

The Tertiary Education Imperative

Knowledge, Skills and Values for Development

Jamil Salmi



The Tertiary Education Imperative

GLOBAL PERSPECTIVES ON HIGHER EDUCATION

VOLUME 38

Series Editors:

Philip G. Altbach, *Center for International Higher Education,
Boston College, USA*

Hans de Wit, *Center for International Higher Education,
Boston College, USA*

Laura E. Rumbley, *Center for International Higher Education,
Boston College, USA*

Scope:

Higher education worldwide is in a period of transition, affected by globalization, the advent of mass access, changing relationships between the university and the state, and the new technologies, among others. *Global Perspectives on Higher Education* provides cogent analysis and comparative perspectives on these and other central issues affecting postsecondary education worldwide.

This series is co-published with the Center for International Higher Education at Boston College.

The Tertiary Education Imperative

Knowledge, Skills and Values for Development

Jamil Salmi



SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6351-126-1 (paperback)

ISBN: 978-94-6351-127-8 (hardback)

ISBN: 978-94-6351-128-5 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
<https://www.sensepublishers.com/>

All chapters in this book have undergone peer review.

Printed on acid-free paper

All Rights Reserved © 2017 Sense Publishers

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work.

TABLE OF CONTENTS

Foreword <i>Philip G. Altbach</i>	vii
Introduction	xi
Chapter 1: The Changing Context: New Challenges, New Opportunities	1
Introduction: Knowledge and Innovation as Drivers of Economic and Social Development	1
Changing Labor Markets in the Digital Era	2
The Evolving Tertiary Education Ecosystem	7
Conclusion: Challenges and Opportunities	28
Chapter 2: The Contribution of Tertiary Education: Theory vs. Reality	31
Role and Benefits of Tertiary Education	31
The Reality of Tertiary Education in Developing Countries: Long-Standing and New Challenges	45
Chapter 3: Designing and Implementing System-Wide Reforms	71
Ignition Phase	72
Elaboration of a Vision for the Future of the Tertiary Education System	74
Formulation of a Set of Strategic Measures	76
Launch of the Reform	106
Ensuring the Sustainability of the Reform	111
Chapter 4: Ensuring Financial Sustainability: What is at Stake?	119
Elements of a Sustainable Financing Strategy	120
Strategic Decisions Influencing Financing Requirements	121
Resource Mobilization Options	134
Resource Allocation Mechanisms	156
Conclusion	161
Chapter 5: Role of the Donors	163
What Works: Lessons of Experience from Donor Interventions	163
Roadmap for Donor Support in Tertiary Education	167
Conclusion: The Reform Imperative	171

TABLE OF CONTENTS

References	175
Appendices	183
About the Author	195

FOREWORD

Postsecondary education is vital to both economies and societies worldwide. Evidence from research over the past few decades has shown repeatedly that nations without effective postsecondary institutions have been—and will continue to be—left behind in the global knowledge economies of the 21st century. Postsecondary education is understood by societies across the planet as a requisite for social mobility. These elements—economic drivers and social pressures—have combined to create mass postsecondary education systems worldwide and, at the same time, have emphasized the importance of the small but quite important research university sector. As Jamil Salmi points out in this comprehensive volume on the vital contribution of universities and other tertiary education institutions, postsecondary education has become a central element of both national education systems worldwide and the global knowledge economy. This has serious implications for developing countries keen on achieving the Sustainable Development Goals.

TERTIARY EDUCATION AS A GLOBAL POLICY CONCERN

This volume emerged from a research initiative of the United Nations in recognition of the central role of postsecondary education systems. It is one of a number of insightful reports commissioned by international agencies over the past several decades, including the World Bank, UNESCO, and the OECD. One of the first reports that argued that postsecondary education was key for economic and social development was *Higher Education in Developing Countries: Peril and Promise*, co-sponsored by UNESCO and the World Bank, and published by the World Bank in 2000. Salmi himself was instrumental in writing *Constructing Knowledge Societies: New Challenges for Tertiary Education*, published by the World Bank in 2002. This volume provided further evidence and useful guidance relating to the importance of postsecondary education. In the years since, postsecondary education has been recognized as a key element for development and increasingly integrated into educational planning by governments. During this same period, enrolments dramatically expanded, as young people and their families recognized the importance of postsecondary education for achieving expanded opportunities and social mobility.

