

**Sri Lanka**  
**State of the Economy Report 2011**

**Chapter 10**  
**Towards a Competitive and Inclusive Knowledge**  
**Economy**

*by*  
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## 10. Towards a Competitive and Inclusive Knowledge Economy

### 10.1 Introduction

Knowledge has always been an integral part of any country's development. But with increasing globalization, shrinking of national borders due to virtualization, the international fragmentation of production, and heightened global competition, the speed at which knowledge is created and used has made it an even more vital element of rapid economic development. Knowledge accumulation and application have become major factors in economic development and are increasingly at the core of a country's competitive advantage in the global economy.<sup>1</sup> Comparative advantages among nations come less and less from abundant natural resources or cheap labour and increasingly from technical innovations and the competitive use of knowledge - or from a combination of the two - as is illustrated by the success story of Bangalore, the capital of the Indian software industry.

The structure of Sri Lanka's economy is also changing rapidly, from being agriculture-based to services-based. The country possesses a sound base of educated individuals, with the highest literacy rate in the South Asian region. Despite the shortcomings of literacy rates as an indication of the quality of education, it demonstrates that literacy provides a trainable workforce which can now be geared to a knowledge-based economy. Moreover, the growth of the telecoms sector, growing private sector participation in non-degree, non-university tertiary training programmes, and the emergence of a globally-competitive offshoring industry can support Sri Lanka's transition to a knowledge economy.

Yet, currently, much of the knowledge-intensive and knowledge-using production is concentrated in pock-

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***“To ensure coherent efforts in building a knowledge economy, Sri Lanka should implement strategies that take a holistic approach. Addressing all elements concurrently would be essential, owing to the strong inter-linkages...”***

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<sup>1</sup> Porter, M., 1990, *The Competitive Advantage of Nations*, Free Press, New York.

ets in Sri Lanka - either regionally or at firm-level. The Western Province, for example, owing to the wider and deeper availability of skill development opportunities as well as better technology diffusion and utilization, has emerged as a knowledge economy region within the country. Knowledge-based enterprises like offshored IT, legal, and accountancy services as well as nano-technology and garment industry innovation centres, are based primarily in the Western Province. The key is to now ensure that these developments would become more widespread and inclusive to the entire economy.

The ability of rich countries to develop rapidly hinged on their ability to fully harness the power of knowledge-induced growth.<sup>2</sup> As identified in the Report of the Commission on Growth and Development,<sup>3</sup> this was also true of thirteen late-industrializing countries that achieved high sustained growth in recent decades. A key ingredient was their ability to harness 'knowledge' to speed up their growth, but not growth as an end in itself, but this knowledge-led growth being able to create higher and more productive employment, better living standards, improve education, etc.

As Sri Lanka attempts to 'catch-up', whilst also ensuring that growth is inclusive and poverty-reducing, the challenges and opportunities for leveraging the knowledge economy to achieve this, needs to be analyzed. This is particularly policy-relevant given the government's stated goal of transforming Sri Lanka into a Knowledge Hub -

one of five hubs articulated in 'Mahinda Chintana - Idiri Dekma' vision statement. An essential pre-requisite for the country to move towards a 'knowledge hub' is the re-orientation of the country towards a 'knowledge economy' (also referred to as a 'knowledge-based economy').

This Chapter aims to provide a better understanding of the advent and evolution of the concept of a knowledge economy and its definition and determinants; evaluate the status and recent performance of Sri Lanka with respect to key determinants of developing a knowledge economy; highlight the key challenges in making a knowledge-economy thrust truly inclusive: and discuss the policy options, particularly possible institutional arrangements, for driving the knowledge economy agenda forward.

## 10.2 Advent of the 'Knowledge Economy' Concept

In 1962, in reference to a publication that appeared to have developed a theory on 'knowledge' as a key production factor in an economy,<sup>4</sup> *Time Magazine* noted that,

*"Economists take infinite pains in diagnosing the auto, oil or steel industry, but almost no one tackles the industry that makes the most important product of all. It is knowledge, defined as information, old or new, which is produced and disseminated by all kinds of agents".<sup>5</sup>*

The term knowledge is almost as old as the term development, as entrepreneurship or

<sup>2</sup> Conceição, P., D.V. Gibson, M. V. Heitor, and G.Sirilli, 2001, "Knowledge for Inclusive Development: The Challenge of Globally Integrated Learning and Implications for Science and Technology Policy", *Technological Forecasting and Social Change*, Vol. 66, No. 1.

<sup>3</sup> Alternatively called the "Spence Commission on Growth and Development," or "The Growth Commission". The Commission is an independent body chaired by Nobel Laureate Michael Spence, and was created in April 2006. The full report, released in 2008, is available at [www.growthcommission.org](http://www.growthcommission.org).

<sup>4</sup> Machlup, F., 1962, *The Production and Distribution of Knowledge in the United States*, Princeton, New Jersey: Princeton University Press.

<sup>5</sup> Time Magazine, 'Education: The Knowledge Industry', Time Magazine, 21 December, 1962, <http://www.time.com/time/magazine/article/0,9171,940171,00.html>.

entrepreneurial knowledge is the linchpin of the organization of production in an economy, which in turn, is fundamental for development. However, the concept of 'knowledge economy' is relatively newer, and has evolved over the last few decades. Today, the knowledge economy has become almost a 'buzz word' among economists, planners, private sector players and other professionals, and its role in broader development is increasingly acknowledged.

Whilst the first use of the term knowledge economy can be traced back to 1962, it would be several decades before the idea would be mainstreamed, as the world globalized, creation and dissemination became freer and cheaper, economies became more integrated with closer trade in goods and services, etc. The knowledge economy became referred to in the context of the ingredients of production, competitiveness, international specialization, and thus growth and development.

With increased globalization, integration, and heightened awareness of economies on gaining a 'competitive advantage' (moving away from the old 'comparative advantage' theory), the need for knowledge-driven growth was identified - innovation, R&D, higher-level learning, proficiency in ICTs, etc. For this, advances in higher level human capital was seen at least as, if not more, important as physical capital.

### **10.3 What is a Knowledge Economy?: Definitions and Determinants**

The knowledge economy has been defined in various ways, but can be well captured as 'an economy that creates, disseminates, and

inputs or uses knowledge to promote growth and development'.<sup>6</sup> This is broadly the idea of a knowledge economy that will be built on in the Sri Lankan context, in the discussion to follow.

While land is the key resource in an agricultural economy and natural resources (raw materials like coal, iron ore, etc.) and basic labour is the key resource in an industrial economy, knowledge is argued to be the key resource in a knowledge economy.<sup>7</sup> It is maintained that a knowledge economy refers to an overall economic structure comprising "the rise in knowledge intensity of economic activities, and the increasing globalization of economic affairs...where the principal component of value creation, productivity and economic growth is knowledge". The primary ingredient of a knowledge economy is viewed as a greater reliance on intellectual capabilities rather than on physical inputs or natural resources.<sup>8</sup> It is the combination of production and services based on knowledge-intensive activities that is argued to contribute to an accelerated pace of technical and scientific advance that can in turn, raise competitiveness and accelerate growth.

