Research

Sector Snapshots

Issue 8

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) SECTOR IN GEORGIA

April, 2023

SUMMARY

- Trends in information and communication technologies (ICT) are shaping the future amid existing global challenges. Among major global ICT trends are the growing prevalence of artificial intelligence (AI) and machine learning (ML), increased mobility, and advanced connectivity.
- As various global ICT trends spread rapidly and companies from all sectors of the economy work intensely on the digital transformation of their activities, it is essential for Georgia's economic development that it keeps pace with these worldwide advances, establishes its own niche, and specializes in certain aspects of ICT.
- Georgia has made significant progress toward achieving universal and meaningful digital connectivity, with notable improvements in indicators of ICT accessibility and affordability. However, importantly, the country lags behind in terms of ICT skills development.
- The increased adoption of home-based and other forms of remote labor in this sector, enabled by increased mobility and advanced connectivity, has presented skilled workers in Georgia with greater opportunities than before to work for companies in other countries. At the same time, numerous workers are moving from small domestic ICT companies to larger international ones.
- There has been a considerable inflow of skilled ICT workers into Georgia from Russia, Ukraine, and Belarus since the outbreak of war in Ukraine in February 2022.
- The YoY real GDP growth of the ICT sector in Georgia reached 49.9% in 2022, representing one of the main drivers of total real GDP growth. Important contributors to this were tax incentives for international ICT companies introduced by the GoG and the inflow of skilled workers due to the war in Ukraine.
- Due to an increased demand for employees from new businesses joining the market, the ICT sector has experienced a steady rise in employment (YoY 20% in 2022). Moreover, the average nominal wage in the ICT sector has also significantly increased and reached 3200 GEL in 2022, marking a 56% rise compared to 2021. Meanwhile, when comparing across sectors, the average monthly nominal wage in the ICT sector was nearly double the average monthly nominal wage in Georgia in 2022.
- While the ICT sector in Georgia has shown substantial growth in recent years, Georgia's position has dropped in some international rankings, in particular those measuring a country's capability to produce innovative outputs (Global Innovation Index), its readiness to adopt frontier technologies (Frontier Technologies Readiness Index), and, critically, its capability to use ICT to increase the country's competitiveness and overall well-being (Network Readiness Index).
- There is thus a need for Georgia to develop a unified state strategy for its ICT sector, which will guide the country towards maximizing sustained economic benefits from those developments, and gaining competitive advantages in particular areas of ICT.

Global trends in ICT are shaping the future amid existing global challenges

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Significant global ICT trends in 2022

Applied AI
Models trained in machine learning can be used to solve classification, prediction, and control problems to automate activities, add or augment capabilities and offerings, and make better decisions.

Advanced connectivity
5G/6G cellular, wireless low-power networks, low-Earth-orbit satellites, and other technologies support a host of digital solutions that can drive growth and productivity across industries.

Increased mobility
Mobility technologies aim to improve the efficiency and sustainability of land and air transportation of people and goods.

Cloud and edge computing
Cloud and edge computing involves distributing computing workloads across remote data centers and local nodes to improve data sovereignty, autonomy, resource productivity, latency, and security.

Web3
Web3 includes platforms and applications that enable shifts toward a future, decentralized internet with open standards and protocols while protecting digital-ownership rights, providing users with greater ownership of their data and catalyzing new business models.

Next-generation software development
Next-generation tools aid in the development of software applications, improving processes and software quality; tools include AI-enabled development and testing and low-code or no-code platforms.

Trust architectures and digital identity
Digital-trust technologies enable organizations to build, scale, and maintain the trust of stakeholders in the use of their data and digital-enabled products and services.

Source: McKinsey Technology Trends Outlook 2022

- Today, while trying to recover from the COVID-19 pandemic and coping with the impacts of the war in Ukraine, **the world faces severe social and economic challenges.**
- Global trends in information and communication technologies (ICT), as well as innovations in digitalization and connectivity can certainly play an important role in shaping the future. Among major global ICT trends are the growing prevalence of artificial intelligence (AI) and machine learning (ML), increased mobility, and advanced connectivity.
- Importantly, **the war in Ukraine** carries some considerable implications for the global ICT industry, including the relocation of ICT companies and the migration of skilled ICT labor.
- The rapidly-spreading process of **digital transformation**, which implies the integration of digital technologies (like AI and cloud computing) by companies aiming to transform their business is reshaping not only the ICT industry but all sectors of the economy.
- Crucially, **frontier technologies are both destroying old jobs and creating new ones**.[1] Currently, with recent advancements in AI and its capacity to mimic human intelligence[2], job expectations are more pessimistic. However, it should also be considered that not all tasks in a job are automated, and, most importantly, technology also creates new products, tasks, professions/occupations, and economic activities.
- The capabilities of countries to use, adopt, and adapt innovations and digital transformation will play a crucial role in their shaping future economic development. That is why it is **crucial to analyse the challenges and opportunities with regard to the development of the ICT sector in Georgia.**

