

# Skills development strategies and the high road to development in the Republic of Korea\*

## 7

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### 7.1 Introduction

For more than four decades, since the early 1970s, the Republic of Korea has sustained strong and equitable economic growth. Increased productivity facilitated not only high rates of economic growth but also concomitant growth in wages and employment, which contributed to declining inequality. Skills development has been at the heart of this “high road” to development, which prioritizes “growth with equity” or “shared growth”. Education and training has been the cause and consequence of high rates of growth, rapid technological change, the opening of the economy and more equal income distribution, resulting in a virtuous circle of rapid catching up.

Government policies on education and training, pursued in harmony with other economic and social policies, helped substantially in establishing and maintaining such dynamic processes. In other words, education and training policies were closely coordinated with industrial policy; without integrating the skills development strategy into its industrial development strategy, it would have been difficult for the country to sustain this model of development over so long a period.

However, with rapid changes in the economic environment, this equilibrium came under increasing pressure, both internal and external. The Asian financial crisis of 1997 gave further impetus to economic opening and technological change, but also increased social and economic inequality. Since then, the

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\* This chapter is a revised version of a background paper prepared for an ILO report.

government's role in the national economy, in respect to both skills development and industrial policies, has diminished. The challenge facing the economy in the twenty-first century is how to develop institutions and policies that enable it to respond flexibly to an environment characterized by further economic opening and technological change, while also restoring the "shared growth" conducive to both prosperity and equity by creating new education and skills development policies for the country.

This chapter sets out to review Korea's experience in education and skills development over the past four decades with the aim of understanding how government policies and institutions coordinated these policies with industrial policy. In other words, it explores what Nübler calls "collective capabilities" for catching up and industrial development (see Chapter 4 in this volume).

The chapter is structured as follows: Section 7.2 reviews Korea's rapid economic development and its welfare outcomes since the 1960s and explores the central role played by education and training in this process. Section 7.3 reviews the role of policy-makers and institutions in aligning and coordinating policies regarding education, research and development (R&D) and industrial development. Section 7.4 discusses challenges in the education and training system that the country faces as it moves into the innovation phase of economic development and into the knowledge economy. Section 7.5 presents lessons learned and conclusions.

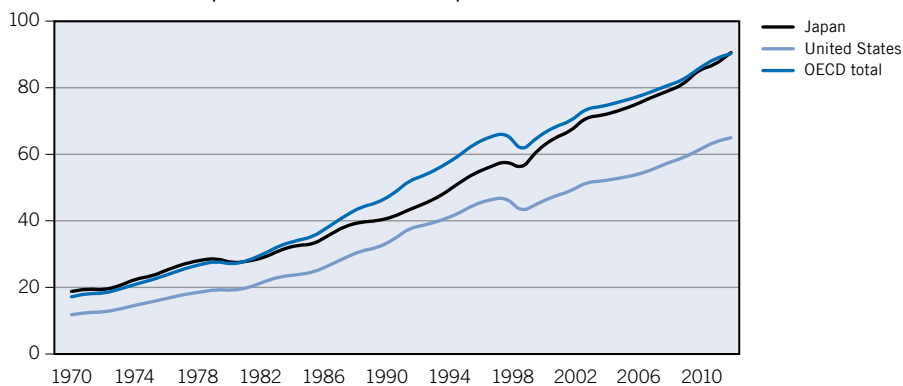
## 7.2 Economic development and skills development

### *7.2.1 The high road to development: Up to the crisis of 1997 and beyond*

The economic achievement of the Republic of Korea over the past four decades is considered one of the success stories of the global economy. Over this period the country has sustained growth rates of over 7 per cent, as a result of which per capita income has risen from just 17.2 per cent of the OECD average and 11.8 per cent of the US level in 1970 to over 90 per cent of the OECD average in 2010 (figure 7.1). This remarkable "catching-up" process continued even after the financial crisis of 1997.

This fast growth in the Republic of Korea was driven by productivity growth, which had long outstripped the labour productivity growth rates of the developed world (see figure 7.2): between 1992 and 2002 the country's output grew by an average of 5.6 per cent a year, well above those observed in the OECD area.

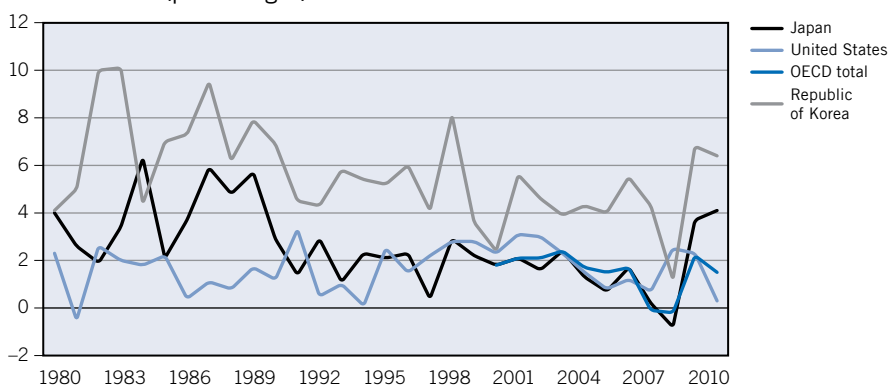
Figure 7.1 GDP per capita relative to OECD, Japan and the United States  
(Republic of Korea = 100 per cent)



Note: GDP in current prices and purchasing power parity.

Source: Author's calculations, based on data from the OECD STAN Database.

Figure 7.2 Growth rate of labour productivity, 1980–2010  
(percentages)

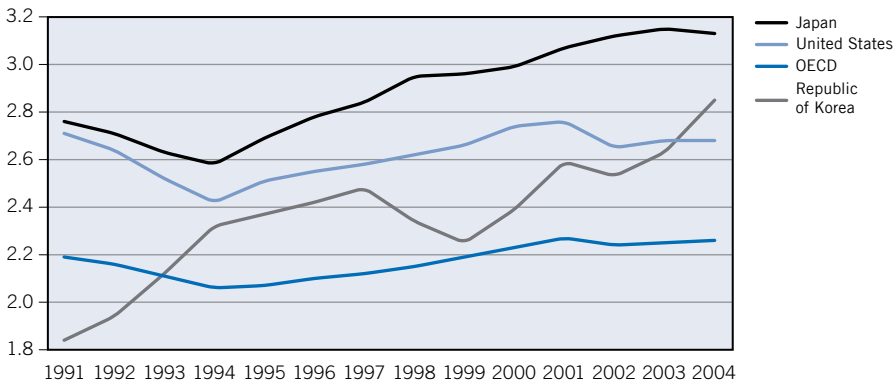


Source: Author's calculations, based on data from the OECD STAN Database.