The OECD defines knowledge economies as "economies which are directly based on the production, distribution and use of knowledge and information".<sup>9</sup> By that definition, however, all economies are knowledge economies. What is different about this concept today, however, is that as economies strive to grow faster and move into advanced stages of economic activity, the effective creation, acquisition, distribution and the use of knowledge becomes increasingly more important, and this is driven, to a great

<sup>6</sup> Radwan, I., N. Kuruppu, and A. Wijesinha, 2008, *Building Sri Lanka's Knowledge Economy*, World Bank, Washington D.C.

<sup>7</sup> Houghton, J. and P. Sheehan, 2000, *A Primer on the Knowledge Economy*, Centre for Strategic Economic Studies, 2000, Victoria, Australia.

<sup>8</sup> Powell, W. and K. Snellman, 2004, "The Knowledge Economy", *Annual Review of Sociology*, Vol. 30, pp. 199-220.

<sup>9</sup> OECD, 1996, *The Knowledge-based Economy*, Organization for Economic Co-operation and Development (OECD), Paris.

extent, by advances in science and technology and ICT.

The characteristics of a successful knowledge economy are that there is a close linkage between academic science and industrial technology, there is greater importance placed on innovation for economic and competitiveness, there is increased significance of education and lifelong learning, and there is greater investment in R&D, software, and education.<sup>10</sup> Thus, a knowledge-based economy is one that encourages its people, its firms, and its institutions to acquire, create, disseminate and use knowledge more effectively for greater economic and social development. Required elements for the creation and strengthening of a knowledge economy are set out in Table 10.1.

The above framework is used to analyze Sri Lanka's status as a knowledge economy, and

identify gaps which need to be addressed to develop the sector. For much of the indicators to analyze each of the elements, the Knowledge Assessment Methodology (KAM) developed by the World Bank Institute is employed.<sup>11</sup>

#### 10.4 Sri Lanka as a Knowledge Economy: Status, Comparison, Inclusiveness

The elements set out in the above discussion can be considered the necessary conditions for Sri Lanka in moving towards a knowledge economy in particular, but also towards increasing the efficiency, flexibility, and resilience of the economy and its ability to restructure, respond to changing competitiveness requirements, and take advantage of new and emerging economic opportunities both at home and abroad, so that the benefits of growth are broadly shared by all Sri Lankans.

**Table 10.1**  
**Elements of a Knowledge Economy (KE) and Descriptions**

| Element of KE   | Description   |
|---|---|
| Business environment and economic incentives regime       | An economic and institutional regime that provides incentives for the efficient use of existing knowledge, the creation of new knowledge and entrepreneurship   |
| Education and skills                                      | An educated and skilled population that can create and use knowledge  |
| Information communication technology (ICT) infrastructure | A dynamic information infrastructure that can facilitate the effective communication, dissemination and processing of information   |
| Research and innovation                                   | A system of research centres, university, think tanks, consultants, firms and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new knowledge |

Source: Adapted from Dahlman, C. and T. Anderson, 2000, *Korea and the Knowledge-based Economy: Making the Transition*, World Bank, Washington, D.C.; and Radwan, I., N. Kuruppu, and A. Wijesinha, 2008, *Building Sri Lanka's Knowledge Economy*, World Bank, Washington D.C.

<sup>10</sup> Dahlman, C. and A. Utz, 2005, *India and the Knowledge Economy: Leveraging Strengths and Opportunities*, World Bank, Washington, D.C.

<sup>11</sup> Available at [www.worldbank.org/kam](http://www.worldbank.org/kam).

The discussion to follow will evaluate Sri Lanka's standing in each of the elements and identify key constraints that need to be addressed in making the thrust towards a knowledge economy both successful and inclusive.

#### 10.4.1 Business Environment and Economic Incentives Regime

Creating a good business environment, with a robust and market-friendly economic incentive regime and institutional set-up, is crucial to spur innovation and knowledge creation and utilization. A conducive competitive environment induces individuals and firms to seek and use knowledge, identify market opportunities, drive entrepreneurship, and thus create wealth, jobs, and economic growth.

A good business environment would mean that Sri Lanka's laws, policies and institutional mechanisms are conducive to fostering successful and inclusive commercial activity. This involves the ease of doing business by both local and foreign firms, the efficiency with which the rule of law is

administered, the ease of entering and exiting a market, the level of labour market flexibility, among others.

The World Bank's 'Doing Business in 2011' report ranks Sri Lanka 102 out of 183 countries in the overall ease of doing business. While it is ahead of more economically developed countries like Greece, Argentina, and Russia, the report indicates that, since the previous report in 2010, Sri Lanka has not pushed forward with any significant policy reforms that could have boosted its standing. Indeed, it is suggested that the business environment in Sri Lanka has become less conducive to carrying out commercial transactions between 2000 and 2009. Despite a rise in the index from 4.96 in 1995 to 6.02 in 2000, it experienced a fall back to 4.56 in 2009.<sup>12</sup>

In this and later sections, Sri Lanka's performance is benchmarked with India and Singapore. Singapore has emerged as an unmatched leader in developing and harnessing knowledge for economic growth, having a formidable force of knowledge workers and

**Table 10.2**  
**Sri Lanka's Rank in Key 'Doing Business' Indicators<sup>a</sup>**

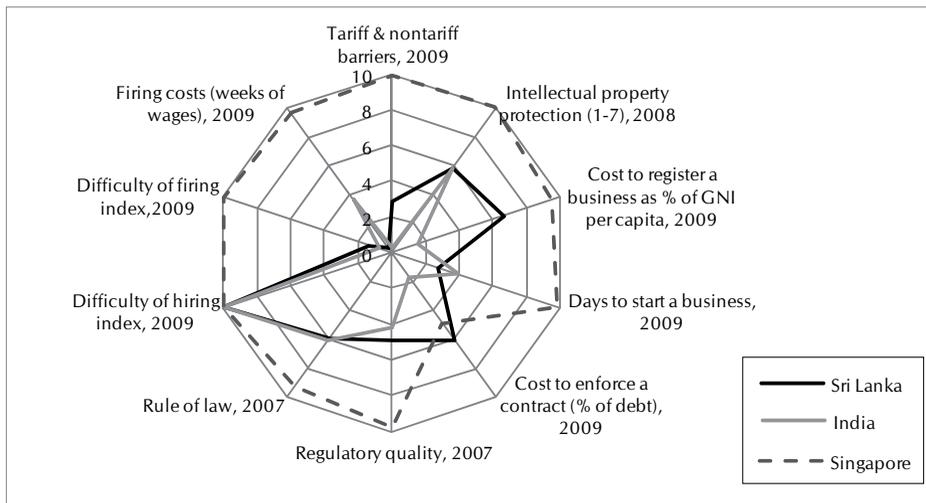
| <b>Doing Business Indicator</b> | <b>2008</b> | <b>2010</b> | <b>2011</b> |
|---------------------------------|-------------|-------------|-------------|
| Starting a business             | 29          | 40          | 34          |
| Dealing with licences           | 160         | 167         | 169         |
| Hiring and firing workers       | 111         | -           | -           |
| Registering property            | 134         | 151         | 155         |
| Getting credit                  | 97          | 69          | 72          |
| Protecting investors            | 64          | 73          | 74          |
| Paying taxes                    | 158         | 165         | 166         |
| Trading across borders          | 60          | 66          | 72          |
| Enforcing contracts             | 133         | 136         | 137         |
| Closing a business              | 39          | 45          | 43          |