Given these dynamic and sustained global demands for more and better postsecondary education, it is surprising that the World Bank's pending 2018 World Development Report, the first such report dedicated to education, does not include postsecondary education as an integral part of the education spectrum. Similarly the Organization for Economic Cooperation and Development (OECD) recently closed its highly regarded higher education journal and abolished its Institutional

FOREWORD

Management in Higher Education program. UNESCO, as well, has diminished its higher education engagements over the past decade. In this context, it is imperative for global scholars of higher education to continue the discourse that can support improved and sustainable development and reform efforts for the sector. The sector is growing, as government and societies demand more and better tertiary education, whether international organizations choose to remain relevant to that growth or not. Salmi's volume, therefore, could hardly come at a better moment.

MASSIFICATION AND PRIVATIZATION

Massification—expanded enrollment to over 35% of the traditional age cohort for higher education—has had dramatic implications for postsecondary education worldwide, although the specific circumstances vary significantly by country and region. The rise of private providers in the tertiary sector has been one widespread development. Indeed, private postsecondary education, both for-profit and non-profit, is the fastest growing segment of the sector worldwide. As Salmi points out in this book, Latin America and Asia are increasingly dominated by private, often for-profit provision—with Western Europe and North America less affected. Public postsecondary education has increasingly been privatized, with tuition and fees increasing in many countries as a way of financing institutions. Government funding has been replaced or supplemented by student tuition. Student debt has become an issue of public concern in many countries. There are outliers to these trends, however. Switzerland and the Nordic countries still regard postsecondary education as a public good and provide full government support, keeping tuition free or at a very low cost. Funding patterns, policy orientations to postsecondary education, governance structures, and other realities differ considerably worldwide. One of the strengths of this book is that it examines both general trends and specific patterns of development—thus providing valuable comparative perspectives that can be used by policymakers and institutional leaders in both industrial and developing nations.

FUTURE CHALLENGES

Without question, postsecondary education will continue to face dramatic challenges in the coming decades. Expansion will go on, especially in the developing and emerging economies—putting pressure on financing and quality assurance for tertiary education in nearly all countries around the world. Most countries will need a highly trained workforce to contribute to increasingly sophisticated economies, and it will be incumbent on governments and institutions to better align their education opportunities with the outcomes expected by graduates, society, and the labor market.

FOREWORD

Challenges such as the role of distance provision of postsecondary education, the appropriate levels of internationalization, including the use of English as a language of global communication, efficient and effective funding models, adequate governance arrangements, the role of general education in the mix of postsecondary provision, and many other issues face postsecondary education. This volume provides valuable guidance for thinking through these key challenges.

Philip G. Altbach
Founding Director
Center for International Higher Education
Boston College

INTRODUCTION

...All regions and countries can benefit from progress toward a knowledge-based economy, which does not depend heavily on material resources, places less of a burden on ecosystems and is more sustainable than other economic models. By shifting to a knowledge-based economy, societies can move from the age of scarcity to the age of abundance. Knowledge does not deplete with use but rather increases as it is shared among people. Through technological innovation, we can help usher in a more sustainable future...

(Ban Ki-Moon, UN Secretary General, 24 April 2014)

The Brazilian aviation company, Embraer, is the world leader in the production of regional jets. The success of the country's emblematic firm can be traced back to the creation of ITA, the National Aeronautic Engineering School, in the early 1950s. Established in close partnership with MIT, and widely considered today as Brazil's top engineering school, ITA has trained the scientists, engineers and technicians who helped build Embraer into a leading global company.

Typhidot is a revolutionary method to diagnose typhoid fever. Invented by scientists at the Malaysian University of Science in Penang (USM), Typhidot is credited with saving thousands of lives. Compared with traditional methods for detecting the disease, Typhidot is faster, more reliable, cheaper, and it does not require cold storage. USM's Center for Medical Innovations and Technology Development, from which Typhidot originates, is dedicated to finding innovative ways of diagnosing infectious diseases in an effective, quick and affordable manner.

