Introduction

There is little argument that human capital plays a critical role in promoting the process of development. Alfred Marshall succinctly expressed this view by claiming that “Knowledge is our most powerful engine of production; it enables us to subdue Nature and force her to satisfy our wants” (*Principles of Economics*, Book IV, Chapter 1). In development economics, ‘nature’ can be interpreted as ‘diminishing returns’ to physical assets, and ‘knowledge,’ human capital. That is, Marshall’s words echo the importance of human capital accumulation as the essence of economic development in overcoming the inevitable characteristics of bounded growth from physical capital, allowing us to bypass the limitations and constraints set by the physical world.

There are many cases that show such significance of human capital in the history of economic development. Among them, Korea’s remarkable success story of sustained development over the last seven decades is perhaps the most salient example revealing such essence of human capital for development process. The initial conditions of Korea were full of disadvantages for development, since it was the time when Korea got liberated from the devastating colonial rule of Japan in 1945 and a massive civil war (the Korean War) that followed. The consequent destruction of physical and human resources, a corrupt government, ideological, political conflicts from the remnants of the colonial rule, and the lack of system for state-building were huge hurdles to cross in pursuit of national economic development. The success story of Korean development is amazing not because it grew so fast but because such achievement was based on a series of efforts to overcome such constraints. Korea’s constant exertion of human capital investment in various forms, which led Korea to be ranked the third highest in terms of average years of schooling and the highest in terms of R&D spending to GDP ratio in the world, has been at the heart of such efforts. Thus, this kind of development experience would deliver important messages about human capital and development for the currently developing nations.

At the same time, Korea’s experience of human capital accumulation offers interesting insights for the currently advanced nations as well, regarding the issues of relevant skill formation and quality upgrading of human capital in response to technological progress. Despite the
above-mentioned great achievement in human capital investment, Korea during its later stage of development process experienced a phenomenon of an ‘education bubble,’ which we define as the case in which human capital investment bears insufficient returns compared to the costs of investment. For example, during the massive expansion of higher education in Korea, college premiums over high school education turned negative for a significant portion of college graduates as the expanded universities at the bottom level lost their grip over ‘quality controls’ while upgrading the speed of human capital quality became much slower than that of quantitative human capital expansion. This kind of ‘bubble’ was possible because human capital investment is a lifetime process, involving a long interval (possibly a generation) between investment and realization of its returns. This situation is likely to happen particularly when an economy rapidly goes through some forms of structural transformation. Structural transformation can vary from a typical industrialization of a developing country, which entails a shift from manufacturing to a service economy, to a transformation of an entire ecosystem of innovation corresponding to the Fourth Industrial Revolution. However, when the educational system fails to adapt to those changes, the dire consequences of skill mismatch and quality upgrade failure among the labor force are essentially the same, which in fact is one of the most important contemporary issues for many advanced countries such as the U.S. and the U.K. Thus, Korea’s experience of an education bubble and the ongoing policy efforts to solve this problem can offer valuable insights for the advanced countries as well.

In sum, Korea’s development experience regarding human capital formation may provide a useful prism for both developing and advanced countries with a useful prism to reflect on their contemporary issues regarding human capital formation in the context of national development. This monograph is a collection of our research describing the essentials of and policy implications for the process of human capital accumulation in Korea, maintaining the perspectives above.

From the perspective of human capital formation, Korea’s modern development process over the seven decades after Korea’s independence can be divided into two stages: the first period from 1945 to 1979\(^1\) and the second from 1980 to 2015, which we call the first and second learning generations, respectively.\(^2\)

\(^1\) The year of 1979 corresponds to the end of the Park Chung-hee regime.

\(^2\) We take the term ‘learning generation’ from the Learning Generation Report in 2016 by the Education Commission, which emphasized that it is possible to get all young people into school and learning within a generation (The Education Commission, 2016). From this perspective, Korea is an excellent example of providing each generation with the opportunities for a higher level and dimension of learning that is critical for sustainable development.
The ‘first learning generation’ achieved universal basic education and emphasized vocational learning to supply the necessary skilled workers for economic development. This stage involved the formation of basic institutions for a modern education system, the sequential expansion of education from basic to higher education, and the effective skills built from vocational education and training for industrialization. The Korean government had to allocate funds to the highest return sectors and to those least able to pay for services given the scarcity of public funding. That is, Korea’s secondary education could receive support only after a sufficient expansion of the more urgent elementary education. Likewise, tertiary education expansion only followed after the expansion of the more important secondary education. This sequential nature of educational expansion, rather than all-at-once type of expansion, solved the limited resource problem and made transition smooth because the demand for higher levels of education naturally evolved over time. Furthermore, in terms of the institutional and incentive design of the education system, Korea exerted extra policy efforts to balance general and vocational education to provide the relevant set of skills to the economy during its course of economic development. In addition, Korea effectively tackled brain drain through diverse policies including competitive rewards for foreign-trained scholars and researchers in newly established research institutions that bridged Korea’s relatively small and less developed academic and research society to the global community. Chapter 1 of this monograph provides the essential details on the features of human capital formation of the first learning generation in Korea.