Note: a: Ranked from a total of 178 in 2008 and 183 countries in 2010 and 2011.

Source: World Bank, 'Doing Business' database.

<sup>12</sup> *Ibid.*

**Figure 10.1**  
**Comparison of Business Environment Infrastructure: Sri Lanka, India and Singapore**



Source: Compiled using data from World Bank Knowledge Assessment Methodology (KAM) database.

playing host to hundreds of leading knowledge enterprises and innovation centres. India has been a new entrant to the knowledge economy sphere, but has been able to make rapid headway on all fronts of knowledge economy development, and gained international competitiveness in areas like nanotechnology and bio-technology as well as hi-tech production and offshore IT services.

When compared to Singapore and India, Sri Lanka lags behind with respect to certain indicators of business environment infrastructure (Figure 10.1). In particular, Sri Lanka scores low in terms of the number of days to start a business and the difficulty in firing employees. However, Sri Lanka scores well above India with respect to costs associated with registering a business, tariff and nontariff barriers, and costs to enforce a contract, even placing itself above Singapore on this last point.

These indicators provide an indication of the 'national' picture on the state of doing busi-

ness in Sri Lanka. At the regional/provincial level, the picture is likely to remain largely the same. However, it is often the case that in dealing with licences and permits, firms located in or around key commercial hubs (e.g., Western Province) may be better able to access the relevant government institutions, than firms located in lagging regions. There are also disparities across provinces, as reported in the Asia Foundation's Economic Governance Index (see Box 10.1). Despite the presence of provincial branches of relevant government agencies, discussions with stakeholders reveal that firms often perceive the institutional and regulatory regime to be more pro-business or more understanding of the private sector's needs in commercial hubs like the Western Province which have reached a higher level of sophistication and dynamism of economic activity, than those in other areas.<sup>13</sup> Thus, such practical issues need to be borne in mind when considering the inclusiveness of public agencies in providing a business environment conducive for entrepreneurship.

<sup>13</sup> These were revealed during field visits and stakeholder consultations with members of the local private sector during the period January 2009 to December 2010 in the Central, Southern, North Central, Eastern and Northern Provinces.

**Box 10.1****Asia Foundation Economic Governance Index**

The Asia Foundation's Economic Governance Index (EGI) evaluates the business environment for private enterprises. It employs ten sub-indices to carry out its evaluation, ranging from ease of obtaining permits and licences to confidence in legal institutions. The EGI report on Sri Lanka highlights the provincial disparities across the country using surveys conducted among private enterprises. These surveys capture a sense of the private sector's perception of the business environment across seven of the nine provinces, with the Northern and Eastern Provinces excluded due to security concerns at the time of data collection.

The report finds that economic governance across the provinces differs widely, with certain provinces ranking high on some sub-indices while scoring low on others. The Western Province, for example, scored the highest when it came to businesses obtaining registration, permits, and licences while scoring the lowest on confidence in legal institutions and conflict resolution. Uva Province scored highest in this latter category, indicating stronger support for the province's judiciary and appeals process regarding business activities compared to other provinces. On the other hand, this province ranked the lowest in terms of tax administration, burden, and services, indicating private enterprises in this area experienced relatively more tax-related obstacles than any other province. In reference to land access and property rights, the survey revealed that obtaining property for commercial purposes was easier in the North Western Province than in the Western Province, with 55 per cent of businesses in the former province highlighting the ease of obtaining property compared to 34 per cent in the latter.

Source: The Asia Foundation, *Economic Governance Index 2007: A Measure of the Local Enabling Environment for Private Enterprise in Sri Lanka*.

**10.4.2 Information Communication Technology (ICT) Infrastructure**

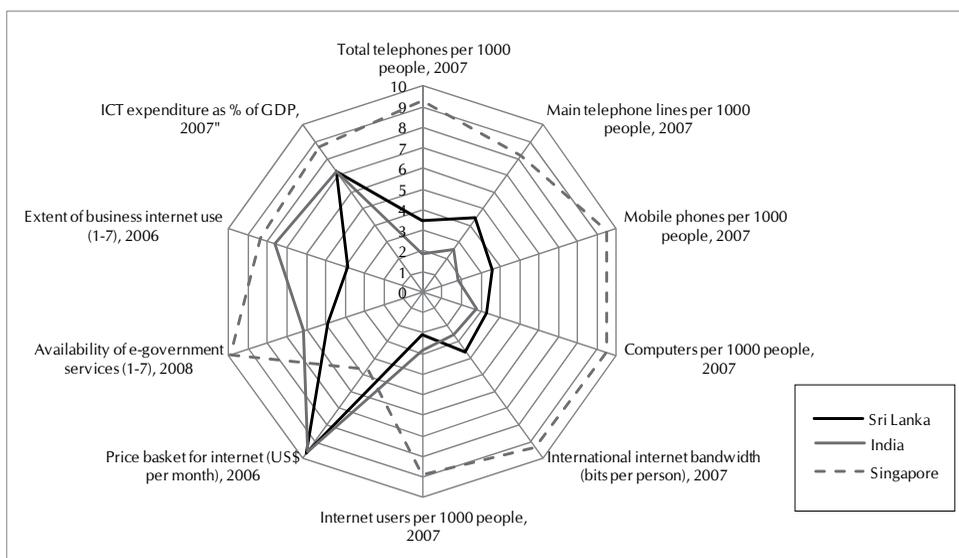
With ICT usage permeating through all aspects of economic and social activities, ICTs have become a linchpin of a knowledge-based economy. As Sri Lanka pushes towards becoming a knowledge economy, ensuring that its ICT infrastructure is affordable, efficient, and inclusive, will be important to drive economic growth and productivity across the country.

