

The Drivers and the Changes of the Digital Economy and the Skills Gap in the Formal Education

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Abstract

The digital economy is changing the way people work and creating new skills and competencies. But the formal education system is often behind in giving learners the skills they need to succeed in the digital economy. This paper looks at how the digital economy is changing and how the skills gap in formal education is getting bigger. It looks at different research works that show how to bridge the skills gap and teach learners relevant skills for the digital economy. It also discusses some of the best practices and recommendations for improving the quality and relevance of formal education in the digital era.

Keywords: digital economy, skills gap, formal education, digital skills, lifelong learning.

I. Introduction

The digital economy means how things like the internet, mobile devices, cloud computing, artificial intelligence, and blockchain affect how people do business. The digital economy encompasses a diverse range of sectors and industries, including but not limited to e-commerce, digital media, digital finance, digital health, digital education, and digital government. The digital economy also enables new forms of business models and value creation, such as platforms, networks, ecosystems, and sharing economy (Adobe Communications, 2022).

As the digital economy continues to evolve, new opportunities and challenges will arise for workers, employers, and policymakers. The main effects of the digital economy on the workplace include:

The emergence of new occupations and skills: The digital economy requires workers to have a mix of cognitive, technical, and social skills that are relevant to the changing needs of the labor market. Data analysts, software developers, digital marketers, online teachers, and platform workers are some of the new jobs and skills that the digital economy has created (International Labour Organization, 2021).

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The increase of flexibility and mobility: The digital economy lets workers do their jobs from anywhere and at any time using digital devices and platforms. This helps workers be more flexible and move around more easily because they can choose when, where, and how they work. This also poses challenges for ensuring decent working conditions, such as fair wages, social protection, health and safety, and work-life balance (Deloitte, 2022).

The transformation of work organization and relations: The digital economy has a significant impact on the way work is organized and coordinated between workers and employers. In the digital economy, for example, platform work is a form of work that connects workers to customers or tasks through online platforms. Platform work can offer workers greater autonomy and income opportunities, but it can also create issues of precarity, fragmentation, and isolation. Furthermore, the digital economy affects the role of social dialogue and collective bargaining in shaping the terms and conditions of work (Cocorocchia, 2016).

Problem Statement

The formal education system frequently lags in equipping learners with the essential competencies to thrive in the digital economy. It is not sufficient for the formal education system to prepare learners for the challenges and opportunities of the digital economy. A mismatch exists between the skills and competencies that learners acquire through formal education and the skills and competencies required by the digital economy. This mismatch is known as the skills gap, which can have negative consequences for learners, such as low employability, low productivity, and low innovation. The skills gap is influenced by numerous factors, including outdated curriculum, ineffective pedagogy, inadequate assessment, restricted access to digital infrastructure, and inadequate skills training.

Hence, the paper proposes that the formal education system necessitates a transformation to align with the evolving demands of the digital economy and address the skills gap among learners. This transformation may entail enhancing curriculum design, pedagogy, assessment, and accreditation to align with the present and future demands of the labor market and society. It can also mean encouraging people to keep learning and working together with others to make sure they have opportunities to learn and support throughout their career. The purpose of this paper is to give evidence and suggestions for this transformation based on different research works.

II. Drivers and Changes of the Digital Economy

The digital economy has its own characteristics, featured by new technological advances in the ways and means of doing business across sectors. Some of the key characteristics of the digital economy are:

Data-driven: Businesses collect data on their customers and anyone who visits their site, allowing them to personalize their products and services, optimize their operations, and innovate faster. Data is also a valuable asset that can be traded, monetized, or used to create network effects.

Highly mobile: Smartphones have changed the way we shop and live, allowing us to bring the internet wherever we go — whether it's ordering food delivery, booking a ride, or streaming a movie. Mobile devices also enable businesses to reach more customers, offer more convenience, and leverage location-based services.

Constantly evolving: The digital economy is dynamic and fast-paced, with new technologies emerging and disrupting existing markets and industries. Businesses need to be agile and adaptable to keep up with the changing customer preferences and competitive pressures. Innovation is essential for survival and growth in the digital economy.

