Chapter 13
The Importance of STEM Fields in Higher Education in a Post-Pandemic World

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ABSTRACT

In today's world, along with the COVID-19 pandemic, the importance of innovation and digitalization for economic growth raises the value of STEM (science, technology, engineering, and mathematics) education due to its contribution to knowledge generation, application, and distribution. Higher education students in STEM fields represent high-quality human capital because they are expertly aware, engage with industry, and incorporate commercial sensibilities into their daily research activity. So, the main goal of this study is to look at the current state of STEM fields in higher education and the labor market for university graduates from STEM fields. Also, the challenges facing STEM fields in higher education during the COVID-19 pandemic are discussed.

INTRODUCTION

A political consensus has emerged on the necessity of STEM education (science, technology, engineering, and mathematics) in recent decades (Freeman et al., 2014). This new policy objective is based on the belief that STEM education, knowledge, and innovation are crucial for economic growth as well as adherence to the principles of the knowledge-based economy (Hancock, 2019; Kayan-Fadlelmula et al., 2022). The knowledge-based economy is simply defined as an economic system in which the creation, application, and dissemination of knowledge lead to economic development (Bell, 1973). Also, the rise of the knowledge-based economy around the world plays a key role in giving all industries, including higher education, a long-term competitive edge (Günay, 2022). As a result, in developed countries, the

DOI: 10.4018/978-1-6684-5053-6.ch013

quality of human capital is a key factor in economic growth and is rapidly replacing other forms of corporate investment (Organisation for Economic Co-operation and Development [OECD], 1996). Higher education students in STEM fields, such as engineering, information and communication technologies (ICTs), natural sciences, manufacturing, etc., are thought to be high-quality human capital (Lam, 2010; Hancock, 2019). This is because they have professional knowledge, work with industry, and incorporate a business sense into their regular research activities.

Currently, a country's ability to maintain its competitiveness depends largely on the quality of its STEM education and how well its citizens perform in STEM fields (Koehler et al., 2015). Li et al. (2020a) reported that most of the projects in STEM education funded publicly by the Institute of Education Sciences (IES) of the US Department of Education from 2003 to 2019 were mainly classified as "development and innovation" or "efficacy and replication". As a result, STEM education is an essential strategy for advancing qualified workers, research and development (R&D), and innovation. In other words, highly qualified higher education graduates in STEM fields are an important factor influencing the country's competitiveness. From this point of view, STEM education is more important than ever because STEM-related fields in higher education have specific policy implications at a time when countries are trying to improve their citizens' ability to use new technology and compete in the economy.

Because STEM fields are constantly evolving, countries should compete globally to keep up with these new developments. New technologies, for instance, continue to be the main causes of disruption in workplaces and employment today all over the world. Even before the COVID-19 pandemic, the rapid and broad adoption of ICTs—one of the key STEM fields—had altered or eliminated a wide range of work environments, occupations, industries, and socioeconomic activities. It has also given rise to new labor market conditions all over the world. Learning STEM skills, or science, technology, engineering, and mathematics skills, has never been more crucial due to the pandemic as technology-intensive working life evolves and changes quickly. The jobs of the future will heavily rely on having a solid understanding of STEM subjects as the demand for roles that bridge the gap between humans and machines increases, and the types of jobs being created and those being destroyed have not been the same around the world since the last decade (OECD, 2018). The Future of Jobs 2020 report from the World Economic Forum (WEF) predicts that increasing automation would eliminate 85 million occupations by 2025 while creating 97 million new jobs that are better adapted to the new division of labor between people, robots, and computers due to the impact of the COVID-19 pandemic on the global labor market (WEF, 2020a). Hence, the need to acquire STEM skills for practical applications has never been greater in the post-pandemic world. In light of the COVID-19 pandemic, countries should coordinate their policies and investments in STEM education to help higher education students build skills for the 21st century and prepare them for a changing future (Soler & Dadlani, 2020).

In sum, the primary objective of this study is to look into current state of STEM fields in higher education and labor market conditions for higher education students, graduated from STEM fields, all around the world in a post-pandemic world. For this purpose, the findings on available data, particularly in OECD countries, were used as a proxy for evaluating the current state of STEM in higher education worldwide, along with some other resources such as WEF, providing information about the prospects of the labor market for higher education graduates related to STEM fields. Moreover, there are currently some challenges for higher education in STEM fields. Since university closures have disrupted the lives of higher education students, there is no time to spend on putting in place comprehensive policies to avoid a lost generation and greater disadvantages for higher education students enrolled in STEM fields. Hence, this study examined existing databases and other sources in depth to find out which STEM-related skills

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