However, this push forward may not be enough. The World Bank's KAM data indicate that ICT infrastructure in Sri Lanka has worsened over time. The index that measures ICT development stood at 4.50 in 1995 but dipped to 3.64 in 2000, and dropped further still to 2.98 in 2009. This seems counterintuitive given the numerous

initiatives undertaken by the Information and Communication Technology Agency (ICTA) to improve the level of ICT development in the country, but could be due to the faster advances that other countries have made, relative to Sri Lanka.

Furthermore, Sri Lanka scores low on several indicators with respect to ICT infrastructure when compared with Singapore and India (Figure 10.2). In particular, Sri Lanka lags behind in terms of the number of internet users and extent of business internet use. On the other hand, Sri Lanka surpasses India on total number of telephones and mobile phones per person, prevalence of telephone lines, as well as number of computers available per person and international internet bandwidth. The lack of internet usage, then, could reflect the high connection and

**Figure 10.2**  
**Comparison of ICT Infrastructure: Sri Lanka, India and Singapore**



Source: Compiled using data from World Bank Knowledge Assessment Methodology (KAM) database.

monthly rental costs, as well as the cost of computers which cannot be afforded by all groups.

Telecoms, a key determinant of ICT infrastructure, has shown remarkable growth in recent years in Sri Lanka (growing at around 16 per cent annually in the last three years), following liberalization of the sector and the subsequent influx of FDI into it (Table 10.3). While fixed telephony has saturated over time, mobile telephony has shown a sharp growth, as heightened competition drove down prices, and mobile service charges

became very affordable to individuals at most levels of the income spectrum.

Fixed tele-density remains heavily skewed towards the Western Province - accounting for 40 per cent of all fixed line phones (Figure 10.3). However, it must be borne in mind that with the proliferation of affordable mobile telephony, this gap has been bridged, with many rural households substituting the lack of a fixed line by a mobile telephone or at least a portable CDMA (Code Division Multiple Access) phone.

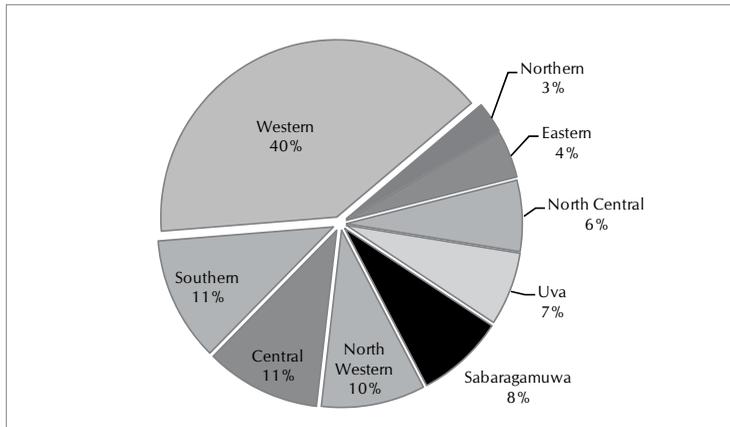
**Table 10.3**  
**Number of Fixed, Mobile, and Broadband Subscribers**

| Year | Fixed     | Mobile     | Broadband <sup>a</sup> |
|------|-----------|------------|------------------------|
| 2006 | 1,884,076 | 5,412,496  | 130,000                |
| 2007 | 2,742,059 | 7,983,489  | 202,348                |
| 2008 | 3,446,411 | 11,082,454 | 234,000                |
| 2009 | 3,435,958 | 14,095,346 | 249,756                |
| 2010 | 3,578,463 | 17,359,312 | 280,000                |

Notes: a: Provisional.

Source: Telecom Regulatory Commission, *Statistical Overview 2010*.

**Figure 10.3**  
**Provincial Distribution of Fixed Phones (as at December 2010)**



Source: Telecom Regulatory Commission, *Statistical Overview 2010*.

Broadband internet connectivity has also risen over the years (although not as dramatically as mobile telephony), doubling between 2006 and 2010. However, the lack of full expansion of the broadband backbone to rural areas makes availability unequal geographically. An estimated 280,000 broadband subscribers as at end 2010, comprised a mere 1.4 per cent of the country's total population. This is compared to over 70 per cent of people being connected via mobile telephony.<sup>14</sup>

The high costs of broadband connectivity limit access to connectivity and affects inclusiveness in terms of expanding internet literacy for all. Sri Lanka ranks third highest among South Asian countries in terms of the annual cost of a broadband connection (Table 10.4). Moreover, the quality of broadband also remains an issue, with download speeds estimated to be far below the advertised rates.<sup>15</sup> However, since then, corrective measures adopted by Telecom Regulatory Commission (TRC) have led to a 60 per cent improvement by operators.<sup>16</sup>

**Table 10.4**  
**Broadband Internet Costs in Sri Lanka vis-a-vis South Asia**

| Country    | Annual Cost (US\$) <sup>a</sup> |
|------------|---------------------------------|
| Bangladesh | 618                             |
| Nepal      | 248                             |
| Sri Lanka  | 168                             |
| Pakistan   | 114                             |
| India      | 143                             |

Notes: Cost of 256kbps broadband business connection.

Source: LIRNEasia, [www.lirneasia.net](http://www.lirneasia.net).

<sup>14</sup> Dialog Axiata Plc., *Annual Report 2009*.

<sup>15</sup> Lanka Business Online (LBO), 'Sri Lanka broadband speeds below advertised rates: regulator', 27<sup>th</sup> December 2010, <http://www.lankabusinessonline.com/fullstory.php?nid=1013747302>.

<sup>16</sup> *Ibid.*

The concerted efforts by the ICTA currently underway to completely re-orient Sri Lanka towards better ICT adoption and utilization

by broader society will no doubt boost the country's position on the ICT pillar in the coming years (see Box 10.2).

### **Box 10.2 e-Sri Lanka Programme**

Sri Lanka began implementing the e-Sri Lanka Programme in 2003, with the aim to promote access to ICT across the country. According to a report prepared for the ICTA in 2010, a mere 5.7 per cent of the population in Sri Lanka has access to the internet.<sup>17</sup> The impetus behind the programme is that ICT is seen as "an enabler and a tool that can help people to increase their income levels in whatever fields of employment they are involved in." The programme's primary aims are to provide improved access and use of ICT; access to and use of public services on-line by businesses and citizens; and enhanced competitiveness of the private sector and in particular of the knowledge industry and SMEs. It endeavors to tackle these challenges through:

1. Empowering the rural poor, disadvantaged groups, women and youth through increased and affordable access to information and communication tools
2. Developing leadership and skills in ICT
3. Creating employment in the ICT industry and ICT enabled services, and enhancing the competitiveness of user industries and services

The e-Sri Lanka Programme has adopted six approaches to fulfilling these aims. They include i) ICT Policy, Leadership and Institutional Development; ii) ICT Human Resources Development and Industry Promotion; iii) Regional Telecommunications Network; iv) Telecenter (Nenasalas) Development; v) Re-engineering Government; and vi) e-Society Development. Several of these have been successful in promoting ICT among government employees, as well as reaching out to the disadvantaged and providing ICT access to youth and women in rural areas.