1. UNCTAD, Technology and Innovation Report 2023. https://unctad.org/tir2023
2. Of note here is the recently-released ChatGPT by OpenAI, a powerful new chatbot using an updated version of its AI system to perform a wide range of tasks, from creating software to generating business ideas to writing a wedding toast. While versions of GPT have been around before, this latest model has crossed the threshold of the quality of produced outputs as the quality of the outputs produced previously was much lower than that produced by an average human. Critically, the last version of ChatGPT has achieved previously unseen rapid and widespread adoption. Read more at: https://hbr.org/2022/12/chatgpt-is-a-tipping-point-for-ai

Georgia making progress in terms of ICT connectivity and affordability

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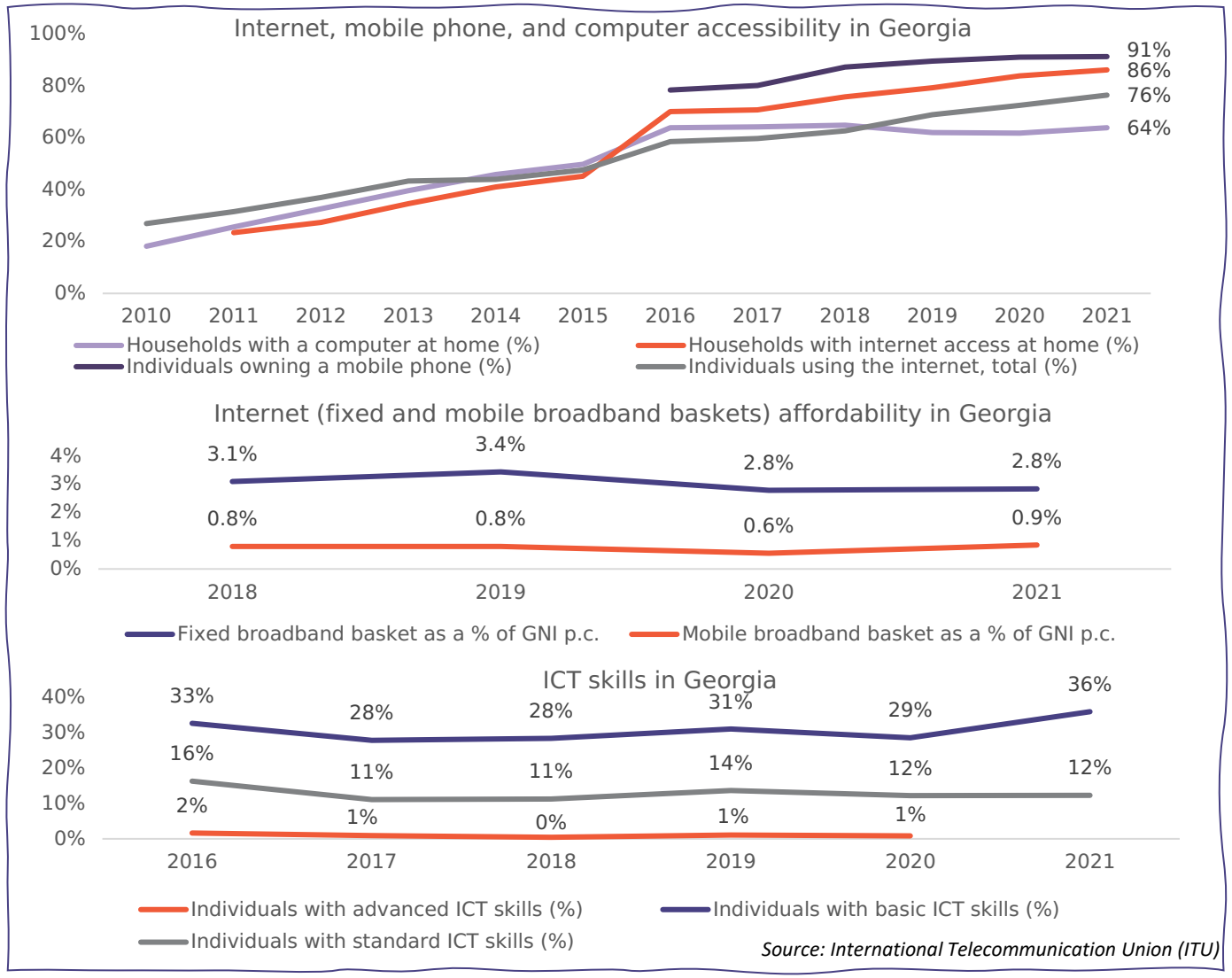
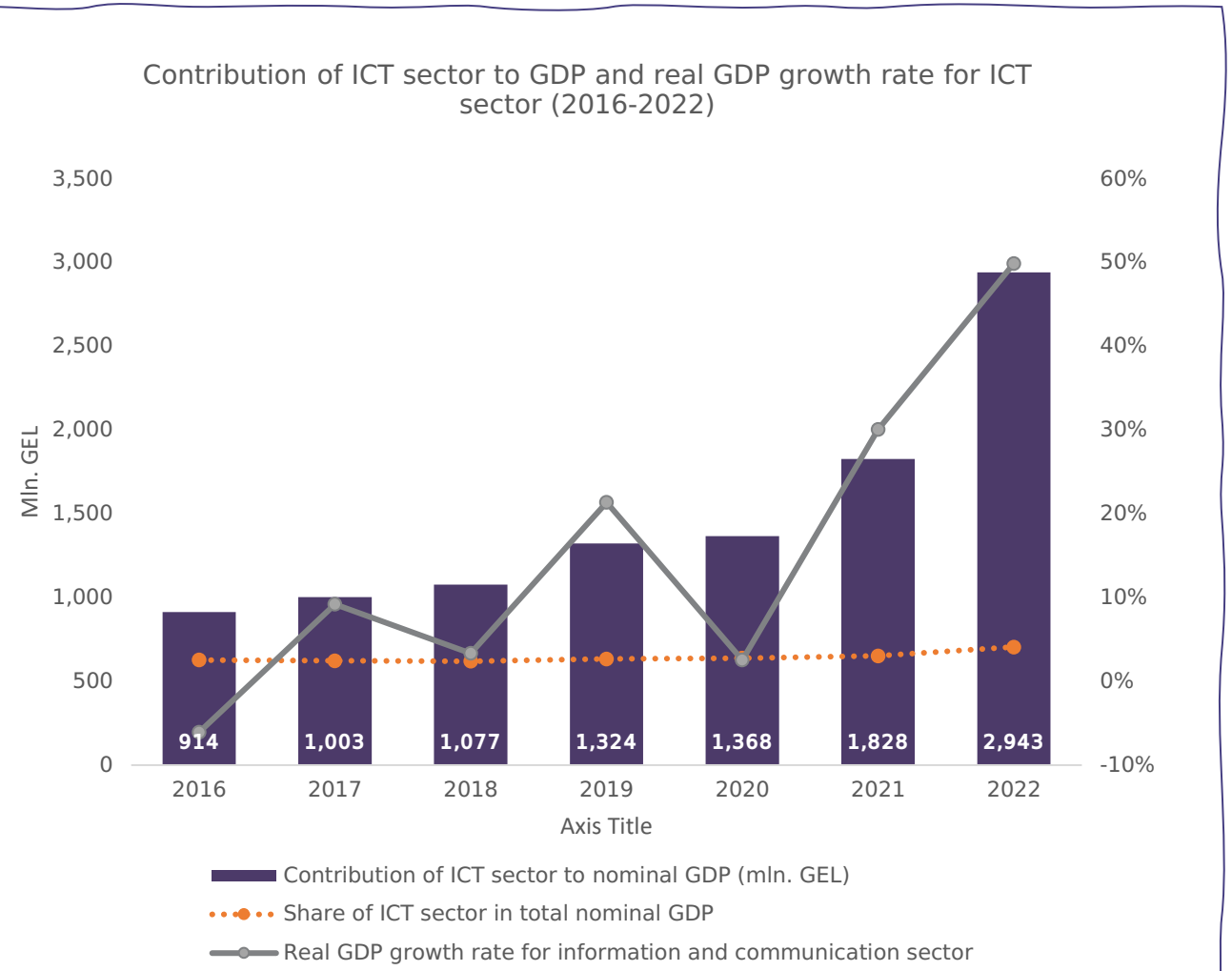


Source: International Telecommunication Union (ITU)

