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# Policy Brief

# Knowledge Economy

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This policy brief is part of a series of nine sectoral studies developed by the Lebanese Center for Policy Studies (LCPS). The lead author of this series is Senior Economic Researcher Lina Maddah, with the contribution of Executive Magazine. The aim of this series of briefs is to examine the impact of Lebanon's economic crises on key economic sectors and present recommendations that can assist with private sector recovery. This series was developed with the support and contribution of the Lebanese Private Sector Network (LPSN) and in collaboration with Executive Magazine.

## Sector Overview

The term 'knowledge economy' refers to an economic sys-tem that is built upon information and knowledge as core resources and relies on highly skilled human capital and technological innovation as its enablers. Constituting a key driver of the global economy since the second half of the 20th century, the core digital aspects of information societies and knowledge economies have been fueled by a wave of new information and communication technologies (ICT), including hardware, computer operating systems, and software; the growth of the internet and creation of the world-wide-web in the 1980s and '90s, the 'New Economy' of the late 1990s, the escalation of mobile telephony, mobile data and smartphone applications in the 2000s and 2010s, and lately by innovations such as machine learning and internet-of-things that have by the World Economic Forum been described as constituents of the Fourth Industrial Revolution.[1]

In light of the accelerating speed and impact of knowledge economy developments over the past half century, it cannot be assumed that the process of digital transformation of human economy and society has reached its peak at the time of this brief characterization. Lebanon benefits from the presence of enterprises in many knowledge economy specializations, from ICT to telecoms operators, internet services providers, mobile application specialists, cybersecurity vendors, and platforms for social media, e-commerce, food, and goods deliveries, and, very notably, remote working on international and domestic grounds.

In 2016, the ICT industry, located at the center of the knowledge economy, reached a size of $436.2 million, making it the third principal contributor to the country's GDP, following the banking sector and emigrant remittances[2], with the sector being differentiated by its dynamism and innovation. Between 2014 and 2016, the market grew at a compounded annual growth rate of 7 percent and the sec-tor's value-added reached $2.2 billion in 2017, up from $1.9 billion in 2013, contributing 3 percent to Lebanon's GDP[3] (up from 0.73 percent in 2011). The ICT sector is mainly composed of small and medium enterprises (SMEs) and relies heavily on retail and whole-sale activities, except for its main actor in knowledge production; the software development and services subsector.

Software firms operate across three major activities: 52 per-cent being software producers, 36 percent web solution providers, and 12 percent mobile services and applications developers. Together, they employ around 5,000 individuals in direct jobs (2017).

The number of SMEs in the ICT sector before the crisis was given by Investment Development Authority of Lebanon (IDAL) as approximately 550. Estimates on the number of companies in the combined ICT sector and the IT services sector range up to 800. Number of ICT workforce according to the Lebanon Economic Vision released by the McKinsey & Company consulting

1 See The Fourth Industrial Revolution, 2016 book by Klaus Schwab and numerous references by the WEF

2 UK Lebanon Tech Hub (2016), The Future of Lebanon's Knowledge Economy, UK Lebanon Tech Hub, Beirut, Report

3 IDAL (2017), ICT Sector in Lebanon, Available at: https://investinlebanon.gov.lb/Content/uploads/Publication/181205011004908~IDAL-ICT%20 FACTBOOK%202018.pdf

firm was 2 percent, or 44,000, in the total Lebanese employee base. However, industry representatives have given substantially lower estimates for the existing number of enterprises and jobs in ICT as of 2021.

Before the crisis, estimates on the annual salary per worker in the software sector were $19,300 as compared to $12,200 in the manufacturing sector, and the majority of its labor force were young when compared to other sectors of employment (64 percent of total em-ployment in the software sector require good technical skills and 12 percent require highly technically skilled engineers and graduates)[4]. Additionally, software firms generate high-value ideas, innovation and copyrights, that contribute to other sectors' growth and competitive-ness (such as industrial innovation), and have multiplier effects evident in the increase in the income driven by any sectors' growth.

