OIC ECONOMIC OUTLOOK 2023

The Rise of the Digital Economy and Bridging the Digital Divide

ORGANISATION OF ISLAMIC COOPERATION

STATISTICAL, ECONOMIC AND SOCIAL RESEARCH AND TRAINING CENTRE FOR ISLAMIC COUNTRIES

Organization of Islamic Cooperation

Statistical, Economic and Social Research and Training Centre for Islamic Countries

OIC Economic Outlook 2023

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Please cite the work as follows: SESRIC (2023). *OIC Economic Outlook: The Rise of the Digital Economy and Bridging the Digital Divide*. Economic Development Studies. The Statistical, Economic and Social Research and Training Centre for Islamic Countries. Ankara.

Under the leadership of H.E. Mrs. Zehra Zümrüt Selçuk, Director General of SESRIC, this report is prepared by a research team supervised by Mazhar Hussain, Director of Economic and Social Research Department. The report was led by Kenan Bağcı, who also prepared Chapter 3, Chapter 4 and Chapter 5. Cem Tintin and Esat Bakımlı supervised and co-authored Chapter 1 and Chapter 2, respectively, with technical assistance from Davron Ishnazarov, Muzamil Edema, and Buhara Aslan.

ISBN: 978-625-7162-24-1

Cover design by Savaş Pehlivan, Publication Department, SESRIC.

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Inner Photo Credit: https://e.huawei.com/tr/publications/global/ict_insights/201908281022/special-report/201911081512

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Acronyms

ADB	Asian Development Bank
AI	Artificial Intelligence
CEE	Central and Eastern Europe
COMESA	Common Market for Eastern and Southern Africa
CPI	Consumer Price Index
DSN	Digital supply network
DOTS	Direction of Trade Statistics
EC	European Commission
ECB	European Central Bank
EPR	Employment-to-Population Ratio
EU	European Union
FDI	Foreign Direct Investment
FTRI	Frontier Technology Readiness Index
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GII	Global Innovation Index
GNI	Gross National Income
GVC	Global Value Chain
HIPC	Heavily Indebted Poor Countries
ICT	Information and Communication Technology
IFS	International Financial Statistics
ILO	International Labour Organisation
IMF	International Monetary Fund
IoT	Internet of Things
IPR	Intellectual Property Rights
ISIC	International Standard Industrial Classification
ITC	International Trade Centre
ITU	International Telecommunication Union
LAC	Latin America and the Caribbean
LAYS	Learning adjusted years of schooling
LDCs	Least Developed Countries

LVC	Local value chain
MENA	Middle East and North Africa
ML	Machine Learning
MNE	Multinational Enterprise
MVA	Manufacturing Value Added
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
OIC	Organisation of Islamic Cooperation
PPP	Purchasing Power Parity
P-PP	Public-Private Partnership
R&D	Research and Development
RER	Real Exchange Rate
RTA	Regional Trade Agreement
RVCs	Regional Value Chains
SDG	Sustainable Development Goal
SME	Small and Medium-sized Enterprise
SSA	Sub-Saharan Africa
STI	Science, Technology and Innovation
TLD	Top-level Domain
TOT	Terms of Trade
TTIP	Transatlantic Trade and Investment Partnership
UAE	United Arab Emirates
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
UNSD	United Nations Statistics Division
USA	United States of America
US$	United States Dollar
WB	World Bank
WDI	World Development Indicators
WEF	World Economic Forum
WEO	World Economic Outlook
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Preface

The Organisation of Islamic Cooperation (OIC) has been working assiduously to achieve sustainable economic development in its Member States by deploying considerable efforts to promote intra-OIC trade, investment, tourism, Islamic finance and various other instruments. This has resulted in a continuous expansion of OIC's development agenda over the years, which is duly reflected in the multisector scope of the OIC-2025: Programme of Action. As an important global development actor, the OIC has also been supporting and encouraging its Member States to participate actively in the international geopolitical, economic and social decision-making processes to secure their common interests. With a mission of creating economic opportunities for all and improving the welfare of people in the OIC Member States, the OIC calls for joint Islamic action to develop more integrated, interconnected, internationally competitive, inclusive and sustainable economies.

In recent years, the global economy has been marked by significant transformations across various dimensions. Economic growth and integration trajectories have been impacted by re-emerging protectionist sentiments on the international economic policy agenda. Growing adaptation of digital technologies as well as concerns over supply chain resilience are transforming trade and investment dynamics. In this shift, innovation and technology-driven sectors in advanced economies attract greater investments than traditional sectors in developing economies. Unfortunately, the rising trend of restrictive policies threatens to reverse economic integration and undermine the cooperation needed to protect against new shocks and address global challenges. In a very timely manner, the OIC Economic Outlook 2023 report delves into these multifaceted global economic developments, offering insights into how they are shaping the world and affecting the OIC region today.

With their unique economic structures, resource endowments, and demographic profiles, OIC nations are navigating these global developments in their own distinct ways. The digital economy, in particular, has emerged as a key element for many OIC countries, as they seek to leverage technology and innovation for economic growth, diversification, and inclusion. The rising digitalization and automation presents both opportunities and challenges for OIC countries. On one hand, it has the potential to drive economic diversification, enhance competitiveness, and empower young and dynamic populations. On the other hand, it also poses questions about the digital divide, cybersecurity, and the need for effective governance in the digital age.

As we navigate the complexities of the global economic landscape, we at the OIC, recognize the importance of bridging the digital divide as an essential component of our commitment to sustainable development and prosperity. It is our hope that this report will serve as a valuable resource for policymakers, businesses, researchers, and all stakeholders interested in understanding the intricate interplay of global economic developments and the role of the digital economy in shaping the future. In an increasingly interconnected world, knowledge and informed decision-making are essential, and we trust that this report will contribute to a deeper understanding of these critical issues.

I would like to express my sincere appreciation to SESRIC for preparing this report, and I encourage our Member States to engage with its contents, drawing inspiration and guidance to shape their own national strategies for bridging the digital divide as they work towards a better future.

Hissein Brahim TAHA
Secretary General
Organization of Islamic Cooperation

Foreword

It is with great pleasure that I present to you this report titled "*OIC Economic Outlook 2023: The Rise of the Digital Economy and Bridging the Digital Divide"*. The report provides a detailed analysis of recent developments in the global economy and offers valuable perspectives on the economic landscape of OIC countries by using a wide range of useful comparative statistics and information.

The world economy today stands at a critical juncture marked by technological advancements, environmental imperatives, geopolitical tensions, and demographic shifts. The challenges we face today transcend borders, and require collaborative solutions that bridge divides and go beyond narrow interests. In particular, the rise of artificial intelligence, blockchain, the Internet of Things, and other transformative technologies are reshaping industries, supply chains, and the very nature of work itself. It is in this intersection of the global economy and OIC economies that we find both commonalities and unique challenges. How we leverage these technologies to enhance economic resilience, empower our youth, and address pressing issues of economic transformation is a central theme of our exploration in this year's edition of OIC Economic Outlook.

OIC countries, whether through ambitious Dubai smart city initiatives, dynamic e-commerce ecosystems of Jakarta, the bustling tech hubs of Istanbul or the burgeoning startup ecosystems of Kuala Lumpur, are embracing digitalization as a catalyst for progress, and harnessing innovation to redefine industries, create jobs, and drive economic growth. The diversity of these achievements reflects the dynamism of these economies and the aspirations of their people. While some cities and regions surge forward, others grapple with limited access to the digital tools and knowledge needed to participate fully in the digital age. This stark reality should be reflected in policy dialogues at the OIC level to ensure that the benefits of digitalization are shared by all segments of society.

The embrace of digitalization and advanced technologies is not only a reflection of economic progress but also a manifestation of the Islamic principles of innovation and stewardship. The Islamic tradition encourages the pursuit of knowledge and the responsible use of resources, both of which find resonance in the OIC countries' endeavours in the digital realm. We need to encourage OIC countries to draw on their rich heritage to promote ethical and sustainable digital transformations that align with Islamic values of justice, equity, and social responsibility.

The choices we make today regarding digitalization and advanced technologies will reverberate through the economies of OIC member states and the world at large. We stand at a pivotal moment in history, one that demands foresight, collaboration, and innovation. In this report, we try to not only understand the complexities of this digital age but also to envision a future where these technologies become instruments of progress, inclusivity, and shared prosperity. As we delve deeper into the transformative power of digitalization and advanced technologies, let us seize the opportunity to foster resilience, sustainability, and prosperity among the OIC countries.

Zehra Zümrüt SELÇUK
Director General
SESRIC

Executive Summary

Recent Developments in the World Economy

ECONOMIC GROWTH

The world economic growth rate hit 6.3% in 2021, triggered by a strong rebound in both developed (5.4%) and developing countries (6.8%) following a 2.8% contraction in 2020. The removal of the base effect in 2022 enabled a moderate growth rate of 3.5%. It is projected to continue in a similar pattern as the central banks of major economies in the world attempt to cool down inflation. The projections of IMF estimate that the global economy will continue to maintain a growth rate of 3% in 2023 and 2024. A number of factors could influence the global economic growth prospects in 2023-24, most notably the ongoing Russia-Ukraine conflict continues to bring significant uncertainties to the outlook with an impact on energy and commodity prices. On the financial front, measures taken by central banks have been limiting the financial sector growth, which in turn could potentially increase banking sector vulnerabilities in the short term while reducing liquidity.

UNEMPLOYMENT

The global unemployment rate fell by 0.7 percentage points to 6.2% in 2021, after peaking at 6.9% in 2020 due to the outbreak of the pandemic. This was the highest level since 1991, when available data began. In 2022, it further declined by 0.4 percentage points to 5.8%, with global unemployment standing at 192 million, down from 214.2 million in 2021. ILO estimates that the unemployment rate will likely remain unchanged through 2023 and 2024. Gender disparities do exist in unemployment in the world, particularly in developing regions; the unemployment rate is higher among the female population, and it continues to be harder for a woman to find a job as compared to a man.

PRICES & INFLATION

Commodity prices, on average, increased by 33.5% and reached new heights in 2022, as measured by the IMF's Commodity Price Index. Unlike in 2022, however, the overall commodity prices are expected to decline in 2023. Around the globe, rising inflation has become a central concern in many countries. Global inflation rose to 4.7% in 2021 and hit 8.7% in 2022. In developing countries, inflation rose from 5.9% in 2021 to 9.8% in 2022, while in developed countries, it more than doubled, rising from 3.1% to as high as 7.3%. Global inflation is projected to slow through 2023 and 2024 to 6.8% and 5.2%, respectively, thanks to tightening monetary policies being implemented by central banks around the globe.

INTERNATIONAL TRADE

The growth rate in world trade volume in goods and services went down from 10.7% in 2021 to 5.2% in 2022, whereas trade volume in goods recorded a sharper slowdown, from 11.1% in 2021 to 3.3% in 2022. The significant slowdown in overall economic activity, the conflict in Ukraine, and the lingering effects of the pandemic have played some role in this picture. Projections reveal that growth in world trade volume in goods and services is expected to be around 2.0% in 2023 and 3.7% in 2024.

CURRENT ACCOUNT BALANCE

The aggregate current account balance of developed countries was in deficit at US$ 258.4 billion in 2022, compared with a surplus of US$ 435.2 billion in 2021. The massive deficit of the US rose from US$ 846.4 billion to US$ 925.6 billion over the same period. As a percent of GDP, developed countries as a group had current account surpluses of 0.8% in 2021, which turned into a deficit of 0.5% in 2022. The aggregate surplus of developing countries increased by 79% and reached US$ 582.7 billion in 2022. Thus, the surpluses to GDP ratio increased from 0.8% in 2021 to 1.4% in 2022. Current IMF projections show that surpluses of developing countries are expected to vanish by 2024, whereas those of developed countries reach 0.3% of GDP.

FOREIGN DIRECT INVESTMENT

Global foreign direct investment (FDI) inflows showed a significant rebound in 2021 and amounted to US$ 1.48 trillion, up 53.7% from the exceptionally low level of US$ 962 billion in 2020. Afterwards, the global FDI inflows dropped to US$ 1.29 trillion in 2022, registering a 12.4% decline. It stemmed from a substantial slowdown in FDI inflows directed to developed countries that declined by 21.6% from US$ 773 billion in 2021 to US$ 606 billion in 2022, while inflows to developing countries fell slightly by 2.3% from US$ 705 billion to US$ 689 billion over the same period. As a result, the share of developing countries in global FDI inflows improved from 47.7% in 2021 to 53.2% in 2022.

FINANCIAL CONDITIONS

Following a rapid recovery under eased financial conditions in 2021, the global outlook improved. Yet, early in 2022, global financial conditions have tightened notably and downside risks to the economic outlook have increased because of the war in Ukraine. In the second half of 2022, financial conditions started to ease before it got tightened. In particular, financial conditions have tightened as central banks continue to hike interest rates. Higher interest rates will also make borrowing more expensive worldwide, straining public finances. Amid the highly uncertain global environment, risks to financial stability have increased substantially

FISCAL BALANCE

Globally, fiscal deficits declined in 2021 and 2022 as economies recovered from the pandemic and governments started to cease their emergency support. Indeed, as of 2022, governments' ability to support the economic recovery through fiscal space was more limited. In developed countries, deficits narrowed from 7.5% of GDP in 2021 to 4.3% in 2022. Deficits are expected to hover around the 2022 level over 2023-24. In developing countries, deficits remained at 5.2% of GDP in 2022, the same as the previous year. However, they are projected to increase slightly and represent 5.8% of GDP in 2023, mainly due to weakening revenues.

RECENT ECONOMIC DEVELOPMENTS IN OIC COUNTRIES

PRODUCTION AND ECONOMIC GROWTH

At current prices, the total GDP of the OIC countries increased to US$ 8.7 trillion in 2022 as a result of the ongoing gradual recovery. With this economic size, the OIC countries, as a group, accounted for 8.7% of global GDP in 2022, up 0.9 percentage points from the previous year. In terms of Purchasing Power Parity (PPP) expressed in international dollars, the total GDP of the OIC countries reached 24.4 trillion dollars and accounted for 14.9% of global GDP in 2022, up 0.3 percentage points from 2021.

GDP per capita

Given the ongoing recovery in output, per capita GDP values at current prices continued to increase worldwide in 2022. In US dollar terms, the global average rose by 3.2% from the previous year to US$ 12,884. The increase in the OIC countries was much larger, with the average GDP per capita rising by 13.1% to US$ 4,581. In PPP terms, GDP per capita averaged globally at 21,015 dollars in 2022, up 9.6% from a year earlier. In the OIC countries, it increased by 10.8% to 12,851 dollars. Consequently, GDP per capita continued to be lower in the OIC countries, both in US dollars and in PPP, but the faster growth rate achieved by the group of OIC countries helped reduce the gap to some extent in 2022.

Economic Growth

The OIC countries registered an average growth rate of 5.6% in 2022, which was higher than the global average and the highest rate achieved since 2011. In line with the global trends, the economic growth in OIC countries is expected to moderate in the next two years, to 3.5% in 2023 and 3.9% in 2024. Guyana was by far the fastest growing economy in the OIC and in the world in 2022. The Maldives and Niger also recorded a two-digit growth rate, 12.3% and 11.1%, respectively, and they appeared among the fastest growing 10 economies in the world. On the other hand, 3 out of 54 OIC countries with available data recorded a negative growth rate in 2022: Libya (-12.8%), Sudan (-2.5%), and Brunei Darussalam (-1.5%).

Structure of GDP: Value Added by Sector

The latest available data for 2021 show that, constituting only 1.3% of total value added in developed countries, *agricultural activities* have a high share of 10.9% in total value added in the OIC countries, which is even higher than that in non-OIC developing countries (8.6%). The share of the *non-manufacturing industry* averaged at 22.1% in 2021 after falling from 27.5% in 2010 to a record low of 19.5% in 2020. The *manufacturing sector* has a share of 16.2% in total value added of the OIC countries, which is higher than that of developed countries (13.6%) but significantly below that of non-OIC developing countries (22.5%). The services sector continues to play a key role in the majority of OIC economies, accounting for an average of 50.8% of the total value added in the OIC. This share is still low though, considering that the sector has a share of three quarters (76.1%) in total value added in developed countries and 55.6% in non-OIC developing countries, averaging at 67.1% worldwide.

Structure of GDP: Expenditures

As of 2021, final consumption expenditures (by both households and government) continue to have the highest share in GDP in the OIC countries as well as in the rest of the world. *Household consumption* accounted for 55.9% of GDP in OIC countries, higher than that in non-OIC developing countries (48.3%) but slightly lower than that in developed countries (58.6%). The share of *general government final consumption expenditures* in GDP was low in OIC countries (13.5%) relative to both developed and

developing countries. The share of *gross capital formation* averaged at 27.3% for the OIC countries, lower than the average for non-OIC developing countries but higher than the average for developed countries. International trade –in goods and services– continued to account for a higher share of GDP in OIC countries than in both developed and developing countries. For the OIC countries, the share of *exports* and *imports* in GDP averaged at 33.4% and 31.1%, respectively.

LABOUR MARKET

The employment-to-population ratio (EPR), after falling to a historically low level of 54.5% worldwide in 2020 due to employment losses, recovered by 1.2 percentage points to 55.7% in 2021 and further went up by 0.7 percentage points to 56.4% in 2022. EPR continued to be lower in the OIC countries than in the rest of the world throughout the last five-year period under consideration (2018-2022). After bottoming out at as low as 51.5% in 2020, EPR in the OIC countries registered a limited recovery in 2021 to 52% and then grew up to 52.7% in 2022. According to data from the International Labour Organization (ILO), the number of unemployed in the OIC countries decreased by 0.7 million to 46.3 million people as of 2022. Consequently, the unemployment rate also declined by 0.3 percentage points to 6.3% in 2022. It is expected to remain at the same rate over the 2023-24 period, continuing to hover over the global averages.

INFLATION

Consumer price inflation in the OIC countries increased sharply to 20.0% in 2022, compared with 12.6% in 2021. This increase of 7.4 percentage points was much greater than that observed in both non-OIC developing countries (3.1 percentage points) and developed countries (4.2 percentage points). Considering that the inflation rate increased to 7.3% in developed countries and to 7.6% in non-OIC developing countries, the OIC countries, on average, continued to have a much higher inflation rate in 2022. This trend is expected to continue in 2023 as well, although a decline in inflation rates is expected worldwide in 2023. Among the OIC countries, Sudan recorded the highest annual inflation rate of 138.8% in 2022, followed by Türkiye (72.3%), Suriname (52.5%), and Iran (49.0%), all among the top 10 countries with the highest inflation in the world.

INTERNATIONAL TRADE

Merchandise Trade

The annual value of global merchandise trade, after falling by 7.3% in 2020 amidst the pandemic, rebounded by 27.0% in 2021 and 10.8% in 2022. Both exports and imports of the OIC countries followed a parallel course, though a sharper rebound was recorded in exports. Falling by 17.5% in 2020, merchandise exports of the OIC countries increased by 41.4% in 2021 and by 29.8% in 2022. Merchandise imports increased by 30.4% in 2021 and by 18.2% in 2022 following a drop of 9.8% in 2020. Consequently, the exports, which reached as high as US$ 2.7 trillion in 2022, accounted for a higher share of global exports; 11.2% in 2022 compared with 9.6% in 2021. Similarly, the imports, which increased to US$ 2.4 trillion in 2022, had a higher share in global imports, rising from 9.3% in 2021 to 9.7% in 2022.

Services Trade

The value of global trade in services, which shrank by 17.2% in 2020 from the previous year, rebounded by 18.8% in 2021 and further grew by 14.8% in 2022. After experiencing even a greater fall in services trade in 2020, the OIC countries also registered a recovery in 2021 followed by an even sharper increase in 2022.

Their services exports, plummeted by a third (34.0%) in 2020, recovered by 24.8% to US$ 372 billion in 2021, and then sharply increased by almost a half (47.6%) to US$ 549 billion in 2022, such that their share in global services exports increased from 5.7% in 2020 to 6% in 2021 and then to 7.7% in 2022. Similarly, their services imports, which fell by 26.7% in 2020, recovered by 15.3% and amounted to US$ 509 billion in 2021, then further went up by 22.1% to 622 billion, with their share in global services imports increasing to 9.4% in 2022 from 8.9% in the previous two years.

Net exports of the OIC countries in merchandise trade soared to US$ 303 billion in 2022, compared to US$ 50 billion in 2021. In services trade, the OIC countries, on aggregate terms, remained a net importer over the last 5-year period of 2018-2022, though the deficit narrowed over that period. The aggregate deficit of OIC countries in services trade amounted to US$ 72 billion in 2022, the lowest in the period under consideration.

Intra-OIC Merchandise Trade

Decreased by 8.1% to US$ 293 billion in 2020, merchandise exports among the OIC countries (intra-OIC exports) rebounded by 30.3% to US$ 381 billion in 2021 and further rose by 24.4% to US$ 475 billion in 2022. Nevertheless, the OIC countries' exports to the rest of the world increased at higher rates, resulting in a decline in intra-OIC export share from 19.6% in 2020 to 18.1% in 2021 and further down to 17.3% in 2022.

Among the OIC countries, Saudi Arabia was the largest exporter to the OIC countries in 2022, with intra-OIC exports valued at US$ 94.7 billion. In terms of intra-OIC export share, however, Yemen took the lead by directing 93.6% of its total exports to the OIC countries. As for intra-OIC imports, the United Arab Emirates was by far the largest importer from the OIC countries in 2022, with intra-OIC imports valued at US$ 77.5 billion. In terms of intra-OIC imports share, Benin took the lead receiving almost two-thirds (63.6%) of its imports from the OIC countries.

CURRENT ACCOUNT BALANCE

The OIC countries, on aggregate terms, recorded a current account surplus of US$ 299 billion in 2022, more than 2.5 times the surplus of US$ 116 billion in the previous year. In parallel, the surplus as a percentage of GDP increased from 1.5% in 2021 to 3.4% in 2022, the highest ratio observed in the past nine years. Looking ahead, the IMF projections signal a shrinking surplus to US$ 107 billion or 1.2% of GDP in 2023. Among the OIC countries, Saudi Arabia registered the largest current account surplus in nominal terms in 2022 (US$ 152.8 billion), while Türkiye recorded the largest deficit (US$ 48.7 billion). As a percent of GDP, the surplus reached as high as 30.5% in Azerbaijan, while the deficit reached as high as 36.0% in Mozambique.

FISCAL BALANCE

Government deficits in the OIC countries, on average, continued to narrow in 2022, down to 0.7% of GDP. This improvement resulted from both an increase in revenues and a decrease in expenditures, both as percentage of GDP. However, current projections for the year 2023 signal a deviation from this trend, with expenditures rising, revenues falling, and deficits expanding to 2.9% of GDP. Most OIC countries with available data witnessed an improvement in their fiscal balance as percent of GDP in 2022 as compared to the previous year. Moreover, while only seven countries recorded a surplus in 2021, this number increased to 15 in 2022.

INTERNATIONAL FINANCE

FDI Flows and Stocks

Following a fall of 15.2% to US$ 98 billion in 2020, FDI inflows to the OIC countries rebounded by 40.6% and reached as high as US$ 138 billion in 2021. A slight decrease of 1.7% to US$ 135 trillion was recorded in 2022. The share of OIC countries in flows to developing countries was measured at 19.7% in 2022, up from 19.5% in 2021. Similarly, their share in global FDI inflows reached a decade high of 10.5% in 2022, compared to 9.3% in 2021. In the 5-year period from 2018 to 2022, FDI stocks increased by 18.4% to US$ 2.3 trillion in the OIC countries while they increased by 53.4% in non-OIC developing countries and by 33.9% in developed countries. Thus, the OIC countries hosted a slightly lower share of the global inward FDI stocks in 2022 (5.3%) than in 2018 (6.1%). The bulk of global stocks continued to be hosted by developed countries, which had a share of 73.8% in 2022.

External Debt

The total external debt stock of the OIC countries increased by US$ 81 billion or 4.1% to US$ 2,064 billion in 2021 from US$ 1,983 billion in 2020. *Use of IMF credit*, which expanded by US$ 45.7 billion or 60.7% to US$ 120.9 billion, contributed the most to this increase although it was still the smallest component of the total external debt stock of the OIC countries. *Public and publicly guaranteed debt* increased by US$ 30.7 billion or 3.0% in 2021 and continued to be the largest component of the total external debt stock (50.8%). *Private nonguaranteed debt* fell by US$ 4 billion or 0.7% from its 2020 level and amounted to US$ 591.3 billion. Thus, as the second largest component of total external debt stock, it had a share of 28.6% in 2021. Overall, *long-term debt stock*, comprising public, publicly guaranteed, and private nonguaranteed debt, amounted to US$ 1,640 billion in 2021, up US$ 26.7 billion or 1.7% from the previous year, and accounted for 79.5% of the total external debt stock. *Short-term debt* reached US$ 303.2 billion in 2021, with an increase of US$ 8.9 billion or 3.0% from the previous year, and maintained its share at around 15%.

International Reserves

World total international reserves amounted to US$ 14.8 trillion in 2022, with a decrease of US$ 1 trillion or 6.5% from the previous year. Two-thirds (68%) of this decrease originated from developed countries, of which reserves fell by US$ 689 billion, or 9.3%, to US$ 6.7 trillion. In developing countries, reserves decreased by US$ 332 billion or 4.0% to US$ 8.0 trillion. In the OIC countries, however, the 2022 data available for 36 member countries indicate an increase in reserves by 2.0% to US$ 1.66 trillion in 2022. Nevertheless, while half of them improved their reserves in 2022, the reserve adequacy with respect to imports deteriorated in most OIC countries due to either a decline in reserves or a higher increase in imports than in reserves.

Official Development Assistance (ODA)

In 2021, net ODA flows received by the developing world reached US$ 203.9 billion, its highest level ever, with an increase of US$ 9 billion, or 4.6%, from the previous year. The flows that were reported at the individual country level (about one-third of the total ODA flows are not reported at the country level) decreased by 1.7% and amounted to US$ 133.8 billion in 2021, accounting for 66% of the total ODA flows. ODA flows to the OIC countries reached US$ 78.3 billion in 2021, up 5.7% from US$ 74.1 billion in 2020. The share of OIC countries in total ODA flows to individual developing countries also increased in 2021, to 58.5%, as compared to the previous year (54.5%).

Personal Remittances

Despite the COVID-19 pandemic, remittance flows remained resilient in 2020 across the world and improved afterwards. At the global level, officially recorded remittance flows reached US$ 767 billion in 2022, up 3.7% from the 2021 total of US$ 739 billion. Inflows to the OIC countries increased by 4.6% or US$ 8.6 billion to US$ 195 billion, and their share in world total remittance flows slightly increased to 25.4% in 2022, compared with 25.2% in the previous year.

The Rise of the Digital Economy and Bridging the Digital Divide

Changing Patterns of Production and Trade with Rising Digitalization

The world economy is witnessing a new form of transformation characterized mainly by rising digitalization, automation and artificial intelligence. More specifically, the integration of digital technologies and advanced robotics is transforming the manufacturing process and driving the Fourth Industrial Revolution (Industry 4.0). These technologies can be grouped into two categories, each playing a crucial role in revolutionizing the manufacturing landscape.

Smart Manufacturing and Service Technologies: This category focuses on the automation and decentralization of tasks within manufacturing processes. Advanced robotics introduces sophisticated machines capable of handling complex tasks with precision and efficiency. 3D printing enables the creation of three-dimensional objects layer by layer, revolutionizing rapid prototyping and customization. The IoT connects physical devices, machines, and sensors to facilitate real-time monitoring, data collection, and optimization of production processes. Together, these technologies enhance manufacturing capabilities, improve productivity, and lead to more flexible and adaptive production systems.

Data Processing and Communication Technologies: This category involves the interconnection and exchange of data across various components of the manufacturing process. Big data analytics processes and analyses vast amounts of data, providing valuable insights for decision-making, process optimization, and quality control. Blockchain technology ensures secure and transparent data exchange and transaction recording, enhancing supply chain management and traceability. Cloud computing offers on-demand access to shared computing resources, enabling scalability and storage for large datasets. Machine learning and AI enable machines to learn from data and make intelligent decisions, further enhancing process automation and efficiency.

The novelty of all these technologies lies in their seamless integration and the convergence of hardware, software, and connectivity in complex production systems. This integration creates interconnected and intelligent manufacturing ecosystems, where data-driven decisions and automation lead to more efficient, agile, and responsive manufacturing processes. As a result, businesses can achieve higher levels of productivity, reduced production costs, faster time-to-market, and increased product customization, ultimately driving economic growth and competitiveness across global value chains (GVCs).

These technologies are crucial for OIC economies as they bring about significant advancements in productivity, efficiency, and innovation across industries. By harnessing these technologies' potential, OIC countries can stimulate growth, create new job opportunities, and position themselves at a competitive place on the global stage. OIC countries have the opportunity to leverage automation and advanced robotics to accelerate their development, improve productivity, and enhance their global

competitiveness. There are opportunities to leapfrog traditional stages of development and adopt advanced technologies directly. However, it requires strategic planning, investment in infrastructure and human capital, and supportive policies to mitigate potential challenges and ensure inclusive and sustainable development. By embracing these technologies early on, OIC countries can position themselves as innovation hubs and attract investment.

Issues and Challenges for Digital Economic Transformation in OIC Countries

There are important opportunities as well as challenges for OIC countries in adapting to the changing nature of work in association with digitalization and automation. Significant disparities exist across OIC countries in terms of availability, accessibility, quality and reliability of digital infrastructure and services. There are OIC countries with well-advanced infrastructure and better readiness for future economic transformation, but on aggregate, OIC countries fall behind the world average performances in many indicators. This requires closer collaboration among OIC countries to facilitate knowledge sharing and capacity development.

The current state of digital infrastructure in OIC countries shows some promising developments in some OIC countries, but demonstrates major challenges in the majority of OIC countries, particularly those in sub-Saharan Africa. These countries are the least ready to use, adopt or adapt to frontier technologies and are at risk of missing current technological opportunities. Facing relatively higher ICT prices, lower software spending, and limited broadband subscriptions, it is crucial for lagging OIC countries to recognize the urgent need for digital infrastructure development. High ICT costs and limited software access hinder economic growth and digital inclusion. Therefore, concerted efforts are needed to reduce ICT costs, increase investment in software and digital services, and expand broadband access.

Policy Options for Bridging the Digital Divide in OIC Countries

Bridging the digital divide in OIC countries involves a multifaceted approach that begins with assessing the current digital landscape, identifying priority areas, and engaging stakeholders to understand the specific challenges faced by underserved communities. This process encompasses addressing demographic and geographic disparities, boosting digital literacy, tackling socioeconomic factors hindering digital access, and ensuring adequate digital infrastructure. Moreover, it requires reforming regulatory and policy frameworks, focusing on educational and healthcare needs, considering economic opportunities, and actively involving the public in decision-making. Through a comprehensive, data-driven strategy and collaboration with public and private sectors, countries and regions can effectively prioritize and invest in initiatives aimed at reducing the digital divide, fostering inclusive digital development, and promoting equitable access to the benefits of the digital economy.

In this connection, this report offers a set of comprehensive policy options under seven steps for OIC countries to adapt to the growing digitalization of economic activities and benefit from its mounting importance. This includes how to identify the priority areas to invest, how to finance digital infrastructure investments, how to improve access to digital technologies, how to regulate the digital economy, how to ensure cyber security, how to support firms and entrepreneurs to better utilize digital technologies, and how to upgrade skills to increase productivity and minimize job losses.

CHAPTER ONE

Recent Developments in the World Economy: Trends and Prospects

World economic recovery is threatened by persistent inflation, increasing interest rates, rising geopolitical tensions, and uncertainties, which aggravate the risk of prolonged low growth due to lingering COVID-19 effects, worsening climate change impacts, and unaddressed structural challenges. International trade remains under pressure due to geopolitical tensions, weakening global demand and tighter monetary and fiscal policies.

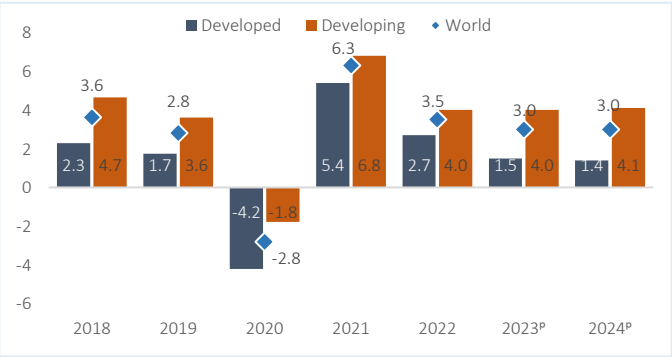
ECONOMIC GROWTH

A sluggish economic growth recorded in 2022 after a strong rebound in 2021

The COVID-19 pandemic and the associated containment measures resulted in an unprecedented slowdown of economic activities all over the world in 2020. According to the International Monetary Fund (IMF, 2022a), the world's real GDP contracted by -2.8%, with developed economies contracting more than developing countries did, -4.2% and -1.8%, respectively. With the removal of the pandemic-related restrictions, a strong economic recovery was recorded in the globe where the world economic growth rate hit 6.3% in 2021, triggered by a strong rebound in both developed countries (5.4%) and developing countries (6.8%) (*Figure 1.1*). It should be noted, however, that this quick recovery in 2021 should be interpreted with some caution that it mainly stemmed from the base effect. The severe output contractions recorded by countries around the world in 2020 resulted in a low comparison base and significant statistical carry-over, inflating the year-over-year growth rates in 2021 (UN, 2021).

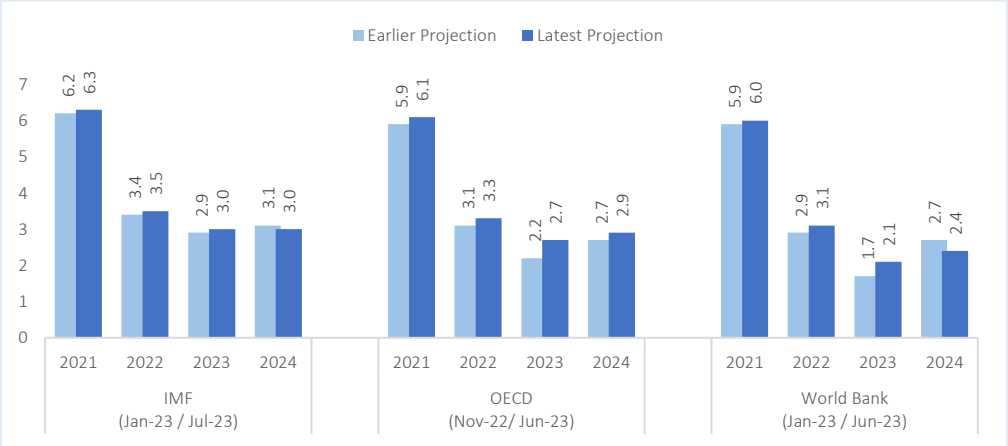
The erosion of the base effect in 2022 helped to put the real GDP growth rate back to its pre-pandemic trajectory. A moderate growth rate of 3.5% was recorded in 2022 and it is projected to continue in a similar pattern as the central banks of major economies in the world attempt to cool down the inflation. The projections of the IMF reveal that the global economy will continue to maintain a growth rate of 3% in 2023 and 2024. Several pressing issues continue to mask the global economic growth trajectory over the period 2022-2024. Most notably, the ongoing Russia-Ukraine conflict is anticipated to have a substantial impact on the post-pandemic global economic recovery and pose significant uncertainties to the outlook. Besides, the measures taken by central banks have been limiting the financial sector growth that could have the potential to increase banking sector vulnerabilities in 2023 and 2024 (IMF, 2023a; 2023b). This could result in a moderate decline in financial sector growth, which may take the global growth projections further down. Nevertheless, the positivity in the global economy following the pandemic still goes on. The global demand remains strong, which also keeps the price level elevated.

Figure 1.1: Real GDP Growth (%)



Source: IMF, World Economic Outlook (WEO) Database, April 2023 and WEO Update July 2023. Note: P= Projection

Figure 1.2: Revisions to World Real GDP Growth Projections (%)

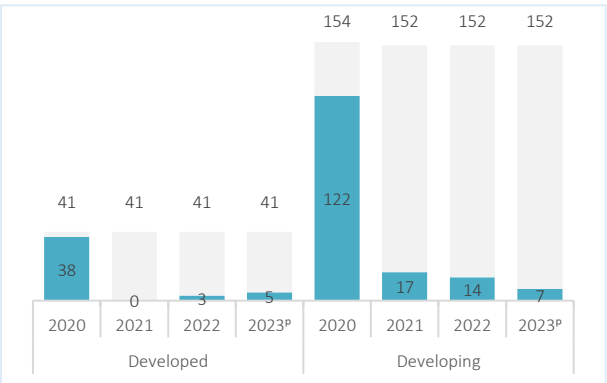


Source: IMF, World Economic Outlook, January 2023 update and July 2023 update; World Bank, Global Economic Prospects, January 2023 and June 2023; OECD, OECD Economic Outlook, November 2022 and June 2023.

Given the strong demand particularly seen in developing countries, the global economic growth rate has been revised upward by the IMF, Organisation for Economic Co-operation and Development (OECD), and World Bank. IMF July 2023 projections expect a 0.1 percentage point higher growth in 2023 than previously projected in January. This positive difference is wider in the case of the OECD. The OECD foresees a growth rate of 2.7% by the end of 2023 instead of the 2.2% projected in November 2022. Likewise, the World Bank upgraded its projection for the growth rate of 2023 from 1.7% to 2.1% in its recent Global Economic Prospects Report (*Figure 1.2*). The outlook for 2024 is, however, highly uncertain. As the Russia-Ukraine conflict continues, geopolitical tensions are high and commodity prices stay high, the IMF revised the projected growth rate of 2024 from 3.1% to 3%. The risk of having a more contagious virus strain of COVID-19, which could affect the global economy, and an increased risk of inflation in emerging economies also put pressure on the growth prospects in 2024 (IMF, 2023b).

