup> World Bank, 2006c.

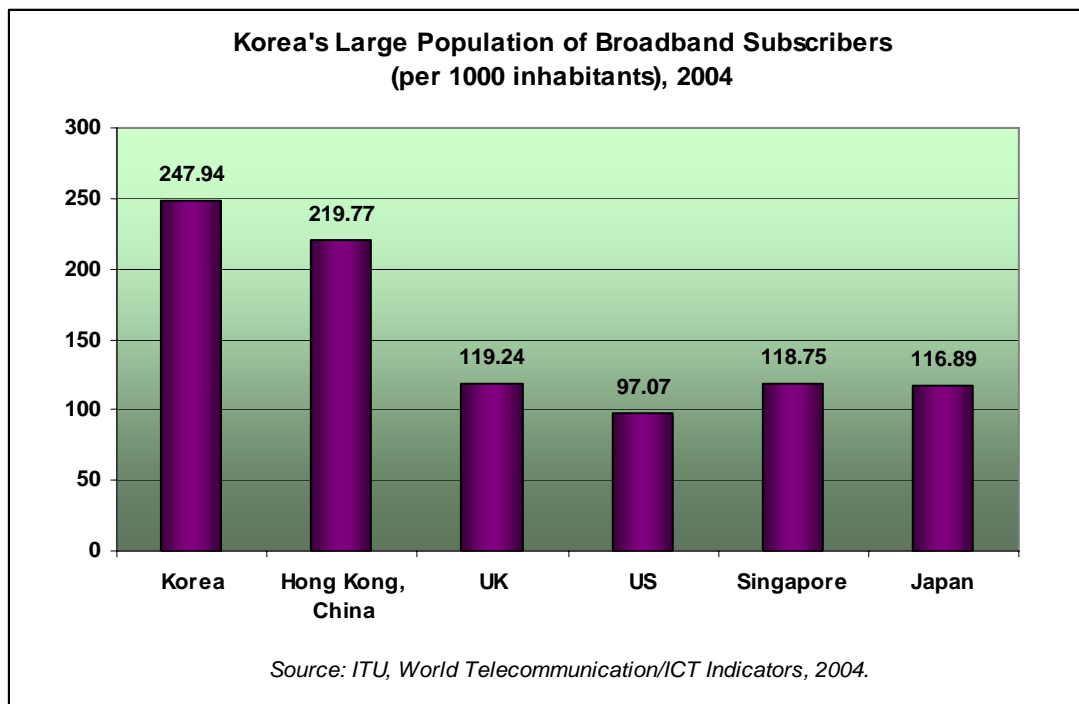
## Building Information Infrastructure

**Korea's excellent ICT infrastructure has been developed by a competitive private sector telecom industry.** In the early 1970s, Korea's information infrastructure was inadequate. To improve its efficiency, the Korean government focused in the 1980s and 1990s on introducing competition into the ICT sector by deregulating and liberalizing the sector and privatizing the government owned telecom operators. From 1995 to 2003, the proportion of Koreans with cell phones increased to 70 percent, while the proportion of internet users increased to 60 percent. Korea is now among the leading countries in the world in terms of proportion of broadband internet subscribers, largely due to its successful construction of ICT networks connecting all areas of the country (Figure 41).

**Excellent ICT infrastructure leads to increased uptake in e-commerce and e-government services.** The number of subscribers to internet banking services reached 22.58 million as of March 2005 and e-commerce has increased from 50 billion won in 1998 to 314 billion won in 2004. Led by an e-government initiative, the public sector is extensively using ICT. By 2004, 97 percent of documents were dealt with through the e-approval system in the government agencies.<sup>77</sup>

**Establishing a dedicated fund on a PPP basis was key to rapid roll out of ICT infrastructure.** In order to finance the investment for the rapid deployment and overcome short term budgetary constraints the Informatization Fund was established. From 1993 to 2002, the fund reached a total of \$7.78 billion, 40 percent of which was from government budgetary contributions and 46 percent of which came from private enterprises. The funds were allocated in a way that would balance ICT activities: 38 percent for technology development programs, 18 percent for human resources development, and the remaining 44 percent for building of infrastructure and diffusion, including standardization. Korea strategically used this fund to both narrow the digital divide and provide citizens with more dependable telecommunication services.<sup>78</sup>

Figure 41: Korea wired for the future



<sup>77</sup> Ibid.