The most important component of this growth was the increase in labour productivity at an annual rate of 4.3 per cent, double the OECD average (OECD, 2004).

This closing productivity gap reflects the country's success in moving beyond an industrial structure based on low-wage, labour-intensive industries to one based on capital- and R&D-intensive sectors. This process of structural transformation began in the mid-1970s with the creation of heavy and chemical industries through targeted industrial policies. From the early 1980s it moved on to knowledge-based industries with R&D strategies based on catching up through reverse engineering and duplicative imitation (*ibid.*, 2005). Investment in R&D

Figure 7.3 Ratio of R&D to GDP, Republic of Korea, Japan, United States and OECD, 1991–2004 (percentages)



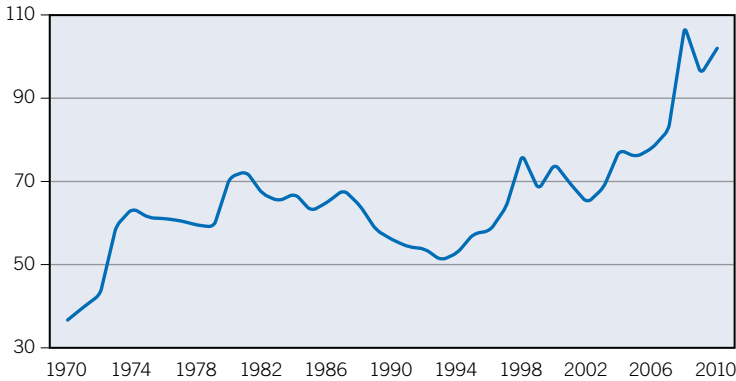
Source: Author’s calculations, based on data from the OECD STAN Database.

has increased markedly since the mid-1980s: the ratio of R&D to GDP rose from 1.84 per cent in 1990 to 2.85 per cent in 2005 and has surpassed that of the OECD since 1993 and the United States since 2003, even though the absolute volume of R&D is still low (figure 7.3).

It is well known that the Republic of Korea began the process of industrialization in the mid-1960s with an outward-oriented and export-driven strategy. At an early stage of the country’s development, the government had adopted export-oriented growth policies with the slogan of “nation building through exports”. Up to the 1997 crisis, the opening up of the national economy was carefully controlled by the government, and between 1975 and 1997 the share of GDP attributable to trade remained relatively stable. However, it increased very rapidly after the crisis (figure 7.4), as the reduction in financial regulations and trade barriers accelerated the opening of the economy to the international market. Lately, too, Korea’s strengths in technology-intensive sectors have boosted the importance of international trade in its economy.

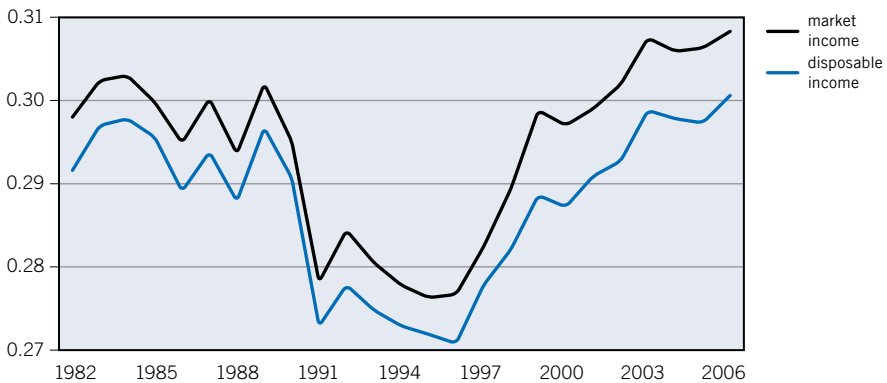
Alongside high productivity and output growth fostered by trade, the high road to development prioritizes “growth with equity”, or “shared growth”. This phenomenon in East Asian economies has been widely recognized, for example by the World Bank (1993) and by Campos and Root (1996). Before the 1997 crisis, reductions in both inequality and poverty accompanied rapid growth in the Republic of Korea. Income inequality, as indicated by the Gini coefficient, started to decline from the mid-1970s (Jomo, 2006; OECD, 1994) and continued to fall in the years leading up to the 1997 crisis (figure 7.5). As growth increased, so did employment and wages: the employment rate (ratio of those in employment

Figure 7.4 Ratio of trade to GDP, 1970–2010 (percentage)



Source: Author's calculations, based on data from the OECD STAN Database.

Figure 7.5 Trends in the Gini coefficient, 1982–2007



Source: Calculations by Roh Dae-Myung (Korea Institute for Health and Social Affairs), based on the Republic of Korea National Statistical Office, Household Income and Expenditure Survey.

to total labour force) has risen consistently even with high labour productivity growth, and real wages have also risen, albeit more slowly than productivity.

After the 1997 crisis, however, the Republic of Korea was required by the International Monetary Fund to open its economy to global product and capital markets. Combined with government investment in technology-intensive sectors, this resulted in a reduced potential for job creation. Inequality increased markedly, and the employment rate stagnated. The country thus found itself facing an urgent need to find ways to sustain productivity growth while at the same time creating jobs and reducing inequality and poverty – a combination of goals that represented a challenge to both industrial policies and the skills development system.