According to the IMF data, in 2020, during the pandemic, 38 developed economies around the world recorded a negative GDP growth rate. With the pandemic-led recession in the global economy in 2020, 122 out of 154 developing countries witnessed a negative economic growth rate during that year. All developed countries reported a positive growth rate in 2021 thanks to the ongoing economic recovery process and only 17 developing countries experienced a contraction in their GDP in the

Figure 1.3: Number of Countries with a Negative GDP Growth Rate



Source: IMF, World Economic Outlook Database, April 2023.
Note: P= Projection

same year. In 2022, the vast majority of economies from developed and developing regions were on track and reported positive growth rates (181 countries out of 193 with available data). In particular, the projections for 2023 show that only five developed countries and seven developing countries will record a negative growth rate (*Figure 1.3*).

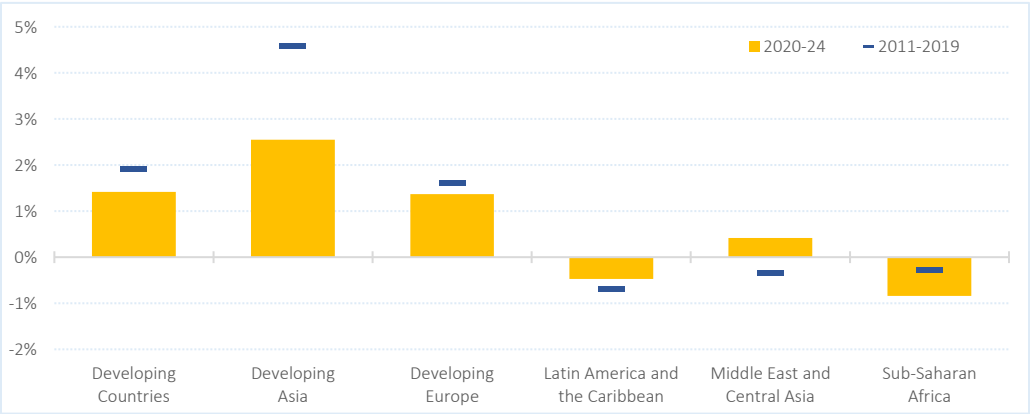
Divergence in economic prospects across countries remains a major concern

The slowdown in per capita economic growth rate since the outbreak of the pandemic in developing countries has affected their pace of growth negatively. Overall, the pandemic has disrupted the progress in many developing countries in terms of per capita income catch-up with developed countries (SESRIC, 2022). The recovery process from the pandemic was hit by the outbreak of the war in Ukraine in 2022 that deteriorated prospects for a quick recovery and inflated global commodity prices. The difference in per capita income growth between developing and developed countries is estimated to decrease by 1.4% during 2020-24 compared to 1.9% during the previous decade (*Figure 1.4*), reflecting that per capita income catch-up with developed economies would slow down given the projected growth rates.

Regional differences are also significant. Developing countries in Europe and particularly in Asia are expected to face a remarkable slowdown in the catch-up process while those in Latin America and the Caribbean and in Sub-Saharan Africa, which have already been diverging from developed countries, are expected to widen the gap. On the other hand, developing countries in the Middle East and Central Asia, which also diverged from developed countries in the 2010-2019 period, are expected to see positive growth rates in real per capita income in the 2020-2024 period. This positive pattern would allow them to reduce the gap between their average per capita income and those seen in developed countries over the 2020-2024 period.

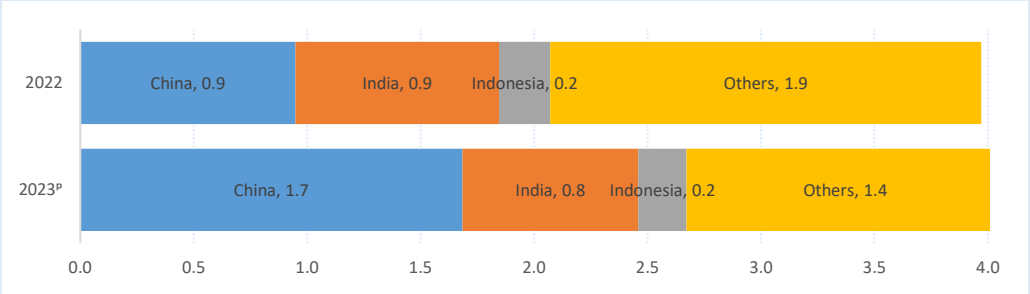
Per capita income growth rates among developing economies vary significantly, which also leads to a diverse pace of catch-up. This is mainly stemming from the differences in real GDP growth rates in the developing world. Economic dynamism is driven by several countries – so-called growth engines – in developing economies. Among them, China, India and Indonesia accounted

Figure 1.4: Per Capita Income Growth Relative to Developed Countries (percentage points)*



Source: SESRIC staff calculation based on data from IMF, World Economic Outlook Database, April 2023. Note: * Annual average difference in GDP per capita growth rate at constant prices between developing country groups and developed countries.

Figure 1.5: Major Contributors to Economic Growth of Developing Countries (percentage points)



Source: SESRIC staff calculation based on data from IMF, World Economic Outlook Database, April 2023 and July 2023 Update.
Note: P= Projection

for over half of the growth of developing countries in 2022. The growth rate in the developing economies is expected to remain at 4% in 2023 as in 2022. These three countries are again expected to drive growth thanks to their large domestic markets and diversified export base. They are projected to make a significant contribution to the growth of developing countries, accounting for 67% in 2023 (*Figure 1.5*).

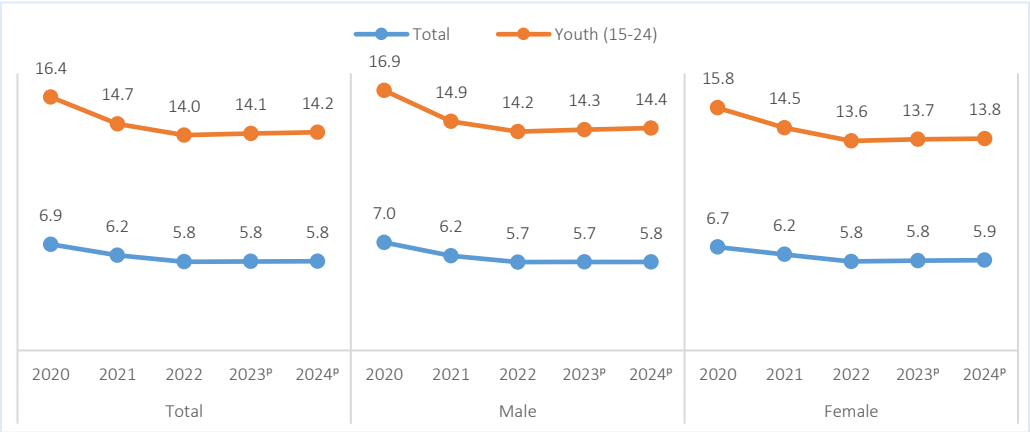
UNEMPLOYMENT

Unemployment rate continued to decline in 2022

According to ILO estimates, global unemployment stood at 192 million in 2022, down from 214.2 million in 2021. It is projected that global unemployment will decrease slightly, by 1 million, to reach 191 million in 2023 (ILO, 2023). The global unemployment rate fell by 0.7 percentage points to 6.2% in 2021, after peaking at 6.9% in 2020 due to the outbreak of the pandemic, the highest level since 1991, when available data began. In 2022, the global unemployment rate experienced a further decline by 0.4 percentage points to 5.8%. This figure is estimated to remain unchanged through 2023 and 2024 (*Figure 1.6*). Overall, the decline in the unemployment rate by 2023 will not be sufficient to close the gaps led by the pandemic, though the pandemic has waned in most countries, accelerating the global recovery in unemployment rates remarkably (ILO, 2023).

The severe contraction in the world economy in 2020 has had disproportionate adverse impacts on employment and earnings of certain groups such as youth, women, workers with relatively lower educational attainment, seasonal migrant workers, and the informally employed. Constituting large segments of the population, particularly in developing countries, these groups have been more vulnerable to negative economic aspects of the pandemic and containment measures and, therefore, have generally been the hardest hit. Young people – aged 15 to 24 – constituted a particularly vulnerable segment of the global population, with an unemployment rate of about twofold as compared to that of adults. Limited employment opportunities for the youth, which has already been a global challenge, have further deteriorated because of the pandemic-induced economic collapse. However, youth unemployment has steadily declined, dropping from 16.4% in 2020, during the peak of the pandemic, to 14.7% in 2021, and further to 14.0% in 2022 as containment measures were gradually removed. Nevertheless, it is estimated to see slight increases to 14.1% in 2023 and 14.2% in 2024 (*Figure 1.6*).

Figure 1.6: World Unemployment Rate (%)

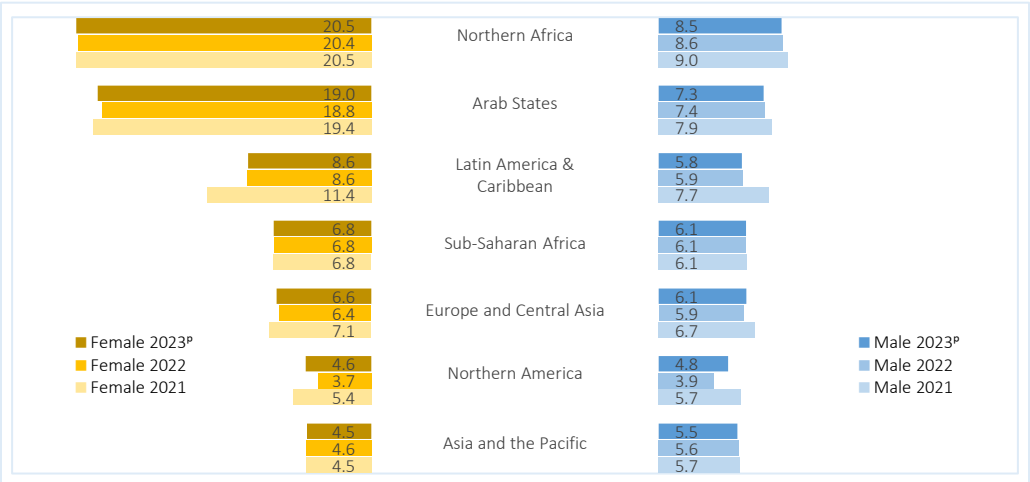


Source: ILOSTAT, ILO Modelled Estimates, November 2022.

The total male unemployment rate is estimated to have decreased from 6.2% in 2021 to 5.7% in 2022. It is estimated to remain at 5.7% in 2023 before recording a slight increase to 5.8% in 2024. Similarly, the female unemployment rate continued to decrease in 2022, falling to 5.8% that year from 6.2% in 2021. Estimates show that it will stay at 5.8% in 2023 and slightly increase to 5.9% in 2024 (*Figure 1.6*). In addition, the labour force participation rate (LFPR), having sharply declined in 2020 due to the shocks of the pandemic, increased by 1.2 and 1.3 percentage points for both males and females, respectively, between 2020 and 2022. However, the LFPR continued to be significantly lower for females (47.3 %) than males (72.5 %) in 2022.

While global unemployment rates for both males and females decreased in 2022, they varied by gender and region worldwide (*Figure 1.7*). Unemployment rates for both males and females decreased in all regions, except in Sub-Saharan Africa and Asia and the Pacific. In Sub-Saharan

Figure 1.7: Unemployment Rate by Region and Gender (%)



Source: ILOSTAT, ILO Modelled Estimates. Note: Regional classification is based on ILO country groupings. Regions are ordered by the difference between female and male unemployment rate in 2022.

Africa, the rates remained stable, while in Asia and the Pacific, the female unemployment rate slightly increased vis-à-vis a slight decline in the male unemployment rate. Moreover, the gap between female and male unemployment rates widened in 2022 in Europe and Central Asia, Latin America and Caribbean, and Northern Africa. In Northern Africa and the Arab States, the unemployment rate for females continues to be more than twice the rate for males, mainly due to some social norms and country-specific factors (SESRIC, 2021). It is obvious from *Figure 1.7* that, for women, it is harder to find a job in many developing regions of the world.

PRICES & INFLATION

Commodity prices further increased in 2022, with inflation at record heights

In 2020, commodity markets faced significant disruptions from the pandemic and associated mitigation measures that plummeted global demand for most commodities due to severely curbed consumption, production, and investment. Commodity prices declined sharply as a result of tumbling global demand, with oil prices particularly affected, falling by a third (32.7%) from 2019. Behind this fall in oil prices was a large contraction in travel and transport activities, which accounted for two-thirds of oil consumption, stemming from controls to slow the spread of the pandemic (World Bank, 2020).

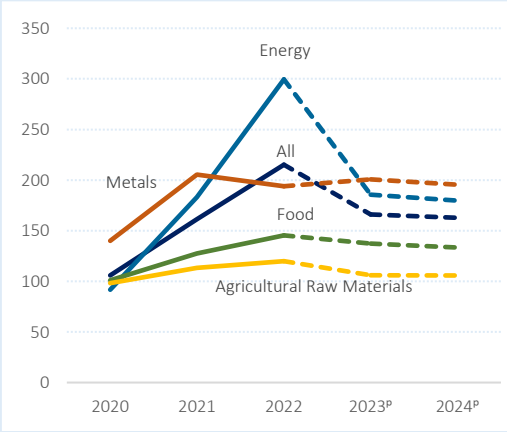
As restrictions relaxed throughout 2021, demand accelerated, but supply was slower to respond amid ongoing disruptions. Commodity prices saw a significant rise from their low levels in the previous year, increasing by 52.3%. In 2022, commodity prices increased, on average, by 33.5% and reached new heights, as measured by the IMF's Commodity Price Index (*Figure 1.8*). It is projected to cool down by 23% in 2023.

Driven by a strong recovery in demand along with improving global economic prospects, energy (fuel) prices significantly increased by 99.6% in 2021. The pace of increase in energy prices lowered in 2022, however, it continued to rise (63.6%). Metal prices, buoyed by the recovery in global manufacturing, improved prospects for infrastructure investment in advanced economies, and supply disruptions due to COVID-19, increased by 46.7% in 2021 and decreased by 5.6% in 2022. Food prices were up by 26.1% in 2021 and further increased by 14.1% in 2022. Regarding agricultural raw materials, prices went up by 15.5% in 2021 and by 5.7% in 2022.

Unlike in 2022, the overall commodity prices are expected to decline in 2023. The Commodity Price Index is projected to decrease by 22.9% in 2023 and further narrow down by 2.0% in 2024. This decline is attributed to a combination of factors, including slowing economic activity, favourable winter weather, and shifts in global commodity trade flows (World Bank, 2023a; 2023b).

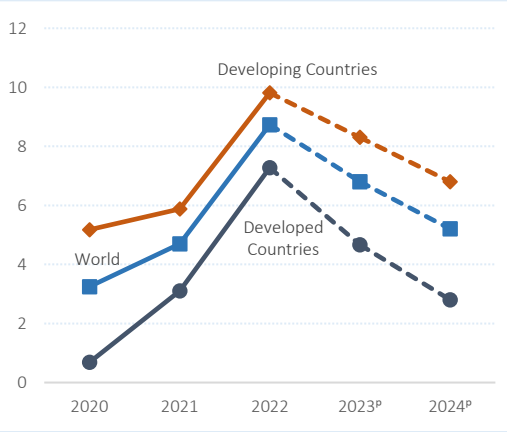
Accordingly, energy prices in 2023 are projected to see a sharp decrease of 38.0%. This is because, on the supply side, the impacts of Western sanctions on Russian crude oil exports eased as Russian exports remained steady when the country redirected its oil to non-sanctioned countries, mainly India and China, selling at a discount to Brent prices. Additionally, OECD member countries releasing strategic petroleum reserves helped balance oil markets, partially

Figure 1.8: World Commodity Prices (2016=100)



Source: IMF, World Economic Outlook Database, April 2023.
Note: P= Projection

Figure 1.9: Inflation (%)



Source: IMF, World Economic Outlook Database, April 2023 and July 2023 Update. Note: Annual average change in consumer prices (CPI); P= Projection

offsetting underproduction and OPEC+ output cuts (IMF, 2023a). Global food prices and agricultural raw materials prices are projected to fall by 5.6% and 11.6%, respectively, in 2023; this is partially attributed to the Black Sea grain deal signed in July 2022, and subsequent renewal in November 2022. This agreement facilitated the flow of food supplies from Ukraine and Russia, major producers of wheat and corn, and ensured that Russian fertilizer could reach global markets. However, Russia's withdrawal from the grain deal in mid-2023 will cause a possible increase in food prices (UN, 2022 and IMF, 2023a). Metal prices are expected to rise by 3.5% in 2023, following a 5.6% decline in 2022. Even before the war, supply shortages, alongside the release of pent-up demand, and the rebound in commodity prices caused consumer price inflation to increase rapidly all around the world.

Global inflation rose to 4.7% in 2021 and hit 8.7% in 2022. It is projected to slow through 2023 and 2024 to 6.8% and 5.2%, respectively. The increase in inflation was notable in developing countries, rising from 5.9% in 2021 to 9.8% in 2022, and the projections show that there will be a downturn to 8.3% and 6.8% in 2023 and 2024, respectively. In developed countries, the inflation rate was 3.1% in 2021 and then increased by more than twofold to 7.3% in 2022. The projection displays that it will ease to 4.7% and 2.8% in 2023 and 2024, respectively (*Figure 1.9*). Although projections signal a decline in 2023 and 2024, there is great uncertainty regarding the supply-demand imbalances, including those stemming from the war. Some central banks in developed and developing countries, particularly the US Federal Reserve, are continuing their monetary policy tightening due to rising inflationary pressures.

Indeed, around the globe, rising inflation has become a central concern in many countries. In some advanced economies, including the United States and some European countries, such as Germany, Belgium, and the Netherlands, the 2022 inflation was expected to be the highest in 40 years. According to the IMF (2022), there is a rising risk that inflation expectations drift from central bank targets, prompting a more aggressive tightening response from central banks. As advanced economy central banks tighten policy and interest rates rise in those countries,

developing countries could face a further withdrawal of capital and currency depreciations that could increase inflation pressures. The rising cost of living due to elevated inflation, particularly the increases in food and fuel prices, could escalate the risk of social unrest, especially in developing countries.

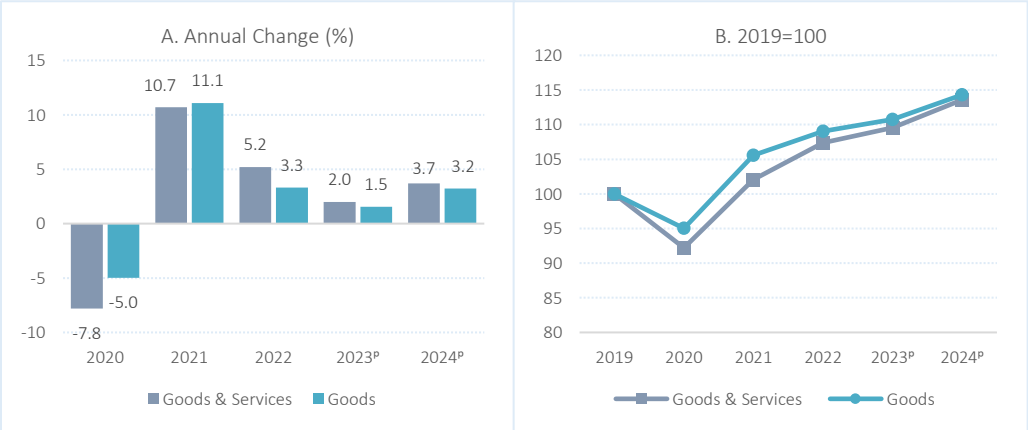
INTERNATIONAL TRADE

Trade volume continues to grow but at a slower pace

The containment measures and lockdowns aimed to curb the pandemic have affected both demand and supply negatively. International transportation and global value chains (GVCs) were also disrupted remarkably during the closures. The unprecedented adverse effects of the pandemic led to a remarkable collapse (-7.8%) in global trade volume in 2020. However, the recovery was quick, particularly in merchandise trade, while trade in services remains sluggish mainly due to the slow recovery in travel activities. After experiencing a 5.0% decline in 2020, trade in goods rebounded and expanded by 11.1% in 2021. Similarly, trade in goods and services showed a significant growth rate of 10.7% in 2021 after the setback in the previous year (*Figure 1.10*).

Reflecting the significant slowdown in overall economic activity, the conflict in Ukraine, and the lingering effects of the pandemic, the global trade growth rate decelerated in 2022. The sanctions imposed to press Russia to end the war are limiting financial and trade linkages between Russia and other countries, with far-reaching repercussions. Accordingly, the IMF indicated that the growth rate in world trade volume in goods and services went down from 10.7% in 2021 to 5.2% in 2022, whereas trade volume in goods recorded a similar slowdown from 11.1% in 2021 to 3.3% in 2022. The latest projections of the IMF indicate that the growth in world trade volume in goods and services is expected to decline to 2.0% in 2023 and rise to 3.7% in 2024. Similarly, trade volume growth in goods is forecasted to further slowdown to 1.5% in 2023 before rising to 3.2% in 2024 (*Figure 1.10.A*). Several factors like the reduction in expected inflation and the positive

Figure 1.10: World Trade Volume



Source: IMF, World Economic Outlook Database, April 2023. Note: P= Projection

expectations regarding a possible deal between Ukraine and Russia could have the potential to increase the volume of the global trade while reducing the cost of transportation. Overall, as of 2022, the figures revealed that the world trade volume is far above the pre-pandemic levels and the recovery continues in a positive mood despite having some headwinds due to pressing energy prices and several on-going regional conflicts/tension (*Figure 1.10.B*).

In nominal US dollars, merchandise trade registered a two-digit growth rate in all regions in 2021, while all regions recorded a decline in both exports and imports in the previous year, albeit at different scales (*Table 1.1*). Global merchandise export value, contracted by 7.2% in 2020 with the impact of the pandemic. It grew by 26.6% in 2021 mainly due to the base effect and further increased by 11.5% in 2022. At the regional level, the largest growth both in 2021 by 42.3% and in the following year by 41.6% was recorded in the Middle East, mainly due to an increase in oil prices resulting from the recovering economic activity in the global economy. Exports from Asia, which declined by a modest 1.4% in 2020, increased by 27.2% in 2021 and grew by 7.3% in 2022. Regional disparities existed in import growth, as well, ranging from 23% in North America to 42.2% in South and Central America and the Caribbean in 2021. In 2022, the largest increase was observed in the South and Central America and the Caribbean region at 23.5% while imports to Asia grew by only 9.5%.

Contracted more severely than merchandise trade in 2020, trade in commercial services also recorded a smaller rebound in 2021 compared to that of merchandise exports. However, commercial service exports grew more rapidly in 2022 than merchandise exports. At the global level, commercial services exports grew by 19% in 2021 and further expanded by 14.8% in the following year. At the regional level, on the export side, the Middle East registered the largest increase in commercial services exports in both 2021 (25.9%) and 2022 (47.3%). In 2022, after

Table 1.1: Annual Change in Global Trade Values by Selected Region (%)

Exports				Imports		
2020	2021	2022	Region	2020	2021	2022
			Merchandise			
-7.2	26.6	11.5	World	-7.5	26.5	13.3
-17.8	41.0	17.8	Africa	-16.6	26.6	16.3
-1.4	27.2	7.3	Asia	-6.3	30.0	9.5
-6.3	22.4	8.6	Europe	-6.3	23.8	15.1
-24.5	42.3	41.6	Middle East	-12.8	26.3	20.3
-12.5	23.5	17.5	North America	-7.9	23.0	15.7
-9.4	33.7	16.5	South and Central America and the Caribbean	-16.0	42.2	23.5
			Commercial services			
-17.3	19.0	14.8	World	-18.1	16.0	14.8
-35.1	22.4	30.6	Africa	-23.8	9.9	19.0
-19.8	20.4	13.6	Asia	-19.5	15.1	11.6
-12.9	20.0	11.4	Europe	-13.1	14.8	12.5
-22.6	25.9	47.3	Middle East	-29.6	25.5	22.6
-19.2	11.7	15.6	North America	-21.7	19.4	24.2
-36.7	19.1	39.6	South and Central America and the Caribbean	-28.5	24.5	33.6

Source: SESRIC staff calculation based on data from WTO STATS.

the Middle East came South and Central America and the Caribbean (39.6%) and Africa (30.6%), the hardest hit regions with commercial service exports falling by more than a third in 2020. On the import side, the Middle East, which experienced a 29.6% contraction in commercial services imports in 2020, registered the largest increase (25.5%) in 2021. The highest percentage year-to-year change in 2022 was recorded in South and Central America and the Caribbean region (33.6%). Aimed to control the spread of COVID-19, containment measures, especially international travel restrictions, played a central role in the contraction of commercial services trade all over the world in 2020. Transport and travel services have been the most affected areas in terms of both a fall in services trade in 2020 and a rise in the following couple of years. With the removal of all these restrictions, all regions saw a remarkable recovery in their services imports in the two consecutive years, allowing them to return and even surpass the pre-pandemic levels by 2022.

CURRENT ACCOUNT BALANCE

Developing countries expand their surpluses, developed ones face deficit in 2022

After hitting the peak in 2021, global current account balances – the sum of absolute deficits and surpluses – narrowed in 2022, essentially due to deficits of developed countries driven by the US. They are expected to further narrow in 2023 mainly due to shrinking surpluses of developing countries. In 2024 and over the mid-term, global current account balances are expected to steadily recover (*Table 1.2*) as commodity prices are expected to decline and stabilise (World Bank, 2023a).

Aggregated current account balance of developed countries was in deficit at US$ 258.4 billion in 2022, compared with a surplus of US$ 435.2 billion in 2021, while the massive deficit of the US rose from US$ 846.4 billion in 2021 to US$ 925.6 billion in 2022. As a percent of GDP, developed countries as a group had current account surpluses of 0.8% in 2021, which turned into a deficit of 0.5% in 2022. The aggregate surplus of developing countries, which was at US$ 325.7 billion in 2021, increased by 79% and hit US$ 582.7 billion in 2022. The widening surpluses of China and the large surpluses recorded in the Middle East and Central Asia played a significant role in this improvement. The surpluses to GDP ratio increased in developing countries, from 0.8% in 2021 to 1.4% in 2022. Current IMF projections show that surpluses of developing countries are expected to decline to 0.3% of GDP in 2023 and vanish in 2024, whereas those of developed countries improve to 0.3% of GDP by 2024.

Among developed countries, the United States continues to have a substantial trade deficit that resulted in a current account deficit of 3.6% in 2021 as well as in 2022, worsening from 2.9% in 2020. This deficit (as a percent of GDP) is expected to fall to 2.7% in 2023 and further drop to 2.5% in 2024. Germany and Japan generated significant trade surpluses in 2021, which helped them achieve a current account surplus of 7.7% and 3.9%, respectively. In 2022, current account surpluses of these countries declined to US$ 171 billion and US$ 90 billion or 4.2% and 2.1% of their GDP's, respectively. These countries are projected to maintain strong surpluses in the next two years.

Table 1.2: Current Account Balance

	Billion USD					Percent of GDP				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
World (Global Disparity)	**281.7**	**760.9**	**324.2**	**160.1**	**198.9**	**0.3**	**0.8**	**0.3**	**0.2**	**0.2**
Developed Countries	**125.5**	**435.2**	**-258.4**	**13.3**	**179.5**	**0.2**	**0.8**	**-0.5**	**0.0**	**0.3**
United States	-619.7	-846.4	-925.6	-728.8	-689.9	-2.9	-3.6	-3.6	-2.7	-2.5
Germany	274.2	329.8	171.0	201.2	227.9	7.1	7.7	4.2	4.7	5.1
Japan	147.9	197.3	90.0	131.8	180.3	2.9	3.9	2.1	3.0	4.0
Developing Countries	**156.2**	**325.7**	**582.7**	**146.8**	**19.4**	**0.5**	**0.8**	**1.4**	**0.3**	**0.0**
Asia	319.2	252.0	288.9	182.6	132.0	1.5	1.0	1.1	0.7	0.5
China	248.8	317.3	417.6	272.5	232.6	1.7	1.8	2.3	1.4	1.1
Europe	1.9	66.1	114.5	-37.7	-38.1	0.1	1.5	2.4	-0.8	-0.7
Latin America and Caribbean	-15.5	-102.8	-141.6	-111.8	-112.2	-0.4	-2.0	-2.5	-1.8	-1.7
Middle East and Central Asia	-102.9	130.3	360.9	167.5	99.1	-3.0	3.3	7.5	3.6	2.1
Sub-Saharan Africa	-46.5	-19.9	-40.0	-53.9	-61.3	-2.8	-1.1	-2.0	-2.6	-2.7

Source: IMF, World Economic Outlook Database, April 2023. Note: P= Projection

The current account balance performance of developing countries differed across regions in 2022. In Developing Asia, surpluses grew up to 1.1% of GDP from 1% in the previous year, particularly China, which has a long-standing external surplus, continued to run increasing surpluses that reached 2.3% of GDP in 2022, compared to 1.8% in 2021. Nevertheless, over the 2023-24 period, surpluses of China and other Developing Asian countries are expected to narrow down.

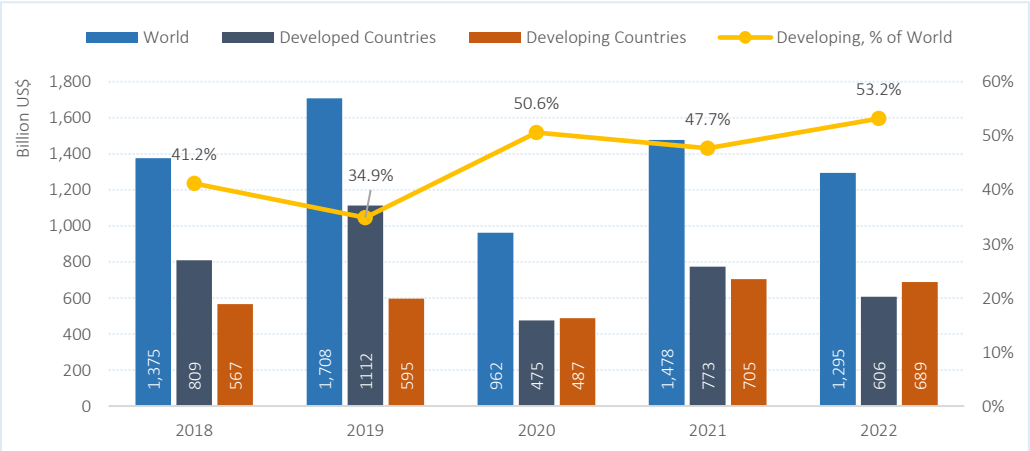
Sub-Saharan Africa improved its current account balance in 2021, narrowing the deficit to 1.1% from 2.8% of GDP in 2020. Yet, in 2022, the deficit increased to 2% of GDP and projections indicate that it will almost return to the 2020 level by 2024. The Middle East and Central Asia region was hit the hardest by the pandemic, running a significant deficit of 3% in 2020. The region recorded a large surplus of 3.3% in 2021 thanks to the strong oil price rebound along with the global economic recovery. With the soaring energy prices in 2022, the region achieved much larger surpluses that reached 7.5% of GDP. The current account surplus of the region is expected to remain higher than other regions in the 2023-24 period. By contrast, Latin America and the Caribbean run current account deficits in both 2021 and 2022 and expectations are that this will continue over the next two years.

FOREIGN DIRECT INVESTMENT

A marked slowdown in global FDI in 2022

According to the World Investment Report of the United Nations Conference on Trade and Development (UNCTAD, 2023), global foreign direct investment (FDI) inflows showed a significant rebound in 2021 and amounted to US$ 1.48 trillion, up 53.7% from the exceptionally low level of

Figure 1.11: World FDI Inflows



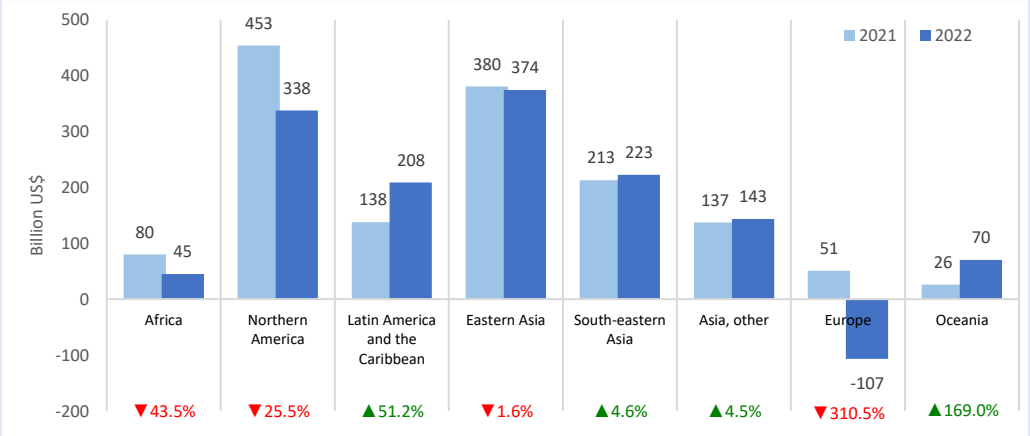
Source: SESRIC staff compilation based on data from UNCTAD, World Investment Report 2023, Annex Tables.

US$ 962 billion in 2020 (due to the pandemic). Afterwards, the global FDI inflows declined by 12.4% and stood at US$ 1.29 trillion in 2022. It stemmed from a substantial slowdown in FDI inflows directed to developed countries that declined by 21.6% from US$ 773 billion in 2021 to US$ 606 billion in 2022, while inflows to developing countries fell slightly by 2.3% from US$ 705 billion to US$ 689 billion over the same period. Thus, the share of developing countries in global FDI inflows improved from 47.7% in 2021 to 53.2% in 2022 (*Figure 1.11*). It is worth noting that, as of 2022, inflows to developed countries were substantially below the pre-pandemic 2019 level, by 45.5%, while inflows to developing countries exceeded the pre-pandemic level by 15.7%.

Change in FDI inflows in 2022 differed significantly by region (*Figure 1.12*). Eastern Asia became the largest FDI recipient in 2022 despite a small decline of 1.6% to US$ 374 billion due to a sharp fall in flows to Northern America by a quarter (25.5%) to US$ 338 billion. Compared to 2021, flows to Europe declined the most, by 310.5%, while Oceania recorded the largest increase, by 169%. Flows to Latin America and the Caribbean[1] increased by half (51.2%) to US$ 208 billion. FDI flows to Africa amounted to only US$ 45 billion, down 43.5% from the previous year.

The global environment for international business and cross-border investment changed dramatically in 2022. Therefore, the growth momentum of 2021 has not been sustained, and the global FDI flows moved on a downward trajectory primarily due to global crises, particularly the Russia-Ukraine war, high food and energy prices, and soaring public debt (UNCTAD, 2023). On the bright side, new greenfield investment in the global value chain (GVC) intensive industries displayed a 15% increase at the global level. The energy sector caused the change in the GVC; on the one hand through attracting more investments to renewable technologies up by 15% with upward trends in almost all regions and sectors, on the other hand, major oil and other conventional energy companies selling their assets mostly to unlisted private equity firms **w**ith lower disclosure requirements (UNCTAD, 2023).

Figure 1.12: World FDI Inflows by Region, 2021 vs. 2022



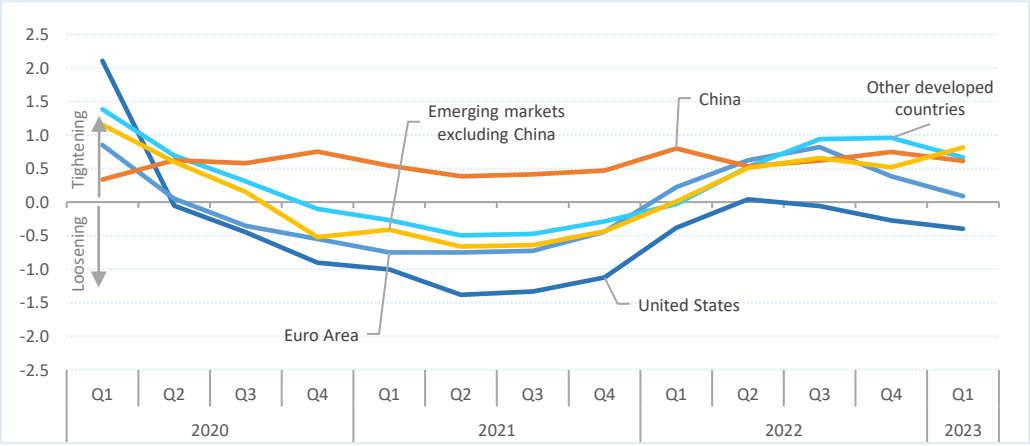
Source: UNCTAD.STAT

FINANCIAL CONDITIONS

A rocky financial environment ahead

Global financial conditions were relatively stable for global economic activities before the pandemic. Nevertheless, with the outbreak of the pandemic as an unexpected game-changer at the beginning of 2020, global financial conditions tightened significantly in the first half of the year (*Figure 1.13*). The containment measures and sudden stops in economic activities not only affected the economic outlook but also deteriorated the expectations and fuelled uncertainty. As COVID-19 spread globally, the prices of risky assets and commodities started to fall at unprecedented speed while the prices of safe-haven assets, such as gold and US Treasuries, gained as investors looked for stability rather than profitability during the crises (IMF, 2020).

Figure 1.13: Financial Conditions Indices (Standard deviations from mean)



Source: IMF, Global Financial Stability Report, April 2023.