Until the beginning of this decade, most practicing teachers in Palestinian primary schools were poorly prepared and did not have a university degree. After new regulations required all teachers to have both a university degree and a relevant professional teaching qualification, three West Bank universities worked together, with support from a renowned British teacher training institution, to radically overhaul their pre-service teacher training program, introducing a competency-based approach and a school experience element. A quasi-experimental study carried out after three years of implementation found very high value added for the new pre-service teaching program.

These are but three examples to illustrate the unique and vital contribution that tertiary education makes to economic and social development. But notwithstanding this crucial developmental role, for several decades traditional human capital theory challenged the need for public support of tertiary education on the grounds that graduates captured important private benefits—notably higher salaries and lower unemployment—that should not be subsidized by taxpayers. Influenced by this argument, many multilateral and bilateral donor agencies focused their support on

INTRODUCTION

basic education rather than investing as well in the expansion and improvement of tertiary education systems in developing countries.¹

In the 1990s, however, a growing body of research demonstrated the importance of going beyond rate-of-return analysis to measure the full value of tertiary education as a fundamental pillar of sustainable development. By focusing primarily on the private returns of government spending, rate-of-return analysis failed to capture the broader social benefits accruing to society, which are important to recognize and measure. These include research externalities, entrepreneurship, job creation, good economic and political governance, and the positive effects that a highly educated cadre of workers has on a nation's health and social fabric (Birdsall, 1996; World Bank, 2002).

Building on these findings, the path-breaking 2000 report entitled *Higher Education in Developing Countries: Peril and Promise* called for scaling up investment in tertiary education and research to equip developing countries with the knowledge and the qualified manpower needed to fight poverty and accelerate economic growth (World Bank and UNESCO, 2000). Written by a distinguished group of independent experts with financial support from UNESCO and the World Bank, the report had an important impact at three levels. First, it helped reorient donor policies to give greater attention to tertiary education in partner countries. Second, it unleashed several reform initiatives in the developing countries themselves. Third, it paved the way for increased South-South networking and collaborative activities (Salmi, 2016a).

Fifteen years later, the world of tertiary education has changed significantly. Developing countries have seen tremendous enrollment growth, especially in the private sector. Many of them are facing an exponentially rising demand as more young people graduate from high school as a result of successes in implementing the Education for All agenda. In Europe, the Bologna process has led to the creation of a regional "higher education space" facilitating the circulation of students and academics. In Asia, the most dynamic economies have been at the forefront of efforts to place tertiary education at the center of their development strategy.

Tertiary education finds itself at another crossroad today, as national systems are pulled in several directions by a combination of factors bringing about both opportunities and challenges. The forces exercising new pressures on tertiary education can be divided into three groups: crisis factors, rupture factors, and stimulation factors.

The crisis factors are the direct results of the economic and financial crisis that started in 2007–2008. Since then, the fiscal situation has seriously deteriorated in many countries and governments almost everywhere have significantly cut their tertiary education budget. At the same time, households have had fewer resources to allocate to finance their private education expenditures. Furthermore, in many countries, the slowing down of the economy has led to rising graduate unemployment.

Compounding these elements of financial crisis are disruption factors such as those pointed out in a 2013 report proposing the image of "an avalanche" to describe

the radical changes affecting how tertiary education institutions will be conducting their teaching and research activities in the future (Barber et al., 2013). Among these rupture factors are (i) technological innovations such as flipped classrooms and other strategies for more interactive learning, (ii) mass online open courses (MOOCs) reaching hundred of thousands of students all over the world, (iii) increased competition from for-profit and corporate universities that provide professional qualifications closely linked to labor market needs, and (iv) new accountability modalities like the global rankings, that allow for different kinds of comparisons of the performance of universities across all continents.