Drivers of the Digital Economy

The drivers of the digital economy include all those factors that enable its continuous evolution and development (Qureshi, 2022). Below are some of the main drivers of the digital economy:

Technological innovation: Digital technologies have made it possible to make, distribute, and consume goods and services in new ways. Artificial intelligence, cloud computing, big data analytics, the internet of things, blockchain, 5G, and biotechnology have created new possibilities for enhancing efficiency, quality, and functionality. Innovative technologies also foster creativity and entrepreneurship, leading to new products and services that meet customer needs or create new markets.

Globalization: The digital economy has enhanced the interconnectedness and interdependence of people, businesses, and countries across the world. The internet has made it easier to communicate and share information, and it also makes it cheaper. Digital platforms have made it possible for people and organizations to work together across borders. Globalization has also made people more exposed to different cultures, ideas, and opportunities, which has made learning and innovation more fun.

Consumer preferences: The digital economy has given consumers greater choices, convenience, and control over their consumption decisions. Through online channels, consumers are able to access a wider range of products and services from anywhere and at any time. They can also compare prices, quality, and reviews from different sources and companies. Consumers are also able to customize their products and services according to their preferences and requirements. Furthermore, consumers are encouraged to provide feedback, ratings, reviews, or user-generated content.

The Changes of the Digital Economy

These can be explained as the components or outcomes of the digital economy. The main changes of the digital economy are:

New business models: The digital economy has enabled businesses to adopt new ways of creating and capturing value from their products and services (OECD, 2014). Some examples of new business models are:

Platforms: Platforms are enterprises that facilitate interactions between two or more groups of users, such as buyers and sellers, by means of an online infrastructure, such as a website or an application. Network effects (the value of a platform increases with the number of users) and data (the platform can collect and analyze data from user interactions) benefit platforms. Examples of platforms are Amazon (e-commerce), Airbnb (accommodation), Uber (transportation), Facebook (social media), Netflix (entertainment), etc.

Networks: Networks are enterprises that establish connections between diverse entities, such as individuals or organizations, through an online platform, such as a software or protocol. Networks let people share information, work together, or do things together. Networks include LinkedIn for professional connections, Wikipedia for knowledge sharing, Bitcoin for digital currency, and others.

Ecosystems: Ecosystems are enterprises that provide a diverse range of complementary products and services, which generate value for their clients through synergies and integration. Ecosystems use information, technology, partnerships, and customers trust to make sure customers have a good experience in many different areas. There are examples of ecosystems, such as Apple (hardware, software, and services), Alibaba (e-commerce, finance, and entertainment), etc.

New occupations: The digital economy has created new types of jobs that require specialized skills or knowledge related to digital technologies or applications.

Some examples of new occupations are:

Data analysts: Data analysts are professionals who collect, process, and interpret data using statistical and analytical tools. They help businesses make informed decisions, optimize performance, and identify opportunities or challenges. Data analysts need skills such as data mining, data visualization, data modeling, programming, etc.

Software developers: Software developers are professionals who design, develop, test, and maintain software applications or systems. They help businesses create digital products or services that meet customer needs or solve problems. Software developers need skills such as programming, software engineering, software testing, etc.

Digital marketers: Digital marketers are professionals who use digital channels (such as websites, social media, email, etc.) to promote products or services, generate leads, or increase sales. They help businesses reach and engage potential or existing customers online. Digital marketers need skills such as digital marketing strategy, content creation, search engine optimization, social media marketing, etc.

New skills requirements: The digital economy has increased the demand for skills that are relevant for the changing nature of work and the evolving customer expectations. Some examples of new skills requirements are:

Digital skills: Digital skills are the abilities to use digital technologies effectively and efficiently for various purposes. They include basic skills (such as using a computer or a smartphone), advanced skills (such as using software applications or online platforms), and specialized skills (such as coding or data analysis).

Cognitive skills: Cognitive skills are the abilities to process information, solve problems, think critically, and learn continuously. They include analytical skills (such as reasoning, logic, or numeracy), creative skills (such as imagination, innovation, or originality), and learning skills (such as curiosity, adaptability, or self-direction).

Social skills: Social skills are the abilities to interact with others in a positive and productive way. They include communication skills (such as listening, speaking, writing, or presenting), collaboration skills (such as teamwork, cooperation, or coordination), and emotional skills (such as empathy, compassion, or resilience).

III. Skills Gap in the Formal Education

The term "skills gap" is utilized to denote the discrepancy between the skills and competencies that learners acquire through formal education and those that are required by the labor market and society (Grob-Zakhary & Hjarrand, 2017). Cognitive, technical, and social skills are the three dimensions of the skills gap.