- Georgia has made progress in the last decade or so toward obtaining "universal and meaningful digital connectivity"[3], with an upward trend in the proportion of people **using the internet (**climbing from 27% in 2010 to 76% in 2021), the proportion of families with **access to the internet** at home (rising from 23% in 2011 to 86% in 2021) and the percentage of families **using a computer at home (rising** from 18% in 2010 to 64% in 2021, although this stalled somewhat between 2016 and 2021, which can be attributed to the proliferation of smartphones and tablets).
- **ICT affordability** in Georgia was closer to "universal and meaningful digital connectivity" objective in 2021 than the global average.[4] Specifically, fixed broadband amounted to 2.8% of GNI and mobile broadband to 0.9%.[5]
- **ICT skills** in Georgia require improvement as the country is still a long way from "universal and meaningful digital connectivity", which would require more than 70% of the 15+ population to have basic skills and 50% to have intermediate skills by 2030. As ICT skills are measured based on whether an individual has recently performed certain activities that require different levels of skill,[6] the decrease in ICT skills observed in 2020 may suggest that a larger pool of computer users, who previously had limited skills, started using computers during the COVID-19-related lockdown.
- According to CAREC institute's **Composite Digital Divide Index**[7], which takes into account factors like price, accessibility, infrastructure, Georgia is the second best-performing (least digitally divided) country among eight selected CAREC economies.[8] Despite being the top performer country in the CAREC region, Georgia demonstrates a substantial digital divide compared with other emerging economies such as Eastern EU or China.
- For information about global trends in internet, mobile phone, and computer accessibility and affordability, and ICT skills, see **Appendix**.

3. "Universal and meaningful digital connectivity" – a set of UN targets aiming to achieve a situation where everyone can enjoy a safe, satisfying, enriching, productive, and affordable online experience.
4. Making broadband affordable is one of the aims towards achieving meaningful universal connectivity, which implies that by 2025, entry-level broadband services should be made affordable in low- and middle-income countries at less than 2% of monthly GNI per capita.
5. Fixed broadband basket is a collection of fixed broadband services that internet service providers typically offer, including a set quantity of data, a minimum speed, and other features, while data-only mobile broadband basket is a collection of mobile broadband services that mobile network carriers provide, including a specific quantity of data and a minimum speed.
6. Indicator HH15 is calculated as the proportion of computer users (HH5) who have carried out each computer-related activity.
7. CAREC-Institute-Digital-CAREC-report-March-2022-1.pdf (carecinstitute.org)
8. Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, and Uzbekistan.

High growth of ICT sector was one of the main drivers of Georgia's real GDP growth