Tightened sharply in March 2020 in both developed and developing countries, financial conditions eased significantly afterwards –except in China– as extraordinary policy measures have supported the economy, helping to contain financial stability risks. In 2021, financial conditions eased further in developed economies and the containment of financial stability risks continued, reflecting ongoing monetary and fiscal policy support and the rebound of the global economy. Similarly, financial conditions loosened in emerging economies following the trend observed in developed countries. Early in 2022, global financial conditions have tightened notably and downside risks to the economic outlook have increased as a result of the war in Ukraine.

Financial conditions have tightened as central banks continue to hike interest rates. Amid the highly uncertain global environment risks to financial stability have increased substantially. Major issues facing financial systems include inflation at multi-decade highs, continuing deterioration of the economic outlooks in many regions, and persistent geopolitical risks (IMF, 2022a). A sharp tightening of financial conditions is likely to cause a slowdown next year amid high inflation.

Besides, critical financial instability following the failures of Silicon Valley Bank along with the New York Signature Bank was amplified by the loss of confidence in Credit Suisse, which led to the tightening of monetary and financial conditions in 2023, particularly in the developed economies. Because banking sector failures resulted in stock market volatility and the widening of credit spreads (IMF, 2023a). In this highly uncertain environment, striking a balance between containing these potential threats and avoiding a disorderly tightening of financial conditions will be critical.

FISCAL BALANCE

Government deficits continue narrowing in 2022

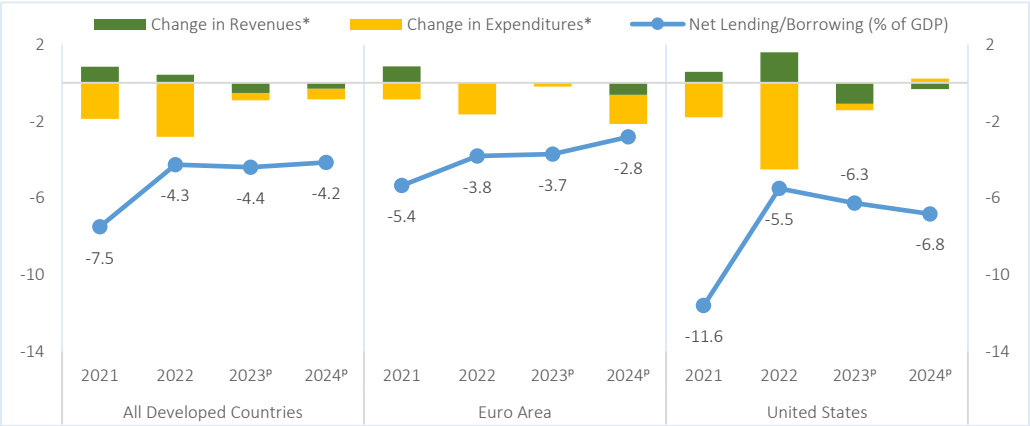
The impact of the pandemic on the fiscal balances of countries was significant. Governments implemented various fiscal measures to mitigate the economic effects of the crisis, including increased spending on healthcare and social welfare programs, as well as offering tax cuts and stimulus packages. As a result, fiscal deficits significantly widened in most countries, leading to a sharp increase in public debt.

Assessing the sustainability of fiscal deficits and the risks associated with high levels of public debt is important. Higher deficits and debt levels could lead to several challenges for economies, such as reduced fiscal space for future spending, higher borrowing costs, and increased vulnerability to financial shocks.

In the post-pandemic period, it has become essential for many countries around the globe to consider fiscal consolidation measures to restore fiscal sustainability. Governments are suggested to develop medium-term fiscal plans that include a combination of revenue-enhancing measures such as tax reforms, and expenditure rationalization such as reducing subsidies and increasing efficiency in public spending.

Despite the recently widened fiscal space as a result of the reverse trend in the post-pandemic era, many countries still need to take additional measures to achieve fiscal consolidation. While low natural rates may ease pressure on fiscal policy, they do not rule out the need for fiscal

Figure 1.14: General Government Fiscal Balance in Developed Countries



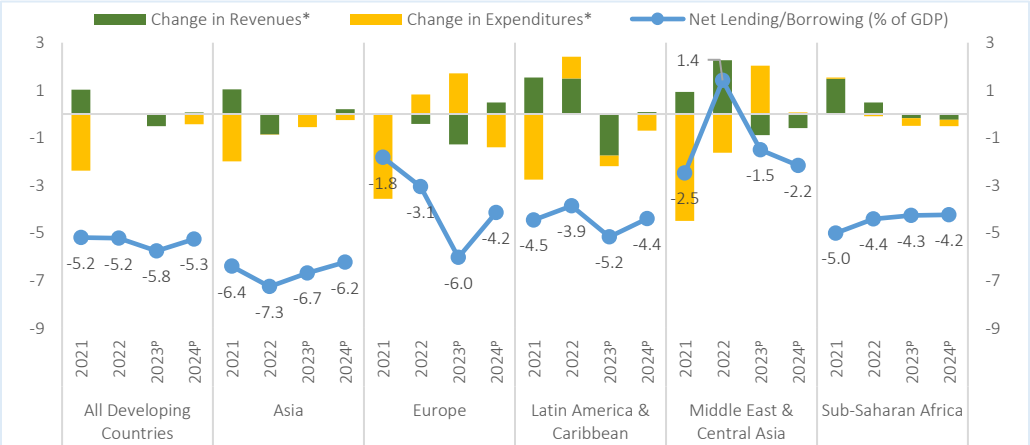
Source: IMF, World Economic Outlook Database, April 2023. Note: P= Projection; * Percentage point difference from the previous year in their ratio to GDP.

responsibility (IMF, 2022a; 2022b). In response to this need, fiscal deficits continued narrowing in 2022 globally compared to the pandemic era. The shifts reflect several shocks that have hit economies around the globe in recent years—the pandemic, the war in Ukraine, and energy and food price shocks—and the exceptional policy responses (IMF, 2021). Regarding their fiscal balances, heterogeneity across countries is observed. Advanced economies generally have higher fiscal deficits compared to emerging markets and developing economies. However, several emerging market economies also face significant fiscal challenges, due to their exposure to external financing risks and commodity price fluctuations.

While the pandemic-related exceptional supports posed a significant burden on the fiscal balances in 2020, government fiscal deficits declined in 2021 and 2022 as economies recovered and countries started to withdraw those exceptional supports. *Figure 1.14* shows that, in developed countries, deficits narrowed from 7.5% of GDP in 2021 to 4.3% in 2022, mainly due to a decline of 2.8 percentage points in expenditures as a percent of GDP as well as an increase of 0.4 percentage points in revenues. The improvements in fiscal balances stemmed mainly from the removal of fiscal measures and accelerated economic recovery from the pandemic. Deficits are expected to hover around the 2022 level over the period 2023-2024. Deficits in the Euro Area declined to 3.8% of GDP in 2022 due to a decrease in expenditures. While further declines are anticipated over 2023-24, these are also expected to result mainly from reduced expenditures. Reached as high as 11.6% of GDP in 2021, the deficit in the United States declined to 5.5% in 2022 – with about 4.5 percentage points decrease in expenditures as a percentage of GDP – and it is projected to bounce back and reach 6.3% in 2023 mainly due to decreasing revenues while the expenditures remain nearly intact.

In developing countries, a decline in expenditures and an increase in revenues (as a percent of GDP) together contributed to the fiscal deficit that halved to 5.2% of GDP in 2021 as compared to 2020 and maintained at the same level in 2022 (*Figure 1.15*). As of 2022, governments' ability to support the economic recovery through increased spending or reduced revenues (fiscal space) was more limited. The war in Ukraine and the increase in global interest rates to keep inflation

Figure 1.15: General Government Fiscal Balance in Developing Countries



Source: IMF, World Economic Outlook Database, April 2023. Note: P= Projection; * Percentage point difference from the previous year in their ratio to GDP.

contained were further constraining fiscal space in many countries, especially oil- and food-importing developing countries. Overall, the deficits in developing countries are projected to increase slightly to 5.8% of GDP in 2023, mainly due to a decline in revenues.

Prospects for fiscal balance (as a percent of GDP) differ across developing regions. All of the regions apart from Europe registered an improvement in fiscal balances in 2022 as compared to the previous year (*Figure 1.15*). The widening government fiscal deficit of Europe resulted from a combination of an increase in expenditures and a decrease in revenues. The Middle East and Central Asia run a surplus in 2022, resulting from both a decrease in expenditures and an increase in revenues. Fiscal balances are projected to deteriorate in Europe, Middle East and Central Asia, and Latin America and Caribbean in 2023. In Asia, however, the deficits are projected to narrow from 7.3% in 2022 to 6.7% in 2023. In Sub-Saharan Africa, fiscal prospects have been improving since 2021 and the deficits are expected to continue narrowing down in 2023 and 2024.

CHAPTER TWO

Recent Economic Developments in OIC Countries

The economic after-effects of COVID-19 and the war in Ukraine have caused significant economic challenges, including surging inflation, rapid monetary policy adjustments, and a period of slow economic growth and reduced investment. These developments had important ramifications on economic activities in OIC countries as well as the rest of the world.

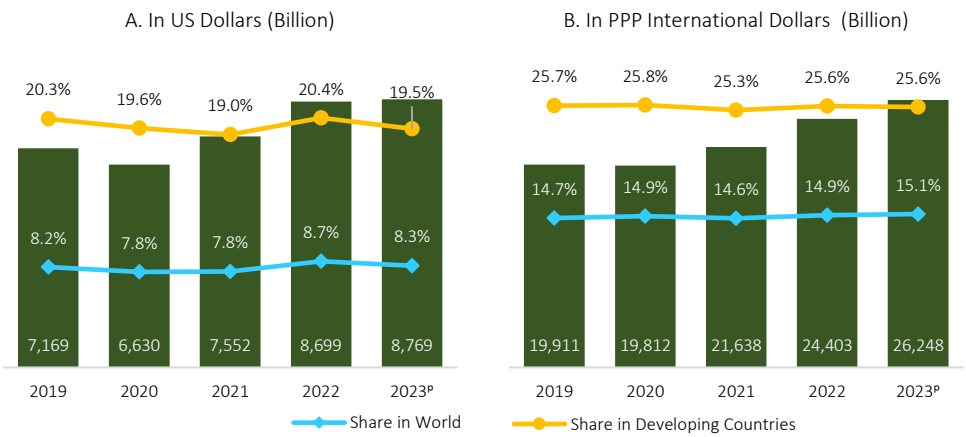
PRODUCTION AND ECONOMIC GROWTH

Output up 15.2% to US$ 8.7 trillion in 2022

At current prices, the total GDP of the OIC countries, which contracted to US$ 6.6 trillion in 2020 due to the COVID-19 pandemic, recovered to US$ 7.6 trillion in 2021 and exceeded the pre-pandemic 2019 level. In 2022, it further increased by 15.2% to US$ 8.7 trillion as a result of the ongoing gradual recovery. With this economic size, the OIC countries, as a group, accounted for 8.7% of global GDP in 2022, up 0.9 percentage points from the previous year. The share of the OIC countries in the total GDP of developing countries also increased from 19.0% in 2021 to 20.4% in 2022, indicating that the recovery in current output was faster in the OIC countries relative to the rest of the world. Nevertheless, this situation is projected to reverse in 2023 given the expectation of limited output growth in the group of OIC countries (*Figure 2.1.A*).

In terms of Purchasing Power Parity (PPP) expressed in international dollars, the total GDP of the OIC countries at current prices reached 24.4 trillion dollars in 2022, and it is expected to reach 26.2 trillion dollars in 2023. With these amounts, the OIC countries, as a group, accounted for 14.9% of global GDP in 2022, up 0.3 percentage points from 2021, and projections show that this share will reach as high as 15.1% in 2023. Their share in the total GDP of developing countries also increased in 2022, to 25.6%, and this is expected to be maintained in 2023 (*Figure 2.1.B*). Considering the estimated share of the OIC countries in the world population (24.4%) and in the

Figure 2.1: Total GDP and World Shares of OIC Countries (at current prices)



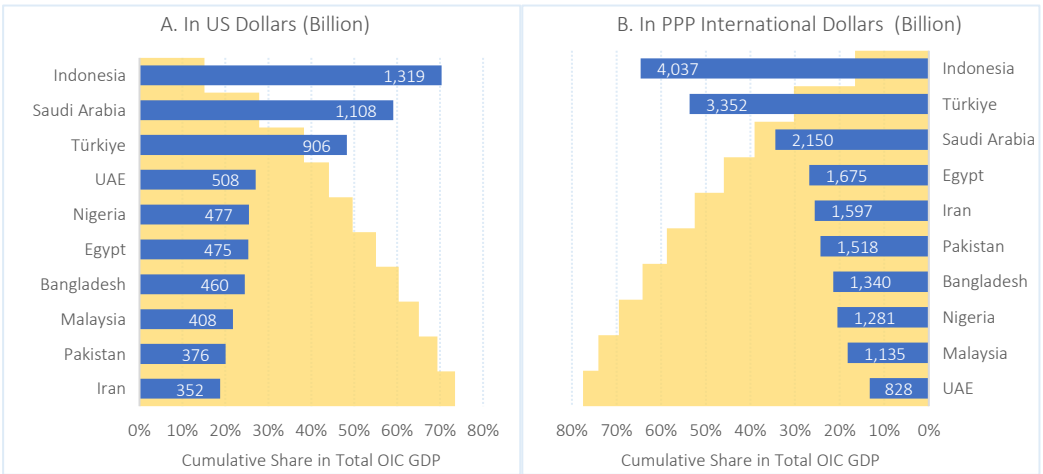
Source: SESRIC staff calculation based on IMF, World Economic Outlook Database, April 2023. Note: P= Projection; Data exclude Syria for the entire period under consideration and Afghanistan and Lebanon for 2021-2023.

population of developing countries (28.4%) in 2022, their share in GDP, whether in current US dollars or in current PPP international dollars, remains below the desired levels.

Furthermore, it is observed that a significant part of the total GDP of the OIC countries is still produced by a few member countries, reflecting wide differences in economic size. In 2022, the largest five OIC countries accounted for half (49.6%) of the total GDP measured in current US dollars, while this share reached up to 73.5% for the largest ten countries (*Figure 2.2.A*). Indonesia, with a GDP exceeding US$ 1.3 trillion, had the highest share in OIC GDP (15.2%), followed by Saudi Arabia (12.7%), Türkiye (10.4%), United Arab Emirates (5.8%), and Nigeria (5.5%).

Figure 2.2 shows that the largest ten countries remain unchanged when GDP is expressed in PPP international dollars, though the ranking of countries changes due to the difference in purchasing power stemming from relative price differentials between countries. Indonesia was the largest economy, with a PPP equivalent of 4.0 trillion dollars that constituted 16.5% of OIC GDP in 2022. Together with Türkiye (13.7%), Saudi Arabia (8.8%), Egypt (6.9%), and Iran (6.5%), these five countries accounted for 52.5% of the total OIC GDP while, for the largest ten countries, this share reached as high as 77.5% (*Figure 2.2.B*).

Figure 2.2: Top 10 OIC Countries by GDP, 2022

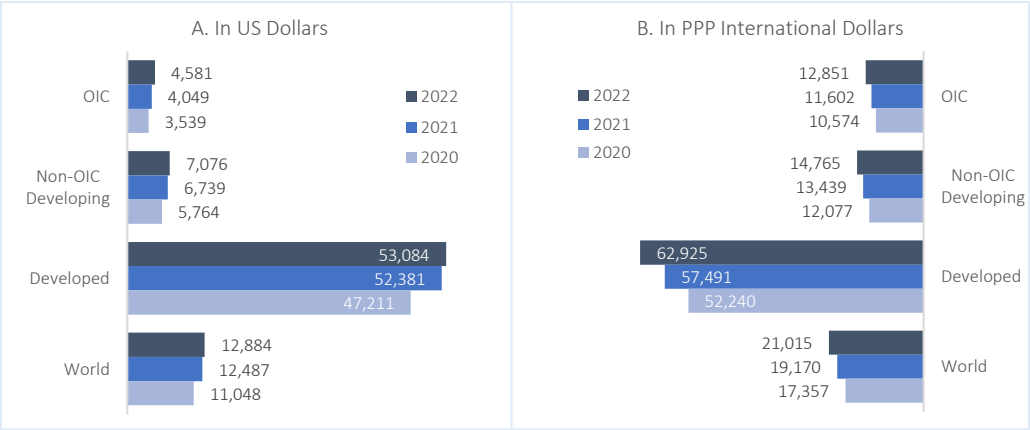


Source: IMF, World Economic Outlook Database, April 2023.

Average GDP per capita exceeds US$ 4,500 in 2022

Given the ongoing recovery in output, per capita GDP values at current prices continued to increase worldwide in 2022 (*Figure 2.3*). In US dollar terms, the global average rose by 3.2% from the previous year to US$ 12,884. The increase in the OIC countries was much larger, with the average GDP per capita rising by 13.1% to US$ 4,581. Non-OIC developing countries registered a smaller rate of growth (5.0%), with their average GDP per capita reaching US$ 7,076. Thus, although GDP per capita continued to be lower in the OIC countries, the gap narrowed to some extent in 2022 (*Figure 2.3.A*).

Figure 2.3: Average GDP per Capita (at current prices)

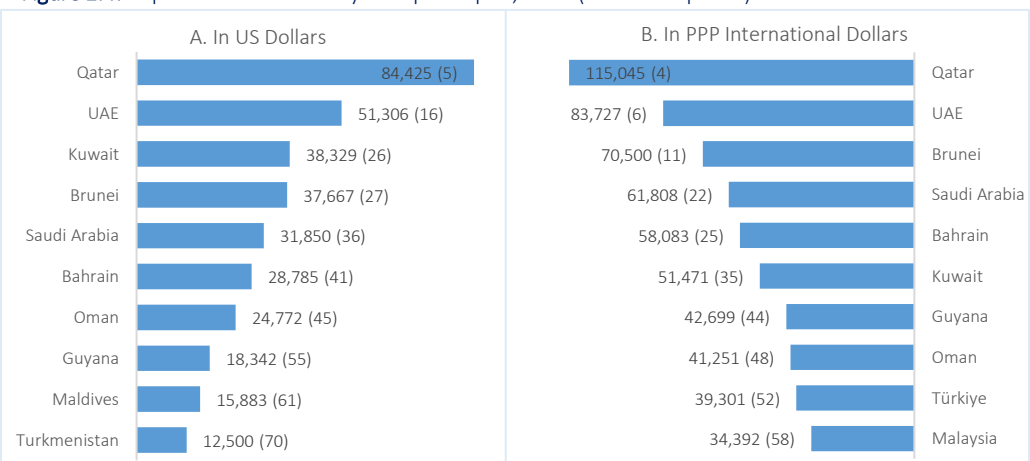


Source: SESRIC staff calculation based on IMF, World Economic Outlook Database, April 2023. Note: Data exclude Syria for the entire period under consideration and Afghanistan and Lebanon for 2021-2022.

In PPP terms, GDP per capita averaged globally at 21,015 dollars in 2022, up 9.6% from a year earlier. In the OIC countries, it increased by 10.8% to 12,851 dollars, remaining below that in non-OIC developing countries, which rose 9.9% to 14,765 dollars (*Figure 2.3.B*).

Among the OIC countries, Qatar had the highest GDP per capita in 2022, ranked globally as the fifth with a value exceeding US$ 84 thousand. This value was more than 18 times the OIC average and 178 times the lowest GDP per capita recorded by an OIC member, indicating the wide disparity among the member countries. Qatar was followed –in descending order– by United Arab Emirates, Kuwait, Brunei Darussalam, Saudi Arabia, Bahrain, Oman, Guyana, Maldives, and Turkmenistan (*Figure 2.4.A*). It is noteworthy that most of them are fossil-fuel-rich countries. In terms of PPP, this list of countries remained the same except that Türkiye and Malaysia replaced the Maldives and Turkmenistan. The ranking of countries somewhat changed, though Qatar

Figure 2.4: Top 10 OIC Countries by GDP per Capita, 2022 (at current prices)



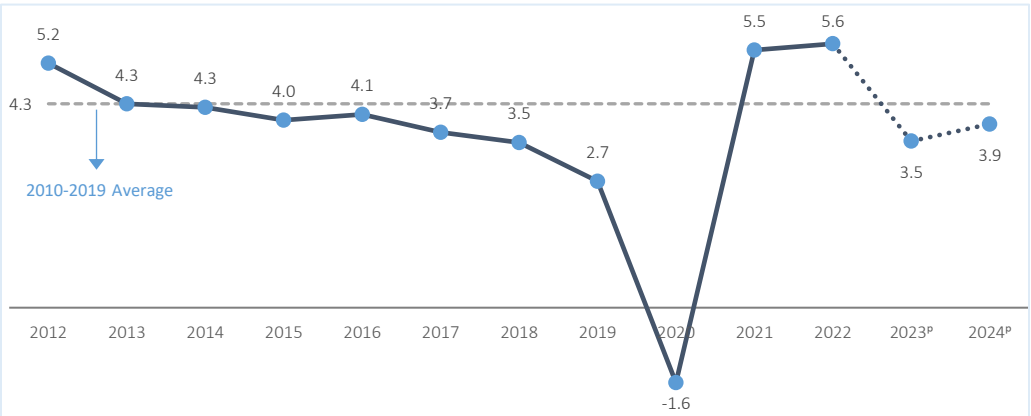
Source: IMF, World Economic Outlook Database, April 2023. Note: The numbers in brackets indicate the global rank of the relevant country among 193 countries.

continued to top the list with a GDP per capita value of over 115 thousand dollars, ranked fourth on the global scale (*Figure 2.4.B*).

Real GDP up 5.6% in 2022, the highest in a decade

Prior to the outbreak of the COVID-19 pandemic, economic growth in the OIC countries followed a decelerating trend, from 6.0% in 2010 to 2.7% in 2019, averaging annually at 4.3%. Under the pandemic conditions in 2020, the OIC countries, on average, contracted by 1.6%, but in parallel with the global economic recovery, they grew by 5.5% in 2021 and 5.6% in 2022, the highest rate achieved since 2011. However, in line with the global trends, the economic growth in OIC countries is expected to moderate in the next two years, to 3.5% in 2023 and 3.9% in 2024 (*Figure 2.5*). It is noteworthy that the average growth rate registered by the OIC countries in 2022 was higher than the global average. As mentioned in the previous chapter, developing economies grew by 4.0% and the developed ones by 2.7%, with the global economic growth averaging at 3.5% (see *Figure 1.1*).

Figure 2.5: Real GDP Growth in OIC Countries



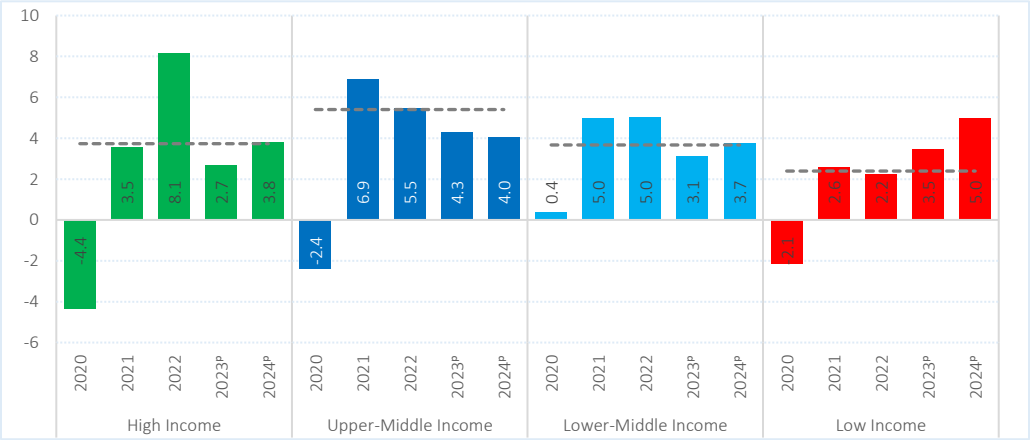
Source: SESRIC staff calculation based on IMF, World Economic Outlook Database, April 2023 and World Economic Outlook Update, July 2023. Note: P= Projection

The growth performance of the OIC countries differed across income groups in 2022 (*Figure 2.6*). Economies of resource-rich high-income countries, which grew 3.5% in 2021, registered the highest growth rate of 8.1% in 2022, more than double the 2010-19 average of 3.7%. A slow growth rate of 2.7% is expected in 2023 before returning to the pre-pandemic average with a rate of 3.8% in 2023.

Having recorded a higher average economic growth (5.4%) during the past ten years prior to the pandemic as compared to the other groups, the upper-middle income economies recorded the strongest recovery in 2021 (6.9%), but growth returned to 5.5% in 2022. Economic growth for this group is expected to further slowdown in 2023 (4.3%) and 2024 (4.0%).

Least affected from the pandemic (+0.4% in 2020), growth in the lower-middle income economies remained above the 2010-19 average of 3.7% in both 2021 (5.0%) and 2022 (5.0%). However, it is expected to moderate in the next two years.

Figure 2.6: Economic Growth in the OIC by Income Group (%)



Source: SESRIC staff calculation based on IMF, World Economic Outlook Database, April 2023 and World Economic Outlook Update, July 2023. Note: P= Projection; Dashed lines represent the annual average growth rate during 2010-2019 for the related income group. See Annex B for the income classification of OIC countries.

The group of low-income countries, which registered a slower average growth rate (2.4%) as compared to the other income groups during 2010-19, shows a different growth trend. After contracting by 2.1% in 2020, growth rate in this group remained around the pre-pandemic average in 2021 (2.6%) and 2022 (2.2%). However, unlike in the other income groups, growth in low-income countries is expected to increase beyond the pre-pandemic average in the next two years, to 3.5% in 2023 and 5.0% in the subsequent year.

An important observation here is that high-income countries managed to return to and actually surpass their pre-pandemic real output level in 2022 thanks to the remarkable growth rate they achieved that year. All the other groups had already recovered their output from the 2020 crisis in the subsequent year, 2021. As of 2022, the output of the OIC countries, as a group, was about 10% over the 2019 level, mostly driven by the performance of middle-income countries (*Figure 2.7*).

Figure 2.7: Real Output Growth in OIC Countries by Income Group (2019=100)

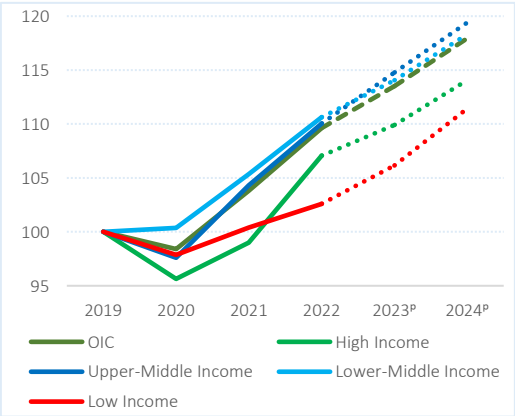
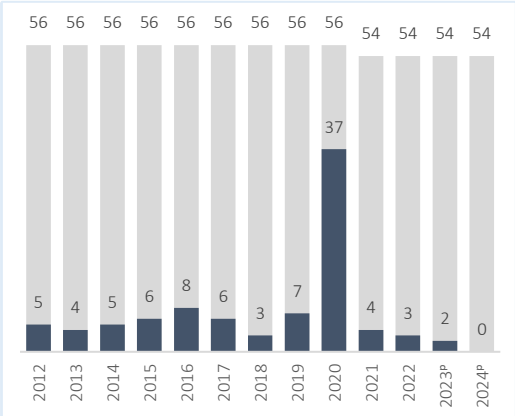


Figure 2.8: The Number of OIC Countries with a Negative Growth Rate*

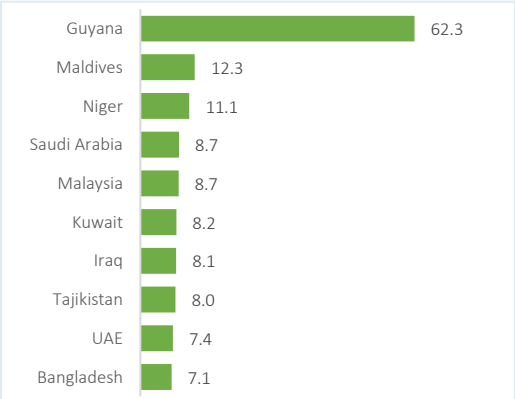


Source: SESRIC staff calculation based on IMF, World Economic Outlook Database, April 2023 and World Economic Outlook Update, July 2023. Note: P= Projection. * Excluding Syria for the entire period and Afghanistan and Lebanon for 2021-2024.

At the individual country level, 3 out of 54 OIC countries with available data recorded a negative growth rate in 2022: Libya (-12.8%), Sudan (-2.5%), and Brunei Darussalam (-1.5%). Current projections indicate that economies of two OIC countries (Yemen and Pakistan) are expected to contract in 2023, while all OIC countries with available data are expected to record a positive growth rate in 2024 (*Figure 2.8*).

Guyana was by far the fastest growing economy in the OIC and in the world in 2022. IMF data show that the Guyanese economy continues to record exceptional growth rates, estimated at 62.3% in 2022, driven by accelerating oil production. The Maldives and Niger also recorded a two-digit growth rate in 2022, 12.3% and 11.1%, respectively, and they appeared among the fastest growing 10 economies in the world that year. In addition to these three countries, Saudi Arabia, Malaysia, Kuwait, Iraq, Tajikistan, United Arab Emirates, and Bangladesh made it to the top ten list of the fastest growing OIC economies in 2022 (*Figure 2.9*).

Figure 2.9: The Fastest Growing OIC Economies in 2022 (%)



Source: IMF, World Economic Outlook Database, April 2023 and World Economic Outlook Update, July 2023.

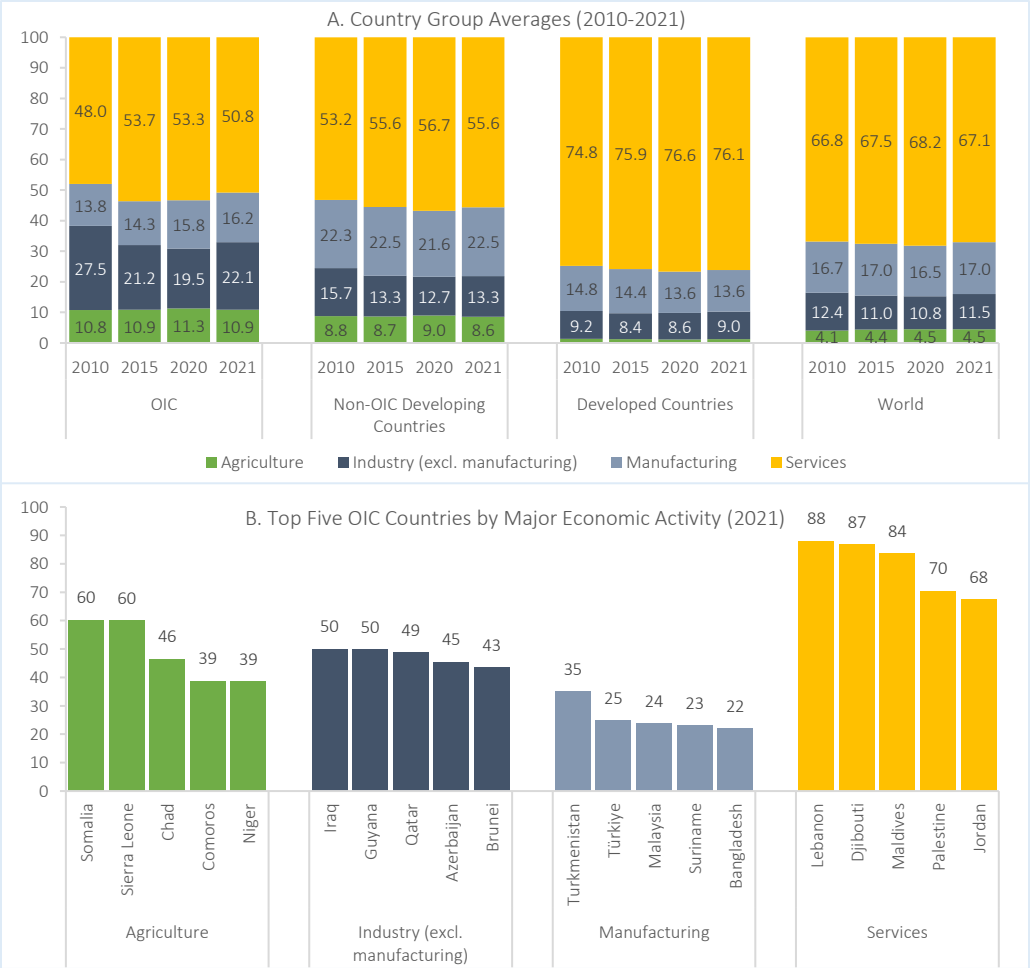
Industrial activities contribute more to GDP in 2021 than in 2020

The composition of GDP reveals important insights into the structure of economies (*Figure 2.10*). The latest available data for 2021 show that, constituting only 1.3% of total value added in developed countries, agricultural activities have a high share of 10.9% in total value added in the OIC countries, which is even higher than that in non-OIC developing countries (8.6%). The agriculture sector is particularly important for the OIC countries in Sub-Saharan Africa; its share in total value added reaches as high as 60% in Somalia and Sierra Leone, 46% in Chad, and 39% in both Comoros and Niger.

The share of the non-manufacturing industry is much higher in the group of OIC countries as compared to the rest of the world, largely due to the substantial fossil fuel extractive industries in many OIC countries. Although this share fell slowly over the 2010-2020 period all over the world, it witnessed an increase in 2021. For the OIC countries, it averaged at 22.1% in 2021 after falling from 27.5% in 2010 to a record low of 19.5% in 2020. The sector accounts for half of the total value added in Iraq and Guyana, and over one-third of the total value added in other ten member countries that are heavily engaged in oil & gas extraction: Qatar, Azerbaijan, Brunei Darussalam, Kuwait, Gabon, Libya, Oman, Algeria, United Arab Emirates, and Saudi Arabia.

The manufacturing sector, which has greater potential to promote productivity and competitiveness, has a share of 16.2% in total value added of the OIC countries, which is higher than that of developed countries (13.6%) but significantly below that of non-OIC developing countries (22.5%). The sector accounts for 35% of the total value added in Turkmenistan and

Figure 2.10: Distribution of Value Added by Major Economic Activity (% of total)



Source: SESRIC staff calculation based on data –at current prices in US dollars– from UNSD, National Accounts - Analysis of Main Aggregates (AMA). Note: "Agriculture" comprises agriculture, hunting, forestry, fishing (ISIC A-B), "Industry" comprises mining, manufacturing, utilities, and construction (ISIC C-F), and "Services" comprises services activities (ISIC G-P). Data coverage: 57 OIC countries, 115 non-OIC developing countries, and 40 developed countries.

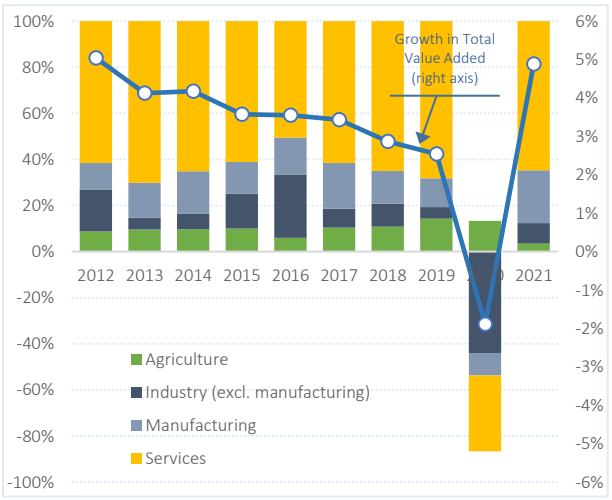
20-25% in six other member countries, namely Türkiye, Malaysia, Suriname, Bangladesh, Uzbekistan, and Indonesia.

The services sector continues to play a key role in the majority of OIC economies, accounting for an average of 50.8% of the total value added in the OIC group. This share is still low though, considering that the sector has a share of three quarters (76.1%) in total value added in developed countries and 55.6% in non-OIC developing countries, averaging at 67.1% worldwide. In the OIC countries, this share reaches as high as 88% in Lebanon, 87% in Djibouti, 84% in Maldives, 70% in Palestine, and 68% in Jordan, while it is at least 50% in 26 other member countries.

The services sector, growing at an annual average of 3.9% during the past decade, has also been the dominant contributor to economic growth in the OIC countries, usually accounting for over

60% of the growth in total value added at constant prices (*Figure 2.11*). Likewise, growing by 5.9% in 2021, this sector was the largest contributor to the recovery in total value added (4.9%) in that year: almost two-thirds (65%) of the growth in total value added stemmed from the services sector. Non-manufacturing industry, which was mainly responsible for the contraction in 2021, grew by 2.2% in 2021 and contributed to the recovery by about 9%. The manufacturing industry, on the other hand, grew by as high as 7.9% and contributed 23%. Contribution of the agriculture sector was less than 4% – the lowest in the past decade – given the slowdown in the sector with growth as low as 1.5%.