On a positive note, tertiary education institutions are also exposed to stimulus factors in the relatively few countries that, notwithstanding the financial crisis, have continued to give priority to the development of their knowledge economy and have protected their tertiary education budget for that purpose. Under the influence of the global rankings, several governments—for example China, France, Germany, Russia and South Korea—are supporting “excellence initiatives” that translate into a large influx of additional resources for their nation’s leading universities. In Sub-Saharan Africa, a new regional project funded by the World Bank, with parallel financing from several bilateral and multilateral donors, is supporting the development of centers of excellence to boost the research capacity of the leading universities in the Region.

Against this background, the launch of the Sustainable Development Goals by the United Nations in September 2015 has given renewed consideration to the importance of education for development and the urgency of putting in place viable financing strategies. This book, which focuses on the tertiary education level, is divided into five chapters.² The first one examines the evolving context in which tertiary education systems operate. Chapter 2 reviews the contribution of tertiary education to economic and social development, contrasting the theoretical impact that it could have and the actual state of tertiary education systems in most developing countries. Chapter 3 proposes a sequence for designing and implementing tertiary education reforms, based on international experience. Chapter 4 concentrates on the financial sustainability aspects of tertiary education reform. Finally, Chapter 5 discusses the important role that the donors can play in support of tertiary education reform in developing countries.

The book carries the following main messages:

- The innovative application of knowledge has become a fundamental driver of social progress and economic development. Advanced knowledge and modern technologies are also influencing the pace of competition and transforming the nature of labor market needs through substantial shifts in the configuration and content of jobs.
- Tertiary education is indispensable for the effective and efficient creation, dissemination, and application of knowledge and for building institutional, professional and technological capacity.

INTRODUCTION

- The tertiary education ecosystem is evolving at an increasingly rapid pace, influenced by elements of uncertainty, complexity and disruption, such as changing demographics, global competition, political volatility, diminished public funding, greater private involvement, growing accountability demands, alternative delivery modes and game-changing technologies.
- In this challenging context, developing countries can either become economically marginalized, incapable of using advanced technology and unable to compete on the global scene because their tertiary education systems are insufficiently developed and under-performing, or they can strengthen their capacity to create and apply knowledge through well-trained graduates and relevant research produced by a diversified and increasingly international tertiary education system.
- To reduce the performance gaps faced by their tertiary education systems, developing countries governments need to design and implement significant reforms. International experience suggests that an appropriate reform sequence includes the following steps: (i) ignition phase to sensitize all stakeholders to the urgency of the reform; (ii) elaboration of a vision for the future of the tertiary education system; (iii) formulation of a set of strategic reforms; (iv) launch of the reforms; and (v) structural measures to ensure the sustainability of the reforms, especially its long-term financial viability.
- To achieve long-term financial viability, developing countries must not only improve resource mobilization through a combination of public and private funding but also adopt an expansion strategy that encourages institutional diversification—non-university institutions and private providers—and increased reliance on online learning opportunities.
- Through knowledge sharing, capacity building and resource mobilization, the donor community can accompany partner countries in their efforts to expand coverage and improve the effectiveness and responsiveness of their tertiary education system.

NOTES

- ¹ This book adopts the OECD definition of tertiary education as representing “a level or stage of studies beyond secondary education. Such studies are undertaken in tertiary education institutions, such as public and private universities, colleges, and polytechnics, and also in a wide range of other settings, such as secondary schools, work sites, and via free-standing information technology-based offerings and a host of public and private entities” (Wagner 1999: 135). Under the new ISCED 2011 education classification, tertiary education contains four levels: short-cycle tertiary (level 5), Bachelor’s (level 6), Master’s (level 7) and Ph.D. (level 8).
- ² This book builds on a report prepared for the United Nations by the author. Available at <http://report.educationcommission.org/resource-materials/>

CHAPTER 1

THE CHANGING CONTEXT

New Challenges, New Opportunities

INTRODUCTION: KNOWLEDGE AND INNOVATION AS DRIVERS OF ECONOMIC AND SOCIAL DEVELOPMENT

If investments in factories were the most important investments in the industrial age, the most important investments in an Information Age are surely investments in the human brain. (Larry Summers)

Among the most influential changes that the past decades have brought is the increasing role that knowledge and innovation have come to play as major drivers of growth in the context of the global economy (OECD, 2015a). Technological progress has become the main driver of growth of GDP per capita, allowing output to increase faster than labor and capital (EOP, 2016). Innovation stimulates the development of new firms and job creation; it fuels rises in productivity and leads to economic growth. Innovative economies are more productive, better able to sustain higher living standards and reduce poverty, more resilient in times of crisis and have a stronger capacity to transform themselves.

