

# 3.

## The future of jobs and skills

### Key messages



**Accounting** and **restaurant operation** skills remain the **highest in demand**, with an increasing trend.



Several ICT skills with decreasing trends are being replaced by other **upward trending ICT skills** in the same sector.



The **average AI scoring** for the region is around **36 per cent**, indicating a low level of AI augmentation. The **highest AI augmentation score** is among data scientist positions, with around **50 per cent** of tasks AI-augmented.



**Out of 15,500 different skills** across the region, around **one third (5,100 skills)** account for more than **95 per cent** of the total frequencies of demanded skills.



The Arab region has a core cluster in **business administration-related jobs**, and is not heavily diversified in science-related jobs such as IT, manufacturing/industry, engineering and innovation, which calls for further structural transformation and greater **technology adaptation** and adoption.

# 3. The future of jobs and skills



## A. Overview

The present chapter examines positively and negatively trending skills, focusing solely on hard skills trends as they have the upper hand in determining the match between applicants' profiles and job requirements. Soft skills trends are less

imperative determinants in the job matching process, meaning that such skills do not vary significantly over time. Based on the ESCWA Skills Monitor, soft skills are stationary in the Arab region, with limited trends over time.



## B. Skills with most ascending and descending trends

For an overview of the upward trending skills, the top 10 steeper trends were related to accounting, restaurant operation, finance, computer science, invoicing, selling techniques, key performance indicators (KPIs), Kurdish (language), financial statements, and sales management (figure 23). Most upward trending skills were related to accounting and finance (accounting, finance, invoicing, financial statements) and to services and sales (restaurant operation, sales management, selling techniques, KPIs). It is worth mentioning that computer science-related skills ranked fourth in the upward trending skills.

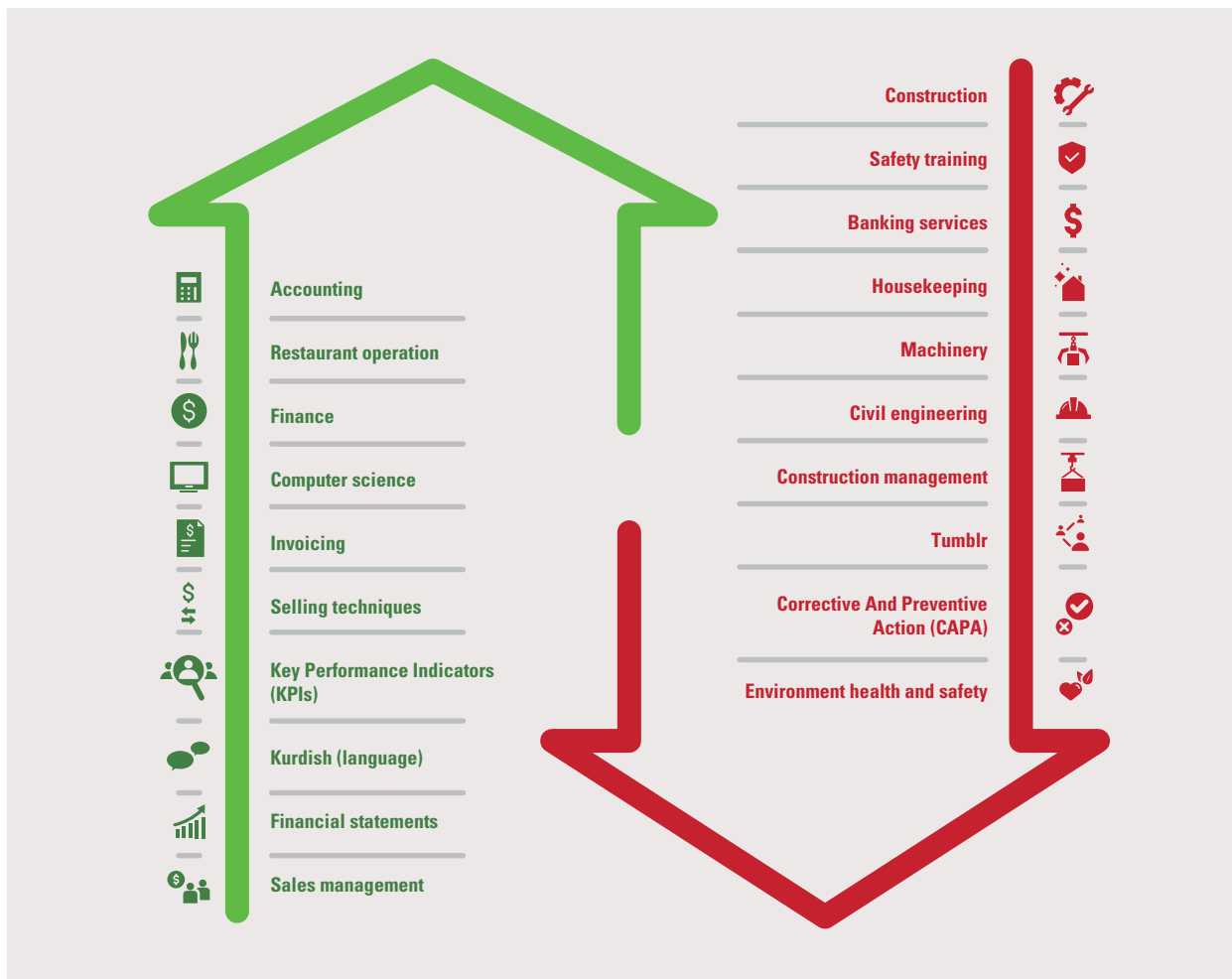
Among the top 10 decreasing trends, several were related to construction sites (construction, civil engineering, construction management, safety training, machinery). If we expand to the top 100 decreasing trends, complement skills to the construction field have the most decreasing trend. This includes facility management and energy efficiency services, followed by electrical engineering and heavy equipment transporter systems.