Figure 2.11: Sectoral Contribution to Growth in Value Added in OIC Countries



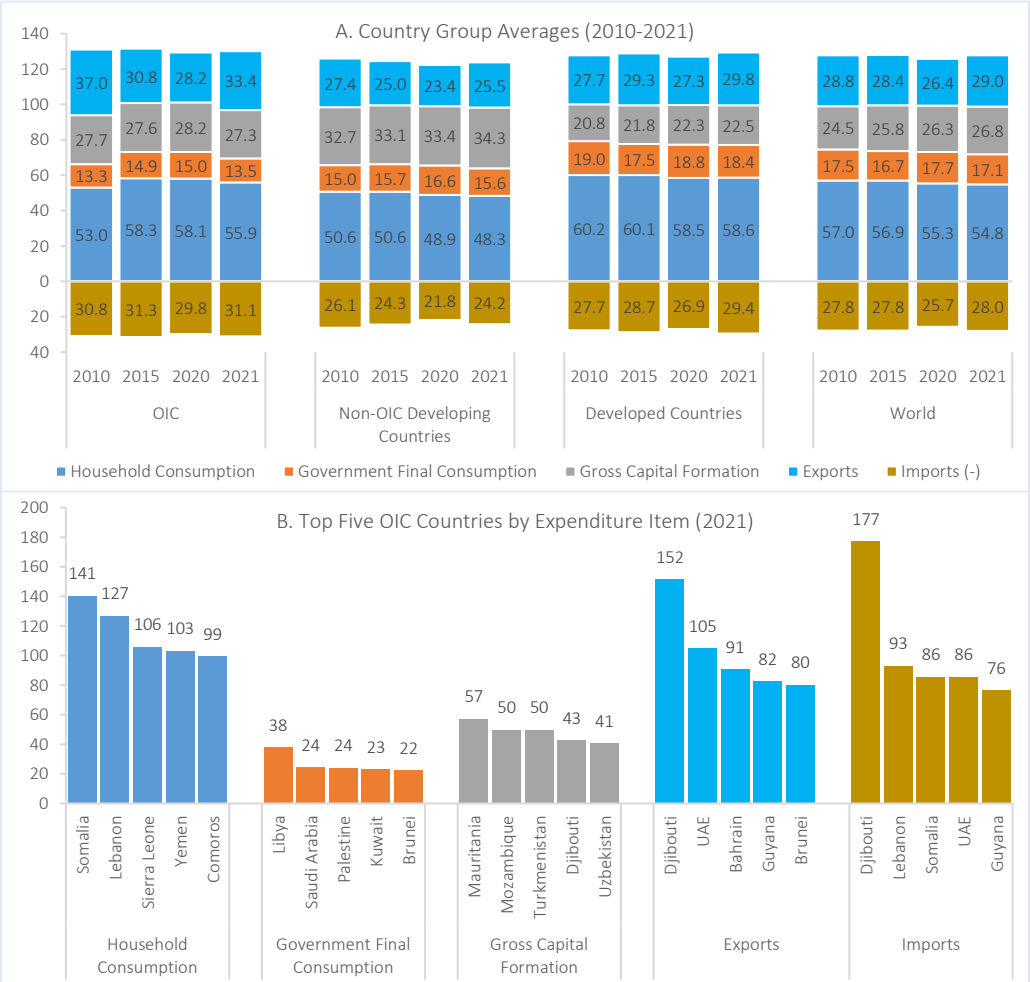
Source: SESRIC staff calculation based on data –at constant 2015 prices in US dollars– from UNSD, National Accounts - Analysis of Main Aggregates (AMA). Note: "Agriculture" comprises agriculture, hunting, forestry, fishing (ISIC A-B), "Industry" comprises mining, manufacturing, utilities, and construction (ISIC C-F), and "Services" comprises services activities (ISIC G-P). Data coverage: 57 OIC countries.

The analysis of the composition of GDP from the expenditures side reveals that final consumption expenditures (by both households and government) continued to have the highest share in GDP over the years in the OIC countries as well as in the rest of the world (*Figure 2.12.A*). In 2021, household consumption accounted for 55.9% of GDP in OIC countries, higher than that in non-OIC developing countries (48.3%) but slightly lower than that in developed countries (58.6%). This ratio reached as high as 141% in Somalia and also above 100% in Lebanon, Sierra Leone, and Yemen, a clear indication that a significant proportion of the private domestic demand was allocated to imported goods and services. In three other OIC countries, namely Comoros, Afghanistan, and Guinea-Bissau, this ratio was over 90% as well, but as low as 11% in Turkmenistan and 20% in Qatar.

The share of general government final consumption expenditures in GDP has been low in OIC countries relative to both developed and developing countries. In 2021, this share averaged at 13.5% for the OIC countries, 15.6% for non-OIC developing countries, and 18.4% for developed countries. The highest ratio among the OIC countries was recorded in Libya at 38%, followed by Saudi Arabia (24%), Palestine (24%), Kuwait (23%), and Brunei Darussalam (22%), while it was less than 10% in ten countries: Lebanon, Nigeria, Bangladesh, Sierra Leone, Egypt, Sudan, Chad, Somalia, Turkmenistan, and Indonesia.

Gross capital formation (GCF), also called "investment", is an important indicator for an economy in that it shows the total value of additions to productive assets, which are intended for use in the production of other goods and services. Thus, a high share of GCF in GDP is desirable for long-

Figure 2.12: GDP by Expenditure (% of total)



Source: SESRIC staff calculation based on data –at current prices in US dollars– from UNSD, National Accounts - Analysis of Main Aggregates (AMA). Data coverage: 57 OIC countries, 114 non-OIC developing countries, and 40 developed countries.

term economic growth as current investment leads to greater future production. *Figure 2.12.A* shows that this share has been relatively stable over the past decade and averaged at 27.3% in 2021 for the OIC countries, lower than the average for non-OIC developing countries (34.3%) but higher than the average for developed countries (22.5%). GCF accounted for as high as 57% of GDP in Mauritania and half (50%) of GDP in Mozambique and Turkmenistan, the highest ratios in the OIC and in the world. This ratio was at least 40% in four other countries (Djibouti, Uzbekistan, Maldives, and Iran) and less than 10% in three countries (Iraq, Guinea Bissau, and Lebanon).

International trade –in goods and services– continued to account for a higher share of GDP in the OIC countries than in both developed and developing countries in 2021. Moreover, both exports and imports had a higher share of GDP in 2021 compared to the previous year in all these groups of countries, as the pandemic-induced severe disruptions to global supply chains and travel services phased out. The share of exports increased by 5.1 percentage points from the previous year and averaged at 33.4% for the OIC countries, while it rose to 25.5% for non-OIC developing

countries and to 29.8% for developed countries. The share of imports increased by 1.3 percentage points to 31.1% for the OIC countries ant it was still higher than the average of both country groups in comparison (*Figure 2.12.A*).

Among the OIC countries, Djibouti was the country with the highest exports share in GDP (152%), ranked sixth on the global scale. This share reached 105% in the United Arab Emirates, 91% in Bahrain, 82% in Guyana, and 80% in Brunei Darussalam, while it was less than 10% in four member countries (Comoros, Gambia, Sudan, and Pakistan). As for the imports share in GDP, Djibouti (177%) also had the top rank in the OIC and the second rank in the world after Hong Kong, China. This share was as high as 93% in Lebanon, 86% in Somalia and the United Arab Emirates, 76% in Guyana, and over 50% in twelve other member countries. At the other side of the spectrum, imports to GDP ratio was as low as 12% in Nigeria and less than 20% in Sudan, Bangladesh, Pakistan, Indonesia, and Egypt.

UNEMPLOYMENT

Unemployment rate further declined in 2022, will remain stagnant till 2024

Global crises such as the Russia-Ukraine war, soaring food and energy prices, increasing debt and inflation have negatively affected the labour market recovery from the pandemic. In 2020, COVID-19 has brought unprecedented disruption to labour markets in the OIC countries just as in other parts of the world. The challenges induced by the pandemic crisis have exacerbated the lack of employment opportunities that would have existed even without the pandemic. Labour markets demonstrated a promising recovery in the past two years following the pandemic; however, the pace of recovery is expected to reverse after 2022.

After falling to a historically low level of 54.5% worldwide in 2020 due to employment losses, the employment-to-population ratio (EPR)[2] recovered by 1.2 percentage points to 55.7% in 2021 and further went up by 0.7 percentage points to 56.4% in 2022. However, due to the gloomy

Figure 2.13: Employment-to-Population Ratio

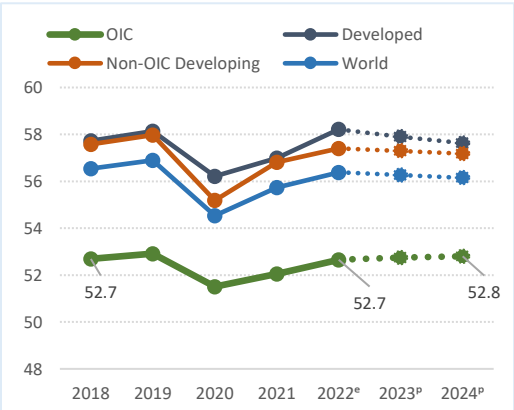
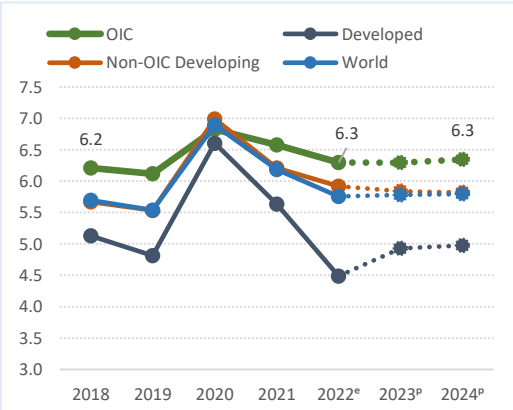


Figure 2.14: Unemployment Rate (%)



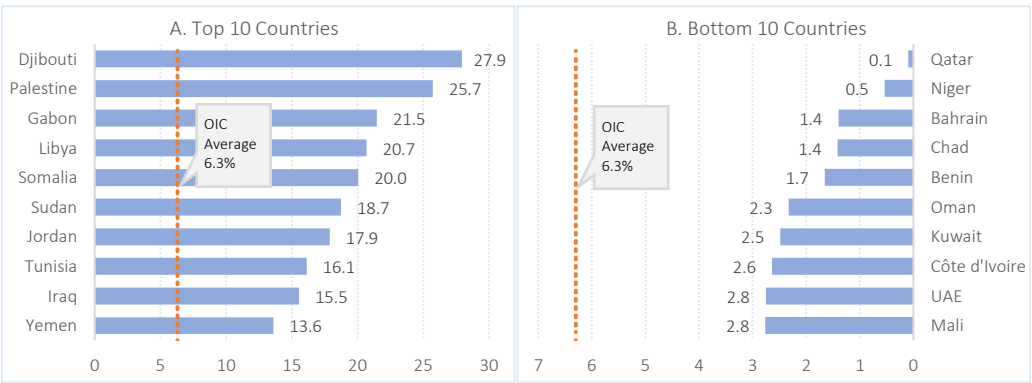
Source: Authors' calculation based on ILOSTAT, ILO Modelled Estimates, November 2022.

economic outlook across the world, it is projected to slightly move downwards in the next two years, remaining below the 2019 level. Although all country groups followed a similar recovery path, both developed countries and non-OIC developing countries maintained a higher EPR than the global average. In comparison, EPR continued to be lower in the OIC countries than in the rest of the world throughout the period under consideration. After bottoming out at as low as 51.5% in 2020, EPR in the OIC countries registered a limited recovery in 2021 – only by 0.5 percentage points to 52% – and then it grew up to 52.7% in 2022. Projections show that the OIC countries, as a group, will be able to slightly increase EPR, in contrast to the other country groups, and move closer to the pre-pandemic levels in the next couple of years (*Figure 2.13*).

As the pandemic transformed from a public health crisis into an employment crisis, millions of people across the OIC were pushed into unemployment in 2020. According to data from ILO, the number of unemployed in the OIC countries increased by over 5 million to reach 48.3 million in 2020. Consequently, the unemployment rate bounced to 6.8% in that year, up 0.7 percentage points from 6.1% in 2019. In the following two years, the number of unemployed people decreased by 1.3 million and then by 0.7 million to 46.3 million people as of 2022. Consequently, the unemployment rate also declined by 0.2 percentage points in 2021 and by 0.3 percentage points to 6.3% in 2022. It is expected to remain at the same rate over the 2023-24 period. Although both developed countries and non-OIC developing countries were hit harder by the pandemic, leading to 1.8 percentage points and 1.5 percentage points increases, respectively, in their unemployment rates in 2020, their recovery has been more substantial in the following two years. Besides, the unemployment rate remained higher in the OIC countries over the whole period under consideration except for 2020, when it averaged at 6.8% for the OIC countries compared with 7% in non-OIC developing countries and 6.9% in the world (*Figure 2.14*). It is notable that the OIC countries, with 46.3 million unemployed people, accounted for 22.6% of the global unemployment in 2022, compared to 21.7% in 2021.

The latest available data show that, in 2022, the unemployment rate fell in 48 OIC countries, and increased in 8 countries. Varied greatly among the OIC countries, the unemployment rate was as high as 27.9% in Djibouti (the second highest in the world after South Africa), followed by Palestine (25.7%), Gabon (21.5%), Libya (20.7%) and Somalia (20%) (*Figure 2.15.A*). At the other

Figure 2.15: Unemployment Rate in OIC Countries, 2022



Source: ILOSTAT, ILO Modelled Estimates, November 2022.

side of the spectrum, it was as low as 0.1% in Qatar (the lowest in the world), 0.5% in Niger, 1.4% in Bahrain and Chad, and 1.7% in Benin (*Figure 2.15.B*).

INFLATION

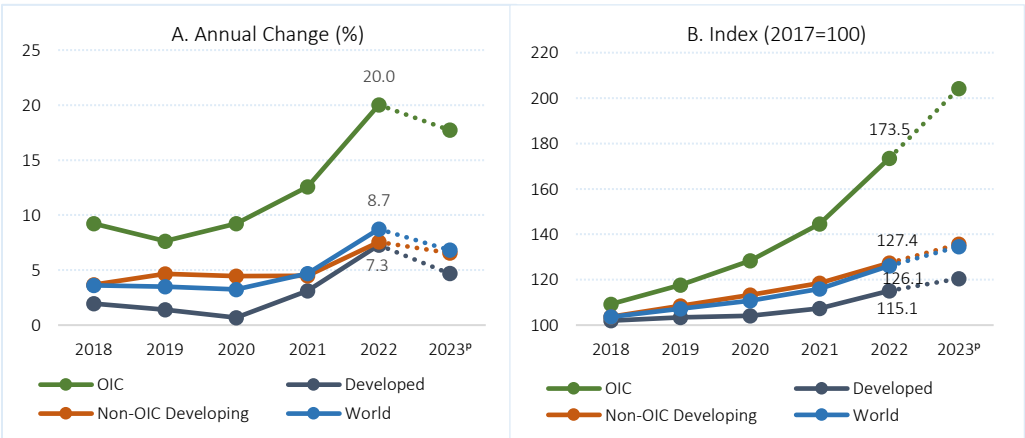
Consumer price inflation to peak at 20% in 2022

Consumer price inflation – measured by the consumer price index (CPI) – rose in most countries across the world in 2022. However, on average terms, the increase was more remarkable in the group of OIC countries (7.4 percentage points) compared to non-OIC developing countries (3.1 percentage points) and developed countries (4.2 percentage points). Inflation in the OIC countries rose sharply to 20.0% in 2022, compared with 12.6% in 2021. Considering that the inflation rate increased to 7.3% in developed countries and to 7.6% in non-OIC developing countries, the OIC countries, on average, continued to have a much higher inflation rate in 2022. This trend is expected to continue in 2023 as well, although a decline in inflation rates is expected worldwide in 2023 (*Figure 2.16.A*).

With the annual inflation rates observed in the 5-year period from 2018 to 2022, the average consumer prices in the OIC countries were 73.5% higher in 2022 compared to 2017, which was considerably above the world average increase of 26.1%. In the same period, average prices increased by 27.4% in non-OIC developing countries and only by 15.1% in developed countries (*Figure 2.16.B*).

Among the OIC countries, Sudan recorded the highest annual inflation rate of 138.8% in 2022, which was also the third highest in the world after Venezuela (200.9%) and Zimbabwe (193.4%). Then came Türkiye (72.3%), Suriname (52.5%), and Iran (49.0%), all among the top 10 countries with the highest inflation in the world. Yemen, Sierra Leone, Nigeria, Kazakhstan, Burkina Faso, and Kyrgyzstan completed the top ten list in the OIC (*Figure 2.17*). Overall, Türkiye, Iran, Sudan, Nigeria, and Pakistan –given their weight in the OIC economy– were the largest contributors to

Figure 2.16: Inflation Rate (Annual Average Consumer Prices)



Source: SESRIC staff calculation based on IMF, World Economic Outlook, April 2023 and July 2023 Update.
Note: P= Projection. Group averages are calculated as a weighted average of national price indices, with the weights being each respective country's GDP in current international dollars based on PPP. The group averages exclude Venezuela.

Figure 2.17: Top 10 OIC Countries by Inflation Rate, 2022

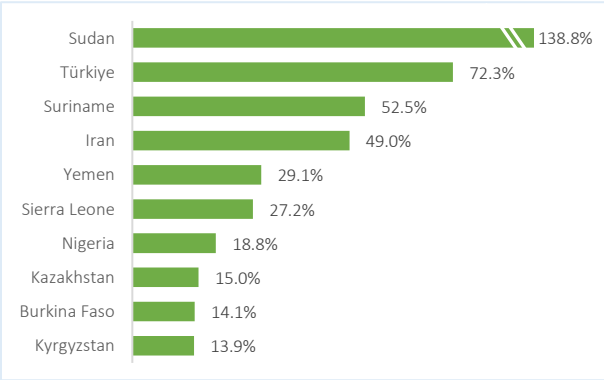
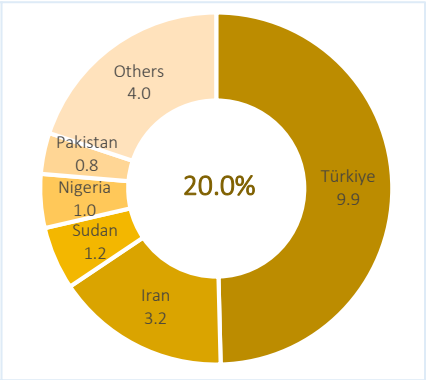


Figure 2.18: Largest Contributors to Inflation, 2022 (percentage points)



Source: IMF, World Economic Outlook, April 2023. Note: Annual average change in CPI. Excluding Afghanistan, Lebanon, and Syria.

the average inflation rate in the OIC in 2022 (20.0%), accounting for four-fifths of the rate (*Figure 2.18*). In 2022, there were no OIC country with a negative inflation rate. The lowest inflation rate was recorded in Benin at 1.5%, followed by Saudi Arabia (2.5%), Maldives (2.6%), Oman (2.8%), and Malaysia (3.4%).

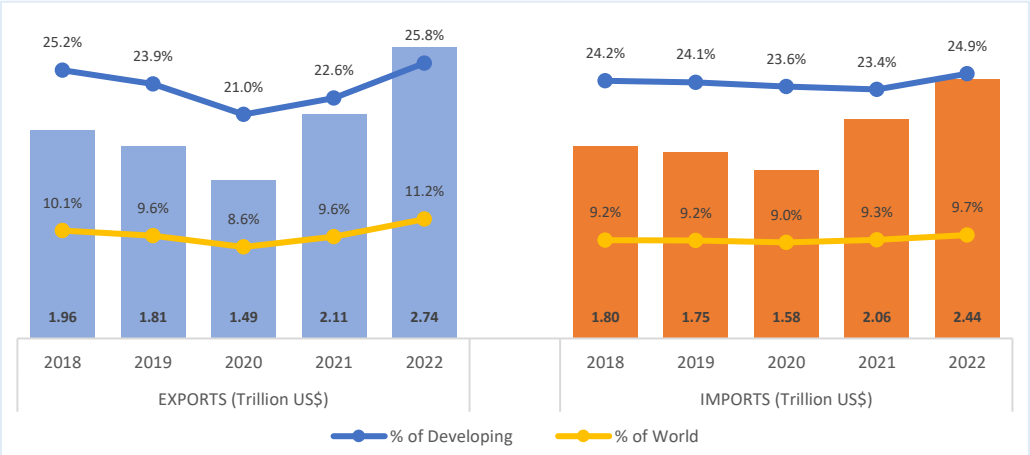
INTERNATIONAL TRADE

Merchandise exports and imports further increase by 29.8% and 18.2%, respectively

According to the IMF data (Direction of Trade Statistics – DOTS), the annual value of global merchandise trade, after falling by 7.3% in 2020 amidst the pandemic, rebounded by 27.0% in 2021 and further went up by 10.8% in 2022. Both exports and imports of the OIC countries followed a parallel course, though a sharper increase was recorded in exports. Falling by 17.5% in 2020, merchandise exports of the OIC countries increased by 41.4% in 2021 and further by 29.8% in 2022. Merchandise imports increased by 30.4% in 2021 and by 18.2% in 2022 following a drop of 9.8% in 2020. Consequently, the exports, which reached as high as US$ 2.74 trillion in 2022, accounted for a higher share of global exports; 11.2% in 2022 compared with 9.6% in 2021. Similarly, the imports, which increased to US$ 2.44 trillion, had a higher share in global imports, rising from 9.3% in 2021 to 9.7% in 2022. A similar trend is observed for the OIC countries' share in the merchandise trade of developing countries. Their share in exports increased from 22.6% in 2021 to 25.8% in 2022, while their share in imports went up from 23.4% to 24.9% over the same period (*Figure 2.19*).

In terms of the share of individual member countries in total merchandise exports from the OIC group, it is observed that the bulk of total exports continued to be concentrated in a few countries (*Figure 2.20.A*). In 2022, the largest five exporters accounted for 61.3% of total merchandise exports of all member countries while the largest ten accounted for 79.4%. Saudi Arabia, with US$ 407 billion worth of merchandise exports and a 14.9% share in total OIC exports, became the largest exporter among the OIC countries in 2022. It was followed by the United Arab

Figure 2.19: International Merchandise Trade of OIC Countries

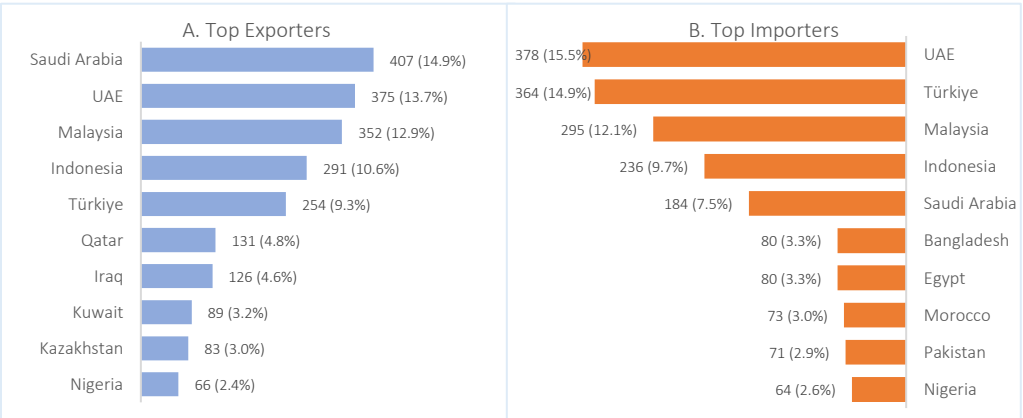


Source: SESRIC staff compilation based on data from IMF, Direction of Trade Statistics (DOTS), October 2023.
Note: Exports are valued on a free-on-board (FOB) basis while imports are valued on a cost, insurance, and freight (CIF) basis. Data coverage: 57 OIC countries.

Emirates (US$ 375 billion, 13.7%), Malaysia (US$ 352 billion, 12.9%), Indonesia (US$ 291 billion, 10.6%), and Türkiye (US$ 254 billion, 9.3%). Additionally, Qatar, Iraq, Kuwait, Kazakhstan, and Nigeria took place in the list of the top 10 exporters in the OIC in 2022.

As in the case of exports, merchandise imports of the OIC countries were also heavily concentrated in a few countries in 2022. As depicted in *Figure 2.20.B*, with US$ 378 billion of imports, the United Arab Emirates took the lead as the top importer, accounting for 15.5% of the total imports of the OIC countries. It was followed by Türkiye (US$ 364 billion, 14.9%), Malaysia (US$ 295 billion, 12.1%), Indonesia (US$ 236 billion, 9.7%), and Saudi Arabia (US$ 184 billion, 7.5%). Accordingly, these largest five importers accounted for 59.8% of the total OIC merchandise imports, while for the largest ten countries, which additionally included Bangladesh, Egypt, Morocco, Pakistan, and Nigeria, this ratio reached 74.9%.

Figure 2.20: Major OIC Countries in International Merchandise Trade, 2022 (US$, billion)

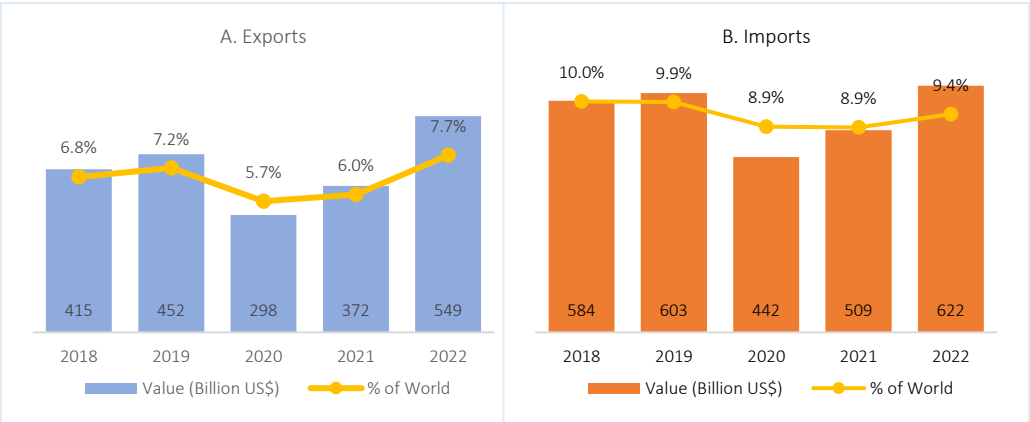


Source: IMF, Direction of Trade Statistics (DOTS), October 2023. Note: The numbers in brackets indicate the share of the respective country in OIC total. Data coverage: 57 OIC countries.

A striking increase in services exports in 2022

The value of global trade in services, which shrank by 17.2% in 2020 from the previous year, rebounded by 18.8% in 2021 and further grew by 14.8% in 2022, according to statistics from the World Trade Organization (WTO). After experiencing even a greater fall in services trade in 2020, the OIC countries also registered a recovery in 2021 followed by an even sharper increase in 2022. Their services exports, plummeted by a third (34.0%) in 2020, increased by 24.8% to US$ 372 billion in 2021, and then sharply increased – almost by half (47.6%) – to US$ 549 billion in 2022, such that their share in global services exports increased from 5.7% in 2020 to 6% in 2021 and then to 7.7% in 2022 (*Figure 2.21.A*). Similarly, their services imports, which fell by 26.7% in 2020, increased by 15.3% and amounted to US$ 509 billion in 2021, then further went up by 22.1% to 622 billion in 2022, with their share in global services imports increasing to 9.4% in 2022 from 8.9% in the previous two years (*Figure 2.21.B*). It is worth noting that the value of trade in services in 2022 surpassed their pre-pandemic levels both in the OIC countries and in the world. This implies that the trade in services, which has been hit harder than the trade in goods, have fully recovered from the pandemic crisis only by 2022.

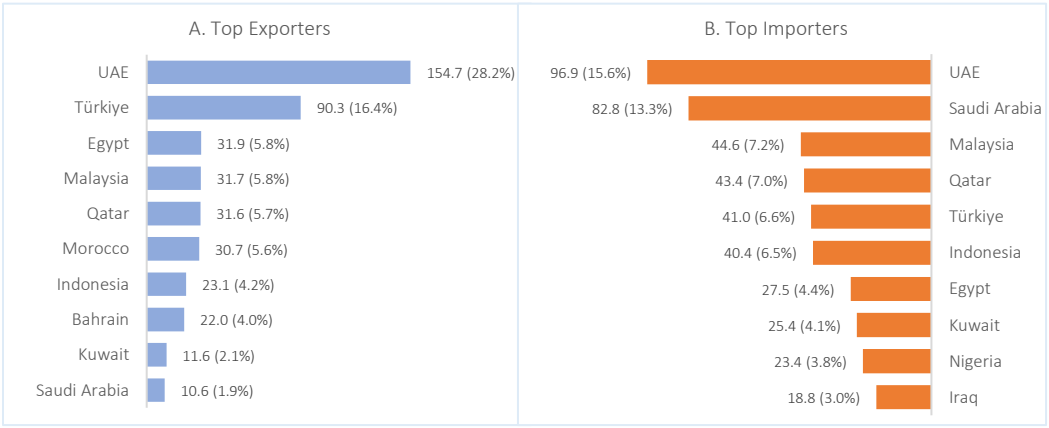
Figure 2.21: International Services Trade of OIC Countries



Source: WTO, Data Portal, October 2023.

As in the case of merchandise trade, services trade of the OIC countries was also concentrated in a few countries in 2022. The United Arab Emirates, with US$ 154.7 billion worth of services exports and a 28.2% share in total services exports of the OIC countries, was the top exporter in services. It was followed by Türkiye (US$ 90.3 billion, 16.4%), Egypt (US$ 31.9 billion, 5.8%), Malaysia (US$ 31.7 billion, 5.8%), and Qatar (US$ 31.6 billion, 5.7%) and (*Figure 2.22.A*). Together, only the top two countries accounted for as high as 44.6% of the total. For the largest ten exporters that also included Morocco, Indonesia, Bahrain, Kuwait, and Saudi Arabia, this ratio increased to 79.7%. Regarding services imports, the United Arab Emirates was the leading importer as well, registering a value of US$ 96.9 billion that made up 15.6% of the total services imports of the OIC countries. It was followed by Saudi Arabia (US$ 82.8 billion, 13.3%), Malaysia (US$ 44.6 billion, 7.2%), Qatar (US$ 43.4billion, 7%), and Türkiye (US$ 41 billion, 6.6%) (*Figure 2.22.B*). While these largest five importers accounted for half (49.7%) of the total, this ratio

Figure 2.22: Major OIC Countries in International Trade in Services, 2022 (US$, billion)



Source: WTO, Data Portal, October 2023. Note: The numbers in brackets indicate the share of the respective country in OIC total.

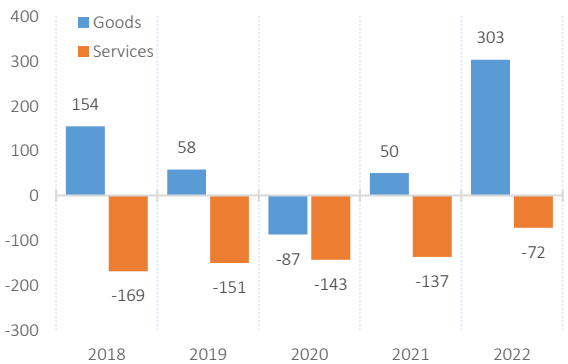
reached 71.5% for the largest ten countries that additionally included Indonesia, Egypt, Kuwait, Nigeria, and Iraq.

Merchandise trade surplus soars in 2022, while deficit in services trade narrows

The OIC countries, on aggregate terms, became a net exporter in merchandise trade in 2021, with a trade surplus amounting to US$ 50 billion as compared to a deficit of US$ 87 billion in the previous year. In 2022, the surplus amounted to US$ 303 billion, six times the surplus of the previous year (*Figure 2.23*). The largest contribution came from Saudi Arabia, which registered a surplus of US$ 223.8 billion. Qatar (US$ 98.4 billion), Iraq (US$ 74.6 billion), Kuwait (US$ 60.9 billion), and Malaysia (US$ 57.1 billion) were among the countries with a large surplus. On the other hand, 37 member countries reported a deficit in 2022, the largest being by Türkiye (US$ 109.5 billion), followed by Pakistan (US$ 39.8 billion), Bangladesh (US$ 33.3 billion), Morocco (US$ 32.3 billion), and Egypt (US$ 31.7 billion).

In services trade, the OIC countries, on aggregate terms, remained a net importer over the last 5-year period of 2018-2022, though the deficit narrowed over that period. The aggregate deficit of OIC countries in services trade amounted to US$ 72 billion in 2022, the lowest in the period under consideration (*Figure 2.23*). Of the 49 countries with available data, only 11 countries did report a positive balance in 2021: United Arab Emirates, Türkiye, Morocco, Egypt, Maldives, Bahrain,

Figure 2.23: Aggregate Trade Balance of OIC Countries (US$, billion)



Source: Authors' calculation based on IMF, Direction of Trade Statistics (DOTS), and WTO Data Portal, October 2023.

Albania, Jordan, Tunisia, Djibouti and Togo. The surpluses reached as high as US$ 57.7 billion in the United Arab Emirates, followed by Türkiye with US$ 49.9 billion and Morocco with US$ 11.2 billion. On the other side of the spectrum, deficits reached as high as US$ 50.9 billion in Saudi Arabia, followed by Indonesia with US$ 20.3 billion and Iraq with US$ 17.0 billion.

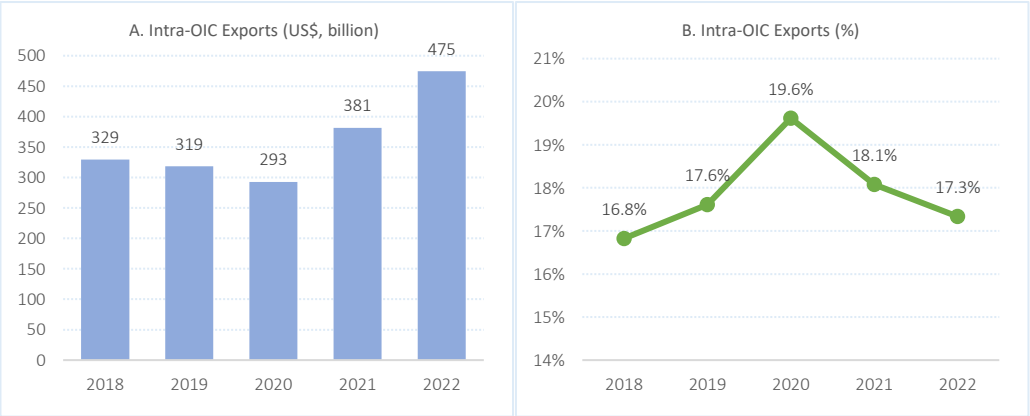
Intra-OIC exports further down to 17.3% in 2022

Decreased by 8.1% to US$ 293 billion in 2020, merchandise exports among the OIC countries (intra-OIC exports) rebounded by 30.3% to US$ 381 billion in 2021 and further rose by 24.4% to US$ 475 billion in 2022 (*Figure 2.24.A*). Nevertheless, the OIC countries' exports to the rest of the world increased by a higher rate of 43.7% in 2021 and 30.5% in 2022, which could largely be attributed to resurgent oil exports. This has resulted in a decline in intra-OIC exports share from 19.6% in 2020 to 18.1% in 2021 and further down to 17.3% in 2022 (*Figure 2.24.B*). The sluggish growth in intra-OIC trade flows reduces the prospects for achieving the 25% target set in the OIC Ten-Year Programme of Action (OIC-2025).

Among the OIC countries, Saudi Arabia was the largest exporter to the OIC countries in 2022. The total exports of Saudi Arabia to other member countries amounted to US$ 94.7 billion, accounting for 20.0% of the total intra-OIC exports. It was followed by the United Arab Emirates (US$ 69.2 billion, 16.6%), Türkiye (US$ 64.3 billion, 13.5%), Indonesia (US$ 39.5 billion, 8.3%), and Malaysia (US$ 37.3 billion, 7.9%). Only the top four countries together accounted for over half (56.4%) of the total intra-OIC exports, while this ratio reached up to 79.0% for the top 10 countries, which also included Qatar, Egypt, Kazakhstan, Oman, and Bahrain. Of these ten countries, Bahrain's exports to the OIC countries accounted for as high as 65.1% of its total exports, while intra-OIC exports share was as low as 10.6% in Malaysia (*Figure 2.25.A*).