The World Bank's analytical framework for studying and explaining the dynamics of knowledge-driven development identifies the converging roles of four contributing factors: the macroeconomic incentive and institutional regime, the information and telecommunication infrastructure, the national innovation system, and the quality of human resources (World Bank, 1999).

Along similar lines, the new OECD Innovation Strategy (2015a) suggests that innovation can only flourish in an economic and regulatory environment that has the following characteristics:

- A skilled workforce that can foster new ideas and generate new technologies, bring them to the market, and implement them in the workplace, and that is able to adapt to technological and structural changes across society.
- A sound business environment that encourages investment in technology, that enables innovative firms to experiment with new ideas, technologies and business models, and that helps them to grow, increase their market share and reach scale.
- A strong and efficient system for knowledge creation and diffusion that invests in the systematic pursuit of fundamental knowledge.
- Policies that encourage innovation and entrepreneurial activity.

CHAPTER 1

- A strong focus on governance and implementation. The impact of policies for innovation depends heavily on their governance and implementation, including the trust in government action and the commitment to learn from experience.

Knowledge is indispensable not only for economic growth but also for social development purposes. Countries without a minimum institutional, scientific and technological capacity to apply research results are likely to lag in realizing key social and human benefits such as increased life expectancy, lower infant mortality, and improved health, nutrition, and sanitation. Such countries will be increasingly vulnerable to emerging environmental threats (World Bank, 2002).

Knowledge and knowhow play an equally essential role as the principal engine of social innovation, defined as the efforts of firms, universities, government agencies and NGOs towards designing and applying new business models and offering services that help improve the life of vulnerable communities and groups in society. Social innovation manifests itself through innovative initiatives, products and processes aiming at finding new solutions to society's complex challenges that are durable and equitable from the viewpoint of the most vulnerable groups.

This includes the development of *frugal* innovations that seek to create greater social value in developing countries while minimizing the use of scarce financial and natural resources. From the low-cost water purifier invented by the Tata Group in India to the mobile payment service pioneered by the Kenyan telecom operator Safaricom, frugal solutions can reach hundreds of millions of people at the bottom of the economy pyramid in ways that create more value while minimizing resource use and facilitating greater collaboration and engagement by local communities (Radjou, 2014).

Against this background of the dynamics of the knowledge economy, this chapter examines the changing labor market and the evolving tertiary education ecosystem, with a focus on the new accountability requirements, the effects of globalization on tertiary education, the impact of the new education technologies, and the political convulsions affecting tertiary education.

CHANGING LABOR MARKETS IN THE DIGITAL ERA

The Fourth Industrial Revolution was the main theme of the 2016 Davos meeting organized by the World Economic Forum. Observers underlined the importance of recent developments in fields that were previously separated but are now becoming increasingly intertwined, such as artificial intelligence and machine learning, robotics, nanotechnology, 3-D printing, and biotechnology and genetics (WEF, 2016). This rapid evolution in the business and production spheres is likely to cause widespread disruptions in labor markets.

In designing their future programs and courses, tertiary education institutions must therefore take notice of the considerable transformation that the labor market is undergoing in the digital era. These developments are going to translate

into tremendous changes in the skill sets needed to succeed in the new work landscape. The changes will be of three types: disappearance of existing jobs, emergence of new jobs, and transformation of existing positions and, therefore, needed skills.

In the first instance, the WEF report notes that many jobs will be threatened by redundancy as robots and intelligent machines become increasingly available to replace human beings in many tasks. A recent study published by two Oxford University professors looked at 700 professions at risk of disappearing over the next ten to twenty years as a direct result of the growing integration of robotics, artificial intelligence and information technology (Frey and Osborne, 2013). Their estimates indicate that up to 47% of total employment in the US labor market is likely to be affected by job computerization brought about by advances in machine learning and mobile robotics.