The ICT skills with the most declining demand among the top 100 decreasing skills are computer engineering, cyber

security, cloud computing, software engineering and software development, unit testing, Java (programming language), Linux, automation, telecommunication, MIS, SAP applications, data engineering, remote computing, angular and SQL languages. Additional analysis shows that while demand for such skills is decreasing, the trends of other ICT skills and languages, such as software systems, Power BI, PHP (scripting language), JavaScript, IOS development, and R (programming language), are increasing

in the Arab region. A second cluster of top skills with decreasing trends, which did not show in the top 10 list, is related to the medical field, namely nursing, surgery, paediatrics, dentistry, intensive care, gynaecology, patient treatment, emergency medicine, obstetrics and gynaecology, vital signs, critical care, health sciences, personal health records and home health care, where these trends can be explained by the unusual demand increase in the baseline period owing to the pandemic.

**Figure 23.** Ascending (left) and descending (right) trends of hard skills in the Arab region



**Source:** ESCWA calculations based on the ESCWA Skills Monitor.



## C. Status of artificial intelligence in Arab labour market activities

AI is a new approach where automated machines are fed or taught human logic, based on which they act and react without errors. Recently, AI has been making verbal communication with devices a norm, with AI augmenting many daily activities and occupations. This was evident during the COVID-19 pandemic, where many jobs drifted to more advanced AI-driven systems, thus requiring a change in the way of executing job-specific tasks. To test how AI is augmenting jobs, Qatar Computing Research Institute (QCRI) built an AI-based method that measures the automation impact of AI on Jobs. ESCWA partnered with QCRI and extended their AI model to measure the AI Impact Score on over 1.7 million online job postings from 19 Arab countries.

The AI scores presented in figures 24 and 25 reflects the percentage of skills in jobs that can be automated with AI augmentation

using current technologies, or those that have been patented. In other words, to perform a job with a high AI Score in the future, the job will likely be using technology extensions to facilitate the tasks. Whereas, in order to perform a job with a low AI score in the future, the job will mostly be employing the same level of technology integration, if any, to perform the tasks. It is worth noting that the AI Score does not reflect the degree of labour capital substitution by technology. Only jobs with 100 per cent AI Score are expected to be fully automated in the future.

Our analysis has revealed that the average AI scoring for the region is around 36 per cent. The set of functions in a given position will never be 100 per cent automated, at least between now and the achievement of the 2030 Agenda. However, AI will significantly influence how activities are executed as more AI is introduced into daily tasks.