The ‘second learning generation’ can be differentiated from the first by the rapid quantitative expansion of higher education and private education spending for college entrance as the Korean economy became more knowledge-based. The unintended consequence was the rise of the ‘education bubble’ around the 1990s and the related attempts to reformulate Korea’s human capital policy. The sharp rise in the demand for higher education as well as for private tutoring already started in the mid-1980s. The higher education sector continued to grow afterwards, which became the basis for a rapid development of research and technology in Korea with the college advancement rate reaching beyond 80 percent at its peak. However, the expansion of the higher education sector was too fast to deliver appropriate returns to college education after the 1990s, which we identify as an important symptom of the education bubble. Furthermore, the quality upgrading of human capital and hence the returns to higher education was asymmetric between the top and bottom tier universities. Thus, human capital accumulation became an important contributing factor to the increasing inequality of the second learning generation in
Korea in contrast to the experience of the first learning generation when inequality decreased along with human capital accumulation. These phenomena are discussed in Chapter 2.

Chapter 3 describes the conceptual framework of ‘education diversification’ as a remedy for the education bubble and the related reform agenda in achieving education diversification. A strict hierarchy in higher education can be one of the root causes of the education bubble because the bubble in Korea was mainly formed among the low-quality universities at the bottom of such hierarchy without any comparative advantages. Therefore, enhancing horizontal diversification would remove the source of such hierarchy measured by a single dimension of competency, hence the education bubble. Furthermore, provision of a more diversified set of skills would help reduce the potential skill mismatch problem.

Chapter 4 explains the Meister High School Initiative to reestablish the significance of vocational education for human capital formation in Korea. Korea is one of the rare success stories of vocational education and training. Korea’s emphasis on vocational education and training, balanced with general education during the first stage of industrialization, played an important role in supplying the relevantly skilled laborers demanded by the industrial sectors and in reducing the skill mismatch problem, which is one of the most serious hurdles for most developing countries in escaping from devastating stagnation. However, as Korea’s economy surpassed the development level of middle-income countries, the rise of higher education demand exploded, which resulted in excessive disregard for the necessary vocational education. In order to revive the much-needed vocational education, Meister High School Initiative of the Korean government offered a job-guarantee policy packaged with a possible option to enter university later. This incentive design was successful in turning around the declining trend of vocational education.

Chapter 5 discusses the various skills and learning deterioration of Korean adults using a recent international competency test for adults (16–65 age group) called PIAAC (Programme for the International Assessment of Adult Competencies), collected by OECD for the 2011–2012 period. Korean adults exhibited just average or slightly below average performance among the participating OECD member countries, but more interestingly, Korean adults’ skill levels deteriorated with aging much faster than other countries. This is a shocking result because in another OECD international competence test for students (15–16 age group) called PISA (Programme for International Student Achievement) since 2000, Korean students have consistently shown the highest level of performance along with Finland and Hong Kong.

This empirical evidence showing the deteriorating skills and weak life-
long learning of Koreans is a crucial warning against the Korean learning system’s fundamental ability to foster life-long learners in preparation for the Fourth Industrial Revolution and the accompanying radical technology expansion. Therefore, despite the successful education for human capital accumulation during the 70 years over the two learning generations after its independence, Korea now confronts the challenge of transforming its education for the ‘third learning generation.’ Chapters 6 and 7 discuss Korea’s critical policy issues in reformulating the strategies and policies for human capital investment to sustain the role of human capital for Korea’s future development.

We first consider how critical a pedagogy reform in classrooms is in redirecting the human capital investment of Korea. Chapter 6 focuses on the transformation from conventional rote memorization to project-based learning and from quantitative assessment based on multiple choices to performance assessment. We discuss various issues in implementing the new teaching and assessment method of project-based learning and performance assessment from the incentive perspectives of teachers and school to emphasize the importance of a bottom-up approach in contrast to the traditional top-down approach of Korean education reform. Furthermore, we illustrate how top-down approaches alone could not be successful because teachers were not delivering the reforms unless the government understood exactly what the teachers needed in order to make changes in pedagogies. That is, we propose that an organic integration between top-down and bottom-up approaches is crucial for a successful implementation of pedagogy reforms.