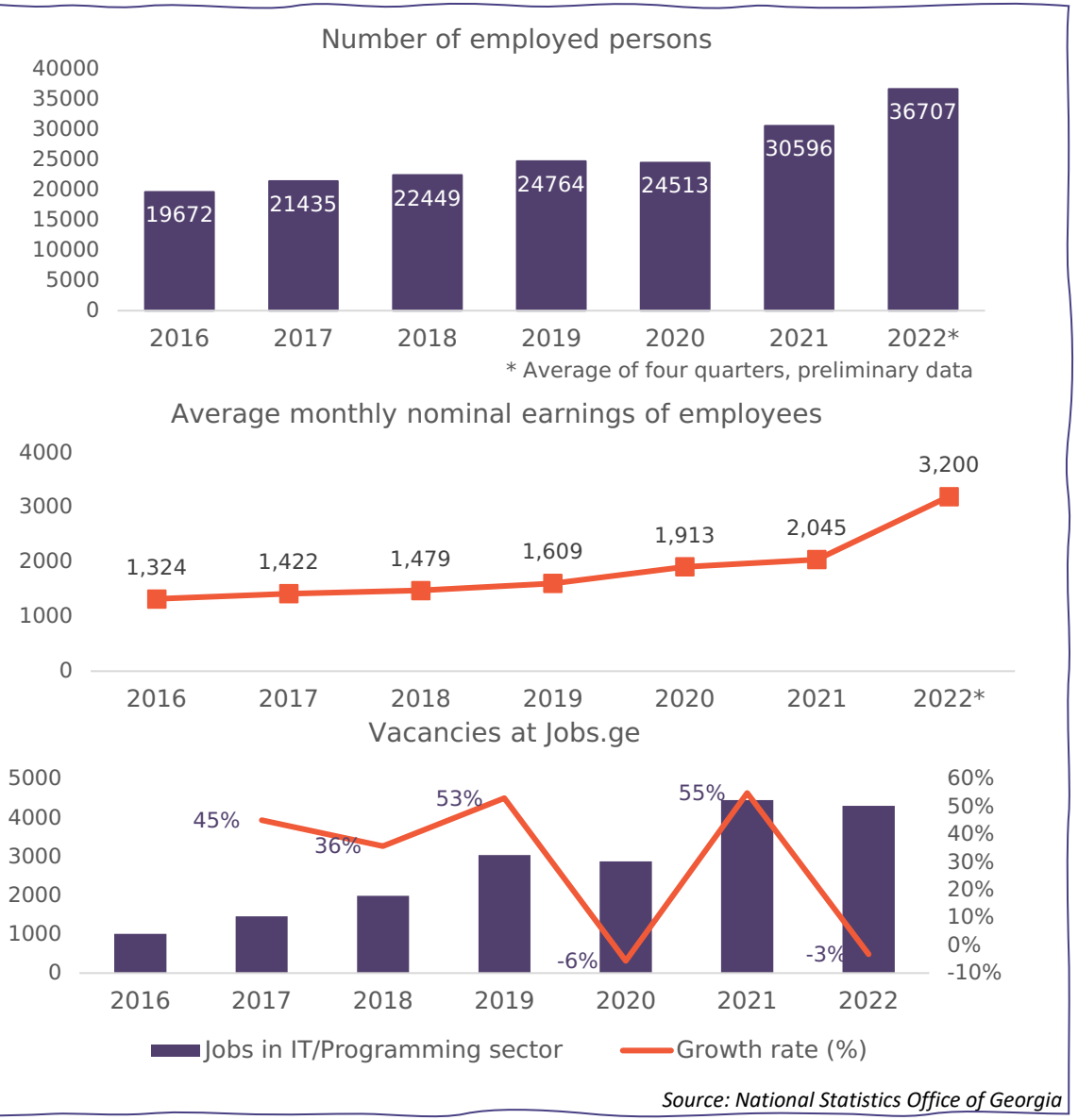


Source: National Statistics Office of Georgia

- The **real GDP growth of ICT sector** reached 49.9% in 2022 and as a result, the growth in the ICT sector was one of the main drivers of real GDP growth in 2022 compared to 2021.
- **The contribution of the ICT sector to the total nominal GDP** of Georgia has been steadily rising since 2016 and reached GEL 2,943 million in 2022.
- If the slight dip in 2018 is omitted, **the ICT sector's share in total nominal GDP** has also been steadily increasing since 2016, going from 2.6% and reaching 4.1% by 2022.
- One of the main factors contributing to the growth of the ICT industry in Georgia is **tax incentives**. In 2020, the GoG adopted new legislation granting significant tax exemptions to international ICT companies.[9] Accordingly, several major international players in the field have entered the country in recent years.[10]
- Another important factor contributing to the growth of the ICT sector in Georgia in 2022 was **the war in Ukraine**. The war has forced **the migration of skilled workers.** Since the outbreak of war in Ukraine, the border crossing statistics have shown significant differences in the number of entries and exists to and from Georgia by Russians[11], as well as Ukrainians and Belarusians. A survey conducted by GET[12] found that the ICT sector was the main sector of employment for 59% of Russians and Belarusians to have migrated to Georgia since the war began. The survey also found that most of those surveyed work for foreign companies.

9. https://virtualzonegeorgia.com/
10. EPAM Systems, Making Science, Exactpro Systems Limited, Amind Solutions, Viber, Lineate, etc
11. From February 2022 to February 2023 the difference between the entries and exits of citizens of Russia was equal to 51 thousand unique persons)
12. German Economic Team (GER) & CRRC Georgia. Relocation of people from Russia and Belarus to Georgia: results of survey and economic implications. Berlin/Tbilisi, July 2022.

Employment, wages and demand for workers have significantly increased in Georgia's ICT sector