Offering positive notes for inclusiveness of women and integration of youth, a wide dispersion of ICT-relevant education and training – such as school-level coding initiatives and STEM education – as well as a not-negligible number of women-led tech startups (in some years upward of 20 percent) indicate that the ICT sector of Lebanon has development potential when viewed through the lens of SDG priorities.

Given the presence of extreme economic uncertainty, the out-look for the Lebanese knowledge enterprises is foggy but overall upbeat. Acknowledged weaknesses in previous state dealings with telecommunication assets and SOEs of knowledge economy relevance notwithstanding, a November 2021 statement by the office of the Presidency of the Council of Ministers stipulates optimistically: 'The Government believes that under the right policies, Lebanon can become a global hub in the provision of e-services, hence creating a substantial number of high value added jobs, increasing the productivity of the Lebanese economy, and boosting GDP growth.'

## Challenges

Though Lebanon has a well-educated and skilled work-force, and the country has positioned itself as a regional hub for software development, with a significant number of startup incubators and accelerators, still, its knowledge economy faces several challenges, which are partly systemic and partly related to the country's economic and political crises of the 2020s.

- Innovation: Lebanon received a score of 33.82 out of 100 in the 2015 Global Innovation Index (GII), placing it 74th out of 141 nations (for comparison, the United Arab Emirates received a score of 40.06 and Jordan received a score of 33.78)[5]. Out of 132 economies, Lebanon dropped to 92nd place in 2021[6] (sub pillars are presented in Figure 1).

4 World Intellectual Property Organisation WIPO, 2017, Study on the Economic Contribution of the Software Industry in Lebanon, Available at: https://www.wipo.int/export/sites/www/copyright/en/performance/pdf/econ_contribution_lb.pdf

5 The Global Innovation Index 2015: WIPO Knowledge Repository, Available at: https://www.wipo.int/edocs/ pubdocs/en/wipo_pub_gii_20 15-intro5.pdf

6 Lebanon: Global Innovation Index, Available at: https://www.wipo.int/edocs/ pubdocs/en/wipo_pub_gii_20 21/lb.pdf

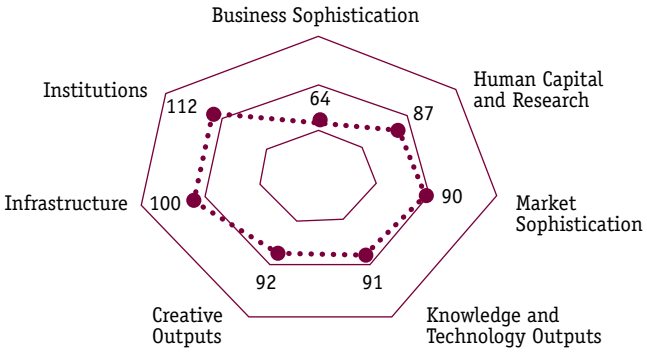
Table 1 **Lebanon GII Ranking (2020-2023)**

| | GII Position | Innovation inputs | Innovation outputs |
|---|---|---|---|
| 2020 | 87th | 93rd | 80th |
| 2021 | 92nd | 94th | 97th |
| 2022 | N/A | N/A | N/A |
| 2023 | 92nd | 86th | 95th |

Source: Global Innovation Index Database, The World Intellectual Property Organization, Retrieved on 28/12/2023

- Failure of the government and institutions: Businesses in Lebanon found it nearly impossible to function as a result of government institutions' catastrophic failures on the local and national levels, particularly the central bank's oversight of the financial sector. According to the World Intellectual Property Organization (WIPO), Lebanon fares very poorly in matters of the political cli-mate and government (rated 129th out of 139 countries), which highlights two significant bottlenecks: political and operational in-stability and inefficiency, as well as government ineffectiveness. Regarding the regulatory environment, the nation ranked 115th in the sub-pillar 'rule of law.' A long line of assessments by international development finance institutions and private sector organizations such as the World Economic Forum have for many years chastised bureaucracy, rigid centralized authority, and institutional inaction as detrimental to doing business in this country. In context of the importance of ICT and digital transformation for Lebanon, the subpar performance of institutions and government agencies has become an even greater obstacle to the knowledge economy as core constituent of economic recovery.