According to the World Bank, the programme has achieved some critical successes, noting that it is the "most comprehensive ICT project in the World Bank."<sup>18</sup> It is estimated that following the programme's implementation, over 50,000 new jobs have opened and over 35,000 private sector employees have used the programme's ICT training in their work. The government online portal has reportedly attracted over 4 million users since it began offering services in 2009, and its telecenter project draws over 70,000 people monthly through its 600+ Nenasalas (see Box 10.3).

Nonetheless, the e-Sri Lanka Programme has key challenges in implementation, which in turn have impacted its scaling-up. When implementing certain projects under the programme, there has been difficulty ensuring the quality of ICT services provided consistently meets the expected standards. Another key issue is that of the language barrier that exists for many Sri Lankans when operating predominantly English software and on-line applications. Additionally, the ICTA is trying to meet the challenge of promoting export growth of ICT-related services and establishing an institutional framework that clearly defines the legal boundaries of ICT use in Sri Lanka.<sup>19</sup>

Sources: ICTA, 2010, "Outcome Evaluation Report of Nenasala Project", a report prepared for the ICTA by Skill International Private Limited; <http://www.icta.lk/en/programmes.html>; interview with Monitoring and Evaluation Programme Head, ICTA.

<sup>17</sup> ICTA, 2010, "Outcome Evaluation Report of Nenasala Project", a report prepared for Information and Communication Technology Agency of Sri Lanka by Skill International Private Limited. ICTA: October 2010.

<sup>18</sup> World Bank, 2011, "Implementation Status and Results: Sri Lanka E-Lanka Development", World Bank.

<sup>19</sup> Interview with Monitoring and Evaluation Programme Head, ICTA.

### 10.4.3 Research and Innovation System

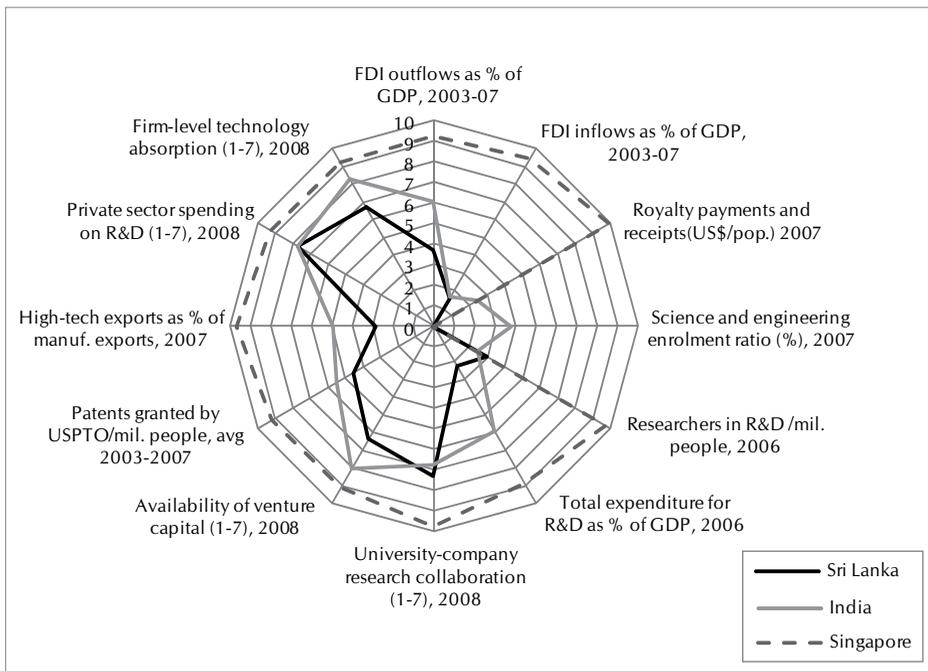
There is no single accepted definition of a national innovation system. Rather, it refers to the network of institutions, rules and procedures that foster innovation and R&D in a country - the web of interaction as a whole. It includes the degree to which existing technologies from other countries are adopted and developed further to suit the local needs, the development of globally competitive technologies and production processes, and the nexus between science and research institutes and the private sector (i.e., firms that would use new and/or adapted technologies).

The World Bank's KAM database reports a rise in the quality of research and innovation infrastructure in Sri Lanka recently. Despite a slight decrease in the KAM indicator between 1995 and 2000 from 3.27 to 3.24,

Sri Lanka's score in 2009 rose to 4.13. Despite this rise, Sri Lanka lags behind India and Singapore with respect to certain aspects of research and innovation infrastructure. In particular, Sri Lanka performs relatively poorly in the areas of royalty payments and receipts, total expenditure for R&D, and high-tech goods as a percentage of manufactured exports (Figure 10.4).

Sri Lanka is a late-comer to the research and innovation revolution that has swept the world in the last decades. Many of the country's scientific institutes remain underfunded, with insufficient international collaboration to acquire and adapt global technologies. Sri Lanka's research institutes are also overwhelmingly agriculture-based. Of an estimated total of 5,300 scientists spread over 13 universities and 19 R&D institutes in 2005, more than 60 per cent of

**Figure 10.4**  
**Comparison of Research and Innovation Infrastructure: Sri Lanka, India and Singapore**



Source: Compiled using data from World Bank Knowledge Assessment Methodology (KAM) database.

the R&D institutes were related to agriculture.<sup>20</sup> Additionally, the protracted conflict, along with unattractive career potential, meant that a large proportion of science and engineering professionals left the country in search of better opportunities. However, this is gradually changing.