### *7.2.2 Growth with equity under pressure: The key role of education and training*

Investment in skills development was crucial to Korea's success in achieving sustained high economic growth rates while maintaining equity; it would not have been possible without the expansion of education and training opportunities. As Green et al. (1999) put it, the economic "miracle" has been accompanied by an education "miracle". Just as the country has conjured up an industrialized economy in the space of a generation, so it had constructed a complete apparatus of schools, polytechnics and universities, together with a network of public and private training centres.

Formal education was organized specifically to serve the needs of the economy by providing an increasingly highly skilled workforce. The subsequent expansion of the skills base has made possible Korea's rapid economic development. Nübler (2013 and forthcoming) argues that it is crucial to increase the diversity, variety and complexity of the knowledge structure in the labour force, and transform and enrich the specific mix of knowledge. Development of strong middle educational attainment structures has shown to be critical for enhancing the options for the development of manufacturing and broadening the scope for industrial development.

This chapter shows that the Republic of Korea has achieved a fast expansion and fundamental transformation of the national skills and knowledge base through formal education. The average length of time spent in education, across all age groups of the population, has increased from 7.6 years in 1980 to 11.6 years in 2010. For the cohort age 20–29, the corresponding increase is from 9.9 years in 1980 to 14.1 years in 2010 (table 7.1).

As shown below, the expansion of education was carried out very rapidly and was closely coordinated with the industrial development strategy. As a result, there were no major, protracted episodes of skills shortages despite sustained periods of unprecedented growth. This confirms the capability framework developed by Nübler, which holds that transformation of the knowledge structure in the labour force needs to precede structural transformation in the economy, as it determines the options and space for diversification into new industries.

The resources for this expansion of education were supplied by the population as well as by the government. Korea spent 7.6 per cent of GDP on educational institutions at all levels in 2008, well above the OECD average of 5.9 per cent, and the second highest proportion among OECD countries after Iceland (OECD, 2011). Although public expenditure on education as a proportion of GDP (4.7 per cent) is slightly below the OECD average (5.0 per cent), private spending on education is the highest in the OECD, at 2.8 per cent in 2008. Sustained high

Table 7.1 Average years of educational attainment by age group

	All ages	6–19	20–29	30–39	40–49	50+
1980	7.6	6.5	9.9	9.2	7.5	4.2
1985	8.6	6.7	11.0	10.1	8.5	4.6
1990	9.5	7.7	12.0	11.1	9.5	5.5
1995	10.3	7.0	12.7	12.1	10.5	6.3
2000	10.6	5.7	13.1	12.8	11.2	7.2
2005	11.2	4.2	13.8	13.6	12.3	8.2
2010	11.6	4.8	14.1	14.0	13.0	9.1

Source: Republic of Korea National Statistical Office, Population Census.

growth rates, rapid changes in technology, high rates of job creation, increases in real wages and more equal distribution of incomes have all acted as incentives to the private sector to invest in education and assume much of its cost.

At the same time, rapid change in Korea's economy, affecting export trends and industrial and employment structures, opened up a wide range of new job opportunities; the more highly educated were in a better position to take advantage of them, thus intensifying the demand for education (J.W. Lee, 2001). The outward-oriented development strategy also contributed to the expansion of the skills base. Larger and more competitive markets boosted the demand for skilled workers and for demand-led expansion of training. At the same time, they enhanced prospects for using education and skills, providing the population with incentives to obtain even more education. As a result, a virtuous cycle was created in which education and growth reinforced each other.

Furthermore, a more equal distribution of income contributed substantially to the expansion of the skills base, increasing both access to and desire for higher education as the sole means of improving one's social status. The Republic of Korea vastly reduced educational inequality between 1970 and 1995. In 1970 its Gini coefficient of education was higher than Brazil's, at 0.439, but by 1995 it had declined dramatically to 0.189, the lowest among the group of 12 developing countries examined by Lopez, Thomas and Wang (1998).

However, since the mid-1990s the picture has changed. The educational base has continued to expand, with increasing rates of entry into higher education, but inequalities have become more pronounced. In 2011 high-income households, with incomes exceeding 6 million Korean won (KRW) per month, spent 11.7 times as much on education as low-income households with monthly incomes of KRW 1 million or less. In 1993 the corresponding multiple was only 5.5 (Cheon et al., 2013). This widening discrepancy may reflect increasing expenditure on

private education. Korean universities and colleges are comprehensively ranked by the scores that students achieve in their entrance examinations, and heightened competition has prompted many families to spend considerable sums on tutoring and private education. The result is that expansion of education is now increasing inequality and maintaining divisions of social status across generations rather than reducing inequality and increasing social mobility, as was originally intended. This growing inequality in education and income has developed alongside the wholesale opening of the economy to global markets beyond the reach of government regulation, continuing technological change and the weakening of industrial policies.

### **7.3 Government policy on education and training**

The following section reviews Korean government policy on education and training in the era of industrialization (1965–95) and in particular the new focus on higher education policy and R&D policy.

#### *7.3.1 Education and training policies in the era of industrialization*

A low level of public expenditure on education does not mean that government policy is of little significance to skills development. Education and training policies in the Republic of Korea have played a prominent role not only in expanding the country's skills base in order to enhance the options for industrial development, but also in managing labour supply and demand and in upgrading skill levels according to the demand of industries. During the industrialization stage (1965–95), skills development in Korea was led by the government and complemented by the private sector. During this period the emphasis was on general and formal education, and the main features of government policy in this area may be summarized as follows:

First, education and training policies were closely linked to the nation's development goals. When decisions were made about the provision of education and training, the needs of the economy took precedence over those of other interested parties, for example, the education profession, government ministries, even parents (Ashton et al., 1999). What this meant in practice was that education and training expanded sequentially, the government implementing a series of policies that would transform the knowledge base of the labour force to prepare it for



the planned diversification patterns and to respond to the changing demands for skills when these industries were established.