By comparison, some countries having a relatively lower value of intra-OIC exports directed a much higher share of their exports to the OIC countries. Indeed, as of 2022, intra-OIC exports accounted for as high as 93.6% of Yemen's total exports, though, in value, it was less than

Figure 2.24: Intra-OIC Merchandise Trade

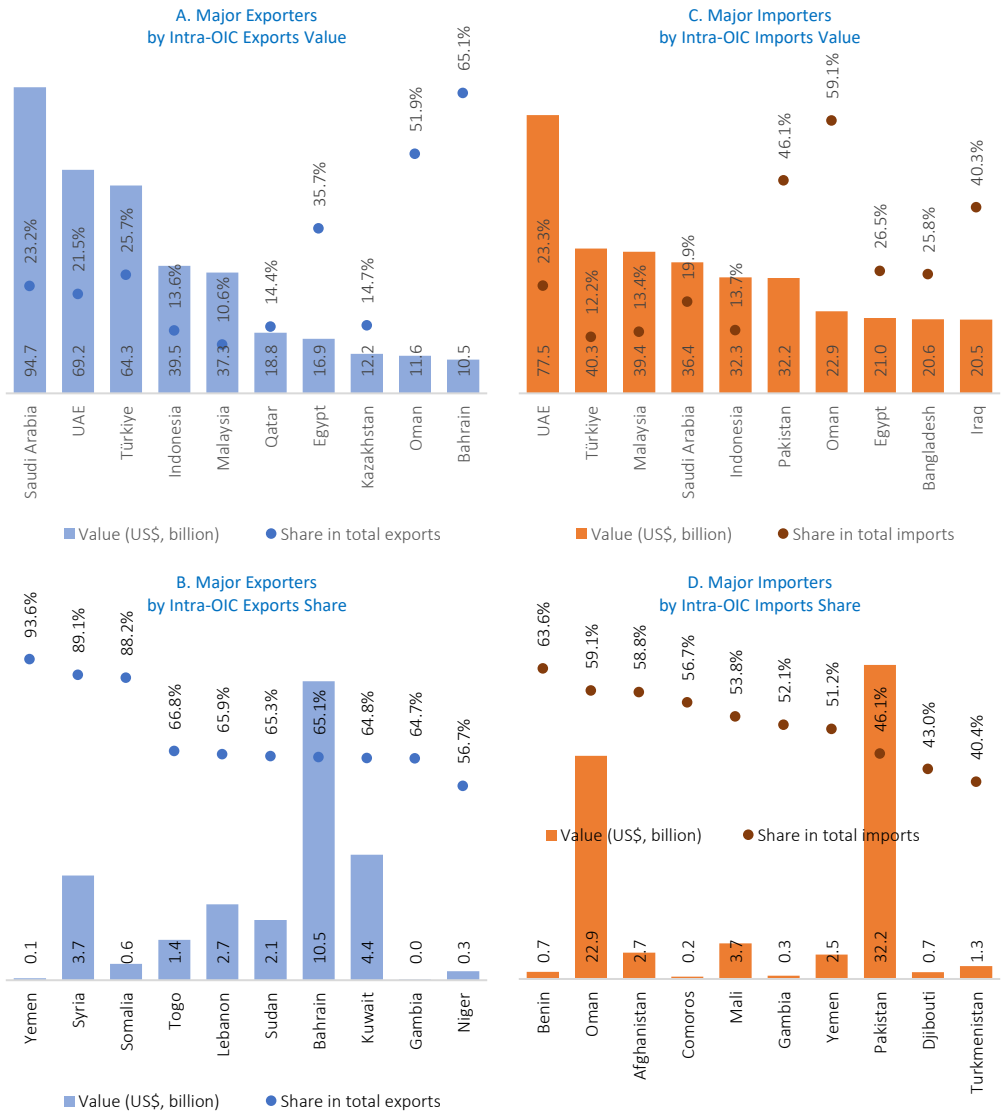


Source: SESRIC staff calculation based on data from IMF, Direction of Trade Statistics (DOTS), October 2023.

US$ 100 million. Similarly, in three other countries with less than US$ 1 billion of intra-OIC exports (Somalia, Gambia, and Niger), this share was more than 55% (*Figure 2.25.B*).

As for intra-OIC imports, the United Arab Emirates was by far the largest importer from the OIC countries in 2022. Its total imports from other member countries amounted to US$ 77.5 billion, accounting for 16.0% of the total intra-OIC imports. It was followed by Türkiye (US$ 40.3 billion, 8.3%), Malaysia (US$ 39.4 billion, 8.1%), Saudi Arabia (US$ 36.4 billion, 7.5%), and Indonesia (US$ 32.3 billion, 6.7%). These largest five importers together accounted for 46.6% of the total intra-OIC imports in 2022 while this ratio reached up to 70.7% for the largest 10 importers that

Figure 2.25: Major OIC Countries in Intra-OIC Merchandise Trade, 2022



Source: SESRIC staff calculation based on data from IMF, Direction of Trade Statistics (DOTS), October 2023.

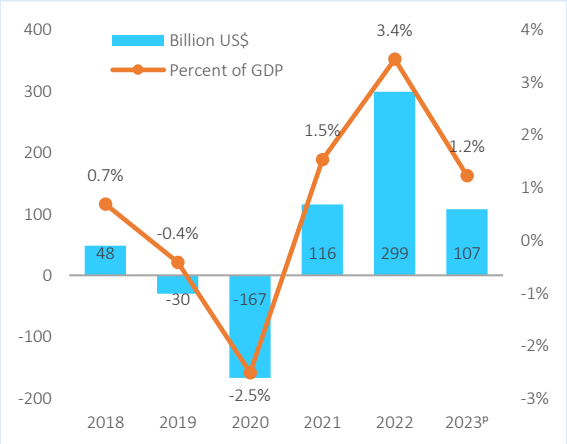
also included Pakistan, Oman, Egypt, Bangladesh, and Iraq. From those ten countries, Oman's imports from the OIC countries accounted for as high as 59.1% of its total imports, while intra-OIC imports share was as low as 12-14% in Türkiye, Malaysia, and Indonesia (*Figure 2.25.C*). Oman's intra-OIC imports share was actually the second highest after Benin (63.6%), and it was followed by Afghanistan (58.8%), Comoros (56.7%), and Mali (53.8%), all receiving at least half of their merchandise imports from the OIC countries (*Figure 2.25.D*).

CURRENT ACCOUNT BALANCE

Surplus at 3.4% of GDP in 2022, the highest in nine years

The OIC countries, on aggregate terms, recorded a current account surplus of US$ 299 billion in 2022, more than 2.5 times the surplus of US$ 116 billion in the previous year (*Figure 2.26*). In parallel, the surplus as percentage of GDP increased from 1.5% in 2021 to 3.4% in 2022, the highest ratio observed in the past nine years. Given that the deficit in services trade continued in 2022, as illustrated by *Figure 2.23* above, the soaring surplus in merchandise trade (from US$ 50 billion in 2021 to US$ 303 billion in 2022) contributed significantly to the resulting current account surplus. Looking ahead, the IMF projections signal a shrinking surplus to US$ 107 billion or 1.2% of GDP in 2023.

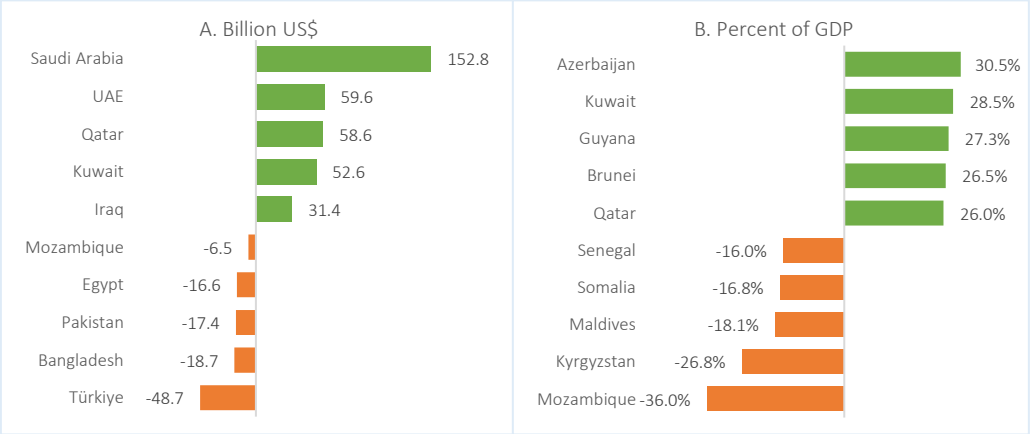
Figure 2.26: Aggregate Current Account Balance of OIC Countries



Source: IMF, World Economic Outlook, April 2023. Note: Data exclude Syria for the entire period under consideration and Afghanistan and Lebanon for 2021-2023.

Among the OIC countries, Saudi Arabia registered the largest current account surplus in nominal terms in 2022, which amounted to US$ 152.8 billion, followed by the United Arab Emirates (US$ 59.6 billion), Qatar (US$ 58.6 billion), Kuwait (US$ 52.6 billion), and Iraq (US$ 31.4 billion). Türkiye, on the other hand, recorded the largest current account deficit, amounting to US$ 48.7 billion. It was followed by Bangladesh (US$ 18.7 billion), Pakistan (US$ 17.4 billion), Egypt (US$ 16.6 billion), and Mozambique (US$ 6.5 billion) (*Figure 2.27.A*). As a percent of GDP, the surplus reached as high as 30.5% in Azerbaijan, followed by Kuwait (28.5%), Guyana (27.3%), Brunei Darussalam (26.5%), and Qatar (26.0%). At the other side of the spectrum, the current account deficit was as high as 36.0% of GDP in Mozambique, 26.8% in Kyrgyzstan, 18.1% in Maldives, 16.8% in Somalia, and 16.0% in Senegal (*Figure 2.27.B*), while it was also above 10% in five other OIC countries: Niger, Gambia, Mauritania, Palestine, and Sierra Leone.

Figure 2.27: OIC Countries with the Largest Current Account Surpluses/Deficits, 2022



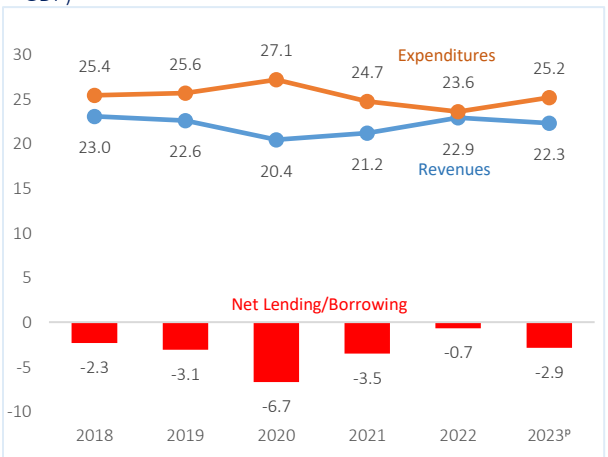
Source: IMF, World Economic Outlook, April 2023. Note: Excluding Afghanistan, Syria, and Lebanon.

FISCAL BALANCE

Government deficits narrow down to 0.7% of GDP in 2022

Government deficits in the OIC countries, on average, continued to narrow in 2022, down to 0.7% of GDP, from 3.5% in 2021 and the historically high level of 6.7% in 2020. This improvement resulted from both an increase in revenues and a decrease in expenditures, both as percentage of GDP. Indeed, revenues increased from as low as 20.4% of GDP in 2020 to 21.2% in 2021 and to 22.9% in 2022. Revitalisation of oil exports revenue along with the economic recovery and rising energy prices played a significant role in this picture. Expenditures, on the other hand, decreased from as high as 27.1% of GDP first to 24.7% and then to 23.6% over the same period. Current projections for the year 2023 signal a deviation from this trend, with expenditures rising to 25.2% of GDP, revenues falling to 22.3% of GDP, and deficits expanding to 2.9% of GDP (*Figure* 2.28).

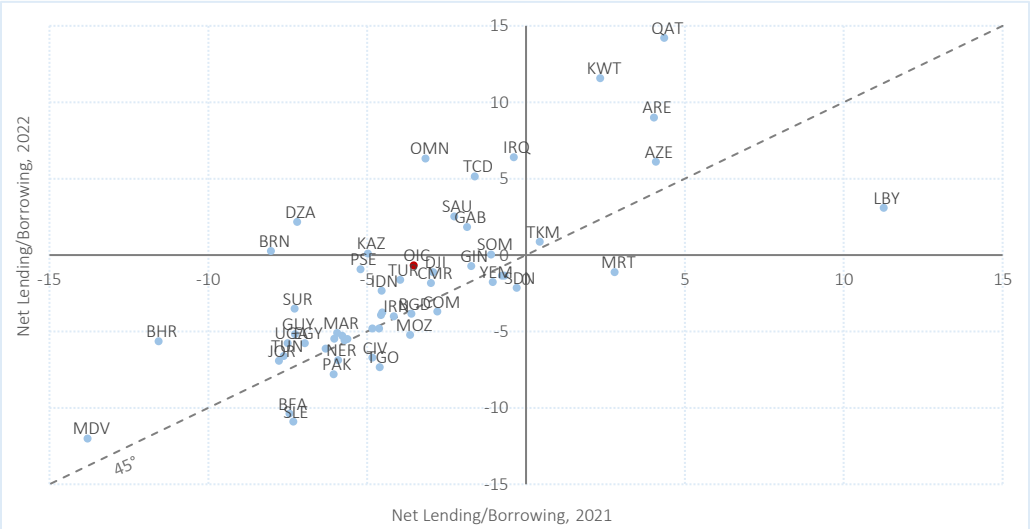
Figure 2.28: Government Fiscal Balance in the OIC (% of GDP)



Source: SESRIC staff compilation based on data from IMF, World Economic Outlook, April 2023. Note: Data exclude Syria for the entire period under consideration and Afghanistan and Lebanon for 2021-2023.

Figure 2.29 shows that 37 of the 54 OIC countries with available data witnessed an improvement in their fiscal balance as percent of GDP in 2022 as compared to the previous year, particularly Qatar (from +4.4% to +14.2%), Oman (from -3.2% to +6.3%), Algeria (from -7.2% to +2.2%), Kuwait (from +2.3% to +11.6%), and Brunei Darussalam

Figure 2.29: Government Fiscal Balance in OIC Countries: 2021 vs. 2022 (% of GDP)



Source: IMF, World Economic Outlook, April 2023. Note: See Annex A for the country codes.

(from -8.0% to +0.3%). Moreover, while only seven countries recorded a surplus in 2021 (Libya, Qatar, Azerbaijan, the United Arab Emirates, Mauritania, Kuwait, and Turkmenistan), this number increased to 15 in 2022, led by Qatar (14.2%) and followed by Kuwait (11.6%), the United Arab Emirates (9.0%), Iraq (6.4%), and Oman (6.3%). On the other hand, Maldives had the largest fiscal deficit as a percent of GDP in 2022, reaching as high as 12.0%, followed by Sierra Leone (10.9%), Burkina Faso (10.4%), Pakistan (7.8%), and Togo (7.3%).

INTERNATIONAL FINANCE

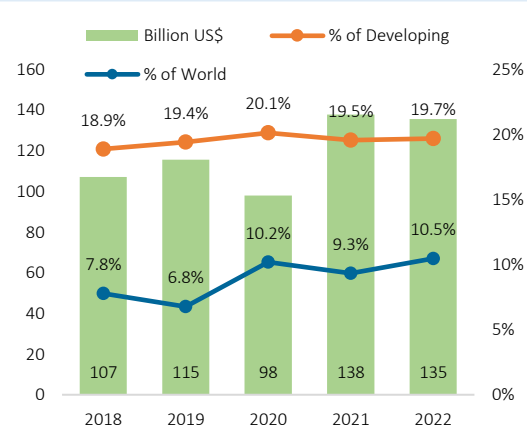
Share of OIC countries in global FDI inflows up to 10.5% despite declining inflows

After a dramatic fall (43.7%) in 2020 due to the pandemic crisis, global FDI inflows increased by half (53.7%) to US$ 1.5 trillion in 2021. This recovery was followed by a 12.4% decrease to US$ 1.3 trillion in 2022, resulting mainly from a 21.6% decrease in flows to developed countries, compared to a 2.3% decrease in flows to developing countries. Following a fall of 15.2% to US$ 98 billion in 2020, flows to the OIC countries rebounded by 40.6% and reached as high as US$ 138 billion in 2021. A slight decrease of 1.7% to US$ 135 billion was recorded in 2022. The smaller decline in flows to the OIC countries resulted in a slight increase in their share in flows to developing countries, but a large increase in their share in global flows in 2022. The share of OIC countries in flows to developing countries was measured at 19.7% in 2022, up from 19.5% in 2021. Similarly, their share in global FDI inflows reached a decade high of 10.5% in 2022, compared to 9.3% in 2021 (*Figure 2.30*).

Greenfield investments[3] are of particular importance to developing countries due to greater growth and employment opportunities they have to offer. The value of announced greenfield FDI projects further increased globally by 64.2% to US$ 1.2 trillion in 2022, following a rebound of

22.3% to US$ 739 billion in 2021 from a record low level of US$ 604 billion in 2020. A larger part (61.5%) of this significant increase in 2022 originated from the increase in investments going to developing countries. The OIC countries witnessed a substantial improvement both in value and in the number of announced greenfield FDI projects (*Figure 2.31*). The number of projects increased by half (54%) to 2549 while the value of the projects almost tripled, rising by 189% to US$ 281 billion – the highest level seen since 2008. Accordingly, in terms of the number of projects, the OIC countries accounted for 14.5% of the world total in 2022, compared with 10.8% in 2021, while their share in the total for developing countries increased from 29.4% to 34.9% over the same period. In terms of the value of projects, their share in the world total reversed its downward trend and increased to as high as 23.2% in 2022, while their share in the total for developing countries increased to a record high of 46.8% in 2022.

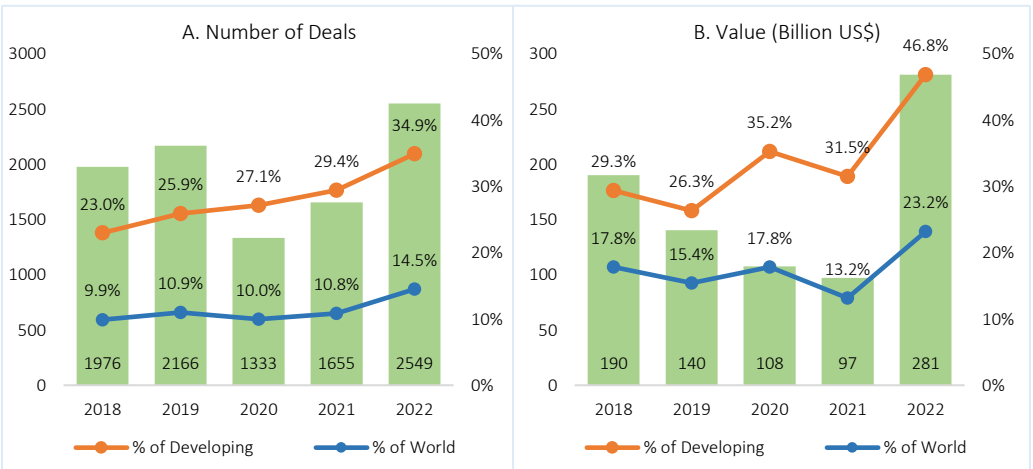
Figure 2.30: FDI Inflows to OIC Countries



Source: SESRIC staff calculation based on data from UNCTAD, World Investment Report 2023, Annex Tables.

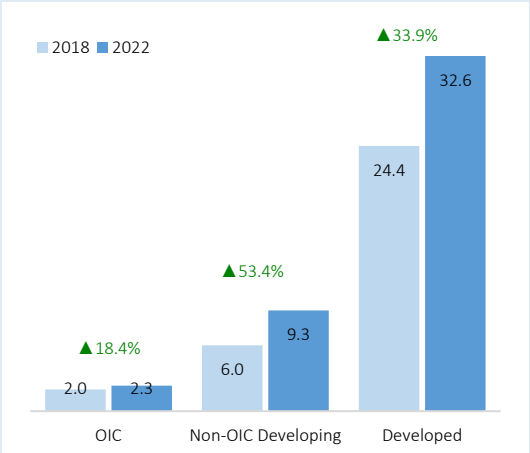
With the developments above, global inward FDI stock reached US$ 44.3 trillion in 2022, 36.5% up from the level in 2018. In the same 5-year period, FDI stocks increased by 18.4% to US$ 2.3 trillion in the OIC countries while they increased by 53.4% in non-OIC developing countries and by 33.9% in developed countries (*Figure 2.32*). Thus, OIC countries hosted a slightly lower share of the global inward FDI stocks in 2022 (5.3%) than in 2018 (6.1%). The bulk of global stocks continued to be hosted by developed countries, which had a share of 73.8% in 2022.

Figure 2.31: Announced Greenfield Investment Projects Destined to OIC Countries



Source: SESRIC staff calculation based on data from UNCTAD, World Investment Report 2023, Annex Tables.

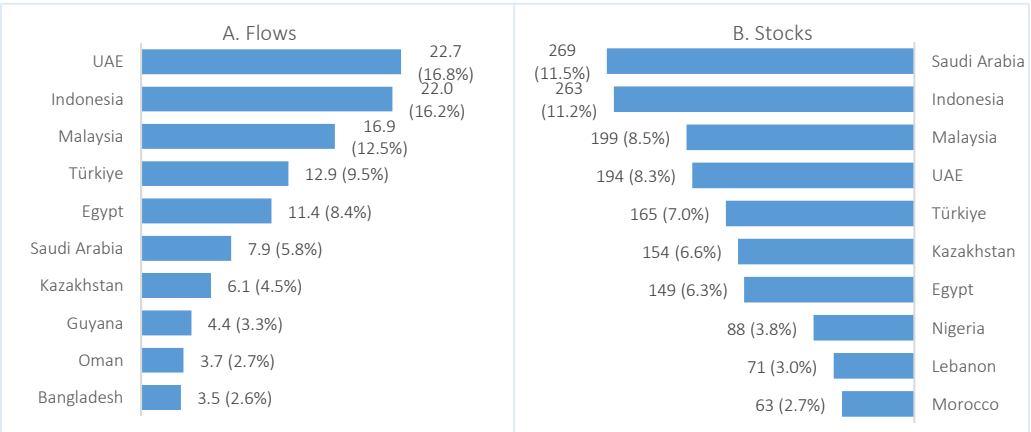
Figure 2.32: Inward FDI Stock (US$, trillion)



Source: SESRIC staff calculation based on data from UNCTAD, World Investment Report 2023, Annex Tables.

As is the case with other major macroeconomic aggregates, inward FDI flows and stocks, too, exhibited a high level of concentration among the OIC countries, with the bulk of the flows persistently directed to only a few of them. Inflows to only the United Arab Emirates (US$ 22.7 billion), Indonesia (US$ 22.0 billion), and Malaysia (US$ 16.9 billion) accounted for 45.5% of total inflows to all OIC countries in 2022. This ratio reached 63.4% for the top five countries and as high as 82.3% for the top ten countries (*Figure 2.33.A*). In the case of inward FDI stocks, the top five countries, as of 2022, hosted 46.4% of the OIC total while the top ten countries accounted for a share of 68.8% (*Figure 2.33.B*). With US$ 269 billion of inward FDI stocks (11.5% of the OIC total), Saudi Arabia ranked first among the OIC countries. It was followed by Indonesia (US$ 263 billion, 11.2%), Malaysia (US$ 199 billion, 8.5%), United Arab Emirates (US$ 194 billion, 8.3%), and Türkiye (US$ 165 billion, 7.0%).

Figure 2.33: OIC Countries with the Largest Inward FDI, 2022 (US$, billion)

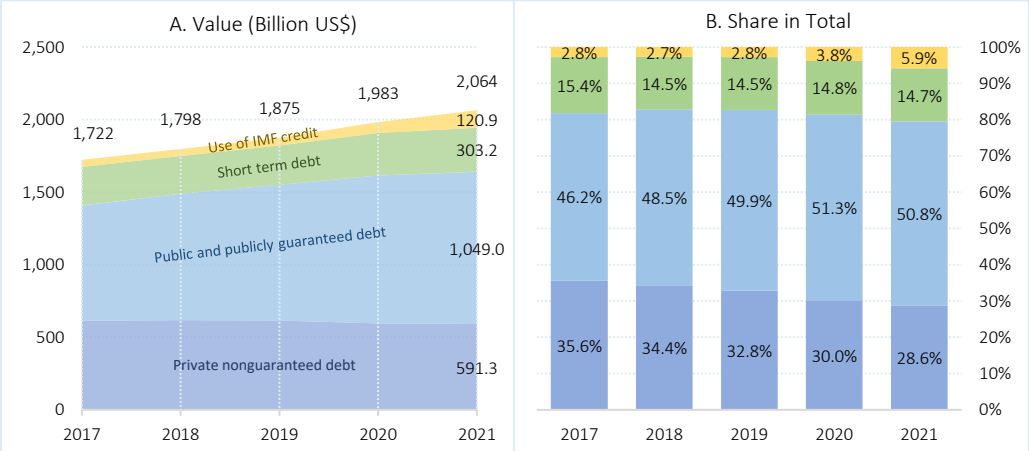


Source: UNCTAD, World Investment Report 2023, Annex Tables. Note: The numbers in brackets indicate the share of the respective country in OIC total.

Total external debt stock up 4.1% to US$ 2.1 trillion in 2021

The total external debt stock of the OIC countries increased by US$ 81 billion or 4.1% to US$ 2,064 billion in 2021 from US$ 1,983 billion in 2020. Use of IMF credit, which expanded by US$ 45.7 billion or 60.7% to US$ 120.9 billion, contributed the most to this increase although it was still the smallest component of the total external debt stock of the OIC countries (*Figure 2.34*). This type of debt made up 5.9% of the total external debt stock in 2021, up from 3.8% in the previous year.

Figure 2.34: Total External Debt Stock of OIC Countries by Component



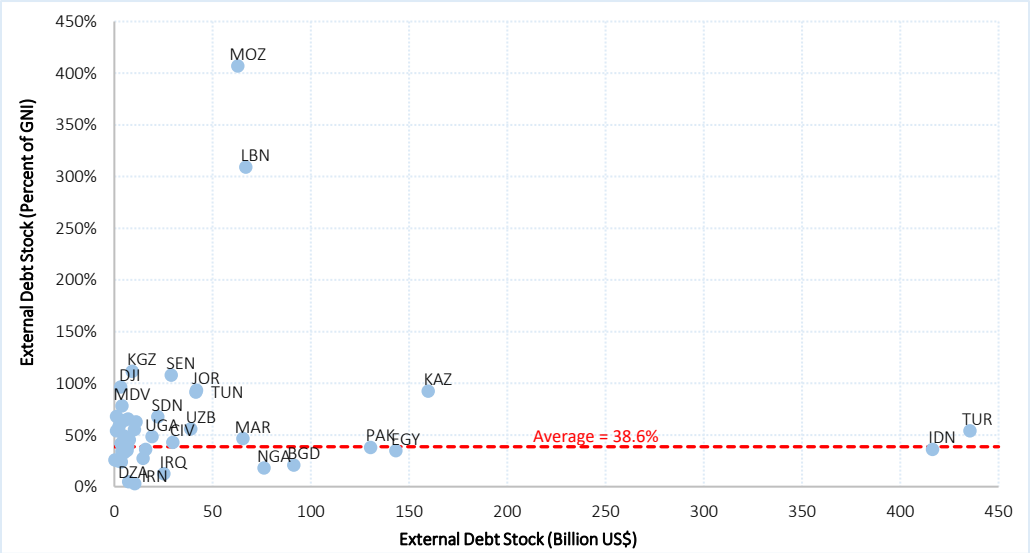
Source: SESRIC staff compilation based on data from World Bank, World Development Indicators. Data Coverage: 46 OIC countries (excluding Bahrain, Brunei Darussalam, Kuwait, Libya, Malaysia, Oman, Palestine, Qatar, Saudi Arabia, Suriname, and the United Arab Emirates).

Public and publicly guaranteed debt increased by US$ 30.7 billion or 3.0% in 2021 and continued to be the largest component of the total external debt stock. However, its share decreased to 50.8% in 2021 from 51.3% in 2020 because of the much larger increase in the use of IMF credits. Private nonguaranteed debt continued to decrease for the third consecutive year after peaking at US$ 617.8 billion in 2018. In 2021, it fell by US$ 4 billion or 0.7% from the previous year and amounted to US$ 591.3 billion. Thus, as the second largest component of total external debt stock, it had a share of 28.6% in 2021, down from 35.6% in 2017. Overall, long-term debt stock, comprising public, publicly guaranteed, and private nonguaranteed debt, amounted to US$ 1,640 billion in 2021, up US$ 26.7 billion or 1.7% from the previous year, and accounted for 79.5% of the total external debt stock. Short-term debt reached US$ 303.2 billion in 2021, with an increase of US$ 8.9 billion or 3.0% from the previous year, and maintained its share at around 15%.

From the OIC countries, Bangladesh's total external debt stock increased the most in nominal terms (by US$ 17.9 billion) over 2020/2021. Pakistan and Egypt followed with an increase of US$ 14.7 billion and US$ 13.5 billion, respectively. On the other hand, 10 out of the 46 countries with debt data recorded a decrease in their debt stock over the same period, namely Türkiye, Lebanon, Kazakhstan, Sudan, Azerbaijan, Iraq, Mauritania, Turkmenistan, Indonesia, and Morocco. As of 2021, Türkiye remained the most indebted OIC country in nominal terms with a total external debt stock value of US$ 435 billion, accounting for 21.1% of the total external debt stock of the OIC countries for which data were available. Türkiye was followed by Indonesia (US$ 416 billion), Kazakhstan (US$ 160 billion), Egypt (US$ 143 billion), and Pakistan (US$ 130 billion) (*Figure 2.35*). Türkiye and Indonesia together accounted for more than two-fifths (41.6%) of the total external debt stock of OIC countries in 2021.

In terms of the debt burden in relation to a country's economic size, however, Mozambique was by far the most indebted OIC country in 2021, with its external debt stock more than quadruple its gross national income (GNI). To be more precise, it had a debt-to-GNI ratio of 406.9%. It was

Figure 2.35: Indebtedness of OIC Countries, 2021



Source: SESRIC staff compilation based on data from World Bank, World Development Indicators. Note: See Annex A for the country codes. Data coverage: 43 OIC countries (excluding Syria, Turkmenistan, and Yemen due to unavailable GNI data as well as the 11 countries excluded from Figure 2.34).

followed by Lebanon (309.2%), Kyrgyzstan (111.6%), Senegal (107.7%), and Djibouti (96.4%) (*Figure 2.35*). Debt-to-GNI ratio averaged at 38.6% for the OIC countries in 2021, decreasing 3.5 percentage points from the previous year's average of 42.1%. While 23 out of 43 countries with available data recorded a decrease, Sudan recorded the largest one, 24.3 percentage points, followed by Maldives (22.2), Mauritania (19.9), Mozambique (18.8), and Kazakhstan (11.1). On the other hand, Lebanon recorded the largest increase in the ratio, 84.9 percentage points, followed by Senegal (10.5), Djibouti (9.4), Afghanistan (9.1), and Togo (7.3).

As the pandemic wreaked havoc on economies worldwide, governments called upon expansionary fiscal policies to stimulate growth and tackle the economic downturn. However, increased government spending led to a surge in debt levels, both domestic and external. As a result, many countries are struggling with the burden of servicing their external debt obligations and maintaining fiscal discipline. Policymakers are faced with the difficult task of striking a balance between driving economic recovery and ensuring debt sustainability, while also considering the potential spill over effects on global financial stability. Close monitoring and effective implementation of fiscal policies will play a crucial role in managing external debt and safeguarding sustainable economic growth in the post-pandemic world.

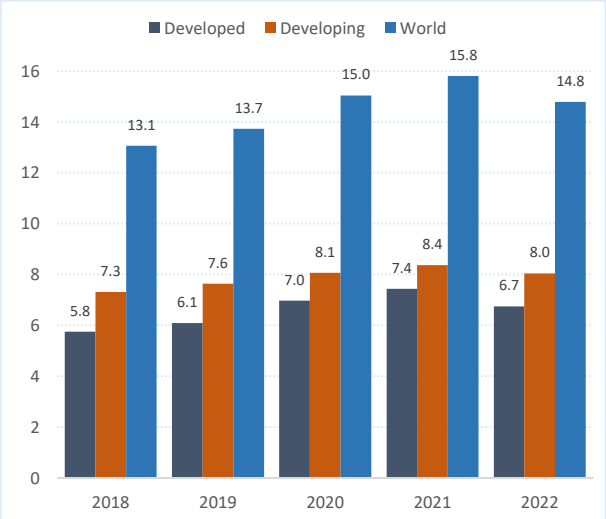
Reserves up 2%, but reserve adequacy deteriorated

At the outbreak of the COVID-19 crisis, developing countries faced unprecedented capital outflows, driven by sales of portfolio assets by foreign investors (OECD, 2020a), a usual pattern whereby international investors transfer capital back home or invest in safer assets during periods of uncertainty. Policy makers have relied on a variety of policy tools, including making use of international reserves, to cope with the pandemic crisis and the associated financial

instabilities. In the face of global dollar liquidity shortages, some central banks in developing countries intervened in the foreign exchange market to support depreciating currencies, and several central banks have established or expanded swap lines to improve their foreign exchange reserves.

The capacity to use international reserves in times of crisis depends on the buffers built up over time, as well as the funding needs. Therefore, the COVID-19 crisis and the associated financial shocks have once again highlighted the need for having sufficient international reserve buffers to help preserving macroeconomic and financial stability in the face of such shocks. In this respect, given the differences in availability of reserves between countries, the shock has not been uniform across countries and they have not entered the crisis in the same way.

Figure 2.36: Total Reserves Including Gold (US$, trillion)



Source: IMF, International Financial Statistics.

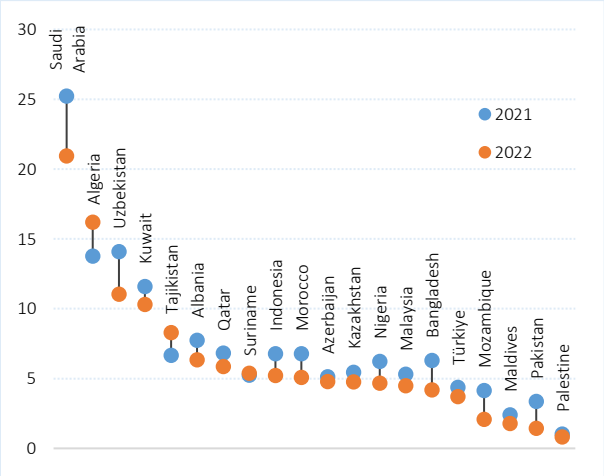
In line with the global economic recovery from the pandemic, reserves and reserve adequacy levels were expected to improve in 2022, but this was not realized. Thus, the strength to withstand potential shocks and maintain financial stability worsened. World total international reserves[4] amounted to US$ 14.8 trillion in 2022, with a decrease of US$ 1 trillion or 6.5% from the previous year (*Figure 2.36*). Two-thirds (68%) of this decrease originated from developed countries, of which reserves fell by US$ 689 billion, or 9.3%, to US$ 6.7 trillion. In developing countries, reserves decreased by US$ 332 billion, or 4.0%, to US$ 8.0 trillion. Accordingly, developed countries decreased their share in global reserves from 47.0% in 2021 to 45.6% in 2022, while developing countries continued to hold the greater part. For countries not having achieved sufficient reserve levels and still facing challenges in strengthening their financial positions, it is important to continue pursuing prudent risk management practices and implementing regulatory reforms to further enhance their reserve adequacy levels.

In the OIC countries, the 2022 data available for 36 member countries indicate an increase in reserves by 2.0% to US$ 1.66 trillion in 2022. Among half (18) of the countries that recorded an increase in their reserves in 2022, Iraq took the lead with an increase of US$ 32.8 billion. It was followed by Algeria (US$ 15.6 billion), Türkiye (US$ 14.2 billion), United Arab Emirates (US$ 7.3 billion), and Qatar (US$ 5.2 billion). The proportional increase was remarkable in the reserves of Tajikistan (54%), Iraq (51%), Azerbaijan (35.9%), Algeria (27.8%), and Suriname (20.4%). Among the countries with decreasing reserves in 2022, Pakistan recorded the largest decrease, US$ 12.9 billion, followed by Bangladesh (US$ 12.4 billion), Indonesia (US$ 7.7 billion), Egypt (US$ 7.7

billion), and Nigeria (US$ 4.9 billion). Proportionally, the largest decreases were recorded in the reserves of Pakistan (56.5%), Sierra Leone (34%), Bangladesh (26.9%), Yemen (25.9%), and Mozambique (22.3%). Overall, as of 2022, Saudi Arabia had the largest international reserves that amounted to US$ 478.2 billion, followed by the United Arab Emirates (US$ 138.4 billion), Indonesia (US$ 137.2 billion), Türkiye (US$ 123.7 billion), and Malaysia (US$ 114.7 billion).

While half of the OIC countries improved their reserves in 2022, the reserves in months of imports[5] deteriorated in most of them, as shown in *Figure 2.37* for the 20 countries with available data. Given that imports of goods and services increased in all of them, behind this deterioration was a decline in reserves in some cases[6] or a higher increase in imports than in reserves in some other cases[7]. Only Algeria, Tajikistan, and Suriname improved their reserve adequacy in relation to imports. Saudi Arabia, with reserves equivalent to 20.9 months of imports, had the highest reserve adequacy in 2022. Algeria followed it with enough reserves to cover 16.2 months of imports. In addition, Uzbekistan (11.0) and Kuwait (10.3) exceeded the global average of 9.2 months.

Figure 2.37: Total Reserves in Months of Imports



Source: World Bank, World Development Indicators.

Net ODA received up 5.7% to US$ 78.3 billion in 2021

Provided to promote economic development and welfare in recipient countries and territories, Official Development Assistance (ODA) continues to be an important source of financing for many developing countries, including the OIC countries. In 2021, net ODA flows received by the developing world reached US$ 203.9 billion, its highest level ever, with an increase of US$ 9 billion, or 4.6%, from the previous year (*Figure 2.38*). According to the OECD (2023), this upward trend is driven by both a rise in bilateral and multilateral aid, reflecting continued commitment from donor countries to support developing nations. Key areas of focus for ODA include health, education, and infrastructure development, with the aim of promoting sustainable and inclusive growth in recipient countries. However, significant challenges remain, particularly with regard to addressing the ongoing impacts of the pandemic, climate change, and humanitarian crises. Ongoing efforts are necessary for sustained and equitable progress in achieving the Sustainable Development Goals.

The flows that were reported at the individual country level decreased by 1.7% and amounted to US$ 133.8 billion in 2021, accounting for 66% of the total ODA flows. ODA flows to the OIC countries reached US$ 78.3 billion in 2021, up 5.7% from US$ 74.1 billion in 2020. Flows to non-

OIC developing countries, on the other hand, decreased by 10.5% to US$ 55.5 billion in 2021. Accordingly, the OIC countries had a higher share of the total ODA flows to individual developing countries in 2021 (58.5%) as compared to the previous year (54.5%).[8]

Regarding the distribution of the ODA flows among the OIC countries in 2021, the largest five recipients accounted for 40.2% of total ODA flows to the OIC countries, while this ratio reached as high as 60.3% for the largest ten recipients. Syria, with total inflows of US$ 9.7 billion that made up 12.4% of the OIC total, ranked first not only among the OIC countries but also among all developing countries. It was followed by Egypt (US$ 8.2 billion, 10.5%), Bangladesh (US$ 5.0 billion, 6.4%), Afghanistan (US$ 4.7 billion, 5.9%), and Yemen (US$ 3.9 billion, 4.9%) (*Figure 2.39*).