For context, every 3 months about 6 percent of jobs in the [US] economy are destroyed by shrinking or closing businesses, while a slightly larger percentage of jobs are added—resulting in rising employment and a roughly constant unemployment rate. The economy has repeatedly proven itself capable of handling this scale of change, although it would depend on how rapidly the changes happen and how concentrated the losses are in specific occupations that are hard to shift from. (EOP, 2016, p. 2)

Another key result of their analysis is that the loss of jobs through computerization is inversely related to educational attainment and that positions that require creativity, high-level socio-cognitive skills and the ability to deal with complex tasks are safe from automating. Research consistently shows that the jobs that are most under risk as a result of automation are highly concentrated among lower-paid, lower-skilled, and less-educated workers. The implication is that automation will continue to put downward pressure on wages for this vulnerable group, thereby accelerating economic inequality.

While these effects may not play out as strongly in the developing economies that still have a high proportion of employment in the informal sector, they will undoubtedly affect the modern sectors of the economy, where the majority of tertiary education graduates seek employment. They will bring about increased opportunities for the development of small and medium enterprises. Also, freelancing jobs will become more numerous in a world where production is more and more project-based.

Secondly, the growth of the digital economy implies the development of a whole range of new professions. The Spanish Observatory of Employment in the Digital Era predicts that four out of five young people between 20 and 30 will work in positions, directly linked to the digital world, that do not exist yet today (El Mundo, 2016). Among the professions likely to be most in demand are smart factory engineer, chief digital officer, digital innovation specialist, data scientist, expert in big data, smart city architect, director of digital content, expert in digital risks, director of digital

CHAPTER 1

marketing, and growth hacker. Firms will particularly looking for big data specialists and growth hackers. Big data specialists, usually trained in computer science or mathematics, analyze the large databases collected by companies as inputs into decision-making on corrective actions and strategic orientations. Growth hackers, coming from informatics, publicity or digital marketing, are trained to identify new growth areas and modalities.

Increasingly linked to the digital economy are the cultural and creative industries, which also represent areas with high potential for the emergence of small companies and employment growth in developing nations, capitalizing on the specific culture and history of each country. In the European labor market, for example, these sectors account today for 3.3% of total employment and 4.2% of Europe's GDP. The performing arts, the visual arts and music in the lead, followed by advertising, books, film, TV, architecture and newspapers.

A few developing countries, India and Nigeria for example, have already shown the way in this direction with the development of their movie industry. In Nigeria, the relatively recent success of "Nollywood" has resulted in thousands of new jobs. In 2015, the film industry employed one million people—second only to agriculture—produced 2,500 movies and generated 600 million dollars of revenue, up from 400 movies and 5 million dollars in 2002 (Onishi, 2016). Close linkages between the ICT and creative industries can also materialize, for instance in the form of digital media in art production, or ICT-enhanced tourism.

Thirdly, existing jobs are also going to experience significant changes in the skill sets required to perform effectively. As documented in several recent studies, the changes in job contents are likely to lead to growing labor market polarization. Goos and Manning's "Lousy and Lovely Jobs" (2007) analyzed the concurrent rise in employment in low-income manual occupations that do not require high education qualifications and in high-income jobs that involve high-order cognitive skills. Similarly, a more recent study prepared by the UK University Alliance (2012) looks at the spread of middle wage routine jobs and, at the same time, the expansion of high wage abstract non-routine jobs in what the researchers describe as the "hourglass economy".

The work of Harvard professors Levy and Murnane (2005) support these findings. They studied the skills requirements for the tasks performed in US firms, showing the types of skills for which there is less demand—or which have been taken over by computers and intelligent machines—and those for which there has been increased demand. In their path-breaking research, the authors divided the tasks performed in firms into five broad categories:

- Expert thinking: solving problems for which there are no rule-based solutions, such as diagnosing the illness of a patient whose symptoms are out of the ordinary;
- Complex communication: interacting with others to acquire information, to explain it, or to persuade others of its implications for action; for example, a manager motivating the people whose work he/ she supervises;

THE CHANGING CONTEXT: NEW CHALLENGES, NEW OPPORTUNITIES

- Routine cognitive tasks: mental tasks that are well described by logical rules, such as maintaining expense reports;
- Routine manual tasks: physical tasks that can be well described using rules, such as installing windshields on new vehicles in automobile assembly plants; and
- Non-routine manual tasks: physical tasks that cannot be well described as following a set of “if-then-do” rules and that are difficult to computerize because they require optical recognition and fine muscle control; for example, driving a truck.