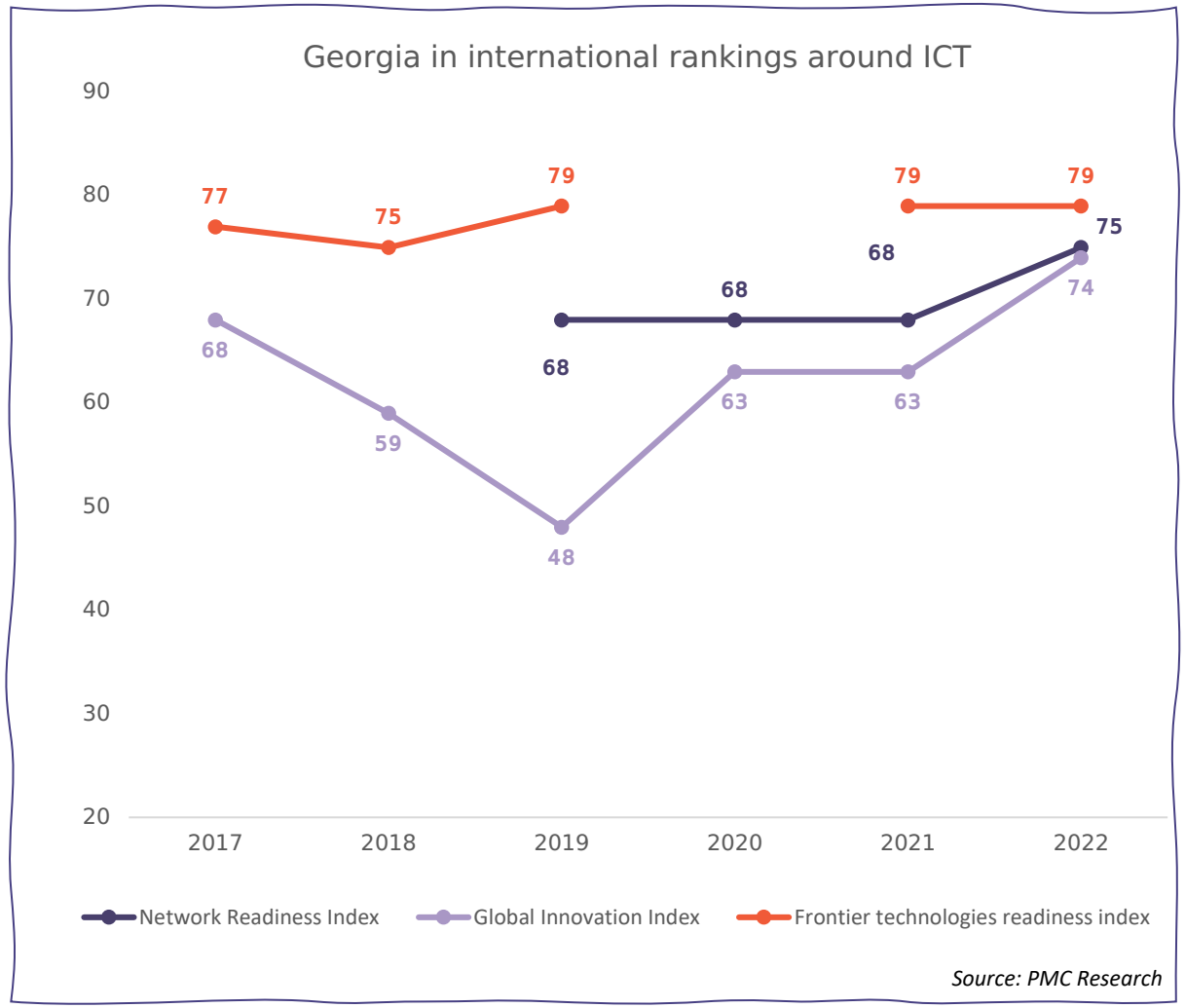


Source: National Statistics Office of Georgia

- **The number of people employed in the ICT sector** has been steadily increasing, with an exception in 2020, when it fell by 1%. It reached 36,707 people in 2022, which equates to a 20% increase compared to 2021, and accounted for approximately 3% of the employed population. It is worth noting that the highest year-on-year growth rate during the observed period occurred between 2020 and 2021, with a 25% increase.
- With increased employment, **average nominal wages** have substantially risen in the ICT sector. This averaged 3200 GEL in 2022, representing a 56% increase compared to 2021. One of the factors contributing to this rise has been the increased demand for workers from new companies entering the market. Another important point to highlight is that in 2022 the average wage in the ICT sector was double the average wage in Georgia.
- According to the data from Jobs.ge, there was a substantial increase in **job vacancies** in 2019 because of the COVID-19 pandemic, and in 2020 the number of job openings went almost unchanged. Moreover, in 2021, there was another significant rise in job vacancies, and in 2022, the number of job openings sustained the same high level achieved during the post-pandemic economic boom. Overall, between 2016 and 2022 the number of vacancies increased by 327%, with the highest year-on-year growth coming in 2021 (55%).
- The demand for **education in the ICT sector** also saw a rapid and substantial increase. In 2021 and 2022, out of the top 100 students, around 90% enrolled in software and applications development and analysis programs.[13]

13. https://tbccapital.ge/en/publications/all-publications/singleview/30004719-higher-education-in-georgia.

Georgia losing positions in international ranking measuring its use of ICT for increasing country's overall well-being



- While the indicators discussed in previous slides suggest substantial growth of ICT sector in Georgia, the country has been losing positions in some international rankings indicating its capability to produce innovative outputs, its readiness to adopt frontier technologies, and critically, its capability to use ICT for increasing country's competitiveness and overall well-being:

- The World Economic Forum's (WEF) **Network Readiness Index** measures how much each country is using ICT to increase its competitiveness and overall well-being. It covers various categories including people, technology, governance, and impact. In 2022, Georgia ranked **75th out of 131 countries, loosing 7 positions compared to the previous year when Georgia ranked 68th.** Georgia's main strength relates to People (rank 64), while the greatest scope for improvement concerns Impact (rank 99).[14]

- The **Global Innovation Index (GII)** takes into consideration a wide range of parameters and assesses and ranks the innovation capability of economies worldwide. Using more than 80 indicators the index measures both innovation inputs and innovation outputs. For this index, Georgia ranked **74th out of 132 economies in 2022 loosing 11 positions from 2021 when country** ranked 63nd in 2021. Georgia performs better in innovation inputs than innovation outputs in 2022. This year Georgia ranks 61st in innovation inputs, which is lower than both 2021 and 2020, and 82nd in innovation outputs, which is also lower than both 2021 and 2020.[15]