Figure 2.38: Net ODA Received (US$, billion)

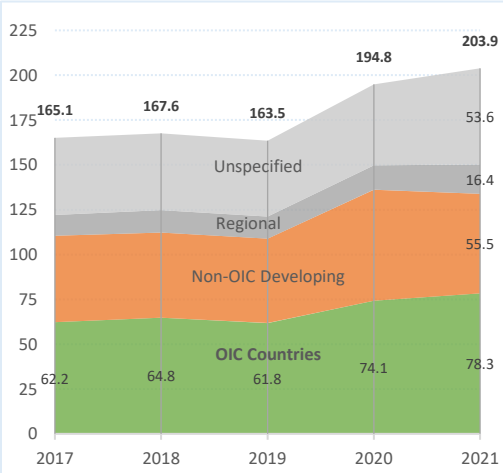
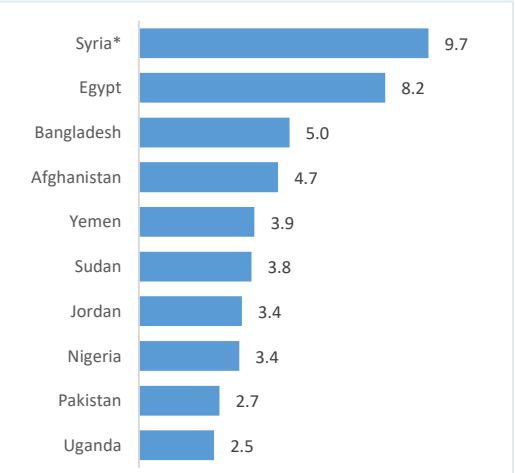


Figure 2.39: Top ODA Recipient OIC Countries, 2021 (US$, billion)



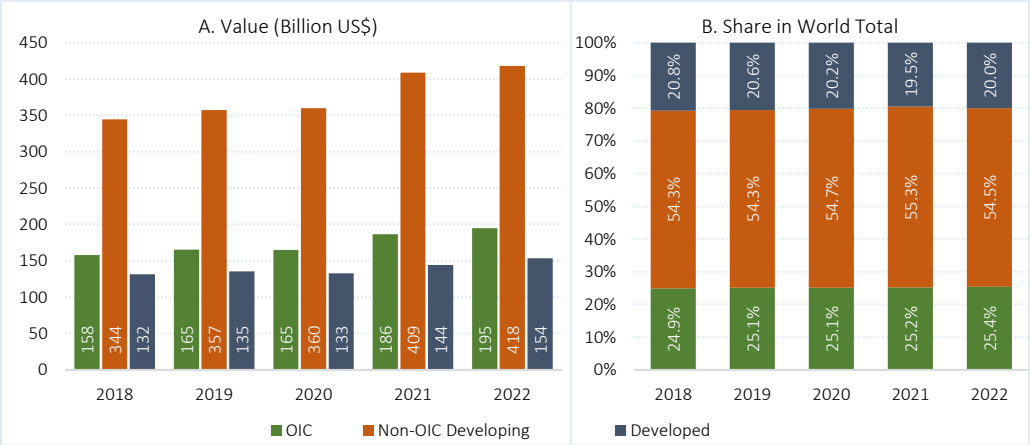
Source: OECD.Stat. Note: Net total ODA received from official donors at current prices. Data coverage: 50 OIC countries (excluding Bahrain, Brunei Darussalam, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) and 99 non-OIC developing countries. For the period under consideration, about 33% of the annual total ODA value is reported as "unspecified" or "regional", not at the country level. (*) Membership to the OIC is currently suspended.

Personal remittance inflows up 4.6% to US$ 195 billion

Despite the COVID-19 pandemic, remittance flows remained resilient in 2020 across the world and improved afterwards. At the global level, officially recorded remittance flows reached US$ 767 billion in 2022, up 3.7% from US$ 739 billion in the previous year. Inflows to the OIC countries increased by 4.6% or US$ 8.6 billion to US$ 195 billion, while inflows to non-OIC developing countries amounted to US$ 418 billion with an increase of 2.3%. Developed countries, on the other hand, recorded a higher rate of growth in remittance inflows. Increasing by 6.5% from 2021, these flows reached US$ 154 billion in 2022 (*Figure 2.40.A*). Accordingly, the share of the OIC countries in world total remittance flows slightly increased to 25.4% in 2022, compared with 25.2% in the previous year (*Figure 2.40.B*).

In 2022, of the 50 OIC countries for which data are available, 20 experienced a decrease in remittance inflows from the previous year. Egypt (US$ 3.2 billion), Pakistan (US$ 1.4 billion), Kuwait (US$ 785 million), Bangladesh (US$ 702 million), and Senegal (US$ 597 million)

Figure 2.40: Personal Remittances Received (US$, billion)

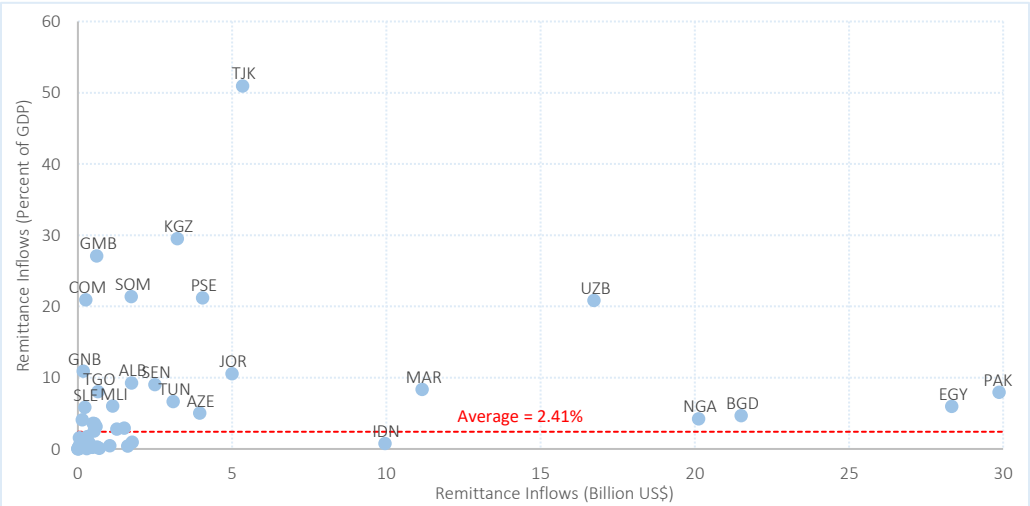


Source: SESRIC staff compilation based on data from World Bank, World Development Indicators.
Note: Data on the group OIC countries exclude Bahrain, Chad, Iran, Libya, Syria, Turkmenistan, and the United Arab Emirates.

experienced the largest decreases while Uzbekistan (US$ 7.5 billion), Tajikistan (US$ 2.4 billion), Azerbaijan (US$ 2.4 billion), Nigeria (US$ 644 million), and Indonesia (US$ 557 million) reported the largest increases.

As of 2022, a significant proportion of remittance flows to the OIC countries was still concentrated in a few members. Flows to Pakistan, despite a decrease of 4.6% from the previous year to US$ 29.9 billion, was the largest among the OIC countries, accounting for 15.3% of the OIC total. It was followed by Egypt (US$ 28.3 billion), Bangladesh (US$ 21.5 billion), Nigeria (US$ 20.1 billion), and Uzbekistan (US$ 16.7 billion). These five countries together accounted for 59.8% of total remittances received by the OIC countries in 2022, while this ratio reached as high

Figure 2.41: Personal Remittance Inflows to OIC Countries, 2022



Source: SESRIC staff compilation based on data from World Bank, World Development Indicators.
Note: See Annex A for the country codes. Data coverage: 47 OIC countries (excluding Afghanistan, Lebanon, and Yemen due to unavailable GDP data as well as the 7 countries excluded from Figure 2.40).

as 79.2% for the largest ten recipients. Nevertheless, in four of the top five countries, the share of remittance inflows in GDP was less than 10% and much lower than in many other member countries with a smaller amount of inflows. The top recipients in terms of the share of remittances in GDP in 2022 included Tajikistan (50.9%), Kyrgyzstan (29.5%), Gambia (27.1%), Somalia (21.4%), Palestine (21.2%), Comoros (20.9%), and Uzbekistan (20.8%). On average, remittance inflows accounted for 2.4% of GDP in the recipient OIC countries in 2022 (*Figure 2.41*).

SPECIAL COVERAGE

THE RISE OF THE DIGITAL ECONOMY AND BRIDGING THE DIGITAL DIVIDE

CHAPTER THREE

Changing Patterns of Production and Trade with Rising Digitalization

The world economy is witnessing a new form of transformation characterized mainly by rising digitalization, automation and artificial intelligence. Unlike other technological innovations, digitization builds on the evolution of network access technologies, semiconductor technologies, software engineering and the spillover effects resulting from their use (ITU, 2020a). They not only change the production processes but also significantly affect the nature of work, which requires a thorough review of the emerging challenges and opportunities to develop appropriate policy responses at individual country level. In this connection, this chapter aims to establish the linkages between technological development, innovation and industrialization, and provides some broad discussions on the importance of emerging technologies.

3.1 Revisiting Industrial Development in a Digital World

Industrialization has been a key driver for the expansion of production and trade over the last century. Fall in trade, transport, and communication costs has facilitated its further fragmentation into parts and tasks, and contributed to regional and economic integration of countries around the world through the creation of value chains, ultimately lifting millions of people out of poverty. Specialization in production helped countries to benefit from scale economies with greater competitiveness and productivity advantages. Countries with a broad and robust domestic manufacturing base achieved a diversified economy, which generated productive linkages with other sectors of the economy, further driving technological progress. On the other hand, countries with limited sophistication of production and trade structure experienced losses in competitiveness and witnessed widening income gaps with frontier economies.

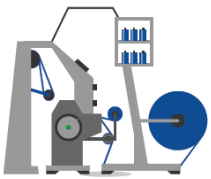
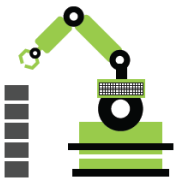
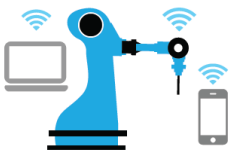
Over the last few decades, production and trade have been heavily dominated by international production networks, which require the combination of parts and components from many different locations and suppliers. This offered opportunities for developing countries to integrate into the global economy by investing in capacities to meet the global demands for intermediate goods at competitive prices and quality. Some countries with effective industrialization and investment promotion policies succeeded in transforming their economies towards more value-added production. Investment in skills development, institutional quality, effective allocation of resources and promotion of innovation and technological development all contributed to this achievement.

A well-diversified manufacturing industry is considered as an important catalyser of better economic performance. It has been where the technological progress takes place, as it is the most research and development (R&D) intensive industry. The manufacturing sector also tends to be the strongest driver for the employment of wageworkers, especially in developing countries (ILO, 2014). Even though there have been historically many attempts by developing countries to develop their economies through industrialization, many of the interventions failed to produce the desired outcomes. Similarly, many OIC economies could attain limited success in creating a diversified manufacturing industry. The digitalization of economies now offers a new set of opportunities and challenges for the OIC countries.

3.1.1 Widening Gaps with Industrial Revolutions

Manufacturing industries have been a driver of development over the last two centuries, thanks to continuous investment in R&D. Advancements in science, technology and innovation stimulated industrial development and economic growth. Industrialisation began with the introduction of mechanical manufacturing equipment at the end of the 18th century, when machines revolutionised the production process. It was followed by a second one that began around the turn of the 20th century with the introduction of electrically powered mass production of goods based on the division of labour. This was superseded by the third industrial revolution that started during the early 1970s, which employed electronics and information technology (IT) to achieve increased automation of manufacturing processes (ISRA, 2013). The fourth industrial revolution was triggered by the entry of the internet into industrial organisations (*Figure 3.1*).

Figure 3.1: A History of Industrial Revolutions

1st Industrial Revolution	2nd Industrial Revolution	3rd Industrial Revolution	4th Industrial Revolution
Late 18th Century	Beginning of 20th Century	1970s-2000s	2010 onward
			
Through introduction of mechanical production facilities with the help of **water and steam power**	Through introduction of mass production with the help of **electrical energy**	Through application of **electronics and IT** to further automate production	On the basis of **cyber-physical production** (CPP) systems, merging of real and virtual worlds

Source: Compiled by author from various sources.

The fourth industrial revolution, or Industry 4.0 or smart manufacturing, was used to describe a situation where technological advances made a paradigm shift in conventional production process logic. Industrial production machinery no longer simply *processes* the product, but the product *communicates* with the machinery to tell it exactly what to do (GTAI, 2014). In other words, Industry 4.0 is a state in which manufacturing systems and the objects they create are not simply connected, but also communicate, analyse, and use that information to drive further intelligent action back in the physical world to execute a physical-to-digital-to-physical transition (DUP, 2016).

Unlike the previous industrial revolutions, Industry 4.0 and digital transformation not only affect how economic activities are organized, but also shape social interactions and government services. When the steam engine was invented, for example, its impacts on large segments of society were more limited. Today, infrastructure for digital services is expanding rapidly and becoming more accessible in many parts of the world. Even if this reduces the divide among the

countries in terms of accessibility, significant disparities remain in transforming the digital infrastructure into productive capacities.

New technological inventions significantly contributed to the growth in outputs and income levels. However, the benefits of industrial revolutions are not evenly distributed across the globe. With each revolution, the gaps between technologically more advanced and less advanced countries expanded. Technologically advanced countries were able to transform their production structures and processes to generate greater welfare for their citizens. During the second half of the last century, a number of developing countries, mainly in East Asia, were able to narrow the gap by joining global value chains and taking advantage of export-led industrialization.

Though there is a growing divergence in technological capabilities, easier access to digital infrastructure provides an opportunity to catch up with the global economic and technological frontiers. In order to tap on this opportunity, developing countries, including OIC countries, need to invest in human capital, support research and development, and identify areas to achieve incremental improvements in their industrial activities. Even if the tensions over global imbalances in trade flows remain vibrant, new technologies are likely to enable even higher levels of interconnectedness across the globe.

3.1.2 Economically Disruptive Technologies: Threats or Opportunities

Technological breakthroughs brought by the steam engine, electricity, internal combustion and information technologies had transformative impacts on the entire economy. However, it is not always needed to wait for technological breakthroughs to attain higher economic growth. Developing countries can invest in incremental innovations to build upon their previous achievements. Perhaps, this largely explains how China is succeeding in achieving growth and reducing poverty. Incremental innovation in the context of developing countries starts with the absorption and imitation of foreign technologies. The capability to adapt them to the local context would demonstrate the potential of a country to make incremental innovation. It is even argued that the cumulative impact of incremental innovations on long-run economic and social change may be even greater than that of radical innovations (UNIDO, 2016). Such a development policy for developing economies is possible thanks to the rapid diffusion of new technologies in today's world.

The next wave of global economic growth is likely to be driven by new technologies. Economically disrupting technologies emerging from digital transformation are expected to have a massive impact in years to come. Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, 3D printing, automation and advanced robotics are some of the technologies that are expected to shape future economic activities (see *Table 3.1* for a brief description of emerging technologies). It is difficult to argue that developing countries are well prepared to take advantage of these technologies. Nevertheless, the ongoing digitalization of economic activities brings new opportunities for developing countries.

In the case of diversification of global value chains (GVCs), digitalization of the supply chain is pivotal. Digitalization allows multinational enterprises (MNEs) to extract further efficiencies from international production networks, by reducing governance and transaction costs and enhancing

centralized coordination and control. Applications of digital technologies to foster international diversification and build supply chain resilience include real-time visibility into the availability of raw materials and finished goods; enhanced control over processes, people and assets, including the tracking of external suppliers down to the bottom of the supply chain. It also includes the use of AI and machine learning to ensure more timely responses to shocks and discontinuities.

Table 3.1: Brief Description of Emerging Technologies

Technology	Description
Artificial intelligence (AI)	AI is normally defined as the capability of a machine to engage in cognitive activities typically performed by the human brain. AI implementations that focus on narrow tasks are widely available today, used for example, in recommending what to buy next online, for virtual assistants in smartphones, and for spotting spam or detecting credit card fraud. New implementations of AI are based on machine learning and harness big data.
Internet of Things (IoT)	IoT refers to myriad Internet-enabled physical devices that are collecting and sharing data. There is a vast number of potential applications. Typical fields include wearable devices, smart homes, healthcare, smart cities and industrial automation.
Big data	Big data refers to datasets whose size or type is beyond the ability of traditional database structures to capture, manage and process. Computers can thus tap into data that has traditionally been inaccessible or unusable.
Blockchain	A blockchain refers to an immutable time-stamped series of data records supervised by a cluster of computers not owned by any single entity. Blockchain serves as the base technology for cryptocurrencies, enabling peer-to-peer transactions that are open, secure and fast.
5G	5G networks are the next generation of mobile internet connectivity, offering download speeds of around 1-10 Gbps (4G is around 100 Mbps) as well as more reliable connections on smartphones and other devices.
3D printing	3D printing, also known as additive manufacturing, produces three-dimensional objects based on a digital file. 3D printing can create complex objects using less material than traditional manufacturing.
Robotics	Robots are programmable machines that can carry out actions and interact with the environment via sensors and actuators either autonomously or semi-autonomously. They can take many forms: disaster response robots, consumer robots, industrial robots, military/security robots and autonomous vehicles.
Drones	A drone, also known as an unmanned aerial vehicle (UAV) or unmanned aircraft system (UAS), is a flying robot that can be remotely controlled or fly autonomously using software with sensors and GPS. Drones have often been used for military purposes, but they also have civilian uses such as in videography, agriculture and in delivery services.

Source: UNCTAD (2023b).

AI, automation and advanced robotics are the factors that are expected to change the nature of work substantially. This has implications not only on workers but also on the operations of businesses and overall production activities. Automation has often been an engine of economic growth as part of technological advances. Acemoglu (2021) notes that automation was part of a broad technology portfolio in the past and its limited negative effects on labour markets could be offset by other technologies providing other employment opportunities. He argues that the next phase of automation, relying on AI and AI-powered machines, may be even more disruptive, especially if it is not accompanied by other more human-friendly technologies. Growing automation in isolation could still boost human productivity in many sectors, but it could also worsen job losses and economic disruption.

The wider use of the IoT can bring fundamental changes in the management of value chains with sensors able to provide real-time data on different stages of production, monitor inventory levels, and assess the usage and functionality of products (Strange and Zuccella, 2017). It thereby allows

a greater integration of data between firms, suppliers and customers. It is also expected to reduce the transaction costs associated with international production, and facilitate an ever-deeper international division of labour across borders. Yet, the implementation of the IoT comes with significant concerns about cybersecurity.

Similarly, big data and analytics enable firms to monitor emerging trends and opportunities in foreign markets, and to optimise their supply, production and distribution activities more effectively around the world. As discussed earlier, the improvements in robotics and automation are likely to reduce the importance of low labour costs, leading to the reshoring of global production activities. Additive manufacturing (3-D printing) may also change the nature of GVCs as it may reduce the need to establish value chains in certain markets, but may favour local value chains (LVCs) and a co-location of production and consumption (Laplume et al., 2016). In LVCs, firms benefit from proximity to customers with diversified demands and needs (UNIDO, 2019).

Evidently, rising digitalization and automation present many potential benefits for industrial development, but there are also important costs and risks. There will be winners and losers, requiring policy interventions to make adjustments. Issues like cybersecurity, intellectual property and data privacy pose major challenges. Like any previous innovations, recent technological innovations will change attitudes and systems substantially, and yet again, interventions will be needed to counterbalance the negative impacts on the affected people and businesses.

Despite the challenges, there is a growing interest in the implementation of Industry 4.0 in manufacturing processes and supply chains in developed countries. It makes it possible to manufacture entirely new things in entirely new ways and revolutionize supply chains, production, and business models. Considering the new developments and opportunities, manufacturers all around the world must decide how and where to invest in new technologies, and identify which ones will drive the most benefit for them. Governments should support manufacturers in their efforts to implement the Industry 4.0 approach to achieve productivity and competitiveness in global markets. Moreover, capabilities of people, firms and countries differ significantly in benefiting from these future technologies. Therefore, special policies are needed to ensure that the new technological advances in the form of AI, automation and advanced robotics do not widen the economic divides between people of varying income, firms of different sizes, and countries of different development levels.

3.1.3 Towards a Digitalizing World

Digital technologies are shaping the behaviour of individuals, firms and governments. Digitization refers to the transformation of the techno-economic environment and socio-institutional operations through digital communications and applications (ITU, 2020a). Such transformations reflect an ever-widening scope of a digital economy. The digital economy is broadly defined as the application of internet-based digital technologies to the production and trade of goods and services (UNCTAD, 2017).

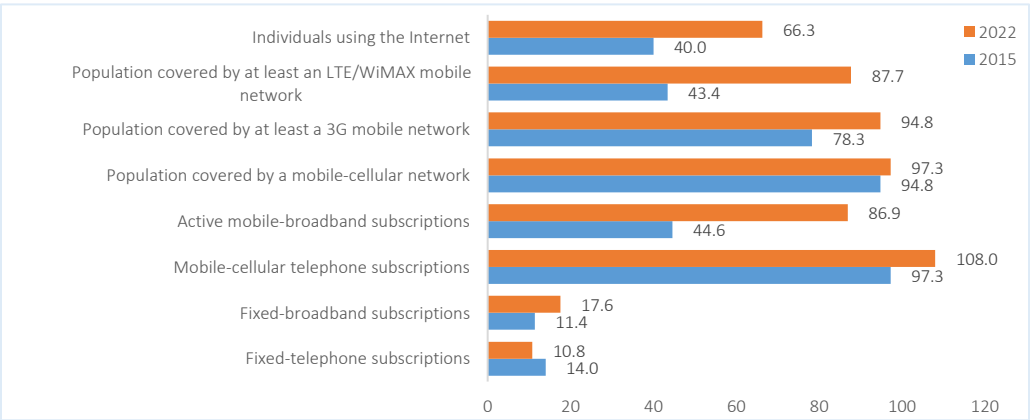
Rising digitalization has implications on many fronts. One is that human behaviour has never been recorded in such detail by big tech companies. Mobile phones, smartwatches, computers and

many other devices keep track of physical activities, social media activities, shopping preferences and other interests of individuals. The collected data play an increasingly greater role in the modern economy and generate enormous economic value. Even if the concerns over individual privacy grow day by day, the big data on human behaviour, interactions and interest are being processed quickly to generate targeted ads, assess the credit worthiness or create any other commercial value. It is not only the human activities that are traced and stored, but also business activities that are reorienting towards digital platforms.

When we look at the number of people using the internet, it is observed that the number expands every year and a greater share of people in developing countries obtain access to the internet. According to the International Telecommunication Union (ITU), the share of people with internet access globally reached 66% in 2022 as compared to 40% in 2015. The number of individuals using the internet grows particularly fast in developing countries, which enables faster access and adaption of people living in developing countries to new digital products and services. However, internet access was still below 50% in lower middle-income countries and only 20% in low-income countries in the world in 2021. Other key indicators of digitalization in the world indicate that there is a rapid growth in the coverage of various digital technologies. Since 2015, the population covered by at least an LTE/WiMAX mobile network expanded from 43.4% to 87.7%, and active mobile broadband subscriptions grew from 44.6% to 86.9% (*Figure 3.2*).

OIC countries demonstrate high heterogeneity in terms of development levels, resources and growth potentials. While there are significant opportunities in enhancing multilateral cooperation and development, often there are serious challenges in fostering economic relations among the OIC countries. Over the last several decades, the industrial development process in OIC countries, as a group, has been rather sluggish (SESRIC, 2017). In certain aspects, the digital economy would provide a level playing field for many developing countries to catch up with pioneering countries. This will require, among many others, substantial investment in human capital and institutions, improving innovation systems, and upgrading industrial clusters and global value chains.

Figure 3.2: Key ICT Indicators for the World (2015 vs 2022), %



Source: ITU World Telecommunication/ICT Indicators database. Version November 2022, for Facts and Figures 2022

3.2 Brief Review of Latest Advances in Key Components of Digital Economy and Industrial Transformation

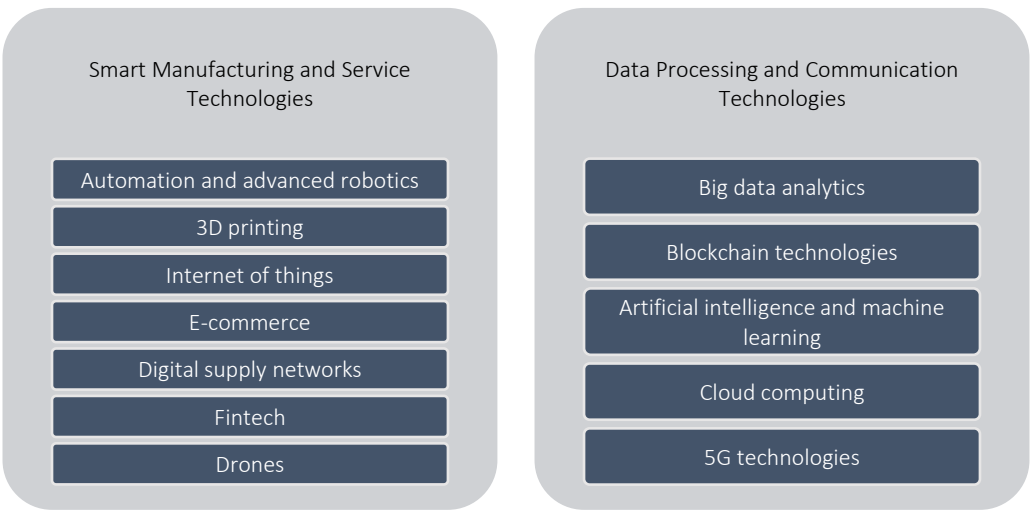
The integration of digital technologies and advanced robotics is transforming the manufacturing process and driving the Fourth Industrial Revolution (Industry 4.0). These technologies can be grouped into two categories, each playing a crucial role in revolutionizing the manufacturing landscape (*Figure 3.3*).

Smart Manufacturing and Service Technologies: This category focuses on the automation and decentralization of tasks within manufacturing processes. Advanced robotics introduces sophisticated machines capable of handling complex tasks with precision and efficiency. 3D printing enables the creation of three-dimensional objects layer by layer, revolutionizing rapid prototyping and customization. The IoT connects physical devices, machines, and sensors to facilitate real-time monitoring, data collection, and optimization of production processes. Together, these technologies enhance manufacturing capabilities, improve productivity, and lead to more flexible and adaptive production systems.

Data Processing and Communication Technologies: This category involves the interconnection and exchange of data across various components of the manufacturing process. Big data analytics processes and analyses vast amounts of data, providing valuable insights for decision-making, process optimization, and quality control. Blockchain technology ensures secure and transparent data exchange and transaction recording, enhancing supply chain management and traceability. Cloud computing offers on-demand access to shared computing resources, enabling scalability and storage for large datasets. Machine learning and AI enable machines to learn from data and make intelligent decisions, further enhancing process automation and efficiency.

The novelty of all these technologies lies in their seamless integration and the convergence of hardware, software, and connectivity in complex production systems. This integration creates

Figure 3.3: Classification of Latest Technologies for Digital Transformation



Source: Author's compilation.

interconnected and intelligent manufacturing ecosystems, where data-driven decisions and automation lead to more efficient, agile, and responsive manufacturing processes. As a result, businesses can achieve higher levels of productivity, reduced production costs, faster time-to-market, and increased product customization, ultimately driving economic growth and competitiveness across GVCs.

These technologies are crucial for OIC economies as they bring about significant advancements in productivity, efficiency, and innovation across industries. By harnessing these technologies' potential, OIC countries can stimulate growth, create new job opportunities, and position themselves at a competitive place on the global stage. To this end, this section reviews major advancements in these technologies with a view to having a better understanding to assess their implications for OIC economies. A summary of key information can be found in Table 3.2 at the end of this section.

3.2.1 Smart Manufacturing and Service Technologies

Automation and advanced robotics

Automation refers to the use of technology, such as computer software, machines, or other systems, to perform tasks that were previously done by humans. This can include tasks ranging from simple repetitive actions to more complex operations. Advanced robotics, on the other hand, refers to machines or systems that are capable of accepting high-level commands or instructions and performing complex tasks in a semi-structured environment with minimal human intervention. These robots are often equipped with advanced sensors, artificial intelligence, and machine learning capabilities, allowing them to perceive and interact with their surroundings, make decisions, and adapt to changing conditions (Deloitte, 2018).

Robotics encompasses a wide range of applications beyond automation, including areas such as exploration, medical robotics, human-robot interaction, and research purposes (Dellot and Wallace-Stephens, 2017). Robotics involves developing machines that can operate in complex and dynamic environments, interact with humans, or perform tasks that require physical dexterity and adaptability. *Table 3.2* highlights some of the recent advancements in automation and advanced robotics that are being used in manufacturing and services.

In line with the growing automation of production processes, robot installations rose steeply to over 517 thousand units in 2021, representing a growth rate of 31% over the previous year (*Figure 3.4a*). This trend is expected to continue over the coming period and reach almost 700 thousand by 2025, according to the International Federation of Robotics (IFR, 2022). The five major markets for industrial robots, China, Japan, the United States, the Republic of Korea, and Germany, accounted for 78% of global robot installations, where China alone accounted for 52% of global robot installations in 2021. Data also shows that the electrical/electronics industry has the highest share of new installation of robots in 2021 with a share of 26.4%, followed by the automotive industry (23.1%), whereas the food industry accounted for just 3.1%. The stock of robots provides a relatively good indication of current trends in automation in industries,

especially in assembly lines. The operational stock of industrial robots estimated by IFR (2022) was almost 3.5 million units, which had been increasing by 14% on average each year since 2016 (*Figure 3.4b*).

Table 3.2: Recent Advancements in Automation and Advanced Robotics

Collaborative Robots (Cobots)	Collaborative robots are designed to work alongside humans, assisting them in various tasks. These robots are equipped with advanced sensors and safety features that allow them to operate safely in close proximity to humans. They are being used in industries such as manufacturing, healthcare, and logistics.
Autonomous Vehicles	The development of self-driving cars, trucks, and delivery drones has seen significant progress. Companies like Tesla, Waymo (Google), and Uber are actively working on autonomous vehicle technology. These vehicles utilize advanced sensors, machine learning algorithms, and artificial intelligence to navigate and make decisions on the road.
Warehouse Automation	Warehouses and distribution centres are increasingly adopting advanced automation technologies. Autonomous robots are used for tasks like order picking, sorting, and inventory management. These robots are capable of operating in complex environments, optimizing workflows, and improving overall efficiency.
AI-Powered Robotics	Artificial intelligence is playing a crucial role in advancing robotics. Machine learning algorithms are being used to train robots to perform complex tasks, adapt to changing environments, and learn from experience. This enables robots to handle more sophisticated operations and make autonomous decisions.
Exoskeletons	Exoskeletons are wearable robotic devices that can enhance human strength and endurance. They find applications in industries like manufacturing and healthcare, where they can assist workers in lifting heavy objects or provide support during physical rehabilitation.
Soft Robotics	Soft robotics is an emerging field that focuses on developing robots made from flexible materials. These robots are more adaptable and can handle delicate tasks with greater precision. Soft robotics has applications in areas such as medical procedures, exploration, and human-robot interaction.
Industrial Automation	Industries are increasingly adopting advanced automation technologies, such as robotic arms, automated assembly lines, and machine vision systems. These systems improve production efficiency, reduce errors, and enable higher levels of customization.
Agriculture Robotics	Robotics is being used in agriculture for tasks like planting, harvesting, and monitoring crops. Autonomous drones equipped with imaging technologies are used for crop monitoring, while robots with specialized arms are developed for tasks like fruit picking.

Source: Author's compilation from various sources.

Figure 3.4a: Annual Installations of Industrial Robots (Thousands)

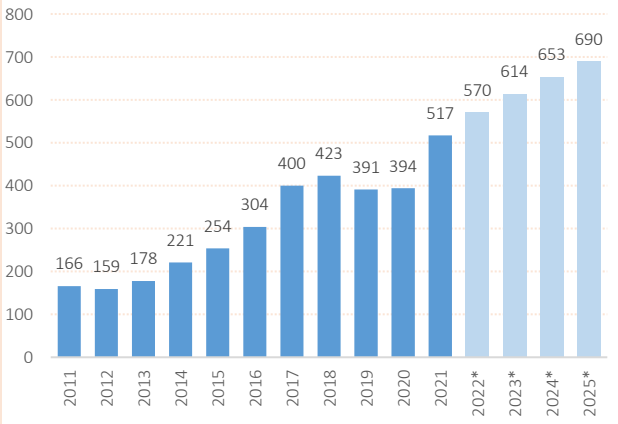
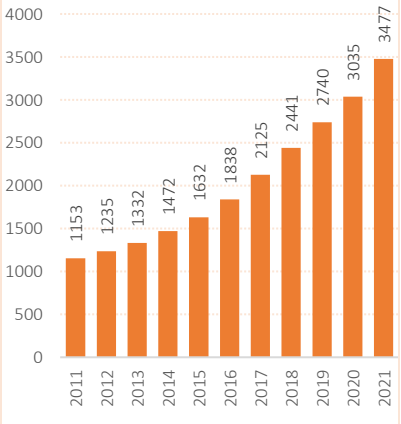


Figure 3.4b: Operational Stock of Industrial Robots (Thousands)



Source: International Federation of Robotics. (*) Projected.

According to Acemoglu and Restrepo (2022), the adoption and development of these technologies are receiving a powerful boost from demographic changes throughout the world and especially from rapidly aging countries such as Germany, Japan, and South Korea. They show that the relative scarcity of middle-aged workers with the skills to perform manual production tasks increases the value of technologies that can substitute for them, leading to industrial automation. This may also explain why Japan, Korea and Germany are among the top countries in the world investing in industrial robots and automation (see Box 3.1)

The advancements in automation and advanced robotics are expected to have significant impacts on economies worldwide, which can vary across people, industries and regions. Among the most expected benefits is the increased efficiency, productivity and growth. Automation and robotics can streamline processes, reduce human error, and operate at higher speeds, leading to higher output levels and reduced costs for businesses. These technologies can encourage entrepreneurs to develop new applications and solutions, fostering technological advancements and creating new business opportunities. It can also give rise to new industries and markets, such as the autonomous vehicle industry, creating opportunities for various sectors such as manufacturing, software development, and infrastructure. These emerging industries can drive economic growth, generate employment, and contribute to technological advancements. Efficiency improvements in producing goods and services arising from automation would also help developing countries to expand their participation in GVCs.

There are also challenges and risks that need to be taken into consideration in policy-making. The most critical one is job displacement and skills mismatch. As discussed in SESRIC (2023), tasks in certain sectors, particularly repetitive and routine tasks, can be easily automated and cause job losses for certain occupations. This requires policies to encourage workers to move to more complex tasks and adapt to the changing job market through reskilling and upskilling. In general, sectors heavily reliant on manual labour may experience shifts in employment patterns and potentially face challenges. This calls for proactive measures to manage the transition, including policies for job creation, social safety nets, and income redistribution to ensure a fair and inclusive economic outcome.

BOX 3.1: Japan's New Robot Strategy

In Japan, the "New Robot Strategy" aims to make the country the world´s number one robot innovation hub. More than 930.5 million USD in support has been provided by the Japanese government in 2022. Key sectors are manufacturing (77.8 million USD), nursing and medical (55 million USD), infrastructure (643.2 million USD) and agriculture (66.2 million USD). The action plan for manufacturing and service includes projects such as autonomous driving, advanced air mobility or the development of integrated technologies that will be the core of next-generation artificial intelligence and robots. A budget of 440 million USD was allocated to robotics-related projects in the "Moonshot Research and Development Program" over a period of 5 years from 2020 to 2025. According to the statistical yearbook "World Robotics" by IFR, Japan is the world´s number one industrial robot manufacturer and delivered 45% of the global supply in 2021.

Source: https://www.automation.com/en-us/articles/january-2023/report-how-asia-europe-america-invest-robotics

Additive Manufacturing and 3D Printing

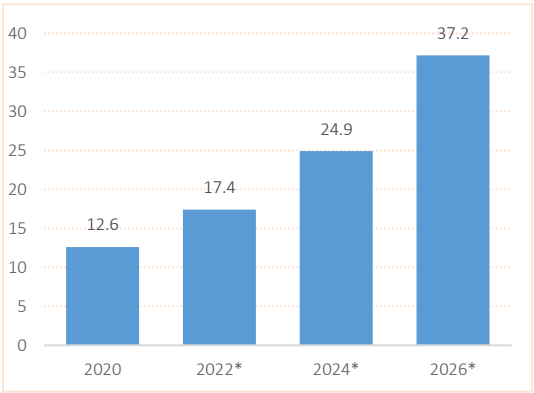
Additive manufacturing and 3D printing are considered highly disruptive technologies, as they have revolutionized the manufacturing process by offering novel and versatile approaches to

creating three-dimensional objects. Additive manufacturing is widely accepted as a fast and cost-effective method for producing functional prototypes during product development and testing. Its benefits include faster production, cost efficiency, customization, and reduced downtime, making it a transformative technology across various industries (McKinsey, 2022). It allows for complex designs, customization, and rapid prototyping, making it a game-changer in manufacturing. 3D printing is one of the specific techniques falling under the umbrella of additive manufacturing. While these terms are often used interchangeably, 3D printing is more commonly associated with non-industrial applications, including personal or small-scale projects.