Cognitive abilities include the capacity to process data, resolve issues, evaluate alternatives, and continuously acquire knowledge. They include analytical skills (such as reasoning, logic, or numeracy), creative skills (such as imagination, innovation, or originality), and learning skills (such as curiosity, adaptability, or self-direction).

Technical skills encompass the proficiency in utilizing digital technologies effectively and efficiently for a variety of purposes. They include basic skills (such as using a computer or a smartphone), advanced skills (such as using software applications or online platforms), and specialized skills (such as coding or data analysis).

Social skills are the ability to interact with others in a positive and productive manner. They include communication skills (such as listening, speaking, writing, or presenting), collaboration skills (such as teamwork, cooperation, or coordination), and emotional skills (such as empathy, compassion, or resilience).

The Causes of the Skills Gap in Formal Education

Outdated curriculum: A lot of formal education curriculum is based on traditional ways of teaching and learning that don't match the current or future needs of the labor market or society. In some cases, the curriculum may not cover the important topics, concepts, or skills that are important for the

digital economy. The curriculum may also be rigid and inflexible, so it can't be changed or personalized based on the learners' interests, abilities, or goals.

Ineffective pedagogy: The traditional education system is often based on passive and rote learning methods that don't encourage learners to learn actively and deeply. The pedagogy may not engage learners in meaningful and authentic tasks that require them to apply their knowledge and skills in real-world contexts. The pedagogy may also not give learners enough feedback, help, or support to improve their learning outcomes and motivation.

Inadequate assessment: The formal education assessment is frequently based on standardized tests that assess learners' recall of facts and procedures rather than their comprehension of concepts and principles. The assessment may not accurately capture the learners' advancement or performance in terms of cognitive, technical, or social skills. The assessment may also fail to furnish learners with valuable information or recommendations to enhance their learning processes and outcomes.

The Consequences of the Skills Gap in Formal Education

Low employability: Learners who don't have the skills or abilities needed for the digital economy may have a hard time finding or keeping a job that matches their qualifications or goals. They may also face challenges in adapting to the changing demands of work or pursuing career advancement opportunities.

Low productivity: Learners who don't have the skills and knowledge needed for the digital economy may do poorly on work tasks or projects that require them to use digital technologies or work with others. They may also fail to innovate or create value for their employers or customers.

Low innovation: Learners who lack the necessary skills and competencies for the digital economy may miss out on the opportunities to generate new ideas, products, or services that meet customer needs or create new markets. They may also fail to contribute to the social and economic development of their communities or countries.

Therefore, it is imperative to address the skills gap in formal education by enhancing curriculum design, pedagogy, assessment, and accreditation to reflect the current and future needs of the labor market and society (Kumar, 2021). It is also important to promote lifelong learning and collaboration among stakeholders to ensure continuous learning opportunities and support for learners throughout their careers.

IV. Strategies and Solutions for Bridging the Skills Gap

Strategies and solutions for bridging the skills gap are the actions and interventions that aim to reduce the discrepancy between the skills and competencies that learners acquire through formal education and the skills and competencies that are required by the labor market and the society. Various research

works have proposed different strategies and solutions for bridging the skills gap in formal education, such as:

Enhancing curriculum design: A curriculum design is the process of planning and developing the content, structure, and delivery of a formal education curriculum. Enhancing curriculum design entails revising and integrating the curriculum with the present and future demands of the labor market and society, while also incorporating pertinent subjects, concepts, and skills that are crucial for the digital economy. Enhancing curriculum design also entails enhancing its adaptability and flexibility to the learners' interests, abilities, and objectives, as well as presenting a wider range of choices and options for learners to tailor their learning pathways, as stated by Eshach (2006) and Kumar (2021)

Enhancing pedagogy: Pedagogy is the method and practice of teaching and learning. Enhancing pedagogy involves adopting more active and deep learning methods that engage learners in meaningful and authentic tasks that require them to apply their knowledge and skills in real-world contexts. Enhancing pedagogy also involves providing learners with adequate feedback, guidance, and support to enhance their learning outcomes and motivation. Moreover, enhancing pedagogy involves leveraging digital technologies and platforms to facilitate learning, such as using online courses, simulations, games, or virtual reality (Wray & Montgomery, 2019).