The Republic of Korea established universal primary education in 1960, before industrialization took off later in the same decade. Middle-school education became universal around 1985, and high-school education some 15 years later, in the late 1990s, although education at high-school level is still not free of charge. The major shift in economic policy in the 1970s, the government-initiated emphasis on heavy engineering and chemical industries, was reflected in an expansion of technical and vocational courses in secondary and higher education and the introduction of a vocational training system. Higher education moved from an elite to a mass basis during the 1980s, before the knowledge-based economy gained full momentum.<sup>1</sup> A new development in the 1990s was the expansion in graduate programmes (J. Lee, 2002), with the number of doctoral degrees conferred per 10,000 persons increasing from 0.6 in 1990 to 1.9 in 2006. In the twenty-first century, the government's decisions on the allocation of funding to human resources development policies are still based on supply and demand forecasts for the strategically important sectors of the national economy. In the terms developed by Nübler (in this volume), forward-looking education policy is broadening, enriching and diversifying the knowledge structure in the labour force and thus widening the option space for domestic firms to shift into new industries and economic activities – and to drive structural transformation according to the national development plans.

Notwithstanding some problems and periodic episodes of imbalance, this forward-looking strategy, in which education and skills strategies have been closely coordinated with industrial policy, has over the past decades continuously expanded the options for productive transformation and upgrading the country's economic structure. It remains a readily available tool for ensuring the supply of those skills required in the existing sectors. Moreover, the sequential expansion of education contributed to enhancing equity by allowing the phased integration of all sectors of society into the modern structure of the polity and facilitating access to the fruits of economic growth.

The education system created the preconditions for successful training at the enterprise level, making it possible for the training system to respond rapidly to the demand for skills required to increase economic productivity (Guarini, Molini and Rabellotti, 2006). With rising demand for more highly qualified workers, fuelled by both economic development and structural changes in the

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<sup>1</sup> The threshold of mass higher education is defined as the point at which 15 per cent of the age cohort enter some form of higher education (Trow, 1973). This level was reached in 1982 in the Republic of Korea, although the most pronounced expansion of higher education came later.

economy as different sectors became more prominent, the number of workers trained in-house grew from less than 100,000 in the mid-1970s to nearly 2 million in the mid-2000s.

Second, while the skills development system was for the most part government-led, this leadership was complemented by private sector activity. The government had to ensure that the education and training system would serve the goal of providing a skilled labour force for the economy (Ashton, Sung and Turbin, 2000). To this end, it exercised tight control over the education and training sectors, ensuring that provision was made, through the use of public funds if necessary, to produce enough technically qualified personnel to sustain a high economic growth rate. This was achieved by channelling young people into vocational schools through various policy measures.

Despite this high level of government control over the education and vocational training system, the private sector has played a prominent role in the actual provision of services. The government, always operating under the constraint of a budget biased towards economic development, relied heavily on the private sector to expand the country's educational base.<sup>2</sup> While the public sector has played an especially important role in elementary and secondary education, private funding has borne much of the cost of providing education beyond the basic level; in particular, a substantial proportion of higher education has been provided by the private sector. The private sector's share of educational spending remained high in 2005, at around 40 per cent of the total. The proportion of students in private sector institutions at this point was almost 100 per cent at junior college level,<sup>3</sup> 80 per cent in universities, and 50 per cent in high schools. Even so, the private sector both receives resources from the government – in the form of tax exemptions, subsidies (for capital developments, scholarships and the teachers' pension fund) and loans – and remains under its control.

This combination of public and private sector provision produced good results during the industrialization era (up to 1995). As J. Lee (2002) has argued, private and public sector efforts have been complementary, and together have undoubtedly contributed to improvements in productivity and thus to faster economic growth.

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<sup>2</sup> Geiger (1988) describes the Republic of Korea as exemplifying a “mass private and restricted public sector” model, in contrast to “parallel public and private sectors” in the United States and “comprehensive public and peripheral private sectors” in the European Union.

<sup>3</sup> “Junior college” in the Republic of Korea is a two-year course corresponding to “community college” in the United States.

### 7.3.2 Higher education: From control to boom

The role of higher education in the Republic of Korea has been closely tied to the needs of the economy and closely regulated by the government. The sector was consequently suppressed during the early industrialization phase, expanding rapidly only from the early 1980s onwards. The main instrument of government intervention in higher education prior to 1981 was an “enrolment quota” system, whereby the government decreed how many students each college was to admit each year. These enrolment quotas were selectively expanded in line with the manpower requirements dictated by industrial policy, which were particularly concentrated in the fields of natural science and engineering.

From the early 1980s onwards, the government began to place more emphasis on R&D and started to promote knowledge-based industries. In addition to growing demand for high skills in the economy, a large and growing pool of secondary school graduates keen to move on to higher education also created demand for an extension of higher education; without considerable expansion of supply, many of those qualified and wishing to go on to the tertiary level would not have been able to do so, to the disappointment and frustration of pupils and parents alike (J.W. Lee, 2001).

Two policy changes gave extra impetus to higher education: the replacement of the simple enrolment quota system with a “graduate quota” system in 1981<sup>4</sup> and the liberalization of laws regulating the establishment and size of universities in the education reform of 1995. With these policy changes, higher education became less demand-led and more supply-driven. There followed a boom in private provision and marketization of higher education (Kim and Lee, 2006).

As the graduate quota system was abandoned in 1987, by the turn of the century Korea produced a higher proportion of engineering and science graduates than almost any other country in the world, and the level remains high even though it has fallen somewhat since the early 2000s. These two policy changes represented a departure from the tightly controlled and demand-oriented system of higher education that had prevailed up to this point. They were intended to increase the quality of higher education by introducing a market mechanism with an element of competition among universities and among students. It is true that the subsequent expansion of higher education contributed to the development since the 1990s of the knowledge-based economy and high-technology industries, especially in the information technology (IT) sector. While this supply-oriented expansion of the knowledge base was intended to create the options for developing those industries targeted by industrial policies, the approach has resulted

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<sup>4</sup> Under this system, new entrants may be admitted up to 1.5 times the number of graduates.

in problems in the new phase of economic development, in which government no longer targets industries. Problems relate in particular to over-supply, low quality and mismatch with labour market demands, as discussed further below.

### *7.3.3 R&D: Beyond the skilled workforce*

As the economy moves into a higher stage of development, the creation of knowledge and its transfer to industries becomes more important. In many countries universities perform this R&D function. In the Republic of Korea, however, the universities were focused on teaching and training students to generate a skilled workforce, while R&D was undertaken by government-sponsored research institutes (GRIs) established to undertake mission-oriented research for the government and for industry. The university's primary function in respect of industry was to supply trained personnel, not to transfer technology and knowledge.