In Chapter 7, we describe the patterns and supporting system evolution of research and development, which is another critical dimension of human capital formation, to propose a policy in promoting a reshaping of R&D strategies. In 2012, Korea’s R&D expenditure as a percentage of its GDP reached 4.3 percent, the highest in the world. However, Korea has not successfully transformed its innovation model from a ‘fast-follower’ to a ‘first-mover.’ We argue that one of the main reasons is that Korea’s innovation ecosystem lacks effective support for ‘high-risk high-payoff’ research. Thus, we propose an establishment of an independent and autonomous project agency K-ARPA (Korea Advanced Research Project Agency) to promote high-risk high-payoff research in a flexible and adaptive way which is to overcome the inherent governance issues causing inefficiency for government-funded research institutions.

Korea’s successful experience of promoting vocational education particularly during the stage of industrialization provides a useful benchmark development strategy for other developing countries. Chapter 8 introduces a significant case study of Korea’s development cooperation for vocational
education with the Southern African Development Community (SADC) region known as the BEAR (Better Education for Africa’s Rise) Project. We illustrate the variety of approaches to vocational education among the advanced countries depending on their socio-economic conditions. We also show that the conditions of the labor market, industrial structure, and human capital formation are diverse across the five development cooperation partner countries of Botswana, D.R. Congo, Malawi, Namibia, and Zambia, requiring a customized approach to build vocational education and training capacity. Korea acknowledged the importance of vocational education and training for the early stage of development as well as the significance of country-specific pre-conditions from Korea’s own development experience. Thus, Korea adopted a completely different approach for this development cooperation of a customized but holistic approach. Starting from analyzing each country’s vocational education system and labor market conditions rather than a conventional building of individual TVET institution capacities, the project ended as a great success. This unique contribution was possible mainly because of Korea’s own experience of utilizing vocational education in the context of a national development strategy.

Korea’s past achievement in human capital formation during the course of such miraculous transformation is amazing. However, Korea is facing critical challenges for effective human capital investment with continuous policy efforts to sustain Korea’s future development. This monograph aims to share the insights on human capital formation not only from Korea’s past experience but also from the ongoing efforts as well as dialogues on human capital investment and development between developing and advanced countries.

We hope that each chapter of this monograph provides important lessons and insights on human capital and development based on Korean experience for other countries. The first chapter shows how Korea’s first learning generation during 35 years after the independence up to 1979 achieved economic growth through education. Chapters 2 to 4 describe second learning generation issues such as the education bubble resulted from a rapid expansion of higher education from 1980 to 2010 and the education diversification reforms that followed including the Meister High School Initiative. Chapters 5 to 7 discuss the problems faced for the third learning generation in adjusting to the imminent Fourth Industrial Revolution. Having discussed the problems, the chapters also introduce remedies such as pedagogy reforms to empower life-long learners and foster the transformation of an innovative ecosystem to become a first-mover away from a fast-follower through an emphasis on high-risk high-payoff research. Last, Chapter 8 explores the methods of sharing Korea’s experience with other countries, particularly the developing ones.
This book attempts to confirm whether human capital accumulation has strongly contributed to the sustainable development of Korea towards an inclusive and innovative economy. Korea achieved sustained growth during the 70 years after its independence by introducing institutions and laws and reforming policies to expand the opportunities for gaining the necessary job skills. The Korean experience of beginning as a weak human capital country and rapidly accumulating human capital presents rich insights on the dynamic process of human capital accumulation for other countries. Government policies need incessant innovation and reform to induce active investment in human capital and widen the benefits to include as many people as possible. As technology evolves along with economic growth, each learning generation requires different skills and technology. To educate changing technology and skills, the education system, pedagogical methods, research and development, and supporting performance measurement and finance all need to change. Korean experience clearly demonstrates the dynamic process of human capital investment.

Furthermore, throughout the book, we focus on each country’s different demands on multi-dimensional skills in its respective development stages. The education system and methods to develop such skills can also differ from one country to another. In many cases, Western scholars emphasize expansion of university education to respond to skill-biased technology and strengthening early childhood education to foster character skills of children in low-income households. However, in Korea, an increase in the number of low quality universities and decline of vocation education caused the serious problem of an education bubble after 1980. To solve this problem, education diversification reforms including the Meister High School Initiative were instituted to foster vocational skills. Recently, a pedagogy reform of basic education in Korea has been emphasized to guide Korea’s third learning generation to become first-movers and life-long learners in the Fourth Industrial Revolution era.

From such perspectives, this book not only focuses on the data and empirical analysis of the multi-dimensional and changing nature of skills and skill demand but also provides in-depth discussions on Korean policy directions and strategies for human capital accumulation in response to skill demand changes in diverse dimensions. We hope that the detailed lessons and insights from the Korean experience in this book will be further scrutinized in both academia and policy circles, which will widen the perspective on human capital and sustainable development for both the developing and developed countries.