Enhancing assessment: Assessment is the process of measuring and evaluating learners' progress or performance in terms of knowledge, skills, or competencies. Enhancing assessment involves using more diverse and holistic assessment methods that capture learners' cognitive, technical, and social skills, as well as their understanding of concepts and principles. Enhancing assessment also involves providing learners with useful information or recommendations to improve their learning processes and results. Furthermore, enhancing assessment involves using digital tools and systems to collect, analyze, and report assessment data, such as using online tests, portfolios, or badges (Kumar, 2021) (Grob-Zakhary & Hjarrand, 2017).

Enhancing accreditation: Recognition and validation of learner's achievements or qualifications in terms of knowledge, skills, or competencies is known as accreditation. To make accreditation better, you need to make sure that what a learner does is important, reliable, and can be used in many different situations or fields. Enhancing accreditation also involves ensuring that learner's accomplishments or credentials are transparent, verifiable, and transferable across various platforms or systems. Furthermore, enhancing accreditation entails utilizing digital credentials or certificates to document and communicate learner's accomplishments or qualifications, such as by utilizing blockchain or micro-credentials.

Promoting lifelong learning: Lifelong learning is the continuous pursuit of learning opportunities throughout one's life for personal or professional development. Promoting lifelong learning involves creating a culture of learning that values curiosity, adaptability, and self-direction among learners.

Promoting lifelong learning also involves providing access to diverse and quality learning opportunities for learners at different stages of their careers or lives. Moreover, promoting lifelong learning involves fostering collaboration among stakeholders (such as educators, employers, policymakers) to support learners' learning needs and aspirations.

The strengths and weaknesses of different strategies and solutions for bridging the skills gap can vary depending on the context, implementation, and evaluation of each strategy or solution.

However, some general strengths and weaknesses can be identified as follows:

Strengths: Using strategies and solutions to help learners get the skills and competencies they need for the changing demands of work and society can help improve the quality and relevance of formal education in the digital age. They can also help enhance learners' employability, productivity, innovation by preparing them for new occupations or roles that are enabled by the digital economy. Moreover, they can help foster learners' personal growth by enabling them to pursue their interests, abilities, goals throughout their lives.

Weaknesses: The strategies and solutions for bridging the skills gap can face challenges in terms of feasibility, effectiveness, sustainability by encountering barriers such as resource constraints, resistance to change, lack of coordination among stakeholders. They can also face risks in terms of equity, quality, ethics by creating gaps or biases such as access gaps, skill gaps, digital divides among different groups of learners.

Some of the best practices and recommendations for enhancing the quality and relevance of formal education in the digital era are:

- Involve multiple stakeholders in designing, implementing, evaluating strategies and solutions for bridging the skills gap to ensure alignment, collaboration, accountability among different actors (such as educators, employers, policymakers)
- Use data and evidence to inform decisions and actions regarding strategies and solutions for bridging the skills gap to ensure relevance, effectiveness, impact of the interventions
- Adopt a learner-centered and inclusive approach to delivering strategies and solutions for bridging the skills gap to ensure diversity, equity, empowerment of learners
- Embrace innovation and experimentation in developing strategies and solutions for bridging the skills gap to ensure agility, adaptability, creativity of the solutions

V. Conclusion

The aforementioned strategies and solutions have the potential to enhance the standard and relevance of formal education in the digital era by ensuring that learners acquire the essential skills and competencies to meet the evolving demands of work and society. They can also make learners more employable, work faster, and come up with new ideas by getting them ready for new jobs or jobs that are possible because of the internet. Moreover, they can help foster learners' personal growth by enabling them to pursue their interests, abilities, goals throughout their lives.

Nevertheless, these strategies and solutions can also face challenges and risks, such as resource constraints, resistance to change, lack of coordination among stakeholders, access gaps, skill gaps, and digital divides among different groups of learners.

It is important to involve multiple stakeholders in designing, implementing, and evaluating strategies and solutions for bridging the skills gap in order to ensure equality among stakeholders.

It is imperative to utilize data and evidence to guide decisions and actions pertaining to strategies and solutions for bridging the skills gap, in order to guarantee the relevance, efficacy, and impact of the interventions.

It is also important to use a learner-centered and inclusive approach to providing strategies and solutions for bridging the skills gap. This will make sure learners are diverse, treated fairly, and empowered.

Furthermore, it is important to embrace innovation and experimentation in developing strategies and solutions for bridging the skills gap in order to ensure agility, adaptability, and creativity of the solutions.

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