Figure 1 below shows the trends of the last decades for each type of task. Tasks requiring expert thinking and complex communication grew steadily and consistently over the past four decades. The share of the labor force employed in occupations that emphasize routine cognitive or routine manual tasks remained stable in the 1970s and then declined over the next two decades. Finally, the share of the labor force working in occupations that emphasize non-routine manual tasks declined throughout the period.

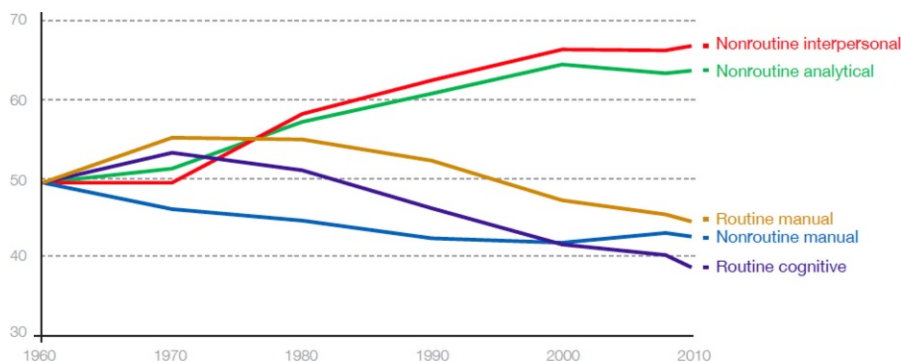


Figure 1. Economy-wide Measures of Routine and Non Routine Task Inputs
United States, 1960–2009.

Note: Each trend reflects changes in the numbers of people employed in occupations emphasizing that task. To facilitate comparison, the importance of each task in the US economy has been indexed to 1960, the baseline year. The value in each subsequent year represents the percentile change in the importance of each type of task in the economy.

Source: Levy and Murnane (2005, 2013)

Therefore, the evolution in the skills requirements for both new and existing jobs will not only affect the professional content of the curriculum but also have momentous implications in terms of generic competencies that graduates are expected to possess, as revealed by a meta-analysis of twenty-first century skills carried out by the World Economic Forum (WEF, 2015). Building on the *fundamental literacies* that any 21st century person needs to acquire during their primary and secondary education, such as literacy and numeracy, scientific literacy, ICT literacy, financial

CHAPTER 1

literacy, cultural and civic literacy, university graduates must master *complex competencies* to be able to contribute effectively to addressing today's challenges. The four key complex competencies are (i) critical thinking and problem solving skills, (ii) creativity, (iii) communication, and (iv) collaboration. Critical thinking is the ability to find and analyze relevant information to make a diagnosis of complex situations and formulate adequate responses and solutions. Creative people are capable of imagining and designing new, innovative ways of viewing and solving problems through the application, synthesis or repurposing of knowledge. This skill is of course crucial in the creative industries but it is also indispensable in any industrial or service activity where innovative processes and products can be applied to increase productivity or to find new solutions. Communication is the ability to listen, understand and explain complex phenomena and to convince others through oral, nonverbal, visual and written means. Finally, collaborative skills refer to the ability of individuals to work well in teams or within networks towards a common goal.

In addition, the ability of individuals to become successful professionals and active citizens in their rapidly changing environment is determined by their *character qualities*, also called socio-emotional skills, and commonly misnamed as “soft skills”. These include (i) curiosity, (ii) initiative, (iii) persistence, (iv) adaptability, (v) leadership, and (vi) social and cultural awareness. Curiosity, an important determinant of the motivation of learners, reflects the desire to ask questions and show open-mindedness. Initiative is the ability to seek new tasks or new goals in a proactive way. Persistence (or grit) is the capacity to sustain interest and efforts in accomplishing a task or a goal. Adaptability is the capacity to modify views, methods, plans or goals in light of new information. Leadership is the ability to inspire, guide and direct others to achieve a common goal. Finally, social and cultural awareness is the capacity to interact with other people and with the environment in a socially, culturally and ethically appropriate manner (Figure 2).