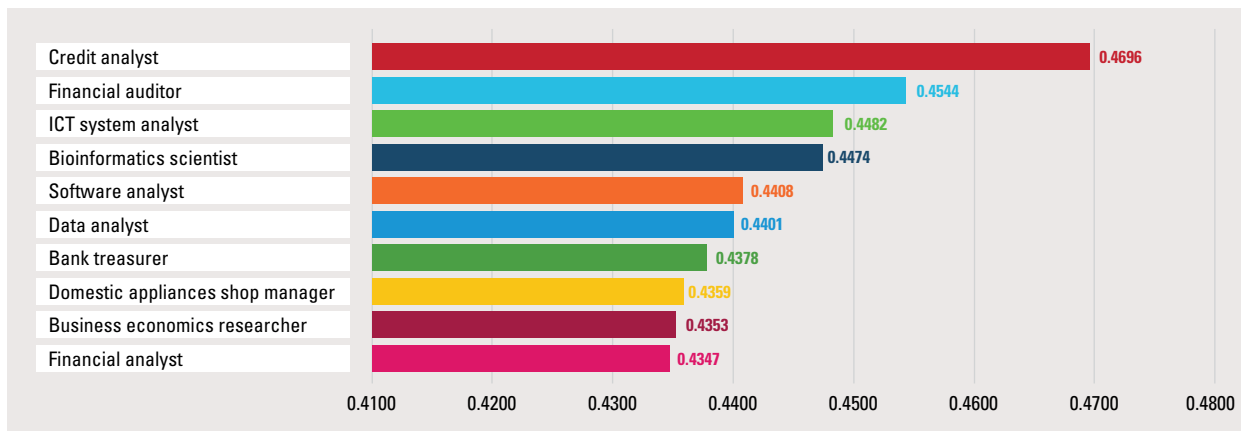


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Figure 24 shows the 10 most AI-augmented jobs, and figure 25 shows the 10 least AI-augmented jobs in the Arab region's online job markets. Figure 24 indicates that the highest score of AI augmentation is among credit analyst positions, with a score close to 47 per cent of tasks being AI-augmented. Besides credit analyst jobs, the top 10 list includes mainly data-related occupations and finance jobs. One indication from the top 10 list is that it does not include mid-skilled jobs, as all 10

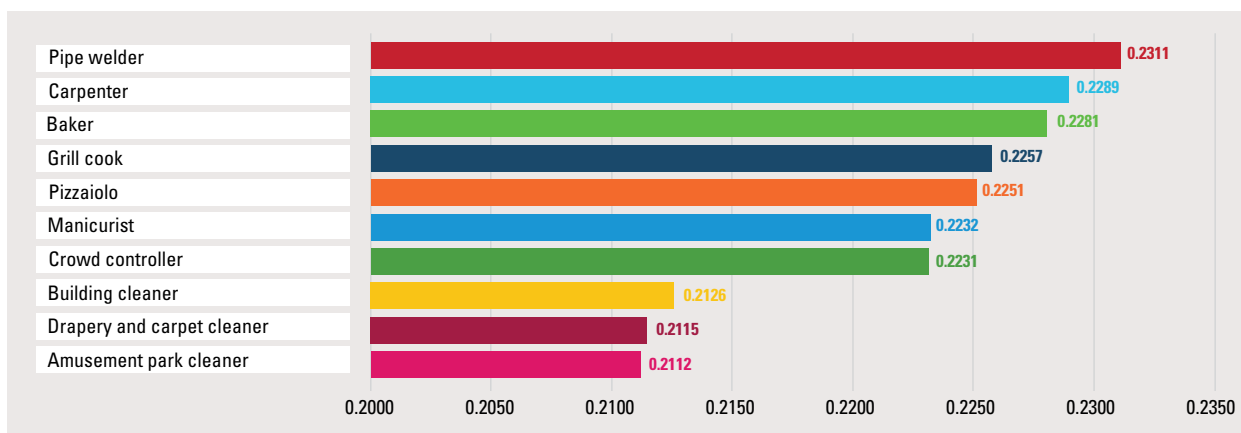
jobs belong to high-skills activities. Looking at the list of the 10 least AI-augmented jobs (figure 25), blue-collar and close to mid-skilled tasks are the jobs not heavily impacted by AI augmentation. Our findings do not negate the fact that such activities may be automated soon, with machines taking over the roles of human beings in the near future. For example, complete automation of activities was evident in recent testing of self-driven trucks and cars in many countries globally.