Both additive manufacturing and 3D printing have a profound impact across industries. They can reduce production time, minimize material wastage, and enable the creation of complex geometries that are not feasible with traditional manufacturing methods. These technologies have found applications in aerospace, automotive, healthcare, consumer goods, architecture, and many other sectors. As they continue to advance, additive manufacturing and 3D printing are expected to drive innovation, transform supply chains, and empower businesses to meet evolving customer demands more efficiently and sustainably. Their potential to disrupt traditional manufacturing processes and enable new possibilities positions them as key drivers of the ongoing industrial revolution.

Due to a lack of widespread availability of data on additive manufacturing, there are varying estimations on the size of the market. Estimations on the current size of the market for 3D printing products and services range around US$ 14-18 billion. According to Statista, the industry is expected to triple between 2020 and 2026 to reach over US$ 37 billion (*Figure 3.5*). Using extensive primary and secondary research, IDTechEx estimates the industry to reach a US$ 41 billion market size in 2033 (IDTechEx, 2023).

Figure 3.5: Global 3D Printing Products and Services Market Size (Billion US$)



Source: Statista. https://www.statista.com/statistics/315386/global-market-for-3d-printers/

Overall, the sector remains extremely dynamic, with more than 200 players competing to develop new hardware, software, and materials (McKinsey, 2022). Top users by sector, measured by spending on 3D printing technology, were industrial manufacturing (especially automotive, aerospace and defence industries), healthcare and education. The cost of 3D printing has dropped markedly in recent years. Currently, an entry-level 3D printer can cost as low as US$ 100, while an industrial 3D printer starts at US$ 10,000 (UNCTAD, 2023b). On the other hand, the industry's demand for labour is also increasing. It is estimated that the industry will create 3-to-5 million new skilled jobs in 3D-printing-enabled manufacturing globally (UNCTAD, 2023b).

Internet of Things

The Internet of Things (IoT) refers to an ecosystem in which applications and services are driven by data collected from devices that sense and interface with the physical world. In IoT, devices and objects have communication connectivity, either a direct connection to the internet or mediated through local or wide area networks (OECD, 2016). IoT is experiencing widespread adoption and transforming economic activities across various sectors. The proliferation of connected devices and sensors enables businesses to collect vast amounts of data, leading to data-driven decision-making and improved operational efficiency. Together with the benefits IoT may deliver, new policy and regulatory challenges may emerge in some areas, including privacy/security concerns, as well as interoperability, numbering and standardisation issues. Thus, creating indicators to inform policymaking in these areas should be a priority (OECD, 2018).

IoT's applications in manufacturing, healthcare, agriculture, logistics, and smart cities contribute to increased productivity, reduced costs, and enhanced customer experiences (Ejaz and Anpalagan, 2019). Moreover, IoT-driven innovations have given rise to new business models and startups, fostering job creation and economic growth. As IoT continues to grow, it is expected to play an increasingly pivotal role in shaping the economies of the future by driving technological advancements and fostering a more interconnected and data-centric world (Prasanna et al., 2017). To this end, IoT is driving the development of smart cities, where interconnected devices and systems improve the quality of life for residents. Smart infrastructure, such as smart grids and traffic management, enhances resource utilization and reduces operational costs, leading to more sustainable economic activities (Bellini et al., 2022).

According to Statista, the IoT market worldwide was worth around US$ 182 billion in 2020, and it is forecast to rise to more than US$ 621 billion in 2030, tripling its revenue in ten years. Not only this, but the number of IoT connected devices worldwide is forecast to triple during this span of time. The Smart Home technologies segment accounts for the biggest share, comprising 97% of worldwide revenues as it is increasingly used by consumers. Compared to other segments, Smart Home technologies grow fastest, also supported by home improvements during the lockdowns in the COVID-19 pandemic (Statista, 2023). McKinsey estimates that IoT could enable US$ 5.5 trillion to US$ 12.6 trillion in value globally by 2030, up from US$ 1.6 trillion in 2020, including the value captured by consumers and customers of IoT products and services (McKinsey, 2021). While the developed world is expected to account for around 55% of the estimated IoT economic value in 2030, China could be responsible for around 26% of the total and other emerging economies could account for 19% of global economic value enabled by the IoT (McKinsey, 2021). The average cost of an IoT sensor has dropped from US$ 1.40 in 2004 to US$ 0.38 in 2020 (UNCTAD, 2023b). Cost reductions and rising demand for advanced consumer electronics will drive the growth of IoT in emerging markets. By 2027, there will likely be more than 29 billion IoT connections, up from 16.7 billion active endpoints in 2023 (IoT Analytics).

E-commerce

Electronic commerce, or e-commerce, is defined by the OECD as the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose

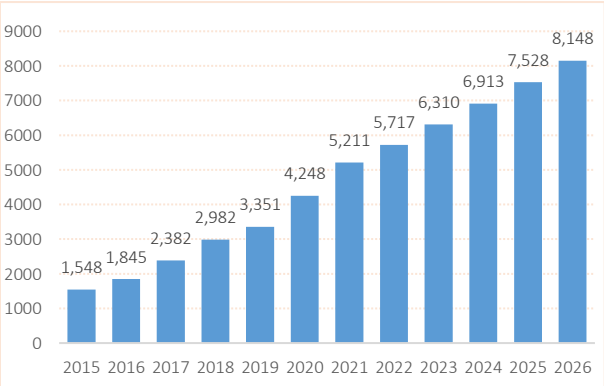
of receiving or placing orders (OECD, 2019a). E-commerce is reshaping the way businesses operate and interact with consumers. It has played a crucial role in digital transformation, encouraging businesses to adopt new technologies, improve their online presence, and invest in cybersecurity to remain competitive and relevant in the digital age. With the ability to shop online from the comfort of their homes or on the go, e-commerce has revolutionized the way people make purchases, becoming an integral part of their daily routines.

Additionally, e-commerce has broken down geographical barriers, allowing businesses to reach customers globally. Even small enterprises can now have a global presence, expanding their market reach and customer base beyond traditional physical boundaries. This accessibility offers equal opportunities to businesses of all sizes and fosters healthy competition. The efficiency of e-commerce processes has transformed the entire supply chain, from order processing to fulfilment. With automation and digitalization, businesses can optimize their operations, improve inventory management, and enhance customer service. Furthermore, the data generated by e-commerce platforms provides valuable insights into customer behaviour and preferences. Businesses can leverage this data to analyse trends, personalize offerings, and refine marketing strategies, leading to more targeted and effective campaigns. The continuous growth of e-commerce has also spurred innovation and competition among businesses (OECD, 2019a).

Its convenience, global reach, efficiency, and innovation make it a critical driver of economic growth, empowering businesses and consumers alike in the digital era. In addition to its economic impact, e-commerce has created new job opportunities in various fields, including logistics, digital marketing, customer support, and technology development. It has also contributed to the growth of the gig economy with the rise of freelance and remote work. The COVID-19 pandemic further underscored the significance of e-commerce, as it enabled businesses to continue operating during lockdowns and restrictions, highlighting its resilience and adaptability in times of crisis.

Over the past few years, UNCTAD has gathered figures related to the monetary value of e-commerce sales in different economies as a basis for deriving estimates of global e-commerce sales. For example, it was estimated that global e-commerce sales jumped to US$ 26.7 trillion globally in 2019, up 4% from 2018 (UNCTAD, 2021). As noted by UNCTAD (2023c), such estimates are subject to major limitations, mainly because exhaustive and internationally comparable national statistics on the value of e-commerce sales are not widely available. Therefore, estimations on retail e-commerce from other research centres vary significantly, and are more conservative, typically estimated at around $5 trillion for

Figure 3.6: Retail E-Commerce Sales Worldwide (Billion US$)



Source: Statista. https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/

2022. Yet, it is expected to grow by an annual growth rate of around 10% over the coming years (*Figure 3.6*).

Digital Supply Networks

Digital supply networks (DSNs) are a key component of Industry 4.0, leveraging digital technologies to revolutionize supply chain management and operations. In traditional supply chains, inefficiencies in one stage can result in a cascade of similar inefficiencies in subsequent stages. Stakeholders often have little, if any, visibility into other processes, which limits their ability to react or adjust their activities (Mariani et al., 2015). DSNs overcome the delayed action-reaction process of the linear supply chain by employing real-time data to better inform decisions, provide greater transparency, and enable enhanced collaboration across the entire supply network (Deloitte, 2016). Real-time data and analytics empower businesses to respond swiftly to changes, optimize inventory management, and streamline processes, ultimately reducing costs and improving customer satisfaction.

One of the key strengths of DSNs lies in fostering collaboration and synchronization among supply chain partners. DSNs facilitate more efficient working relationships and collective process optimization, benefiting all stakeholders involved. In addition to efficiency gains, DSNs enhance supply chain resilience through proactive risk management and contingency planning. The ability to identify vulnerabilities and potential disruptions in real-time empowers businesses to develop strategies to mitigate the impact of unforeseen events, ensuring continuity of operations and customer service (Büyüközkan and Göçer, 2018). Moreover, DSNs contribute to sustainability efforts by optimizing supply chain routes, reducing unnecessary transportation, and facilitating better tracking of product origins and materials.

Fintech

Fintech, the application of digital technology to financial services, is revolutionizing payments, lending, investment, insurance, and other financial products and services. Global financial account ownership and digital payment usage have significantly increased in recent years, but many still lack essential financial services. The latest World Bank Findex data show global financial account ownership grew to 76% from 51% between 2011 and 2021 and the share of adults making or receiving digital payments grew to 57% in 2021 from 35% in 2014 (World Bank, 2022a). Embracing fintech opportunities and implementing policies that promote safe financial innovation and adoption can bridge the gap across regions and empower individuals and businesses to thrive (World Bank, 2023c).

Fintech's impact on economies is far-reaching and multifaceted. By leveraging technology to enhance financial services, fintech is fostering financial inclusion, empowering individuals and businesses with access to savings, credit, and insurance. This inclusion drives economic growth, as more people can actively participate in the formal financial system. Additionally, fintech optimizes financial processes, reducing operational costs for businesses and institutions, leading to increased efficiency and competitiveness. Its data-driven approach enables personalized financial solutions, benefiting businesses with better risk assessment and decision-making. Furthermore, fintech innovations facilitate cross-border payments, enhancing international trade

and remittances, and promoting global economic integration. Overall, fintech's ability to stimulate innovation, competition, and economic resilience makes it a critical driver of economic development and progress in the digital age.

The joint IMF/World Bank (2019) paper finds that while there are important regional and national differences, countries are broadly embracing the opportunities of fintech to boost economic growth and inclusion, while balancing risks to stability and integrity. While fintech is having a global impact on the provision of financial services, mobile payments have been a key early developer with broad implications for inclusion. To this end, governments are seeking to provide an enabling environment, including open and affordable access to core digital services and infrastructures, but important infrastructural gaps and regulatory impediments remain. The best way to keep fintech risks within tolerable levels, while still promoting innovation, is to put in place regulatory and supervisory frameworks that are well targeted and proportionate to the risks identified (World Bank, 2022b).

Drones

Drones play a vital role in Industry 4.0 by offering transformative solutions to various industries. Their automation capabilities enhance efficiency by automating tasks that were once manual and time-consuming. Drones enable remote monitoring and inspections of infrastructure, equipment, and hard-to-reach locations, reducing the need for human intervention and minimizing errors. Equipped with sensors and cameras, drones collect vast amounts of data, enabling data-driven decision-making and process optimization through advanced analytics. In agriculture, they support precision farming practices by monitoring crop health, analyzing soil conditions, and applying targeted treatments, leading to increased productivity and resource optimization. Drones also have significant implications for logistics and supply chain management, enabling last-mile deliveries and enhancing connectivity in remote areas. Additionally, their application in hazardous environments improves safety and risk management while extending communication capabilities to isolated regions. As technology continues to advance, drones are poised to become even more critical in driving progress and transforming industries during the fourth industrial revolution.

The drone industry is currently shaped by military and commercial drones. The global military drone market is projected to grow from US$ 14.1 billion in 2023 to US$ 35.6 billion by 2030.[9] The increasing growth of artificial intelligence and autonomous systems will likely boost the market. This development is expected to lead to strong growth in the global military unmanned aircraft market in the future. For example, Türkiye has made tremendous strides in developing indigenous unmanned aerial vehicles and smart munitions in the last decade (Duz, 2021). By early 2023, Turkish drone-maker Baykar exported Bayraktar TB2 to 28 countries, as reported by news agencies.[10]

Similarly, the global commercial drone market growth was valued at US$ 8.8 billion in 2022 and it is projected to grow from US$ 11 billion in 2023 to US$ 54.8 billion by 2030.[11] There are significant investments in designing and developing lightweight commercial drones for various commercial applications such as medical emergency transportation, inspection and maintenance, filming and photography, mapping, surveillance, and precision agriculture (UNCTAD, 2023b).

3.2.2 Data Processing and Communication Technologies

Big data analytics

Big data refers to a dataset whose size or type is beyond the ability of traditional databases to capture, manage and process (UNCTAD, 2023c). It is a term widely used to describe the exponential growth of data, particularly the data flowing from ubiquitous mobile phones, satellites, ground sensors, vehicles and social media. Big data analytics explains the rise of computing technologies and algorithms that harness big data for valuable insights (World Bank, 2017). In 2020, 64.2 zettabytes of data were created, that is a 314% increase from 2015.[12] In 2023, it will be generated nearly three times the volume of data generated in 2019. The global big data analytics market was valued at over US$ 240 billion in 2021, which is expected to reach over US$ 650 billion by 2029.[13]

Big data analytics is a foundational pillar of Industry 4.0, providing businesses with the capability to process and analyse vast and complex datasets in real-time. Its importance lies in enabling data-driven decision-making, enhancing efficiency, and boosting productivity through the identification of patterns and insights within the data. By leveraging big data analytics, businesses can personalize customer experiences, predict future trends, and uncover new opportunities for innovation. Additionally, it facilitates supply chain optimization and risk management, and drives advancements in healthcare and scientific research. Big data analytics is a transformative tool that empowers organizations to make informed decisions, adapt to changing market conditions, and remain competitive in the digital era (UNCTAD, 2023b).

The potential for big data to transform government is vast. Big data analytics can be used by governments to improve existing services and to draw on novel datasets to drive entirely new public services. It is possible to use satellite imagery, cell phone data and more to produce alternative economic indicators for new – and real-time – policy insights. By applying machine learning to online and social media, governments can be more responsive to citizen sentiment, ushering in a new dimension of civic engagement (World Bank, 2017).

Blockchain technologies

Blockchain is a technology that enables the secure sharing of information. Blockchain technologies are decentralized and secure digital ledgers that offer transparency, trust, and automation. They eliminate the need for intermediaries, reducing costs and enabling direct peer-to-peer interactions. Blockchain facilitates secure cross-border transactions, supports smart contracts, and promotes financial inclusion. Additionally, it enhances data privacy, enables asset tokenization, and fosters decentralized finance, driving innovation across industries (McKinsey, 2022b).

Several implementations of blockchain technology are extensively used in modern-day business and each implementation has its distinct strength in various industries, ranging from IoT and finance to supply chain management, health-care, and reputation systems (Gad et al., 2022). In a new report released by the World Bank, blockchain technology is being examined as a potential game-changer for infrastructure projects, including roads, power plants, and renewable energy

initiatives (World Bank, 2023d). Yet, one major use of blockchain technology that has garnered perhaps the most attention are cryptocurrencies, with the biggest name among these being Bitcoin.

According to Statista, global spending on blockchain solutions is projected to surge from US$ 4.5 billion in 2020 to an estimated US$ 19 billion by 2024. A significant majority of surveyed business leaders worldwide have expressed investment intentions for blockchain in their organizations, with over 60% of respondents planning a budget of at least US$ 1 million for distributed ledger technology. While the financial sector holds approximately 30% of the market value of blockchain in 2020, the technology's adoption has extended across various industries, ranging from healthcare to agriculture.[14] This widespread integration of blockchain reflects its growing importance and potential to revolutionize business processes and transactions worldwide. However, challenges relating to scalability and security, regulatory uncertainty, and difficulties with integrating the technology within existing applications act as potential market constraints (UNCTAD, 2023b).

Artificial intelligence and machine learning

Artificial Intelligence (AI) is the ability of a machine to perform cognitive functions typically associated with human minds, such as perceiving, reasoning, learning, interacting with the environment, and problem solving. Examples of AI technologies include robotics, autonomous vehicles, computer vision, language, virtual agents, and machine learning (McKinsey, 2022c). Machine learning (ML) models use big data to learn and improve predictability and performance automatically through experience and data, without being programmed to do so by humans (OECD, 2021). AI and ML automate repetitive tasks and processes, leading to increased efficiency and reduced operational costs. Businesses can streamline operations, optimize resource allocation, and accelerate decision-making, ultimately boosting productivity.

Their applications span across industries, driving digital transformation and reshaping the future of work and interactions in the digital age. In healthcare, AI and ML revolutionize diagnosis and treatment, while in cybersecurity, they detect fraud and protect against threats (IFC, 2021). In the financial sector, AI and ML improve risk assessment, fraud detection, and credit scoring, making financial services more efficient and accessible (OECD, 2021). They also drive the development of new products, services, and business models, promoting entrepreneurship and economic expansion.

AI and ML present both opportunities and challenges for developing economies, including OIC countries. On the positive side, they have the potential to drive economic growth and productivity by enhancing financial inclusion, improving healthcare and education, and boosting agricultural productivity. They offer an opportunity to reach the underserved by lowering costs and barriers to entry for entrepreneurs and businesses, creating innovative business models, and leapfrogging traditional technologies (IFC, 2021). However, there are concerns about job displacement and the skills gap, necessitating investment in education and training to prepare the workforce for the digital economy. Ensuring widespread access to AI technologies requires

addressing infrastructure limitations and affordability issues. The market for AI (US$ 65 billion in 2020) is growing rapidly. Private investment increased 103% in 2021 compared to 2020 (from US$ 46 billion to US$ 96.5 billion) (UNCTAD, 2023c).

Cloud computing

Cloud computing has a transformative impact on economic activities, providing cost savings, scalability, and innovation opportunities. It is a form of on-demand computing, which allows users to get continual access to shared computing resources, such as servers, storage, and sometimes services (World Bank, 2016). The importance of cloud computing in boosting economic activities is rooted in its cost-effectiveness, flexibility, and provision of advanced technologies to businesses of all sizes. It eliminates the need for expensive physical infrastructure, enabling businesses to pay only for the services they use, reducing operational expenses, and promoting resource efficiency. Cloud services foster innovation by offering easy access to cutting-edge tools and technologies, enabling rapid deployment of new applications and products, ultimately reducing time-to-market and driving economic growth (Alshareef, 2023). The global accessibility and collaboration facilitated by cloud services improve productivity and support seamless communication among remote teams and partners. Moreover, cloud computing enhances business continuity and resilience by automatically backing up data and enabling continuous operations during disruptions (McKinsey, 2022c).

Cloud computing has been in use before the global pandemic, but its significance became even more evident during the crisis. Businesses and organizations across various sectors harnessed the cloud's power and utility to adapt and innovate. Examples include a restaurant chain seamlessly handling a surge in online orders during lockdowns, a biotech company delivering a COVID-19 vaccine candidate quickly using scalable cloud data storage, and banks using cloud solutions for customer service and fraud analytics. Automakers also benefited by consolidating real-time data and tracking logistics through a common cloud platform, reducing costs and promoting innovation (McKinsey, 2022c). For the year 2022, cloud infrastructure spending is estimated to grow 19.6% to US$ 88.1 billion,[15] whereas global end-user spending on public cloud services is forecast to grow 21.7% to total US$ 597.3 billion in 2023, up from US$ 491 billion in 2022.[16] Following this trend, large enterprises aspire to have roughly 60% of their environment in the cloud by 2025 (McKinsey, 2022d).

5G Technology

5G is the fifth generation of wireless networks, building upon the previous generations (2G, 3G, and 4G). It aims to provide significantly higher download and upload speeds, reaching up to 20 Gbps and 10 Gbps respectively, with incredibly low latency of one millisecond. Compared to 4G LTE networks, 5G is expected to be 200 times faster in download speeds and 100 times faster in upload speeds, while offering one-tenth of the latency. 5G is designed for three primary use case scenarios: enhanced mobile broadband for faster and more reliable internet access, massive machine type communications to connect a vast number of IoT devices, and ultra-reliable and low latency communications for applications that require instantaneous responsiveness (OECD, 2019b).

In this connection, the spread of 5G technology is set to revolutionize economic activities by providing faster data transmission, enhanced connectivity, enabling real-time communication and collaboration, fostering more efficient business operations, and driving innovation. Industries will benefit from the widespread adoption of the IoT, smart manufacturing, and augmented/ virtual reality applications. 5G's ability to connect a massive number of devices simultaneously will accelerate the growth of IoT applications. This will enable industries to deploy IoT solutions on a large scale, optimizing processes, enhancing automation, and unlocking new revenue streams.

It is estimated that US$ 13.2 trillion in global economic value will be made possible by 2035, generating 22.3 million jobs in the 5G global value chain alone. PwC estimates 5G's economic impact in 2022 to be US$ 150 billion and projects that it will reach US$ 1.3 trillion by 2030. The rollout of 5G will take time, approximately five years to achieve broad coverage. It is already widespread though, with Ericsson predicting one billion subscriptions by the end of 2022 and 4.4 billion by 2027 (UNCTAD, 2023b).

Table 3.3: Key Indicators of Major Technological Advancements

	AI	IoT	Big Data	Blockchain
Publications	438,619	139,805	119,555	27,964
Patents	214,365	147,906	72,184	63,767
Market Size	US$ 65 billion (2020) US$ 1,582 billion (2030)	US$ 740 billion (2020) US$ 4,422 billion (2030)	US$ 73 billion (2020) US$ 252 billion (2030)	US$ 1 billion (2020) US$ 88 billion (2030)
Major Providers	Alphabet, Amazon, IBM, Microsoft, Alibaba and Tencent	Accenture, TCS, IBM, EY, Capgemini, HCL and Cognizant	Amazon, Microsoft, IBM, Google, Oracle, SAP and HP	Alibaba, Amazon, IBM, Microsoft, Oracle and SAP
	3D Printing	**Robotics**	**Drones**	**5G**
Publications	36,367	276,027	23,526	13,045
Patents	70,799	122,940	48,613	32,412
Market Size	US$ 12 billion (2020) US$ 51 billion (2030)	US$ 12 billion (2020) US$ 150 billion (2030)	US$ 19 billion (2020) US$ 102 billion (2030)	US$ 6 billion (2020) US$ 621 billion (2030)
Major Providers	Stratasys, 3D Systems, Materialise NV, EOS GmbH, General Electric	ABB, Fanuc, KUKA, and Yaskawa, Alphabet/ Waymo, Aptiv, GM, Tesla	3D Robotics, DJI Innov., Parrot, Yuneec, Boeing, Lockheed Martin, Northrop Grumman	Ericsson, Huawei, Nokia, ZTE, Samsung, and NEC

Source: UNCTAD (2023b).

CHAPTER FOUR

Issues and Challenges for Digital Economic Transformation in OIC Countries

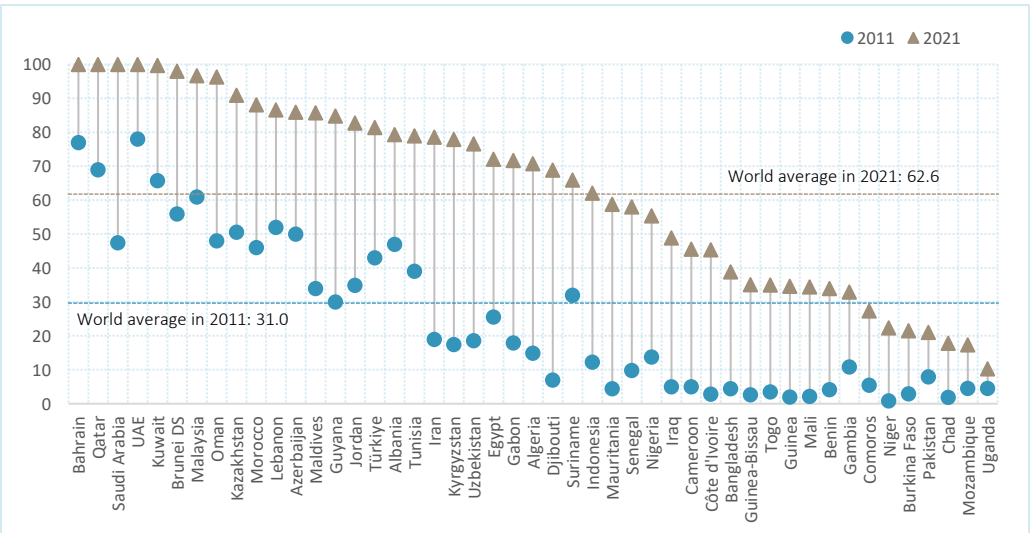
Previous chapter provided an overview of the emerging technologies including automation, advanced robotics, additive manufacturing, AI, digital supply networks, fintech, big data analytics, blockchain, and IoT as crucial drivers of innovation and efficiency across industries. These technologies present opportunities for economic growth, improved productivity, and enhanced competitiveness for all countries. Embracing these technologies strategically and investing in infrastructure and human capital can lead to inclusive and sustainable development in OIC countries, making them innovation hubs and attracting investment. In order to evaluate the existing capacities towards utilizing these technologies, this chapter investigates the major indicators reflecting the overall state of digital infrastructure and capacities in OIC countries.

4.1 Current State of Digital Infrastructure

There are several indicators that are used to measure the level of digital infrastructure in the economies. International Telecommunication Union (ITU) provides a list of core indicators agreed upon through a consultation process involving governments, international organisations, and experts. This list includes more than 60 indicators focusing on different aspects of digital development (ITU, 2022). Considering this list and also the commonly used indicators in the literature for measuring digital infrastructure, we focus mainly on the number of internet users, mobile and fixed broadband subscriptions as well as network coverage.

The digital economy is tightly connected to the internet. Providing a greater share of the population with internet access enables these people to learn and interact through online tools, and become active members of the digital economy. *Figure 4.1* demonstrates the progress in OIC countries in increasing the internet users measured per 100 inhabitants over the last decade. In five GCC countries, almost all individuals have access to internet, with a particularly sharp rise

Figure 4.1: Internet Users per 100 Inhabitants, Total



Source: ITU. SDG Indicators Database 17.8.1.

observed in Saudi Arabia from 47.5 in 2011 to 100 in 2021. In 26 OIC countries, the share of internet users is above the world average of 62.6 in 2021. The most significant improvement was observed in Djibouti, where the number of internet users per 100 inhabitants increased by 61.9, followed by Kyrgyzstan (60.4), Iran (59.6) and Uzbekistan (58). The least progress was observed in Uganda, where there were only 10.3 internet users per 100 inhabitants in 2021.

Table 4.1 provides the statistics on some other major indicators measuring digital infrastructure in OIC countries for the year 2021. It includes country level statistics on mobile and fixed broadband subscriptions and mobile-cellular subscriptions per 100 inhabitants. It also provides information on the share of the population covered by various mobile network technologies. Obviously, there are huge differences across OIC countries in their digital infrastructure. Being relatively more important for speedy access to the internet, fixed broadband subscriptions remain relatively low in most of the OIC countries. The highest share is observed in United Arab Emirates (38.2%), Saudi Arabia (29.5%), Uzbekistan (22%), Türkiye (21.4%) and Suriname (20.1%). In 20 OIC countries, this share is below 1%.

While the fifth generation of wireless networks (5G) are still under development, access to 4G the mobile network currently provides significantly higher download and upload speeds, enabling people and devices to communicate faster. Although many OIC countries have good infrastructure in terms of 4G coverage, this technology was not available in Palestine and Yemen at all in 2021. In 17 OIC countries, less than half of the population was covered by 4G networks. On the other hand, nine OIC countries achieved to provide coverage for more than 99% of their population with 4G mobile network, including Bahrain, Kuwait, Maldives, Saudi Arabia, United Arab Emirates, Qatar, Lebanon, Morocco and Jordan.

Improving digital infrastructure is pivotal from both consumption and creation perspectives, representing a dual benefit for individuals and economies. On the consumption front, a robust digital infrastructure ensures that people have easy access to a plethora of information and services online. This access is the gateway to a world of knowledge, from online education and healthcare services to government resources and entertainment. In essence, digital infrastructure improves people's quality of life by offering convenience and essential resources. Furthermore, digital infrastructure is a powerful tool for economic inclusion. It opens doors to economic opportunities, allowing individuals to participate in the digital economy.

On the creation side, digital infrastructure serves as the backbone of innovation and entrepreneurship. It provides the necessary tools and platforms for entrepreneurs to create new businesses and develop innovative products and services. This is a driving force for economic growth, as startups and innovative ventures are often at the forefront of technological advancements and job creation. Small businesses, in particular, can leverage digital infrastructure to compete on a level playing field with larger enterprises. Additionally, in the world of work, digital infrastructure enables remote collaboration, which helps to tap into a more diverse talent pool. Lastly, digital infrastructure plays a significant role in research and development. It allows researchers and scientists to collaborate across borders, sharing data and insights, which is critical for addressing global challenges.

Table 4.1: Digital Infrastructure Indicators in OIC Countries (2021)

	Per 100 inhabitants			Population covered by (%)		
	Active mobile-broadband subscriptions	Fixed broadband subscriptions	Mobile-cellular subscriptions	A mobile-cellular network	At least a 3G mobile network	At least a 4G mobile network
Afghanistan	18.5	0.1	56.6	90.0	57.0	26.0
Albania	72.0	19.6	92.3	99.9	99.2	98.9
Algeria	97.1	9.5	106.4	98.2	98.2	79.9
Azerbaijan	68.8	19.9	104.9	100	99.5	94.0
Bahrain	135.2	11.4	131.4	100	100	100
Bangladesh	54.7	6.6	108.9	99.6	98.2	98.2
Benin	33.4	0.2	98.0	98.0	80.0	46.0
Brunei DS	136.8	17.8	135.5	99.0	96.0	95.3
Burkina Faso	60.9	0.1	111.7	92.6	53.2	36.6
Cameroon	38.2	2.1	80.0	79.9	25.8	13.5
Chad	7.3	0.0	60.2	86.1	59.0	22.0
Comoros	42.0	0.1	103.9	92.0	87.0	85.0
Côte d'Ivoire	79.3	1.2	162.2	97.7	96.4	64.5
Djibouti	35.9	1.3	44.3	90.0	90.0	90.0
Egypt	61.4	9.9	94.7	99.8	99.5	98.0
Gabon	96.3	2.7	134.3	99.0	98.0	98.0
Gambia	50.3	0.2	101.4	98.0	88.0	7.5
Guinea	23.4	0.0	101.9	88.0	40.0	29.0
Guinea-Bissau	52.9	0.2	108.5	100	43.0	23.0
Guyana	33.8	11.8	106.4	97.3	93.2	50.0
Indonesia	114.8	4.5	133.7	97.8	93.9	96.2
Iran	104.5	12.1	154.6	96.5	85.0	81.0
Iraq	47.5	14.7	93.6	100	96.9	95.9
Jordan	65.3	6.4	65.3	99.8	99.8	99.0
Kazakhstan	93.8	14.3	127.5	98.2	96.0	83.5
Kuwait	136.6	1.7	162.8	100	100	100
Kyrgyzstan	119.3	4.4	130.4	99.3	91.0	85.0
Lebanon	77.8	7.7	76.7	99.6	99.6	99.2
Libya	17.0	4.9	43.4	78.0	98.0	40.0
Malaysia	125.1	11.1	140.6	98.5	95.4	95.4
Maldives	46.4	14.7	135.4	100	100	100
Mali	40.0	0.7	111.1	100	68.0	47.0
Mauritania	70.8	0.4	141.1	96.6	43.7	
Morocco	82.0	6.1	137.5	99.8	99.3	99.1
Mozambique	19.3	0.2	42.7	85.0	85.0	50.0
Niger	5.5	0.0	56.4	92.0	24.0	
Nigeria	36.6	0.0	91.4	92.9	84.6	61.9
Oman	112.6	11.6	135.1	100	100	97.8
Pakistan	46.5	1.3	81.6	89.1	78.1	75.4
Palestine	19.7	8.0	77.6	98.0	59.0	0.0
Qatar	144.0	11.6	144.2	100	100	99.8
Saudi Arabia	119.5	29.5	126.4	100	100	100
Senegal	94.1	1.2	117.7	99.4	99.4	83.1
Sierra Leone	21.2	0.0	97.7	93.2	79.9	48.6
Somalia	2.6	0.7	51.8	80.0	70.0	30.0
Sudan	42.0	0.1	75.6	90.4	78.6	35.0
Suriname	79.0	20.1	147.8	100	92.0	87.0
Tajikistan	24.3	0.1	118.8	90.0	90.0	80.0
Togo	34.3	0.8	72.4	98.0	97.0	83.0
Tunisia	81.3	12.2	127.6	99.0	99.0	95.0
Turkmenistan	13.9	0.2	98.6	97.9	75.8	67.0
Türkiye	82.6	21.4	101.8	99.8	98.8	96.8
Uganda	52.2	0.1	65.7	98.0	85.0	31.0
UAE	241.2	38.2	194.7	100	100	99.8
Uzbekistan	105.5	22.0	102.9	99.4	95.0	75.0
Yemen	5.0	1.2	46.0	88.9	95.0	0.0

Source: ITU Digital Development Database, January 2023.

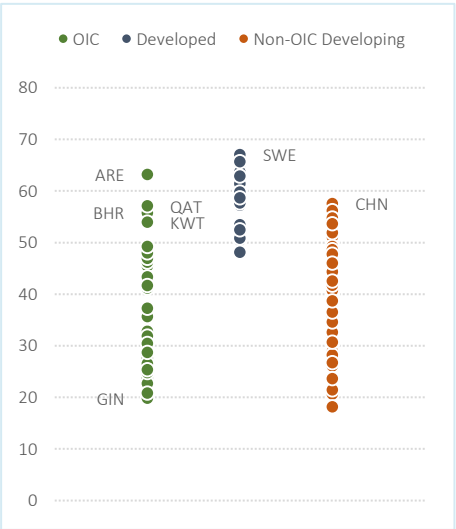
In essence, digital infrastructure acts as a catalyst for both individual empowerment and economic development. It is not merely about enabling passive consumption of digital content but also fostering an ecosystem where individuals and businesses can consume, create, innovate, and contribute to economic and societal growth. In order to assess the current level of digital infrastructure for the facilitation of innovation, the Global Innovation Index (GII) of the World Intellectual Property Organization (WIPO) is used. The GII reveals the most innovative economies in the world, ranking the innovation performance of 132 economies, 39 of which are OIC countries, highlighting their innovation strengths and weaknesses, and pinpointing any gaps in their innovation metrics.

According to the GII, the existing infrastructure, including both digital and general infrastructure, is not very conducive to innovation in a significant number of OIC and non-OIC developing countries. In fact, only the United Arab Emirates, Qatar, Bahrain and Kuwait possess a digital infrastructure that is given a score above 50 (out of 100). The United Arab Emirates ranks 7th in the global rankings, showing its strong base for innovation in the digital age (*Figure 4.2*).

Towards adapting to digitalization and automation of economies, an important ingredient, besides infrastructure development, is the regulatory environment, which captures perceptions on the ability of the government to formulate and implement cohesive policies that promote the development of the private sector and evaluate the extent to which the rule of law prevails. According to the GII, the majority of OIC countries have a score above 50, but most of them fall behind even the worst performing developed country. United Arab Emirates, Brunei Darussalam, Jordan and Bahrain have the highest scores within the OIC region (*Figure 4.3*).

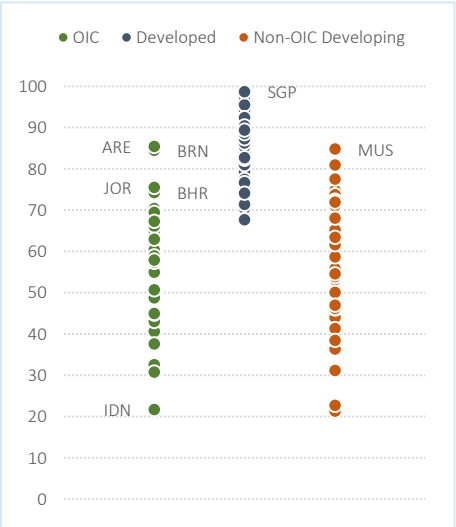
In order to assess the preparedness of countries for frontier technologies, including artificial intelligence, the Internet of Things and electric vehicles, we also employ the Frontier Technology Readiness Index (FTRI) of the UNCTAD, which ranks 166 countries, including 50 OIC countries, based on five "building blocks": ICT deployment, skills, research and development (R&D) activity, industry

Figure 4.2: Infrastructure for Innovation



Source: WIPO Global Innovation Index 2022.

Figure 4.3: Regulatory Environment for Innovation



Source: WIPO Global Innovation Index 2022.

activity and access to finance. The index shows that countries in sub-Saharan Africa are the least ready to use, adopt or adapt to frontier technologies and are at risk of missing current technological opportunities. Index values for OIC countries are provided in *Table 4.2*.