In his latest book (2009), Howard Gardner, the Harvard professor who developed the concept of multiple intelligences in the early 1980s, proposes “five minds for the future” that embody many of the complex competencies and character qualities presented above:

- The disciplined mind: the need to train and acquire the skills to become an expert in a specific professional area
- The synthesizing mind: the ability to understand, evaluate, use and communicate information from various sources in a coherent way
- The creating mind: the ability to think outside the box, break new ground, bring out new ideas, ask unfamiliar questions, and conjures up new ways of thinking
- The respectful mind: the capacity to accept and defer to the ideas of diverse groups
- The ethical mind: the capacity to do the right thing under all circumstances.

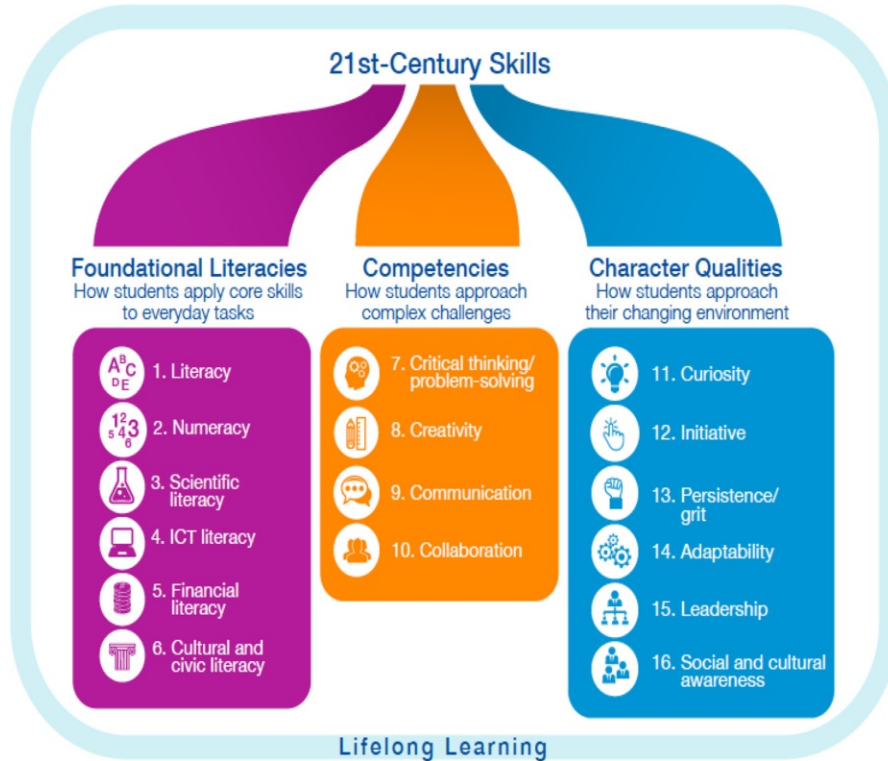


Figure 2. Skills for the Twenty-First Century.
Source: WEF (2015)

THE EVOLVING TERTIARY EDUCATION ECOSYSTEM

New Forms of Accountability

No good book was ever written on command, nor can good teaching occur under duress. And yet, conceding this, the fact remains that left entirely to their own devices academic communities are no less prone than other professional organizations to slip unconsciously into complacent habits, inward-looking standards of quality, self-serving canons of behavior. To counter these tendencies, there will always be a need to engage the outside world in a lively, continuing debate over the university's social responsibilities. (Derek Bok, 1990)

Until the 1980s, tertiary education institutions in the United States, the United Kingdom and Commonwealth countries were the only ones in the world with a strong tradition of external quality assurance. By contrast, most tertiary education systems