Korea's original model for R&D has been characterized as one of innovation through catching up, focused on reverse engineering and duplicative imitation (OECD, 2005). Technological development was achieved by combining the import of technology from abroad with indigenous R&D efforts carried out by GRIs and by firms. During the 1960s and 1970s, when the strategic focus was on creating heavy and chemical industries, innovation was neglected, and the GRIs' role lay in assisting firms in acquiring, importing and absorbing foreign technologies. They also functioned as gatekeepers between government and industry, communicating the government's technology plan to firms, providing technological information deemed crucial to industry's needs, implementing R&D pilot programmes and transferring imported technologies to the private sector (Sohn and Kenney, 2007). Also, Korean scientists and engineers working in the United States were actively recruited.

In the 1980s the locus of R&D work and innovation began to shift from GRIs to private firms. In 1982 the National R&D Programme was established with the aim of localizing technology by helping firms to adapt foreign technology through their own R&D efforts. The number of firms with R&D centres increased from 54 in 1980 to 2,226 in 1995. In the Republic of Korea, therefore, "technology transfer" does not refer to the flow of knowledge from the universities to industry, but rather to the importation of technologies from other countries, such as the United States and Japan (*ibid.*).

The downside of this "catch-up" model was the weakness of the universities' role in R&D. Although Korean universities have highly qualified faculty trained in global-standard research, their mission has long been confined to teaching,

with no encouragement to pursue R&D. While the number of professors in science and engineering has increased from a combined figure of 1,230 in 1980 to 6,268 in science and 14,092 in engineering in 2001, around 80 per cent of the total government R&D budget for that period went to GRIs, with only 20 per cent allocated to universities.

In other words, the Republic of Korea has developed institutions with different levels of “collective competences”. Nübler (in this volume) argues that “smart” institutions reflect collective competences or collective capabilities that support the high performance of productive transformation dynamics and processes. The analysis shows that Korea had developed high competences in the area of teaching at university level and of facilitating transfer and adoption of advanced technologies, but it has failed to develop high capabilities to further develop technologies – a shortcoming reflected in an excessive concentration of R&D spending in a small number of firms and very weak links between business, universities and GRIs.

At the end of the 1980s, new policies were introduced to address this issue and to shift emphasis to university research as a lever for economic development. Universities received government funds to set up science research centres, engineering research centres and regional research centres. In 1997 six “technology parks” were established to provide space for new enterprises (within two to three years of start-up). In 1998 the Special Entrepreneurship Act was passed with the aim of fostering high-technology entrepreneurship by facilitating technology transfer from university to industry and defining how patent applications would be handled.

#### **7.4 New challenges call for new responses**

Hitherto the Korean economy has been catching up with the advanced economies by borrowing and incrementally improving foreign technologies, products and processes. Today, however, imitation will no longer suffice: the urgent task now facing the country is to transform itself into an innovator at the leading edge of technology. To do this it will need a system to develop the skills and innovative capabilities at its disposal at new and higher levels.

Moreover, the experience and aftermath of the 1997 financial crisis changed the nature of the country’s economy, and the skills development system has not adjusted well to the new circumstances of a market-oriented economy fully exposed to the global marketplace and more heavily dependent on trade. This new environment, along with increasing investment in and consumption of IT, has changed the structure of the demand for skills and increased labour market flexibility.

Finally, some features of the old skills development system that were once part of Korea's success have now become part of the problem. For example, the policy of expanding the educational base by transferring the burden of financial support from the government to students and their families, taking advantage of the social demand for education and making use of the private sector, while successful in opening up education to the mass of the population, has lately resulted in lower quality of education and increasing inequality of access.

### 7.4.1 Identifying the challenges

#### 7.4.1.1 Quantitative expansion but qualitative decline

The Republic of Korea has successfully expanded its skills base by mobilizing the private sector and making efficient use of public resources. However, this route to skills development has given rise to a problem in the widening gap between the increasing numbers enrolling in private educational institutions and the limited resources available to maintain their quality.

Hayhoe (1995) argues that the country's experience illustrates the difficulty of maintaining reasonable academic standards in private institutions, the tendency for these institutions to have low prestige, and the inequities inherent in a situation in which less advantaged students pay a relatively high price for poorer quality education. The quality problem is most serious in the higher education sector, where quantitative growth has not been matched by qualitative improvement.<sup>5</sup> Concerns have recently arisen about labour shortages in the areas of science and engineering, not in terms of quantity, but of quality. Students' scores on the Academic Ability Test in these subjects are declining.

The decline in the quality of education is a reflection of spending priorities. Although total expenditure on education in Korea is high, as noted above, in 2008 spending per student at the tertiary level was well below the OECD average (OECD, 2011). Government expenditure on higher education amounted to less than US\$1,000 (at PPP exchange rates), compared with an OECD average of around US\$8,000. User charges, amounting to 84 per cent of total higher education costs, are the highest in the OECD, while the level of public subsidies, such as scholarships, grants, student loans, transfers and other payments, is the lowest. This reflects the low level of public funding of higher education generally.

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<sup>5</sup> Only three Korean universities were listed in the 2005 survey of 200 top universities published by the (London) *Times Higher Education* (*THE* and *QS*, 2005), while in the same year the *IMD World Competitiveness Yearbook* ranked the Republic of Korea 52nd of 60 countries in terms of how well their university education met the needs of a competitive economy (IMD, 2005).

More serious is the low quality of junior colleges – almost entirely privately funded and run – which are performing the role of vocational and technical education formerly discharged by the vocational high schools. Labour market outcomes for junior college graduates are now almost the same as those for high-school graduates.

The intense competition for places in prestigious universities has a negative impact on the quality of secondary education, with many students going through “examination hell” at the expense of creativity and variety in their secondary education. More and more parents are sending their children to study abroad in order to avoid the extreme competition for college entrance at home.