An example of the improved nexus between academic scientific research and private sector initiative would be the telecom centre in the Moratuwa University (in partnership with Dialog Axiata telecom) and the ground-breaking Sri Lanka Institute of Nanotechnology (SLINTEC), which operates under a unique public-private partnership (PPP) model. The SLINTEC has also been able to attract Sri Lankan diaspora experts to link up with local scientists for nanotech research. As was the case in much of industrialized East Asia, Sri Lanka can absorb existing technologies and production systems, and then leverage on such a base to develop more

innovative industries and create newer, or adapt existing technologies. However, due to a lack of public funding for R&D enterprises over the decades, the national science and technology environment experienced little growth. Despite the stated government goal in 2006 to allocate 1.5 per cent of GDP to R&D by 2016,<sup>21</sup> by 2008 only one-tenth of that had been allocated.<sup>22</sup>

A key government initiative is currently under way to ensure that innovation capabilities and opportunities are not limited to the urban and highly commercial hubs - e.g., the 'Vidatha' programme of the Ministry of Technology and Research. By end 2009, there were 254 Vidatha Resource Centres across Sri Lanka, covering 77 per cent of all Divisional Secretariat (DS) divisions in the country,<sup>23</sup> involved in 'transfer of technology' programmes under the theme 'Gamata Thaakshanaya' ('technology to the village'). Yet, there is evidence to suggest that the link-

### Box 10.3

#### Performance Review of the Vidatha Programme

A recent assessment showed that, as at end 2009, Vidatha had provided close to 3,400 trainings in 139 technologies, providing services to over 8,400 entrepreneurs. Moreover, roughly 1,400 entrepreneurs had received assistance in obtaining loans at low interest rates for technology development. A key element of the programme is to provide computer training to local communities, and over 27,200 people have benefited from this feature. However, despite its successes, the programme has encountered certain obstacles. The provision of more up-to-date technologies, business management training, and ways for entrepreneurs to access capital (including raw materials and machinery) at concessionary rates are identified as critical needs. These would need to be implemented both at the local Vidatha Resource Centre level and the central level in order to ensure that innovation at the local level can be of a high quality, with the potential for better commercialization.

Source: Asha Gunawardena, Kanchana Wickramasinghe, and Nethmini Perera, 2010, "Assessment of Vidatha Technology Transfer Programme", a report prepared by the IPS for the Ministry of Technology and Research.

<sup>20</sup> Radwan, I., N. Kuruppu, and A. Wijesinha, 2008, *Building the Sri Lankan Economy*, World Bank, Washington D.C.

<sup>21</sup> DNP, 2006, *Mahinda Chinthana: A Ten Year Horizon Development Framework 2006-2016*, Ministry of Finance and Planning.

<sup>22</sup> Radwan, I., N. Kuruppu, and A. Wijesinha, 2008, *Building Sri Lanka's Knowledge Economy*, World Bank, Washington D.C.

<sup>23</sup> Ministry of Technology and Research, [www.most.gov.lk](http://www.most.gov.lk).

age between the activities of the Vidatha centres and private enterprises in the local area - i.e., if the innovation capabilities developed by these centres are in fact filtering in to entrepreneurship and product/service innovations - remains weak, for several reasons (Box 10.2). These linkages need to be strengthened to ensure that not only is access to such facilities made more widespread, and thus inclusive to a larger part of the population, but that they are effective conduits for research and innovation to be commercialized.

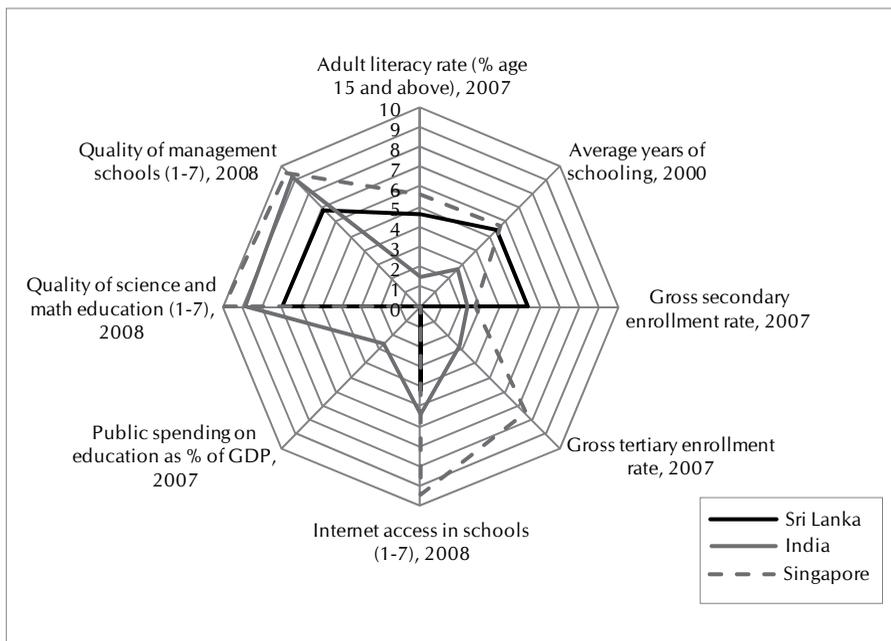
#### 10.4.4 Education and Skills

Developing the country's human resources is the key second element in developing a competitive and inclusive knowledge economy. It refers collectively to the education system and the level of vocational training in the country. Having a relatively high

adult literacy rate of 92 per cent, Sri Lanka is a forerunner among developing nations with regard to universal literacy. However, the quality and relevance of the education provided has not kept up with local and global changes and labour market requirements.

Nonetheless, World Bank KAM data show that the quality of education and skills infrastructure has improved in the recent past. Although the quality in education may have suffered slightly from 1995 to 2000, as suggested by the KAM index's decrease from 4.42 in 1995 to 4.31 in 2000, it seems to have improved over the following years, indicated by a score of 5.00 in 2009. Yet, when looking more closely at various indicators and when comparing to India and Singapore, it is evident that Sri Lanka performs poorly with respect to Internet ac-

**Figure 10.5**  
**Comparison of Education and Skills Infrastructure: Sri Lanka, India and Singapore**



Source: Compiled using data from World Bank Knowledge Assessment Methodology (KAM) database.

cess in schools, public spending on education, and gross tertiary enrolment, as shown in Figure 10.5. However, Sri Lanka excels in terms of gross secondary enrolment, surpassing both India and Singapore in this area.

Spatial disparities in education access and quality pose a considerable challenge to growing the knowledge-potential of the Sri Lankan economy in an inclusive manner. Available evidence suggests significant spatial disparities in access to education across districts in Sri Lanka, whereby educational opportunities, in terms of the availability of schools, human resources, and other facilities, are widely imbalanced across the country.<sup>24</sup> Physical resources in the Northern Province are not as widely available as those in other parts of the country. In particular, the districts of Mullaitivu, Mannar, and Vavuniya suffer a shortage of schools with Advanced Level (A/L) programmes. For instance, there is only one school with A/L science for over 400 sq. km. in Mullaitivu and Vavuniya, while Mannar has one for every 200 sq. km. This is in stark contrast to districts in other provinces. Colombo, which lies in the Western Province, enjoys a distribution of the same type of school for every 10 sq. km., while Kandy and Gampaha have one for approximately every 40 sq. km. and 25 sq. km., respectively.

Human resources is another area where spatial disparities are evident. The availability of qualified teachers (with graduate certificates or other types of training), is considerably disproportionate across different districts. Kilinochchi, Mannar, and Polonnaruwa have particularly low proportions of graduate trained teachers in relation to the total number of teachers available in the province, numbering 0.5 per cent, 0.6 per cent, and 1.3 per cent, respectively. On the other hand,

districts like Kurunegala, Colombo, and Kandy, with 11.2 per cent, 10.5 per cent, and 8.8 per cent respectively, enjoy relatively high proportions of such teachers.