Figure 1 **The Seven Global Innovation Index Pillar Scores for Lebanon - 2021**




Source: Maddah and Akar (2023)[7]

This figure depicts WIPO's seven Global Innovation Index pillar scores for Lebanon in 2021. It shows scores for the seven pillars that make up the Innovation Input Sub-Index. These pillars are Institutions, Human capital

7 Maddah, L., and Akar, B. (2023): Lebanon's Economic Crisis by Sector: The Knowledge Economy Loses its Balance, The Lebanese Center for Policy Studies.

and research, Infrastructure, Market sophistication, Business sophistication. The scores for each pillar range from 0 to 100. A higher score indicates a stronger innovation environment.

- Failures in the infrastructure: The provision of telecommunications networks for connectivity, energy supply, and transportation is generally considered to be a part of national infrastructure. All providers of these specialized infrastructures in Lebanon have been severely impacted by the crisis. Most knowledge economy infrastructures have been disrupted by theft, strikes, electricity shortages and funding problems, and some have deteriorated to the point of collapse. This deterioration is reflected in the fact that Lebanon's position in the Enabling Environment pillar of the Global Knowledge Index dropped from 111th position out of 138 countries in 2021 to 139th place out of 154 in 2022. Connectivity, which is crucial for practically all companies in the knowledge economy, has very markedly suffered. According to the Speedtest Global Index Lebanon's broadband connection speed in 2020 placed it in 161st place out of 177 nations, meaning a one-year drop of over 65 places from 2019.[8]
- Brain drain: Lebanon's ability to retain talent placed it 105th out of 137 countries in the world in 2018[9]. In the two years be-tween 2020 and 2021, the number of people emigrating from Lebanon increased 4.5 times. This new significant wave of emigration was largely fueled by a high youth unemployment rate of 47.8 percent (almost twice the adult unemployment rate of 25.6 percent)[10] as of January 2022.

  There has long been an annual oversupply of university graduates when compared with the absorption capacity of the domestic job markets – an oversupply that has been correlated with the out-migration desires of graduates. Youth unemployment (in Lebanon as in the Arab countries) was a noted problem throughout the last 30 years. Still, the loss of Lebanese talent in context of the ongoing crisis is damaging to the knowledge economy and its key industries, such as ICT.

From the angle of seeing digital transformation as central to any economic system's development until the middle of the 21st century, Lebanon's digital transformation and the knowledge economy are facing grave challenges, as they have for almost the entire period since the end of the internal conflict. For example, past under-investment and extractive abuse of governmental provision of connectivity and mobile telephones as the government's 'cash cow'[11] have been diagnosed in several governmental documents.

Economic experts and tech-savvy policy makers have warned that the failure of digital transformation would translate into the widening of an already existing Lebanese digital lag behind middle-income countries and global markets.

8
The index ranks countries according to their internet speeds monthly, for more details See: Rebuilding the knowledge economy - Executive Magazine (executive-magazine.com)

9
Ben Hassen, T. (2020), The State of the knowledge-based economy in the Arab world: cases of Qatar and Lebanon, Euromed Journal of Business.