- The **Frontier Technologies Readiness Index** takes into account five indicators, namely ICT development, skills, R&D activity, industry activity, and access to finance. Georgia's score has improved over the years, though in 2019 Georgia lost 4 positions and ranked **79th out of 166 nations.** Georgia has remained on this position and ranked 79th in 2021 and 2022 as well. [16]

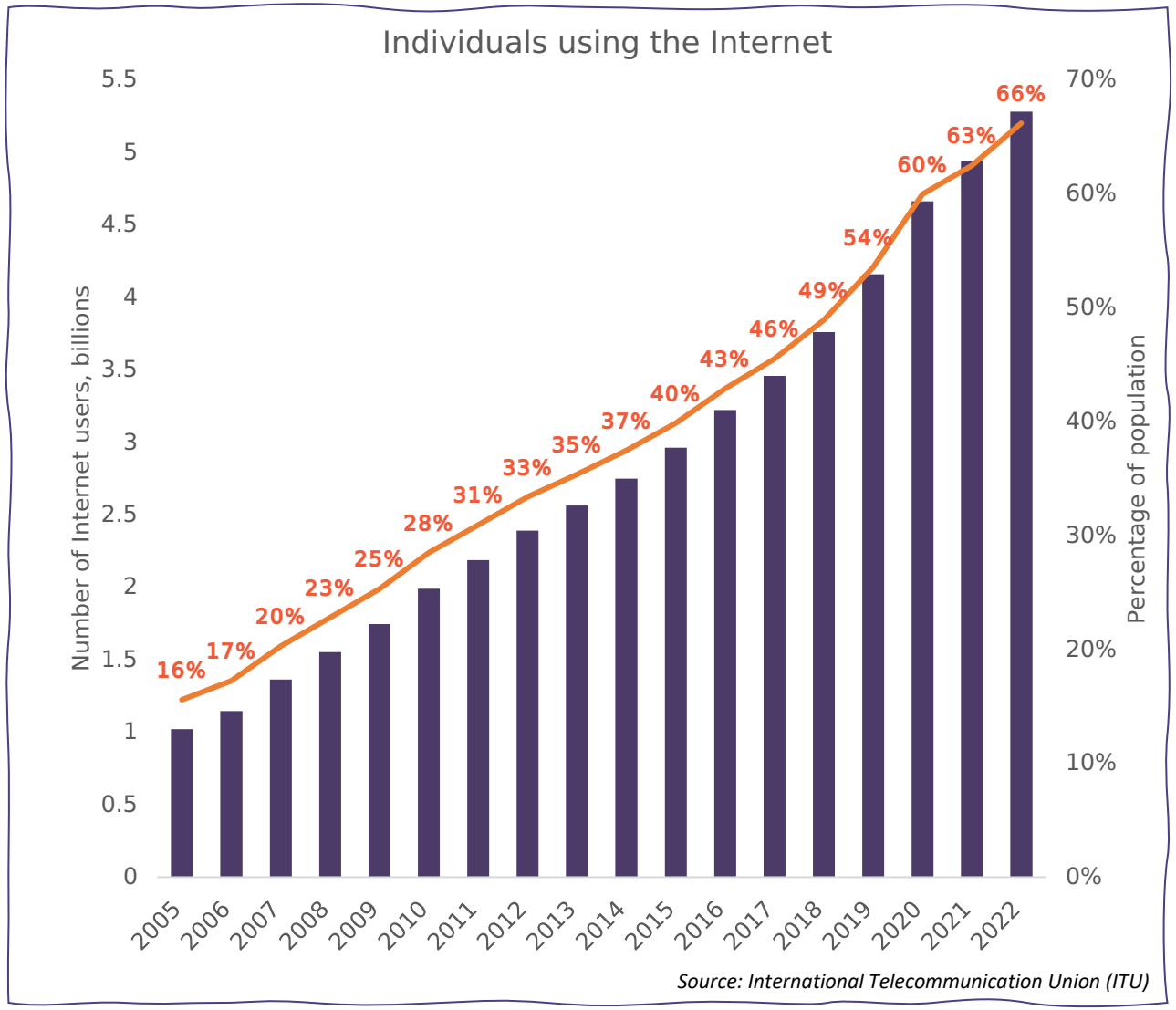
14. https://networkreadinessindex.org/country/georgia/
15. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/ge.pdf
16. Technology and Innovation Report 2023 (unctad.org)