#### 7.4.1.2 Mismatch between skills supply and demand

The Republic of Korea has not experienced pronounced or persistent labour shortages or surpluses over the last four decades. It is becoming clear, however, that the increase in the number of college graduates has outpaced the growth of corresponding labour demand. The supply-oriented expansion of educational provision, together with the weakening of demand-driven policies linked to industrial policies, has resulted in increasingly poor labour market prospects for young people.

In the past, rapid economic growth kept pace with rapid educational expansion, so that the country avoided the persistent graduate unemployment that has plagued other developing economies such as those of the Philippines and India (Hayhoe, 1995). The slower growth in the years following the 1997 crisis, however, exposed the problems arising from supply-driven expansion of higher education, with poor labour market outcomes for graduates and a mismatch of skills, workers at both low- and high-skill levels in short supply, and the middle level over-supplied. This mismatch is now considered to be the most important factor in youth unemployment, reflecting the failure of higher education to adapt properly to changes in skill demands and to engage in effective skills development (Yoon and Lee, 2007). The curricula at higher education institutions are too academically oriented, and links are lacking between colleges and the business world. The knock-on effects in the form of increased costs of in-firm training have inevitably led to a loss of competitiveness at the firm level.

These problems cannot be solved by a return to the government-led education and training policies under which industrial development strategies aligned *ex ante* education with industrial policies. The government has abandoned such industrial strategies, and in any case such an approach is less likely to succeed in current conditions, owing to lack of information about rapidly changing skill demands. For example, in the early 2000s the government decided to promote the supply

of IT skills, only to find that it had created an over-supply of medium-skilled labour. The solution will have to be found instead in strengthening cooperation and networking between industry and educational institutions and intensifying the public sector's capacity to gather relevant information and transmit it both to students and to educational and training institutions.

#### 7.4.1.3 Imbalance between formal education and lifelong learning

With the major role in skills development allocated to formal and general education, Korea's investment in human capital after entry into the labour market is very low. Central government expenditure on lifelong learning is only 0.1 per cent of GDP, while public expenditure alone (excluding all funding from private sources) on formal education reached 4.7 per cent of GDP in 2008. Participation in lifelong learning is correspondingly low, at around 20 per cent of the population.

The country's current skills development system is characterized by academically oriented education in schools for the younger generation and limited training in firms for the employed. Even though the volume of in-firm training has expanded since 1996, the propensity of firms to invest in training is decreasing. Spending on training fell from 2.1 per cent of total labour costs in 1996 to 1.5 per cent in 2003 – well below the EU's 1999 average of 2.3 per cent. For small and medium-sized enterprises (SMEs), it is only 0.5 per cent. Today, firms in the Republic of Korea prefer to recruit skilled workers rather than produce their own, and workers themselves hesitate to invest in training in an increasingly flexible labour market.

If workers are to have more adaptability to enable them to cope better with the increasing risks posed by globalization, technological innovation and an ageing population, they need to be provided with broad and portable skills over their entire working life. Pressure on the public sector to provide training outside the context of the firm is already increasing.

#### 7.4.1.4 Inequality

The provision of educational opportunity equally to all citizens regardless of sex, age or regional background has contributed to a reduction in poverty and social inequality and an increase in upward mobility (J. Lee, 2002). However, concern is now growing about whether education and training are still having these beneficial effects.

First, the inadequacy of the secondary education system, the falling quality of schools and excessive competition for places at prestigious universities have all led increasing numbers of students and parents to resort to private tutoring, the cost



of which is rising rapidly. This appears to be the key education-related factor in growing social inequality (*ibid.*).

Second, a widening “training gap” is opening up between regular workers in large firms and workers in SMEs, irregular workers and female workers, all of whom are at a relative disadvantage. In 2005 only 9.9 per cent of employees in SMEs participated in the Vocation and Ability Development Programme (VADP), as opposed to 87.0 per cent of employees in large firms. In 2003, when 14.8 per cent of regular workers had had some training over the previous 12 months, the corresponding rate for irregular workers was only 2.3 per cent (author’s calculations, based on KLI, 2003).

To restore growth with equity and put the country back on the high road to development, new policy programmes will need to be constructed to ensure more investment in public secondary education, a more effective student loan programme, and more training opportunities for relatively disadvantaged groups of workers.

#### *7.4.2 Change and reform: the government’s response*

The government’s efforts to address the problems associated with the old skills development system and respond creatively to the transition to a knowledge-based economy, began in 1995 with the work of the Presidential Commission on Educational Reform and the incorporation of vocational training provision into the employment insurance system. Although the reforms promoted by the Commission were based on demand-oriented and market-based concepts of education and training, they were not sufficient to solve the problems. Recent government education and training policies, while building on earlier reform ideas emphasizing competition and response to demand, put more stress on networks and social partnership between stakeholders. In other words, new collective capabilities need to become embodied in “smart” institutions and procedures. These will include the ability to coordinate and align evolving knowledge structures in the labour force in order to create options needed for the development of newly targeted industries and technologies (Nübler, forthcoming). It will also be important to ensure that institutions are equipped to supply the skills needed to maintain high productivity in existing industries.

##### 7.4.2.1 National human resource development as a core strategy

In 2001 the government of the Republic of Korea added human resources development (HRD) to the remit of the Ministry of Education (MOE), renamed the

expanded ministry MOE&HRD, and promoted its head to deputy prime minister with responsibility for overseeing and coordinating all major policy initiatives related to human resources development. This was a significant step both symbolically, in identifying human resource development as a core strategy for national development, and practically, in creating a central agency for HRD policies that had previously been dispersed among several ministries, enabling such policies to be reviewed and coordinated at the national level with a long-term perspective.

The pursuit of HRD policies on a national scale required the creation of a framework and support system, including a medium- to long-term human resources development vision, implementation strategies, and organizations to implement HRD policies within each ministry. To this end, in 2001 the government set up the Ministerial Commission on HRD, composed of 14 ministers, and passed the Basic Law on HRD in 2002. A range of instruments were devised to help the MOE&HRD and the Commission to coordinate HRD policies; these included a policy evaluation scheme, HRD policy indicators, manpower projections, investment analysis and budget allocation schemes.