**Figure 24.** Most 10 AI-augmented jobs in the Arab region



Source: ESCWA calculations based on the ESCWA Skills Monitor.

**Figure 25.** Least 10 AI-augmented jobs in the Arab region



Source: ESCWA calculations based on the ESCWA Skills Monitor.

**Box 2. Future technologies and the status of their adoption in the Arab region**

To assess the readiness of the Arab region to adopt and absorb new technologies, the following five dimensions are examined: AI, innovation ecosystems, public services, network readiness, and e-commerce.

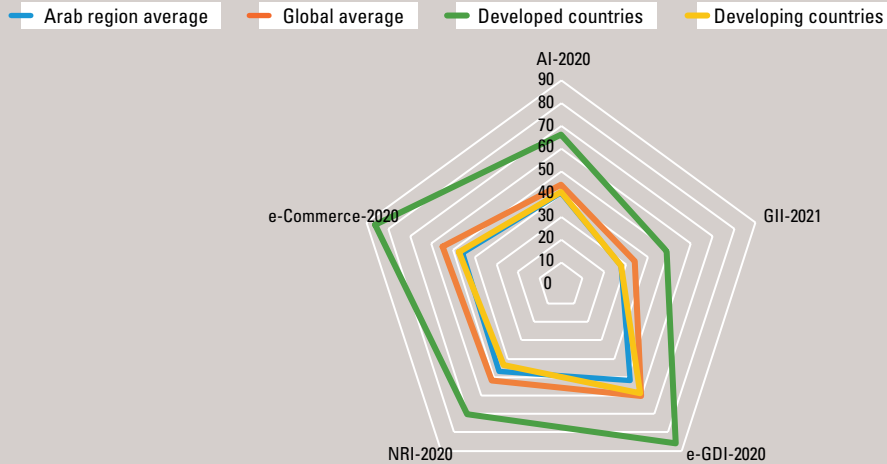
**Comparative tabulation of technology adoption by index**

Index	Arab region average	Arab diversified	Arab LDCs	High income average	Upper middle income	Lower middle income	Low income	Global average	Developed countries	Developing countries
AI-2020	40.56	40.18	25.46	62.46	41.61	34.93	27.4	44.25	66.36	41.16
GII-2021	27.52	25.98	13.62	45.96	31.09	25.25	19.43	34	48.84	27.82
e-GDI-2020	52	50	29	81	62	50	29	60	86	59
NRI-2020	46.82	42.33	12.33	67.81	47.34	37.27	30.61	51.8	70.14	43.25
E-commerce-2020	45.8	44.28	19.33	82.26	57.64	39.22	19.04	54.9	85.89	47.5

**Source:** ESCWA estimations.

**Note:** AI-2020 denotes the latest AI Government Readiness Index 2020, GII-2021 denotes the Global Innovation Index, e-GDI-2020 denotes the e-Government Development Index 2020, NRI-2020 denotes the Network Readiness Index 2020, and e-commerce-2020 denotes the UNCTAD B2C E-Commerce Index 2020.

**Technology adoption between regions by index**



**Source:** ESCWA estimations.

**Note:** Each region is represented by a pentagon where the score of each index increases in an outward direction.

The following observations can be deduced from the above table and figure:

- **AI readiness:** The Arab region is below the global readiness average, as per the latest AI Government Readiness Index (2020) produced by Oxford Insights.<sup>a</sup> It has one of the biggest gaps in country performance (some countries are rank high even on the global scale, while others are among the lowest category). AI readiness in the Arab region needs to be improved by strengthening strategy development and modernizing education and academic programmes to provide the labour market with required skills, and by developing the innovation and entrepreneurship ecosystem.
- **Innovation ecosystem:** Based on the Global Innovation Index, the Arab region average is far above the global average, and its score is comparable to the average of lower middle-income countries and of developing countries. This result implies the need for many Arab countries to review current innovation ecosystem, and mitigate the barriers faced by young people and entrepreneurs to help establish startups, create new job opportunities, and produce innovative and useful services.
- **Public services:** The E-Government Development Index 2020 can be used to capture the current development stage of public services that are delivered electronically. According to this index, the Arab region's average score is far behind the global average, although some GCC countries are rank high globally. Furthermore, the region's score is less than that of developing economies. Given the importance of delivering services remotely through electronic channels in the COVID-19 era, some Arab Governments need to enhance their technological infrastructure, develop their human capital, and digitize more government services to reach all individuals.
- **Network readiness:** The Network Readiness Index 2020 can assess the readiness of infrastructure in the Arab region. In this index, the Arab region scores below the global average, but above the average of developing countries. GCC countries and some upper middle-income countries in the region have developed an appropriate technology infrastructure. For the remaining countries, especially those that are affected by conflict, more efforts and investments are needed to restore basic services, and ensure minimum connectivity across their territory. Establishing such infrastructure should be prioritized in recovery agendas, as it could positively impact socioeconomic development and expedite peacebuilding process.
- **E-commerce:** During the COVID-19 pandemic, the Arab region, like other regions worldwide, witnessed a net increase in e-commerce activities. According to the UNCTAD B2C E-Commerce Index 2020, the Arab region's score is below the global average and close to that of developing economies. Arab least developed countries and conflict-affected countries are lagging far behind, owing to inappropriate technological infrastructure and unstable postal systems. To reap the benefits of e-commerce in the Arab region, national plans and strategies are required to modernize legal and regulatory frameworks, and allow innovators and entrepreneurs to seize this opportunity to develop solutions, applications and products related to e-commerce, such as portals and digital intermediation platforms.

In summary, the Arab region is lagging behind in the adoption of future technologies, except in the development of e-services where the regional average is close to the global average. National readiness assessments of the above-mentioned technologies are necessary to identify weaknesses and challenges, and to develop related policies to address them and enhance the preparedness of the region to absorb those technologies and maximize their impact on national development.

<sup>a</sup> Oxford Insights, 2020.