<sup>78</sup> Ibid.

## Continuing Challenges

**Despite its achievements, Korea's education system continues to face challenges in maintaining its competitive edge.** The Korean education system has yet to evolve to meet the new skill and knowledge requirements of the knowledge economy. Teacher-centered one-way teaching, rote memorization, the lack of diversity of educational programs, and a preoccupation with preparing for entrance exams have all left little room to nurture creativity and initiative. Korea needs a more flexible education system that is less academic and that puts an end to stiff government control over the curriculum, testing, tuition fees, and the number of students in each discipline. These restrictions have eroded the links between educational output and labor market demand. There are current mismatches in supply and demand of human resources including high skilled labor shortages in strategic areas, labor shortages in small and medium enterprises, and a high degree of youth unemployment.

**Critical thinking and problem solving will be the by-words of education in the future.** It is increasingly important to improve students' competencies in critical thinking, problem solving, and essentially, promote lifelong learning through a broader interdisciplinary approach. These objectives will only be accomplished by granting greater autonomy to the universities and giving them discretionary powers in hiring teaching staff, management of academic affairs, and in setting student admission quotas.<sup>79</sup> In terms of innovation, Korea is a high spender on R&D and most of it is by the private sector, but outputs could be improved further. There will be an increasing need to update the role of GRIs, improve interaction between universities, Government Research Institutes and private firms, and improve the efficiency of private R&D output.<sup>80</sup>

## What can Sri Lanka learn from Korea's experience?

**Sri Lanka should strive to formulate a strategy for development that is centered on coordination and private sector involvement.** Korea's most significant development attribute was its ability to develop its skill and innovation base according to the needs of the industry. Government played a major role in effectively making a transition from a regulator to that of an architect in making strategic decisions on guiding the country towards strengthening different sectors at various times in the country's development, by taking a less direct interventionist approach.

Sri Lanka, which is beginning a transition towards becoming a major services industry, should begin investing in knowledge inputs that strengthen all relevant sectors of the economy. In terms of innovation, Korea invested heavily in R&D, but only after it had built up the knowledge capacity and technique base that it received from years of outward looking assimilation and imitation of technologies inherited from the global community.

**Sri Lanka should begin investing in developing a research base geared to the process of imitation and assimilation.** This will help to increase the value added of exports and begin the process of domestic innovation. Research as a discipline should be given greater funding within universities and R&D institutes, as they form the backbone of a research base. In the education system, Korea encouraged the private sector to finance a large portion of primary and secondary levels, leaving the country to focus its investment on higher education.

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<sup>79</sup> World Bank, 2006c

<sup>80</sup> Aubert, Jean-Eric. 2006

**Sri Lanka should begin allowing the private sector to finance education** as it will encourage competition among the education sector along with providing the government with excess funding to be distributed towards higher education, which will be increasingly important in creating skilled workers for the emerging services industry.

**Sri Lanka must fast track investments in ICT infrastructure.** As Sri Lanka attempts to position itself as a major destination for offshoring activities, it will be even more important to have an adequate ICT infrastructure and good human resources. It is important that the country possesses the skills necessary to supply the BPO sector. Sri Lanka can also consider establishing something along the lines of Korea's Informatization Fund. Such a fund could build upon the achievements of the e-Sri Lanka initiative and help to develop IT connectivity, culture and literacy levels within Sri Lanka, and thereby, lessen the digital divide.