The policy coordination established by the MOE&HRD and the Commission resulted in several key documents, including the Comprehensive Plan for Activating Industry–Academia Cooperation, the Comprehensive Plan for Raising Human Resources in Areas of National Strategic Sectors (2003), the Basic Plans for HRD (2001, 2006) and the Medium- to Long-Term Demand and Supply Outlook for National Human Resources (2002).

#### 7.4.2.2 Development of core human resources in the nation's strategic sectors

Traditional industrial policies, characterized by a sector-targeting and sequenced approach to industrial development, have lost much of their earlier importance. Nevertheless, there is still opportunity to pursue industrial policies in the sense of fostering strategically important sectors through subsidizing R&D and HRD and to develop a labour force that has the right mix of knowledge to support economic growth and the creation of jobs.

The so-called “6T Project”, including IT and BT (biotechnology), which became the Next-Generation Growth Engine Industries Project in 2003, is expected to play a key role in Korea's development by creating high value added sectors in an economy with an increasing need for sophisticated knowledge and information. What distinguishes the new industrial project from the old industrial policies is its focus on human resources as a source of competitiveness in the

world market in the knowledge-based international economy of the twenty-first century. The government recognizes that high-quality human resources are essential for an economy seeking to leap into the ranks of the leading nations and to create and sustain a new impetus for continuous national growth. Comprehensive Human Resource Development Plans in the Next-Generation Growth Engine Industries and Six National Strategic Areas are currently being implemented.

While it is difficult to “pick winners” and thus identify the skills required for the next generation of industries, the government is aiming to identify the qualities that will be required by those who work in leading-edge sectors. For example, the MOE&HRD, together with the Ministry of Commerce, Industry and Energy and the Ministry of Information and Communication, formulated the High-Value-Added Manpower Nurturing Programme, which supports universities providing practical education programmes to meet the needs of industry in respect of work on next-generation semiconductor, telecommunications and display devices. The government has stipulated that universities should deliver workers who are equipped with skills closely tailored to national strategic industries and that graduates should be able to move straight into employment, without further in-firm training.

The key factors in the success of these policies are coordination between government agencies and cooperation between industry and academia. These are the core aims behind the creation of the MOE&HRD and the HRD Commission.

#### 7.4.2.3 Reform of higher education

In a knowledge-based economy, continued development requires a high quality of higher education. Accordingly, the government seeks to raise the country's universities to a level where they can compete with the best in the world and serve as a new engine for sustainable economic growth. In 2003, having reviewed the experience of educational reform over the preceding eight years, the new Democratic Party Government introduced its Plan for Strengthening the Competitiveness of Korea's Institutions of Higher Education. The plan emphasized three goals: enhancing the autonomy of universities; fostering competition to strengthen educational and research capabilities; and providing intensive support to selected universities. The real underlying aim is to restructure the over-supplied higher education institutions and enhance their quality through a system of selective subsidies based on performance evaluation. “Autonomy” means, in effect, voluntary restructuring in the light of an expected rapid reduction of the student population in the near future, encouraged by the offer of government subsidies to those universities and colleges that enter into alliances and

mergers with others. At the same time, with a view to encouraging reduction of class sizes as well as mergers of university departments, the government will set annual goals for improvement of educational quality, including reductions in student–faculty ratios.

The more outward-looking aspect of higher education reform is the drive to increase global competitiveness through competition, specialization (diversification) and government investment. To this end, the existing system of uniform support to all universities will be gradually abolished. Instead, the government will identify outstanding programmes and institutions among those of similar type and function as “selected for concentrated support” and channel support and investment to them. In line with these policy directions, the government promoted projects such as Brain Korea 21 (BK21), which was expected to help universities grow into world-class research institutions and to establish a professional graduate school system that would produce highly trained personnel tailored to the needs of the country’s economy and society. On the basis of a careful analysis and evaluation of the results of BK21, which ran from 1999 to 2005, the government formulated the second BK21 project (2006–12), focused on science and technology development in the industries identified by the MOE&HRD to be of national strategic importance as the new drivers of growth.

#### 7.4.2.4 Industry–academia cooperation and specialization of higher education institutions

The development of the Republic of Korea is particularly interesting in that its economy grew rapidly despite limited direct interaction between industry and universities and little clustering in the vicinity of universities (Sohn and Kenney, 2007). As the knowledge-based economy develops, however, this interaction becomes more important in sustaining development and increasing the labour market performance of college and university graduates.

To promote cooperation between industry and academia, the Act on Industrial Education Promotion and Industry–Academia Collaboration Promotion was passed in 2003, enabling universities to establish companies on campus, to build and operate collaborative research centres on campus, to establish departments based on contracts with firms, and to support collaborative industry–academia education and material development programmes.

The promotion of industry–academia cooperation encourages specialization in higher education institutions. One notable project in this area was the New Universities for Regional Development (NURI) initiative, set up in 2003, and continued under the name of LINC (Leaders in Industry–University Cooperation)

by the new government that took office in 2008. The aim of the project is to give intensive support to universities focusing on producing the specialist-trained personnel needed for regional economic development. The project was intended to facilitate exchange and collaboration between universities, industries, research institutes and local government.

#### 7.4.2.5 Addressing the training deficit: Social partnership for training

In a country making the transition to a knowledge-based economy and trying to remain on the high road to development, lifelong learning and training are increasingly important. Empirical analysis (controlling for other variables) has shown that the effects of training in the Republic of Korea have been significantly positive at the levels of both firms and workers (B.-H. Lee, 2004). Yet, despite these beneficial effects, training has played a relatively minor role in expanding the skills base for economic development, compared with the prominence accorded to general and formal education. The adult participation rate in lifelong learning, at 21 per cent, is one of the lowest among OECD countries (the average being over 35 per cent), and investment by firms in training has stagnated since the 1997 crisis.