A third area where access to education is disproportionate is accessibility to facilities like libraries, science laboratories, and computers. Over three-fourths of the total number of schools in Kilinochchi, Mannar, Mullaitivu, and Vavuniya do not have a library, not even a temporary reading room. However, many schools in Colombo and Gampaha enjoy such resources, with only 15 per cent and 26 per cent of schools in these respective districts having no access to libraries or reading rooms. The availability of science laboratories tells a similar story, with over 80 per cent of schools in Kilinochchi and Mullaitivu having no science labs whatsoever, while only 11 per cent of schools in Colombo and 20 per cent of schools in Gampaha suffer the same fate. Similarly, Kilinochchi and Mullaitivu have, on average, fewer than one computer per school, whereas Colombo has, on average, over six computers per school while Galle, Gampaha, Hambantota, Kalutara, Kandy, and Matara, have between two and three computers per school.

Specific education areas like computer literacy are also important indicators of the ability to strengthen Sri Lanka's knowledge economy potential. This needs to be developed along with expanding ICT infrastructure, to ensure that ICT development is inclusive for all to leverage upon. However, there are significant geographical disparities in computer literacy across the country. A survey conducted by the DCS, reveals that while computer literacy in 2009 was around 30 per cent in urban Sri Lanka, it was 19 per cent in rural areas and a low 8.5 per cent in

<sup>24</sup> Tilakaratna, G., A. Galappattige, R. Jayathilaka, and R. Perera, 2008, "Educational Opportunities for the Poor in Sri Lanka: Assessing Spatial Disparities", IPS.

estate areas (Figure 10.6). Across provinces too, significant disparities are prevalent, with all regions lagging well behind the Western Province (Figure 10.7). However, in both indicators, there is clear evidence of improvement between 2006/07 and 2009. The ICT

Agency's Nenasalas programme have gone some way in addressing the issue of computer literacy, by taking computer usage to rural areas through the network of these 'rural telecenters' (see Box 2).

**Box 10.4**  
**Sri Lanka's *Nenasalas***

The ICTA established the *Nenasala* project in order to "empower the population in rural areas of the country through affordable community access to information and communication technologies."<sup>25</sup> The term *Nenasala* roughly translates to 'wisdom outlet' in Sinhala. The project aims to establish 1,000 telecommunications centers in rural communities across the country. These centers are expected to provide:

- availability of affordable basic communication services (voice, fax, email and Internet access), office services (printing, copying, scanning) and community information in rural and disadvantaged areas.
- enhanced access and quality of social services (e.g., public services on-line, distance education).
- access to private sector and banking services on-line.
- e-Commerce, information on employment opportunities for improved entrepreneurship (e.g., through online technical assistance, and expanded input and output market networks).
- mobilization of local knowledge and support to local industry development.
- empowerment of target groups through community driven development.

As of October 2010, there were reportedly 629 centers that had been progressively established across Sri Lanka. An evaluation of the *Nenasala* commissioned by ICTA suggests that the majority of users had a positive opinion about the services offered at these telecenters and perceived them to be useful. Among those surveyed, roughly 60 per cent rate the services as 'very good', and on overall satisfaction, close to 40 per cent of users reported being 'highly satisfied'. However, an independent review is yet to be undertaken.

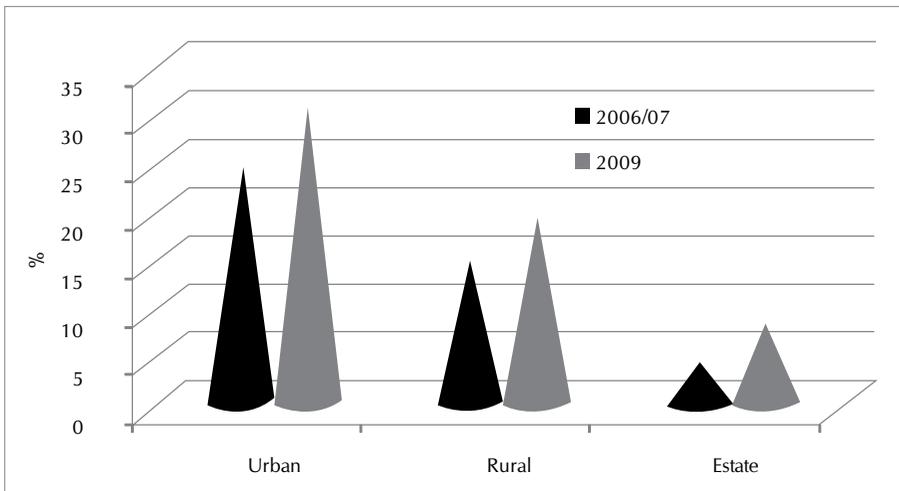
The majority of users of the *Nenasalas* are found to be young people, with three-fourths aged between 12-25 years. The *Nenasala* project has also seemingly succeeded in bridging the gender gap in the area of ICT, with 63 per cent of all users being female. Nonetheless, the sustained popularity and relevance of these telecenters remains to be seen. The same survey pointed out declining trends in both computer usage and number of users between May-July 2010, as well as a decreasing trend in total Internet hours from September 2009 to July 2010. Furthermore, the *Nenasalas* face the challenge of a lack of relevant content available to local communities. Much of the information provided is obtained from the internet, which is predominantly in English, and largely globalised. In order to stay relevant, these centers would need to ensure that more locally relevant information is also available to the users.

<sup>25</sup> ICTA, 2010, "Outcome Evaluation Report of *Nenasala* Project", a report prepared for ICTA by Skill International Private Limited.

Moreover, Sri Lanka spends a disproportionate amount (50 per cent) on secondary education from its total education budget.<sup>26</sup> This stands in stark contrast to the share of expenditure spent on primary, university, and technical levels, which were considerably less at 32, 14, and 3 per cent, respectively. The

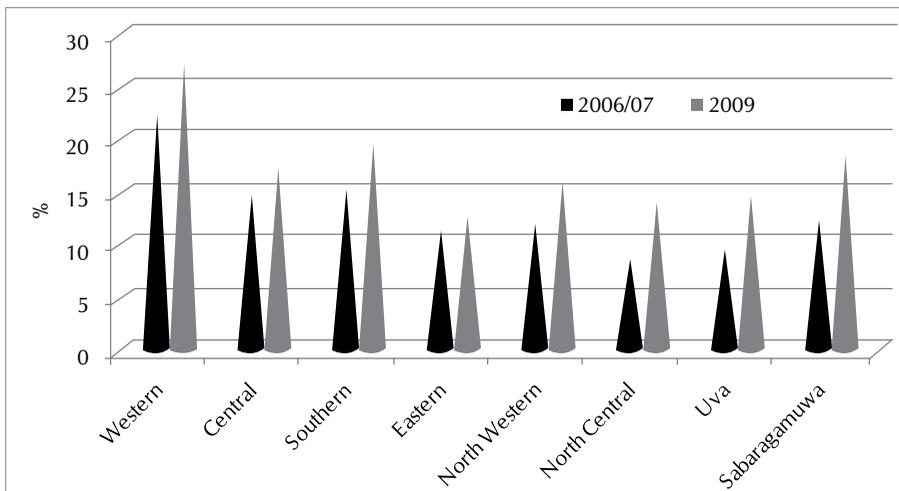
need to further develop the country's private sector university system and expand on the relationship between the tertiary education system and the private sector remains an important step in developing the nation's knowledge economy.