10
Wave after wave: the Lebanese Brain Drain, November 2022, AUB https://sites.aub.edu.lb/data visualization/2022/11/29/wa ve-after-wave-the-lebanese-br ain-drain/

11
Member of Parliament and ICT expert Ghassan Hasbani in a 2022 interview with Executive Magazine

Quite recently, in addressing the problems of under-investment and inconsistent pursuit of digital priorities, the Lebanese government's 2022 digital transformation strategy stipulates three objectives: easing of citizen access to government services; enabling the private sector digital economy; and transformation of the public sector by way of paradigm shift to digital operations. In the document, which notes that the digitization strategy has been subject to frequent revisions at times of changes in government, the number of 'challenges' and 'risks' outweighs the listed opportunities and 'success factors'. The strategy called for addressing more than 10 legislative gaps and new downside risks 'that have increased, grown and become more complex'.[12]

12
2022 edition of the Lebanon Digital Transformation Strategy

## Opportunities

The human capital proposition for a knowledge economy development and digital transformation of Lebanon is anchored by the power of prestigious universities that produce skilled professionals in various fields including engineering, business and technology, think tanks and research centers offering opportunities for collaboration and innovation.

The mindset that drives knowledge economy and digital trans-formation from the private sector is strongly present. It consists of the entrepreneurial spirit that provides a foundation for the growth of knowledge-based industries, particularly in the fields of technology, digital media, and creative ventures.

Multilingual and cosmopolitan environment providing an ad-vantage for global connectivity and cross-cultural collaboration.

Diaspora engagement: extensive, and spread across the globe, with successful professionals in various knowledge-based sectors, the diaspora has many potentials for engaging with knowledge economy advocates and ICT industry stakeholders in Lebanon. Engaging with the diaspora can bring investment, expertise, and networking opportunities.

Private sector companies have the potential to double the contribution of this sector to the country's GDP from $1.5 billion to $3 billion, and the exports to 25% of total exports.[13]

13
The Knowledge Economy - Executive Magazine (executive-magazine.com)

## Policy Recommendations

1. Prioritize telecommunication reforms as structural needs for a knowledge economy. Businesses and start-ups cannot survive, grow, or innovate without having access to fast, accessible, and affordable telecommunication. Municipalities and local governments should support the establishment of local hubs with sustain-able electricity (solar panels) solutions and internet connectivity that businesses, especially those in creative and knowledge-based activities can benefit from.

2. Encourage digitization in education and the economy which can have quite many implications in the knowledge economy and innovation capacity of human capital and organizations.
3. Strengthen K-12 education in STEM, promote vocational training, cultivate soft skills, modernize research institutions, and encourage technology transfer from academia to industry in order to enhance human capital development.
4. Foster an enabling environment for R&D and innovation by establishing legal frameworks that encourage R&D in businesses, such as R&D tax credits and reductions. R&D tax credits support business investments by allowing companies to claim an enhanced corporation tax reduction on their R&D costs. Establish an active intellectual property help desk at the Ministry of Economy and Trade.
5. Join international agreements that strengthen innovation.
6. Prioritize data protection, implement a national digital ID, establish interoperable databases, enable digital payments, and digitize public services for da-ta-driven innovation.
7. Build up the enabling environment for knowledge enterprises through coordination and collaboration among several actors. Universities, the CNRS, and the Ministry of Education and Higher Education should create incentives for researchers to collaborate with private firms. This can be achieved through research programs in universities (masters and PhDs).
8. Establish a comprehensive set of fiscal incentives to encourage investment, close the funding gaps in the ecosystem, particularly at the early ideation stage and at the later scale-up stage. In addition, offer le-gal protections, procurement preference, and streamlined access to investors and resources.
9. Promote and improve exports of ICT services, along with reforms to boost e-commerce and digital payments.
10. Implement strategies for monitoring progress, evaluating performance and data-driven policy adaptation.

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**About the Policy Brief**
A Policy Brief is a short piece regularly published by LCPS that analyzes key political, economic, and social issues and provides policy recommendations to a wide audience of decision makers and the public at large.

**About LCPS**
Founded in 1989, the Lebanese Center for Policy Studies is an independently managed, non-partisan, non-profit, non-governmental think tank whose mission is to produce and advocate for policies that improve governance in Lebanon and the Arab region. LCPS's current research agenda focuses on: enhancing governance, informing the process of economic growth and sustainable development, promoting inclusive and effective social policies, and informing the development of policies for a sustainable environment. Four themes cut across the above areas of focus, including gender, youth, conflict resolution, and technology.

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