The solution to this training deficit, which has come about as a result of both market failure and the inadequacies of government policy, might be found in social partnership. The Republic of Korea, however, has little experience in this respect, particularly in the area of skills development. The industrial relations environment tends to be confrontational, with a collective bargaining process overly focused on issues such as wages and working conditions. Recently, due to increasing pressures from social partners and from civil society, the government has taken steps to set up an institutional and organizational framework for social partnership in training. For example, one of the main purposes of the amendment of the Vocational Training Promotion Act in 2004 as the Workers' Vocational Competency Development Act was to promote social partnership as a long-term policy in the country. There have also been some social pacts between labour and employers' representatives that included provisions on training, such as the Tripartite Commission in 2001 and 2005 and the Social Pact for Job Creation in 2003. These laws and agreements, however, translated only to a limited extent into collective competences, giving rise to little genuine active social partnership in the field of training. Nevertheless, they did contribute to an atmosphere conducive to social partnership for training at the industrial or regional level, allowing the emergence of such initiatives as a training consortium programme

and an HRD sectoral council. As similar experiences at these levels accumulate, social partnership may become an effective institution providing incentives for all stakeholders, including both labour and management, to invest in training.

#### 7.4.2.6 Enhancing equality through education and training

Social integration is as important as economic competitiveness in the “growth with equity” strategy for development. However, as the Republic of Korea shifts to a knowledge-based economy and the focus of education moves on to quality, diversity and creativity, the equity-enhancing effects of education that were so apparent in the earlier decades of development seem to be diminishing. In order to accomplish growth with equity, it is not enough to expand the amount of education and training. It is essential that governments ensure that vulnerable groups in society have access to high-quality education and training opportunities.

Considering the heavy burden borne by families paying for private tutoring, the most important task facing the government in setting out to reduce educational inequality is to increase the quality of public secondary education and thereby restore the public’s confidence in it. This is a large issue that lies beyond the scope of this chapter.

The country faces three educational policy issues that it has not dealt with in a long time: the prohibition on the ranking of high schools, the ban on universities administering their own entrance exams, and the ban on accepting payment for places from students or their families. In the revised university admission system starting in 2008, more emphasis is being put on school records rather than on examination results. However, university entrance policies are too hot a political issue for the government to tackle, and are thus being maintained even though they may conflict with the drive to increase the autonomy and diversity of higher education institutions.

Another way in which inequality of access to education could be reduced is through extending the student loan system. In 2012 a government guarantee was introduced into the system in order to ensure access to university education for many more students, with long-term and low-interest loans covering living expenses as well as tuition fees.

In the field of training, meanwhile, many targeted programmes are being devised to support disadvantaged groups such as workers in SMEs, irregular workers, the small-scale self-employed, female workers and the elderly. The current government has identified social inclusion as one of the main goals of its vocational training policies.

## 7.5 Policy implications

Over the past four decades of rapid economic growth, the Republic of Korea has upgraded not only its economic and industrial structure but also its skills development system. Even though that system has experienced some episodes of mismatch and imbalance and still has many problems to solve, overall it has contributed substantially and fundamentally to the country's pursuit of growth with equity. Education and training policies were successful in developing the skills required for rapid catching up as well as in matching the demand and supply of skills necessary for industrial upgrading, albeit by a process of trial and error in the earlier stages of development before the mid-1990s.

Since then, however, Korea has experienced the great changes that have swept through the world economy, notably globalization, the rapid advance of IT, and the increasing flexibility of labour markets. These changes have made it difficult for the old skills development system to work efficiently and effectively.

In response to these challenges, the government embarked on a range of policy experiments to transform the old system into a newer and more appropriate one. It is therefore possible to extrapolate from the Korean experience policy implications for other developing countries that aim to catch up with developed countries in terms of upgrading their economic and industrial structures and improving social well-being. Five points in particular may be made.

First, the provision of education and training should be determined by the country's stage of development. In the Republic of Korea, sequencing the expansion of education and efforts to improve its quality resulted in efficient resource allocation among the various educational levels over the long term. In particular, the needs of the economy and industry should be reflected in the skills imparted through education and training. Furthermore, countries should develop institutions that can effectively align industrial development with education, training and R&D policies. Korea relied on government control of education and training in the early stages of development and more recently has emphasized private sector participation and social partnership between stakeholders.

Second, even in an environment of globalization where market forces dominate around the world, government still plays an important role in skills development. In the Republic of Korea, a sudden transition to a market-oriented system in the education reforms of 1995 resulted in over-supply, mismatch and skill deficits. These outcomes show that there continues to be market failure in education and training, and that the role of government is more necessary rather than less, albeit in different forms. Although it becomes more difficult and less efficient for government to directly control the whole process of skills development, it can

induce stakeholders in education and training to act in ways consonant with the pursuit of social and national goals by designing sophisticated incentive systems, as seen in Korea's reform of higher education.

Third, the participation of stakeholders and social partners in skills development is becoming increasingly important. A skills development system exclusively regulated by the State will fail to meet the actual skills needs of firms, especially as the economy expands, becomes more diverse and moves into more highly developed, knowledge-based sectors. One weak point of Korea's skills development system was the low level of participation by and partnership among the various stakeholders. The country is now searching for a "smart" skills development model with "competent" institutions (Nübler, in this volume) in which active participation of employers and employees in education and training is backed with institutional support from the government. Such experiences as the training consortium programme and certain regional experiments with partnership in HRD show that it is possible to construct a collaborative skills development system even within a less than cooperative industrial relations environment. These instances also indicate the importance of partnership at the medium (sectoral or regional) level, which can achieve results irrespective of a lack of cooperative industrial relations at the central and workplace levels.

Fourth, the Republic of Korea achieved mass general education without introducing specialization into vocational secondary education. In the period of rapid growth, late specialization was feasible and a combination of general education and in-firm training was efficient. However, this system gave rise to many problems in later stages of development, when the country shifted from a strategy based on planning and targeting industries to one promoting broad technologies. This resulted in an over-supply of higher education and a mismatch between educational outcomes and labour market demands. This illustrates the critical nature of attaining the right balance and sequencing between general and vocational education efforts.

Fifth, the Korean case shows that quantitative expansion of the skill base does not ensure growth with equity as a country makes the transition to a knowledge-based economy. Government efforts should focus on equity-enhancing policies in such areas as quality of education and labour market income.



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