Challenges and opportunities

- With an ongoing rapid shift towards a digital economy, **it is essential for the future of Georgia that it does not lag behind global trends, and instead finds and establishes its niche, and specializes in particular elements of ICT.** To achieve these goals, the country should produce its technological solutions and innovative outputs, which require a strong start-up ecosystem. In this regard, prolonging the "500 Georgia Accelerator" program[17] can be highlighted as an important opportunity.
- The increased adoption of home-based and other forms of **remote labor in this sector**[18] has presented skilled workers in Georgia with more chances to work for companies in other countries offering higher salaries, obtaining better benefits and career opportunities than currently available in their home country.
- At the same time, increasing number of **workers are moving in significant numbers from small domestic ICT companies to larger international companies operating in Georgia.** This trend has been especially pronounced since 2020, when the GoG adopted new legislation granting significant tax exemptions to international ICT companies. On the one hand, this leaves local companies, which cannot compete equally with international companies enjoying tax benefits, suffering from a substantial outflow of workers. On the other hand, large international companies are creating more jobs, offering higher salaries, and contributing to the development of this sector in Georgia by introducing better technologies and a more skilled workforce.
- There has been a considerable **inflow of skilled ICT workers into Georgia from Russia, Ukraine, and Belarus** since the outbreak of the war in Ukraine in February 2022.
- Considering the developments outlined above, there is a pressing need for Georgia to develop a unified state strategy for its ICT sector, which would guide the country towards gaining as many sustained economic benefits as possible and grasping competitive advantages in particular areas of ICT. One potential avenue here could be for Georgia as a whole or one of its cities to focus on becoming an IT hub in the region. If opting for a city, Batumi may the best option as it is already inhabited by a large volume of skilled immigrant ICT workers, which has grown sharply since the war in Ukraine began.[19]
- It is also vital **that educational programs in Georgia equip graduates with the skills demanded by the ICT sector**. Faced with a lack of qualified workers, large private ICT companies in Georgia have been actively developing informal ICT skills training programs and academies in-house. At the same time, some important reforms have been initiated in the state education system, including the establishment of the Vocational Skills Agency which has been designed to facilitate creation of sector skills organizations' (SSOs).
- So-called "**pre-SSO"uniting industry/professional/trade associations in the sector has already been established in the ICT sector**.[20] The aim of the future SSO will be to facilitated collaboration between private companies and education providers to set professional standards and develop educational programs demanded by the private sector.

17. https://gita.gov.ge/news/gita-m-500-global-tan-17-5-milion-lariani-kontrakti-gaaporma-EYb7OkiuM
18. World Bank. 2013. Connecting to Work: how information and communication technologies could help expand employment opportunities
19. The Study under the project entitled "Elaboration of Spatial Development and Development Management Documentation for Batumi City Municipality" (which has been implemented by PMC Research Center for Batumi Municipality City Hall) has provided the recommendation of transforming Batumi into IT hub.
20. A consolidation of sector representatives which sign memorandums with the Skills Agency about the establishment of SSO initiative groups, the purpose of which is to develop a strategy for the development of SSOs, consolidate the sectoral associations, and implement the SSO functions provided by law, in cooperation with the Skills Agency and other stakeholders.

Appendix - Global trends in ICT accessibility, affordability and skills



- In 2022, 66% of the world's population (or 5.3 billion individuals) accessed the internet. Moreover, the growth rate of number of individuals using the internet climbed by 6.1% compared to 2021. Nonetheless, that means there are still 2.7 billion people without internet access, demonstrating that there is a long way to go if the objective of "universal and meaningful digital connectivity" by 2030 is to be reached.[21]
- The majority of individuals to access the Internet do so via their mobile phones, possession of which might be considered a proxy for internet usage. With the exception of the upper middle-income group, the percentage of people who possess a mobile phone is larger than the percentage of people who use the internet in most geographical areas and economic categories. Worldwide, 73% of individuals aged 10 or more own a mobile phone, but a slightly smaller percentage use the internet, which can be attributed to some mobile phone owners having calls-only subscriptions.
- The income-adjusted cost of fixed and mobile internet services continued to decline in 2022 after a slight spike in 2021. Both the fixed broadband basket and the data-only mobile broadband basket have become increasingly accessible globally. Specifically, the fixed broadband basket decreased in cost from 3.5% to 3.2% of GNP per capita, while the worldwide median price for mobile broadband decreased from 1.9% to 1.5% of GNP per capita. Nevertheless, cost, especially in low-income nations, continues to be a major barrier to internet access.[22]
- Lack of ICT skills is a fundamental impediment to establishing universal and meaningful connectivity. In just 8 out of 77 selected nations, 70% or more of the population have basic ICT abilities, while in only 11 do 50% or more of the population have intermediate ICT skills. [23]

21. https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx
22. https://www.itu.int/itu-d/reports/statistics/2022/11/24/ff22-affordability-of-ict-services/
23. https://www.itu.int/itu-d/reports/statistics/global-connectivity-report-2022/

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