**Figure 10.6**  
**Computer Literacy in Sri Lanka across Urban, Rural and Estate Sectors**



Source: DCS, National Computer Literacy Survey.

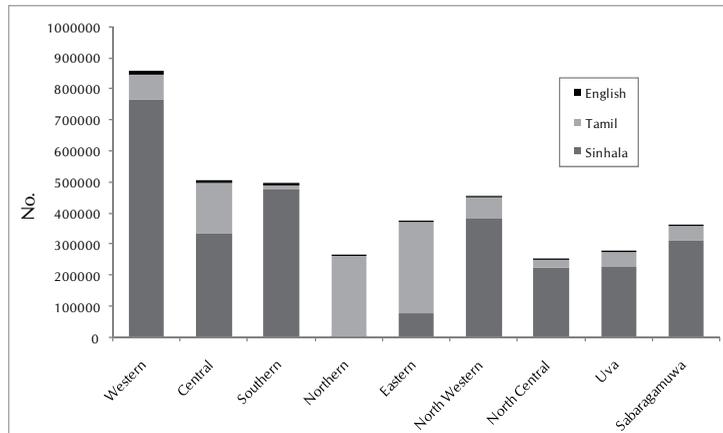
**Figure 10.7**  
**Computer Literacy in Sri Lanka across Provinces**



Source: DCS, National Computer Literacy Survey.

<sup>26</sup> World Bank, 2005, 'Treasures of the Education System in Sri Lanka', World Bank, Colombo.

**Figure 10.8**  
**Students by Medium of Study across Sri Lanka**



Source: Ministry of Education, *School Census 2006*.

As Sri Lanka is becoming increasingly integrated into a globalized society, the need for English language skills is becoming more apparent. However, the prevalence of English as a medium of study is low in all provinces, and markedly so in the Central, Northern, Eastern, North Central, Uva, and Sabaragamuwa Provinces (Figure 10.8). Yet, this might not entirely be an accurate indication of English language ability across the country, owing to the numerous privately administered English language classes seen to be available throughout much of the country, albeit mainly in urban and semi-urban areas.

### 10.5: Way Forward - Strong Institutional Framework

The preceding discussion aimed to demonstrate the key elements that determine the growth of a knowledge-based economy. Sri Lanka needs to take a comprehensive look at each of these elements and their constituents, to identify which gaps need addressing urgently in order to ensure that a competitive and inclusive knowledge economy can be fostered. To ensure coherent and concerted efforts in building the knowledge economy and becoming a knowledge hub, Sri Lankan policy makers should implement strategies that take a holistic approach.

Addressing all elements concurrently would be essential, owing to the strong inter-linkages between the elements highlighted earlier.

Setting up robust institutions to catalyze this would indeed be a vital step. For instance, setting up a Knowledge Commission, or a Knowledge Economy Task Force, could help drive these efforts at a national, strategic level, and ensure the aforementioned holistic and coherent approach is adopted. Some lessons could be drawn from a similar effort in India, where a National Knowledge Commission has been giving leadership to India's efforts at developing its knowledge economy since 2005 (Box 10.3). Such a body could comprise of representatives from the government, academia, and private sector, covering fields relevant to each of the elements that determine the growth of the knowledge economy. Such a Commission would need to be given leadership at the highest level, and tasked with making policy recommendations and developing appropriate strategies, as well as advising on driving the necessary sector-wise initiatives at the line ministry level.

The thrust to develop Sri Lanka as a knowledge hub has been clearly articulated in gov-

ernment policy documents. Thus, it is important for the government to develop and achieve these by setting concrete policy priorities for each of the knowledge economy determinants by bringing together all government and private sector bodies working on this sector. Such an action plan will pro-

vide necessary guidance to these bodies on what specific steps need to be taken, as well as provide a strong signal to investors willing to take up opportunities in investing in the gamut of knowledge-based enterprises - research and innovation centres, tertiary education and technical/vocational training

#### **Box 10.4** **India's National Knowledge Commission**

The National Knowledge Commission (NKC) of India is an advisory body tasked with providing policy analysis and recommendations to help develop India's potential as a knowledge society. It covers areas such as education, science and technology (S&T), and agriculture. Set up in June 2005, it reports to the Prime Minister (PM) and comprises six members. The tasks that the NKC carries out revolve around developing India's research and knowledge production capabilities. It aims to harness this knowledge to use in other areas of the economy, including agriculture, industry, and health care. The NKC aims to:

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge.
- Promote creation of knowledge in S&T laboratories.
- Improve the management of institutions engaged in intellectual property rights (IPRs).
- Promote knowledge applications in agriculture and industry.
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit.
- Expand the education system and use the country's IT infrastructure to improve governance and connectivity across the nation.

The NKC first identifies key issues and their relevant stakeholders, followed by consultations and workshops, discussions within the NKC prior to finalizing their recommendations to the PM, and then issuing a formal letter to the PM containing policy recommendations and financial impacts. It then seeks to disseminate its work using its website and its contact with state governments and members of civil society.

It has led many initiatives over a variety of different areas and has made its findings available through reports, presentations, newsletters, and newspaper articles. Its 'Report to the Nation 2006-2009', a compilation of previously published reports, highlights many of the recommendations the NKC has made over its three and a half year term. Covering topics such as IPRs, vocational education and training (VET), and entrepreneurship, the report addresses key areas through which the country can develop its knowledge economy.

Source: <http://www.knowledgecommission.gov.in/default.asp>.

institutes, IT-enabled service providers, and science and technology related ventures like nanotechnology, biotechnology, and high-tech manufacturing. A policy mix of a specialized high-level advisory body, and recommendations via an expert task force representing all relevant stakeholders, com-

bined with a comprehensive and specific government action plan, as well as buy-in from key government ministries and agencies as well as private sector players, will ensure that Sri Lanka emerges as a competitive and inclusive knowledge economy in the country's new era of post-conflict growth.