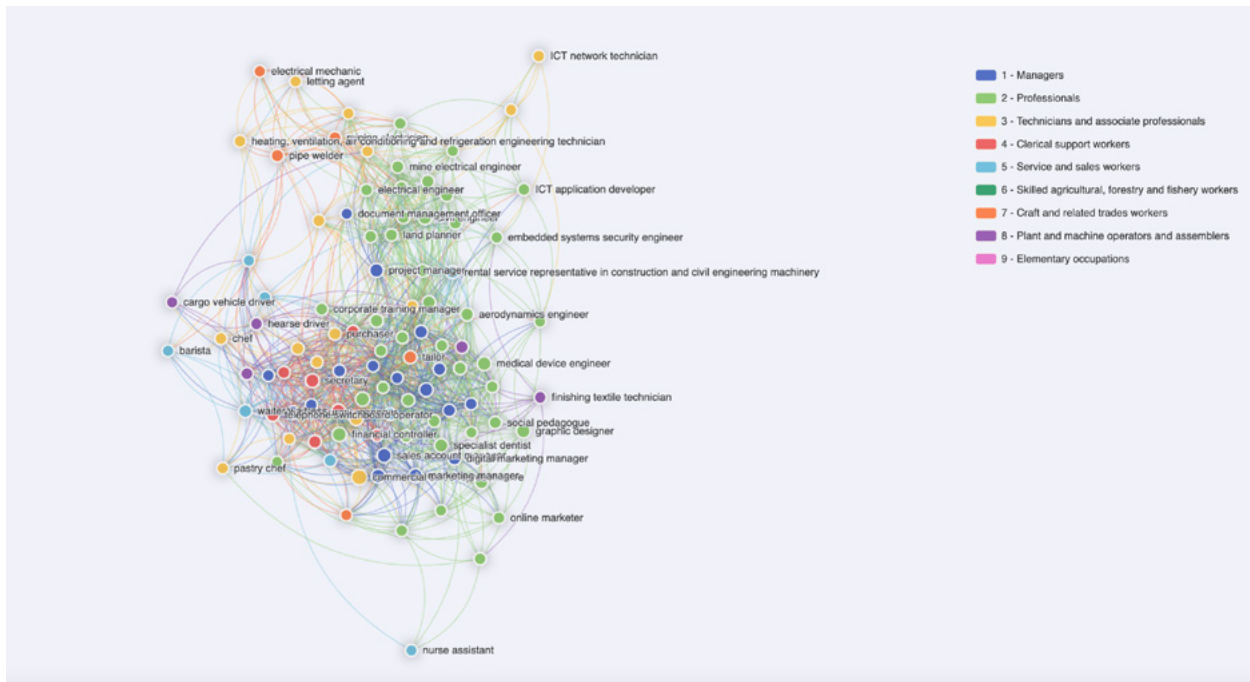


## D. Skills Forest

Inspired by Ricardo Hausmann's Product Space analysis,<sup>62</sup> the ESCWA Skills Forest showcases the structure of the economy based on online jobs postings and the skills they require. The Skills Forest unveils the interconnection between jobs as a network, based on the hard skills they share for each of the 19 studied Arab countries. Each node represents an occupation, with its size showing the frequency of postings for that occupation. The nodes are linked to the most similar occupation by means of common skills.<sup>63</sup> The resulting clusters show the most related jobs in terms of the hard/technical skills they share. For instance, on the top section of the network, we observe engineering occupations, such as ICT developer, database administrator, and

software developer; whereas the bottom left cluster shows mostly business-related occupations, such as business manager, product manager, and sales representatives. The densely populated clusters illustrate the level of interconnectedness among jobs through common skills (it is known as the core), while jobs that are on the periphery reflect a low level of connectivity with other jobs in the economy. The likelihood of a person moving from one job to another in the dense areas is significantly higher, enabled by a significant number of common skills between nearby jobs; while moving from the periphery closer to the core is less likely due to a lack of shared skills, making upskilling and reskilling in the core easier than in the periphery.

Figure 26. Skills Forest



Source: ESCWA calculations based on the ESCWA Skills Monitor.



The dense clusters also reflect the prospects of the economy based on the type of occupations that are present within it. Currently, the Arab region has its skills stock around the core set of jobs. The Arab region can re-skill and up-skill its labour force around peripheric jobs to build a more diversified skills stock. This can happen if multiple clusters in the Skills Forest are created, indicating additional jobs and skills diversification in different areas of expertise.

Figure 26 shows that the jobs belonging to the professional job family, represented by green nodes, are most in demand. The professional job family in the Arab region is dominated by job openings in business and administration, followed by science and engineering. The likelihood of creating a job in business and administration (bottom half of the figure) is higher than in sectors such as

IT or engineering, due to high activity and demand in that area.

Figure 27 reveals that Arab economies are built on consumer-based employment rather than capital production, since most activities are related to business administration fields. An empirical exercise that would add value to the present report is to look at the skills diffusion between countries, and how likely it is that countries in the region and around the globe could help each other evolve, or how one country could evolve to match a regional frontier in a specific sector. The popular approach is to move to jobs and sectors in close proximity to one another; however, the challenge is to shift to sectors that are not within reach. This is relevant in countries that are resource-dependent, where diversification to non-resource-related sectors entails a significant leapfrog to avoid natural resource dependence.

**Figure 27.** Number of online job postings by occupation categories



Source: ESCWA calculations based on the ESCWA Skills Monitor.



## E. Policy recommendations

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**1**

Enhance technological infrastructure, facilitate human capital accumulation, digitize government services, and assist in the AI augmentation of tasks to enhance productivity and create additional employment. Additional technological adoption can create more jobs and increase wages due to higher productivity.

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**2**

To avoid labour substitution (full automation of activities), investigate jobs that are at risk of full automation, and develop appropriate reskilling and upskilling programmes as an attempt to prepare employees at risk to move to jobs with close proximities. This can be done using the ESCWA Skills Forest by investigating jobs and their associated skills.

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**3**

Extend diversification and structural transformation efforts to create multiple cores in the Skills Forest as a plan for long term sustainable economic development. Building infrastructure for digital economies can help keep pace with the Fourth Industrial Revolution.