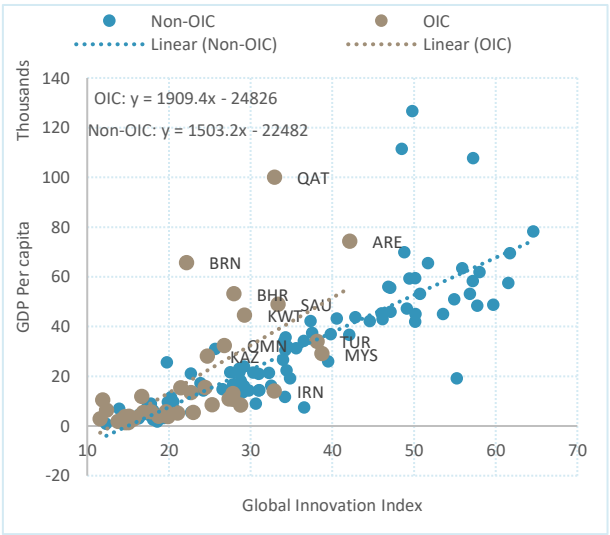
Table 4.2: Frontier Technology Readiness Index

	Total score	Ranks (Total Score and Sub-Indices)								Score group
		2022	2021	Δ	ICT	Skills	R&D	Industry	Finance	
Malaysia	0.76	32	31	-1	30	64	28	7	16	High
UAE	0.74	37	42	5	29	50	34	32	38	High
Saudi Arabia	0.65	47	50	3	46	44	20	119	77	Upper middle
Kuwait	0.64	51	58	7	44	75	70	52	37	Upper middle
Türkiye	0.62	53	55	2	75	48	26	77	49	Upper middle
Bahrain	0.58	60	56	-4	48	58	87	94	50	Upper middle
Oman	0.57	64	74	10	52	86	51	91	63	Upper middle
Tunisia	0.56	66	60	-6	88	61	66	42	45	Upper middle
Qatar	0.55	67	72	5	36	115	56	115	15	Upper middle
Kazakhstan	0.55	68	62	-6	82	36	69	69	124	Upper middle
Brunei DS	0.55	69	69	0	54	38	95	97	93	Upper middle
Morocco	0.55	70	76	6	73	113	53	55	33	Upper middle
Iran	0.53	75	71	-4	78	74	35	118	62	Upper middle
Lebanon	0.51	77	63	-14	84	76	77	86	26	Upper middle
Jordan	0.51	80	64	-16	80	101	61	64	43	Lower middle
Egypt	0.49	83	87	4	91	66	47	90	119	Lower middle
Indonesia	0.49	85	82	-3	102	107	50	47	97	Lower middle
Albania	0.46	88	85	-3	68	81	109	99	98	Lower middle
Azerbaijan	0.4	96	100	4	81	94	85	141	121	Lower middle
Algeria	0.4	97	98	1	112	83	65	162	111	Lower middle
Suriname	0.4	99	92	-7	92	62	160	110	127	Lower middle
Maldives	0.37	103	114	11	98	60	149	158	79	Lower middle
Iraq	0.35	107	126	19	104	100	44	164	158	Lower middle
Guyana	0.35	110	108	-2	113	119	160	87	95	Lower middle
Gabon	0.35	111	94	-17	105	98	149	76	148	Lower middle
Kyrgyzstan	0.34	113	115	2	107	103	119	111	113	Lower middle
Nigeria	0.32	119	124	5	119	108	68	157	153	Low
Libya	0.31	122	117	-5	151	99	97	145	104	Low
Pakistan	0.28	125	123	-2	149	159	43	82	138	Low
Bangladesh	0.28	126	112	-14	148	131	67	135	90	Low
Senegal	0.27	128	118	-10	116	155	92	116	112	Low
Cameroon	0.25	135	132	-3	137	120	101	117	146	Low
Cote d'Ivoire	0.23	136	131	-5	114	146	128	125	132	Low
Uganda	0.22	138	128	-10	133	137	91	120	147	Low
Burkina Faso	0.21	140	148	8	128	162	126	129	115	Low
Togo	0.19	142	129	-13	144	130	146	134	120	Low
Benin	0.19	143	139	-4	152	128	126	124	142	Low
Mali	0.19	145	141	-4	138	165	118	100	123	Low
Tajikistan	0.17	149	143	-6	160	118	140	138	151	Low
Djibouti	0.17	150	146	-4	135	163	160	68	135	Low
Mozambique	0.16	152	149	-3	140	156	123	154	125	Low
Mauritania	0.16	153	147	-6	139	160	137	150	128	Low
Comoros	0.14	156	142	-14	157	132	160	140	145	Low
Guinea	0.14	157	153	-4	154	158	149	130	156	Low
Yemen	0.1	159	156	-3	165	154	90	121	164	Low
Gambia	0.09	160	157	-3	145	151	149	161	159	Low
Sierra Leone	0.09	161	151	-10	158	149	131	143	163	Low
Sudan	0.08	163	155	-8	156	157	99	165	160	Low
Afghanistan	0.08	164	152	-12	164	150	114	151	165	Low
Guinea-Bissau	0.04	165	NA	NA	163	147	160	166	140	Low

Source: UNCTAD (2023b).

There are only two OIC countries that are classified within the 'high' score group, namely Malaysia and United Arab Emirates, which rank among the top 40 in the world. Compared to the earlier year, Iraq made the largest stride in its rankings from 126 in 2021 to 107 in 2022. Oman also demonstrated a 10-step increment in its rankings. Overall, 15 OIC countries were able to improve their places in the global rankings of FTRI. It is discouraging to observe that 33 OIC countries fell back in their rankings. Among the building blocks of the index, OIC countries perform relatively better in the R&D category, where there are 8 OIC countries ranked among the top 50 in the world. It is important to tap into this opportunity to further improve their capacity in research and development and achieve better prospects in frontier technologies. Some OIC countries are also relatively strong in the finance category, demonstrating their greater capability to provide financing for emerging technologies. This is in fact evident from the relationship that countries with higher income levels have higher innovation scores (*Figure 4.4*).

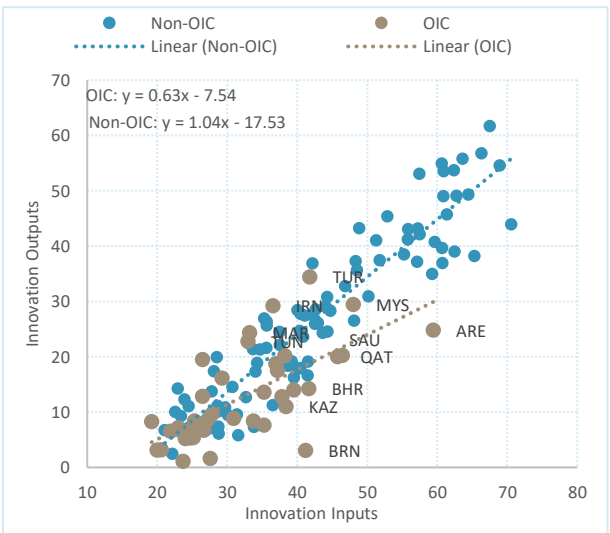
Figure 4.4: Global Innovation vs Income Levels



Source: WIPO Global Innovation Index 2022.

Overall, there is a strong relationship between what countries put in innovation and what they achieve. This is particularly visible in the GII. Associating the two main sub-indices of GII reveals that countries that invest in their innovation capacities tend to have greater success in coming up with innovative outputs. More technically, countries with higher innovation inputs scores get high scores in innovation outputs (*Figure 4.5*). This relationship is stronger in non-OIC countries as compared to OIC countries, implying a smaller generation of innovation outputs from the same amount of innovation inputs in the case of OIC countries. This requires concerned OIC countries to identify the challenges in creating greater innovation outputs and address them

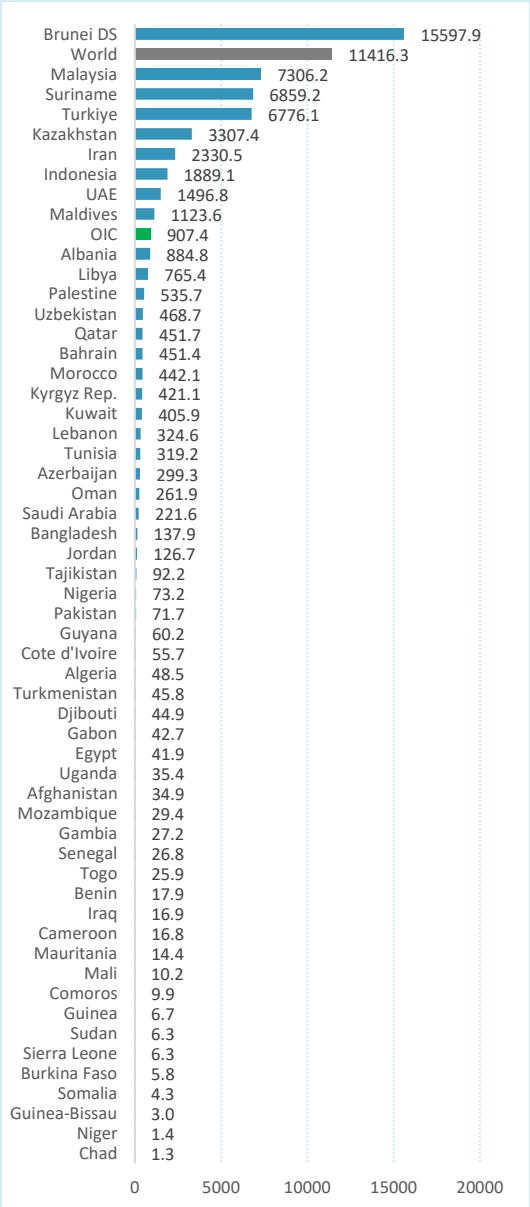
Figure 4.5: Innovation Inputs vs Innovation Outputs



Source: WIPO Global Innovation Index 2022.

with appropriate policy measures. The reasons can be diverse and complex, but their discussion is beyond the scope of this report.

Figure 4.6: Secure Internet Servers (per 1 million people)



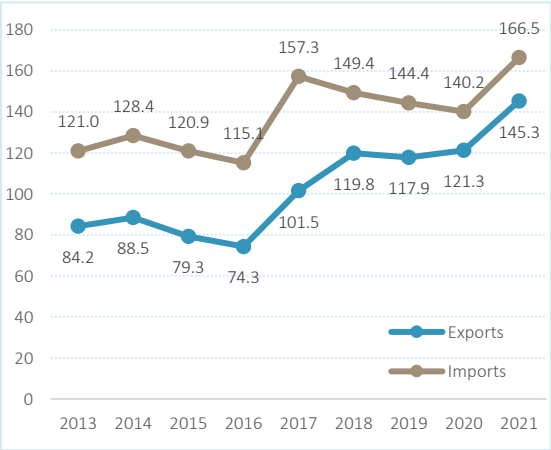
Source: World Development Indicators, World Bank.

To guide the challenges, one example would be the security of internet services. Secure internet servers are crucial because they safeguard data, privacy, and digital operations, preventing unauthorized access, data breaches, and cyberattacks, which can have severe consequences for individuals, businesses, and society. They positively impact innovation outputs by fostering a safe environment for digital collaboration, data sharing, and the development of new technologies. When we look at the number of secure internet servers per 1 million in OIC countries, we observe that there is only one OIC country that is above the world average (*Figure 4.6*). The OIC average is below 0.1%, whereas the world average is 1.1%.

Lower innovation output capacity is reflected in trade figures as well. Countries with better innovation output capacities will be able to export greater value of goods and services related to digital technologies. Total exports of OIC countries in ICT related goods have been increasing steadily, which has doubled between 2016 and 2021 to reach US$ 145 billion (*Figure 4.7*). *Figure 4.7* also shows that while total imports of OIC countries have been higher than their exports, the trade deficit tends to decline over the years. In this connection, their share in total exports of communication equipment increased from around 1.9% to 6% during the same period (*Figure 4.8*).

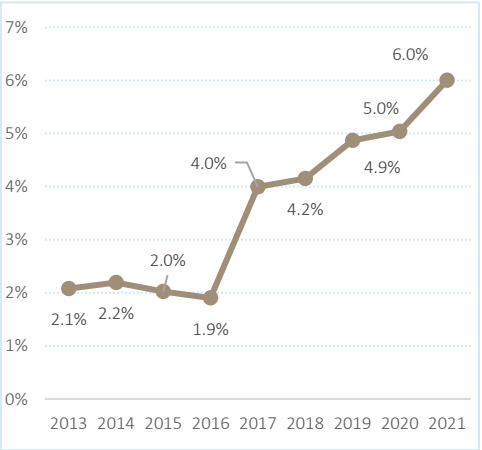
Figure 4.9 shows the trade balance of OIC countries in total ICT goods and its subcategories. In aggregate, OIC countries witnessed a trade deficit at an amount of around US$ 34 billion during 2011-2020, which fell to US$ 21 billion in 2021. Despite the rise in their share of global exports of communication equipment, this category remains the one with the largest trade

Figure 4.7: Total Exports and Imports of OIC Countries in ICT Goods (Billion US$)



Source: UNCTADstat, UNCTAD.

Figure 4.8: Share of OIC Countries in Global Exports of Communication Equipment

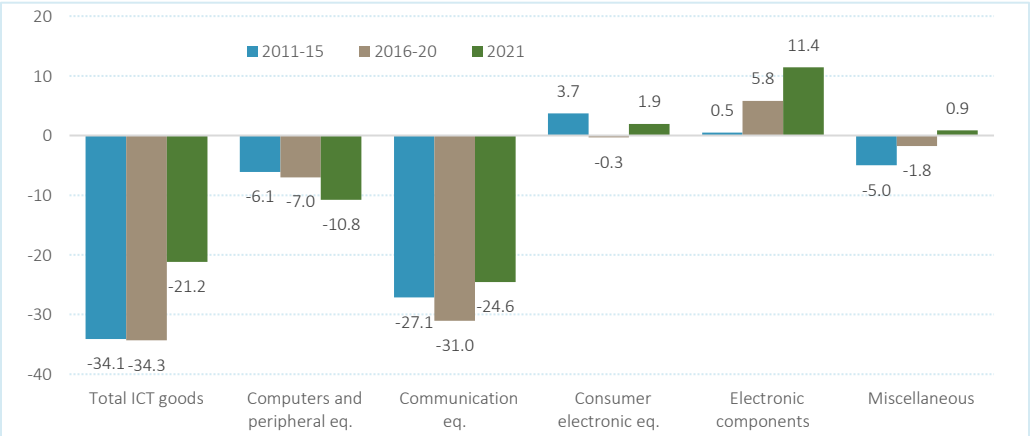


Source: UNCTADstat, UNCTAD.

deficit. It is encouraging to observe that OIC countries have an increasingly higher trade surplus in electronic components, an important ingredient of digital technologies. They have also a surplus in consumer electronic equipment and miscellaneous ICT products.

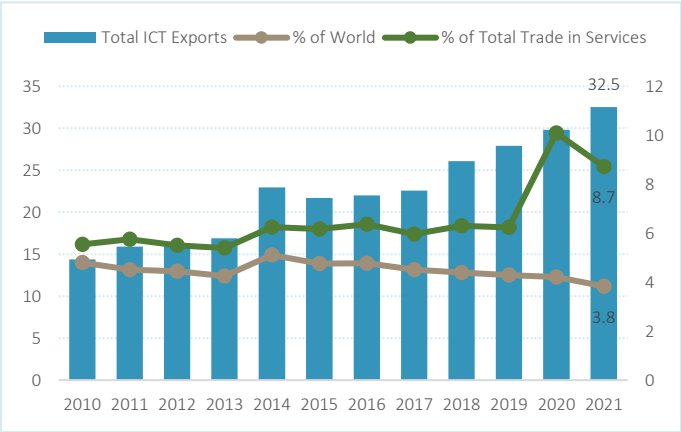
There is also a growing trend in the trade of ICT services. OIC countries also managed to increase their total exports in ICT services over the years to reach US$ 32.5 billion in 2021. Exports of ICT services account for 8.7% of total services exports of OIC countries. On the other hand, despite the growth in total services exports, the share of OIC countries in global ICT exports has been falling continuously over the years since 2014 to reach 3.8% in 2021 (*Figure 4.10*). Obviously, there are significant improvements in the capacity of OIC countries in producing and exporting ICT related goods and services, but there is a need for greater efforts to improve the capacities further and become more competitive in global markets.

Figure 4.9: Trade Balance of OIC Countries in ICT Goods (Billion US$)



Source: UNCTADstat, UNCTAD. 2011-15 and 2016-2020 show the period averages.

Figure 4.10: Total Exports of OIC Countries in ICT Services (US$ at current prices in billions)

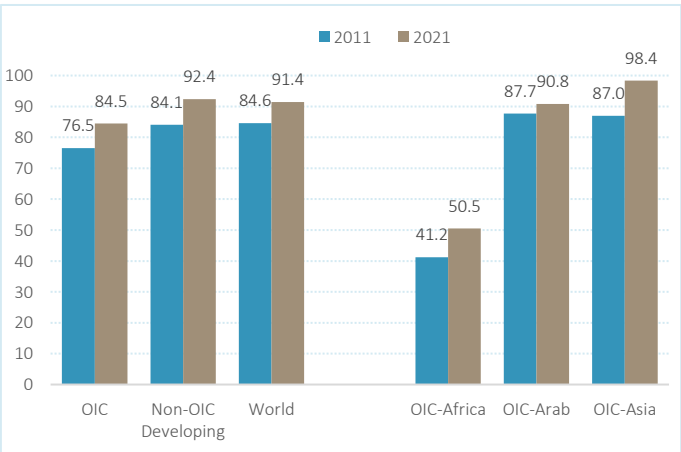


Source: UNCTADstat, UNCTAD.

4.2 Access to Digital Technologies and Services

The current state of digital infrastructure in OIC countries shows some promising developments in some OIC countries, but demonstrates major challenges in the majority of other OIC countries, particularly those in sub-Saharan Africa. This section provides some further insights on digital infrastructure development mainly from the viewpoint of access to digital services. *Table 4.1* already provides some information on the network coverage of mobile technologies, which is critical in understanding the access to services through mobile networks. Perhaps a more fundamental indicator is access to electricity, without which it is not possible to carry the discussions on digital technologies forward.

Figure 4.11: Access to Electricity

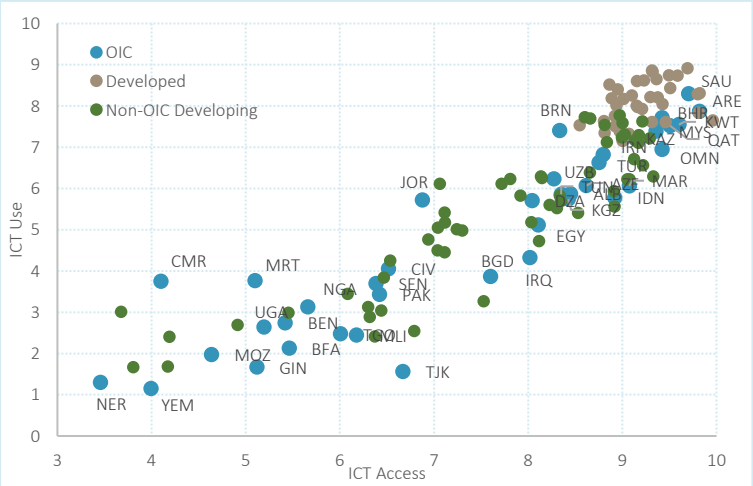


Source: World Development Indicators, World Bank. Weighted averages of 56 OIC, 39 developed and 119 non-OIC developing countries.

Globally, access to electricity is improving, which is estimated to reach 91.4% in 2021. OIC countries were also able to increase the share of the population that has access to electricity from 76.5% in 2011 to 84.5% in 2021. However, the average access rate in OIC countries continues to remain below the world average. This is in fact largely driven by the lower access ratios in sub-Saharan African countries of the OIC, which have an average rate of 50.5%. OIC counties in the Asia region has an average access rate of electricity above 98% (*Figure 4.11*).

Limitations in access to electricity will definitely impact the development objectives of the sub-Saharan African countries. Having access to a technology requires the ability to use that

Figure 4.12: ICT Access vs ICT Use (2020)



Source: WIPO Global Innovation Index 2022.

technology as well. Overall, there is a strong correlation between these two indicators, according to the GII indicators. Developed countries have greater access to ICT and they are able to make use of it better. However, OIC countries demonstrate a mixed picture, where there are countries at varying levels of ITC access and use. Generally, higher income countries within the OIC have higher levels of ICT access and use (*Figure 4.12*). In essence, access is the foundation that enables ICT use, and increased use can, in turn, drive the need for improved access. Bridging the digital divide and promoting equitable access to ICT is essential for ensuring that the benefits of technology are accessible to all.

A critical indicator of digital inclusion is the share of individuals using the internet, as it indicates that people are engaging with the online world for communication, information retrieval, social networking, and more. Individual country statistics on internet usage are already provided in

Figure 4.13: Individuals using the Internet in OIC Countries (% of population), Distribution of Countries, 2021

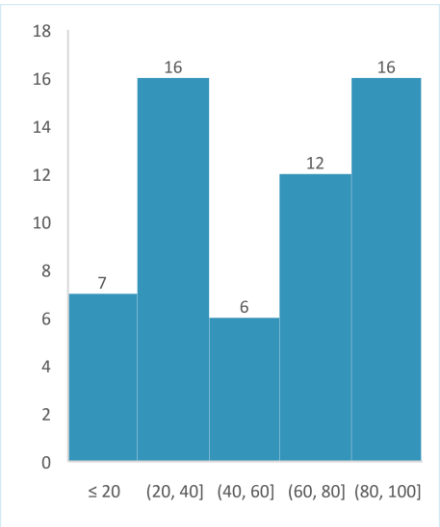
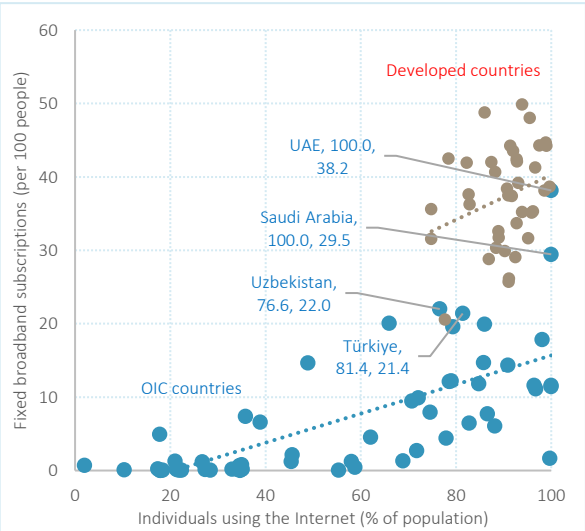


Figure 4.14: Individuals using the Internet (% of population) vs Fixed broadband subscriptions (per 100 people), 2021



Source: World Development Indicators, World Bank.

Table 4.1 in the previous section. *Figure 4.13* shows the distribution of OIC countries with respect to the share of the population using the internet over 20 percentage point intervals. Diversity across the OIC countries is again quite visible in terms of internet usage. However, beyond having access to the internet, it is also important to ensure quality and speed of these services. Fixed broadband offers greater stability, speed, and reliability compared to other forms of internet access like mobile data.

Table 4.3: ICT Price Baskets (2021), % of GNI

	Mobile data and voice basket	Fixed-broadband basket	Data-only mobile-broadband basket
Afghanistan	21.5	15.2	12.1
Albania	3.5	1.5	2.2
Algeria	2.9	4.7	0.9
Azerbaijan	2.3	1.7	1.7
Bahrain	1.4	2.4	1.1
Bangladesh	2.0	2.0	1.4
Benin	14.7	26.1	6.5
Brunei DS	0.6	1.1	0.3
Burkina Faso	19.3	32.7	10.5
Cameroon	21.2	21.0	4.0
Chad	41.3		24.1
Comoros	14.3	29.6	7.9
Côte d'Ivoire	6.9	15.7	2.6
Djibouti	10.1	8.6	6.1
Egypt	1.9	3.0	1.1
Gabon	4.0	8.0	2.2
Gambia	25.4		12.2
Guinea	9.1	11.0	5.7
Guinea-Bissau	8.5	71.1	8.5
Guyana	5.7	6.1	4.0
Indonesia	2.5	7.6	0.9
Iraq	5.0		2.5
Jordan	4.2	11.0	3.7
Kazakhstan	1.4	0.8	0.9
Kuwait	0.8	1.6	0.5
Kyrgyzstan	2.8	3.6	2.8
Lebanon	11.1	1.9	6.3
Libya	6.2	4.5	3.6
Malaysia	1.3	2.3	1.0
Maldives	3.0	4.2	3.0
Mali	17.6	25.0	10.1
Mauritania	9.0	19.1	3.8
Morocco	2.3	4.2	1.3
Mozambique	19.9	35.8	11.9
Niger	38.4		15.3
Nigeria	3.9	21.5	2.0
Oman	1.8	3.5	1.2
Pakistan	4.4	15.7	0.6
Palestine	6.3	7.8	2.4
Qatar	0.4	2.2	0.4
Saudi Arabia	1.4	3.6	0.9
Senegal	5.7	18.5	2.9
Sierra Leone	39.9		14.4
Somalia	19.4	38.7	7.7
Sudan	2.2		3.4
Suriname	12.1	4.9	3.6
Tajikistan	5.5	7.0	7.5
Togo	27.5	56.8	11.4
Tunisia	1.8	3.1	1.2
Türkiye	0.7	1.5	0.7
Turkmenistan	2.4	4.7	5.1
Uganda	25.7		8.0
UAE	0.9	0.6	0.6
Uzbekistan	1.1	2.1	1.1
World	2.9	3.0	1.3

Source: ITU. Mobile data and voice basket includes high consumption basket of 140 min + 70 SMS + 2 GB. Fixed broadband basket includes 5GB internet. Data-only mobile-broadband basket includes 2GB internet

The relationship between individuals using the internet and foxed broadband subscriptions underscores the importance of both individual adoption and infrastructure development in a digital society. High levels of individuals using the internet indicate the prevalence of digital literacy and the relevance of online services in people's lives. Meanwhile, a robust network of fixed broadband subscriptions signifies a technologically advanced and connected environment, capable of supporting advanced digital applications. *Figure 4.14* shows that despite having similar shares of individuals using internet, fixed broadband subscriptions are at comparably lower levels in many OIC countries than in developed countries. This requires OIC countries to expand their infrastructure with a view to generating a thriving digital ecosystem that supports innovation, economic growth, and societal progress.

Affordability is a critical factor in impacting the decisions of both individuals and organizations in subscribing the better quality services. Lower ICT prices can encourage technology adoption, investment in digital infrastructure, and broader use of digital services. Affordable ICT products and services make digital resources more accessible, bridging the digital divide and promoting digital inclusion. They also affect business models and global competitiveness, as reduced costs can drive innovation and attract investment. Therefore, ICT prices play a crucial role in shaping the pace of digitalization and the extent to which individuals, businesses, and countries can harness the benefits of technology. *Table 4.3* compares three alternative price baskets comprising data and voice packages in OIC countries. Obtaining mobile data and voice basket that includes high consumption basket of 140 min + 70 SMS + 2 GB would require 41.3% of and individual income in Chad, 39.9% in Sierra Leone and 38.4% in Niger. In Guinea Bissau, a fixed broadband basket with 5GB internet would cost 71.1% of individual income. Data-only mobile packages cost relatively less, encouraging people to have access to the internet through mobile devices.

On another front, there is a need to acquire the necessary software to better make use of digital and technological tools. Software spending underpins the functioning of businesses, governments, and individuals, enabling efficiency, productivity, and innovation. Businesses rely on software for operations, analytics, and customer engagement, gaining a competitive edge and driving economic growth. Governments use software for improved service delivery and governance, enhancing transparency and citizen engagement. On an individual level, software supports education, communication, and access to essential services. Yet, OIC countries on average spend less than 0.2% of their income on software, whereas this share is mostly between 0.3% and 0.6% in developed countries (*Figure 4.15*).

Figure 4.15: Software Spending (% of GDP, 2021)

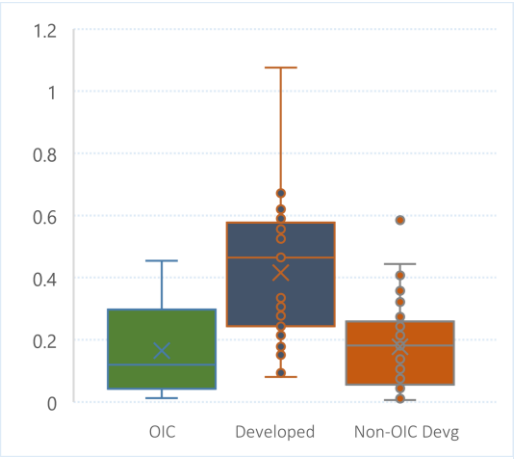
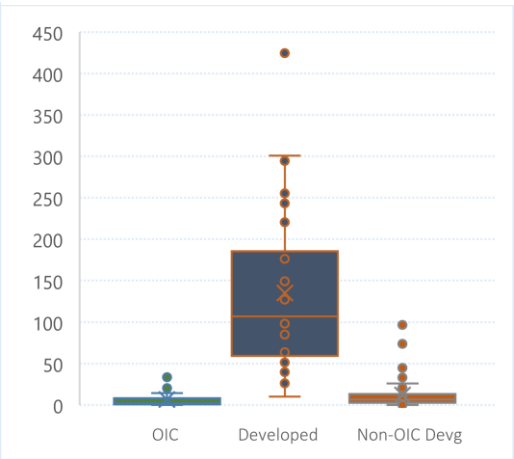


Figure 4.16: Generic Top-level Domains (TLDs), 2021 (per 1000 population at age 15–69)



Source: WIPO Global Innovation Index 2022.

Moreover, generic Top-level Domains (TLDs), such as .com, .org, and .net, are vital in the digital age as they provide unique online identities and help establish trust on the internet. These TLDs enable individuals, businesses, and organizations to create memorable web addresses that represent their brand or purpose. Having access to a variety of TLDs fosters online innovation, e-commerce, and digital entrepreneurship. For every 1000 people aged 15 to 69, there is a very limited number of TLDs in OIC counties, typically below 10, whereas this ratio is over 100 in many developed countries (*Figure 4.16*).

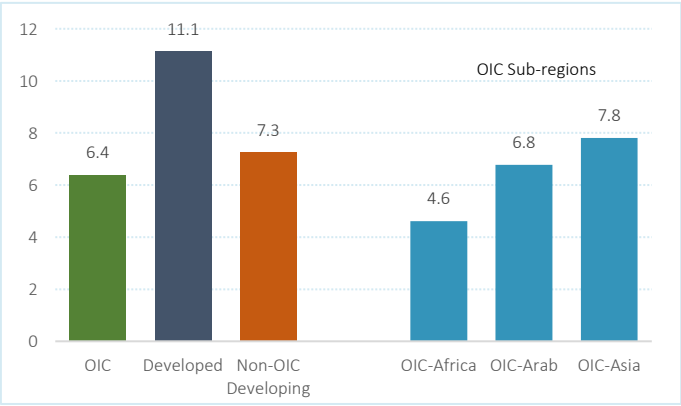
Facing with relatively higher ICT prices, lower software spending, limited broadband subscriptions, and lower availability of TLDs, it is crucial for OIC countries to recognize the urgent need for digital infrastructure development. High ICT costs and limited software access hinder economic growth and digital inclusion. Therefore, concerted efforts are needed to reduce ICT costs, increase investment in software and digital services, expand broadband access, and promote the availability of diverse TLDs. This requires collaborative public-private initiatives, policy reforms, and investments in digital infrastructure to bridge the digital divide, foster innovation, and unlock the full potential of the digital age for all.

4.3 Skills for Digital Transformation

There is an emerging challenge for all countries with the rise of digitalization and automation, which will have extensive impacts on many fronts, including the labour market. Because of changing production processes, demand for certain skills will increase, creating new occupations and rising wages for them, but some other skills and occupations will become redundant. This requires a solid understanding of the needs of the industries for future production processes and accordingly planning investments in the required skills to achieve industrial and economic development in the face of rising digitalization and automation.

As highlighted in SESRIC (2023), a majority of the working force in OIC countries is stuck in vulnerable jobs, but with the rise of manufacturing activities there are greater opportunities for decent jobs with more social security and more stable income flows. A typical feature of industrialization is that it enables resources to move from labour-intensive activities towards more capital and technology-intensive activities. To accelerate this process, OIC countries need to increase their absorptive capabilities to better utilize foreign technology by investing in education and skills. The availability of certain skill sets will encourage foreign

Figure 4.17: Learning Adjusted Years of Schooling (2020)

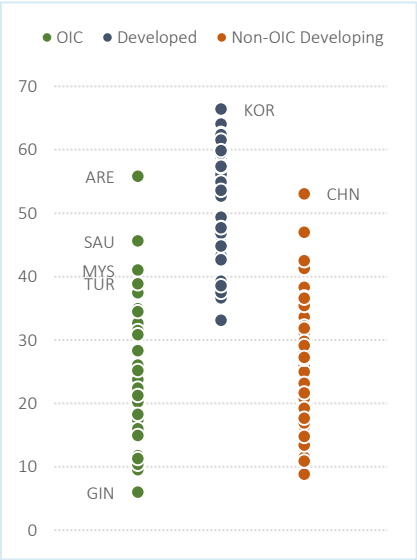


Source: World Development Indicators, World Bank. Simple averages of 49 OIC, 36 developed and 89 non-OIC developing countries.

investors to bring new investments to the country, which in turn helps to upgrade the technological intensity of local manufacturing and facilitates participation in regional and global value chains. Timely investments in skills also avoid skills mismatch, labour underutilization and unemployment.

A common indicator measuring the investment in skills is the learning adjusted years of schooling (LAYS). In the digital age, it is not enough to have more years of schooling; individuals need relevant, practical skills. Learning-adjusted years recognize the importance of adaptable, technology-focused curricula that prepare students for the demands of the digital workforce. These metrics drive educational institutions to produce graduates who can actively contribute to digital innovation and competitiveness, ultimately shaping the success of digital transformation efforts in a society. According to the latest data provided by the World Bank, the LAYS is 6.4, whereas this is 7.3 in non-OIC developing countries and 11.1 in developed countries (*Figure 4.17*). Within the OIC, Asian countries outperform African countries with average LAYS values of 7.8 and 4.6, respectively. Therefore, OIC countries need to invest in improving the quality of education to meet the skills requirement of the digital age.

Figure 4.18: Human Capital and Research for Innovation



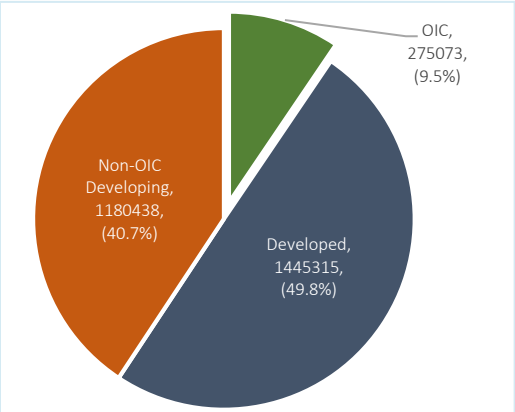
Source: WIPO Global Innovation Index 2022.

This lack of investment in quality education is reflected in the GII sub-index of human capital and research. United Arab Emirates, Saudi Arabia, Malaysia and Türkiye are relatively better performing countries in terms of human capital and research (*Figure 4.18*). Their performance is comparable to that of developed countries. Yet, the majority of OIC countries, lack sufficient expenditure on education, learning materials, and research and development.

As a result, OIC countries collectively account for only 9.5% of scientific and technical journal articles in the world (*Figure 4.19a*). China alone produces journal articles more than twice the articles produced by all OIC countries. Within the OIC, Iran, Türkiye, Indonesia, Malaysia and Egypt are the countries with the highest number of scientific journal articles, which collectively account for 63% of all journal articles produced by OIC countries (*Figure 4.19b*). A greater number of scientific academic journal articles reflect a society's commitment to research, innovation, and knowledge creation. It signifies a thriving academic and scientific community, often supported by robust educational and research institutions. OIC countries need to increase their research output to foster economic growth, technological advancements, and societal progress.

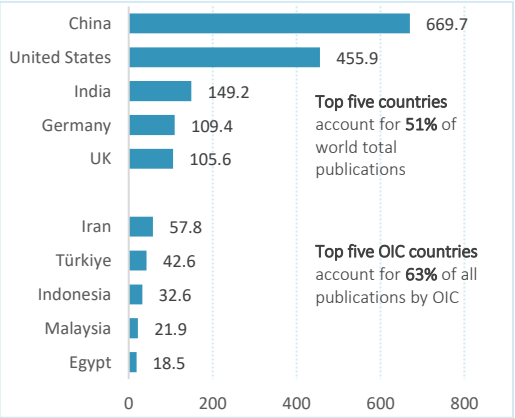
In the same line of reasoning, a higher number of patent applications signifies a culture of innovation, entrepreneurship, and competitiveness, as well as an environment where research and development thrive. Patent filings can also reflect a nation's economic potential, as they often lead to the creation of new industries, job opportunities, and economic growth. However,

Figure 4.19a: Scientific and Technical Journal Articles (by group, 2020)



Source: World Development Indicators, World Bank.

Figure 4.19b: Scientific and Technical Journal Articles (in thousands, 2020)

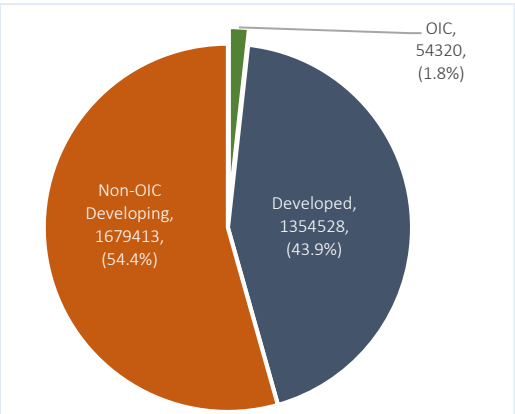


Source: World Development Indicators, World Bank.

OIC countries collectively account for only 1.8% of global patent applications, demonstrating the lack of skills and quality institutions to support innovation and technological development (*Figure 4.20a*). Globally, China takes the lead in patent applications, followed by the United States and Japan. Within the OIC, Iran, Indonesia, Türkiye, Malaysia and Saudi Arabia are the top countries in patent applications, collectively accounting for 71% of all patent applications in the OIC region (*Figure 4.20b*).

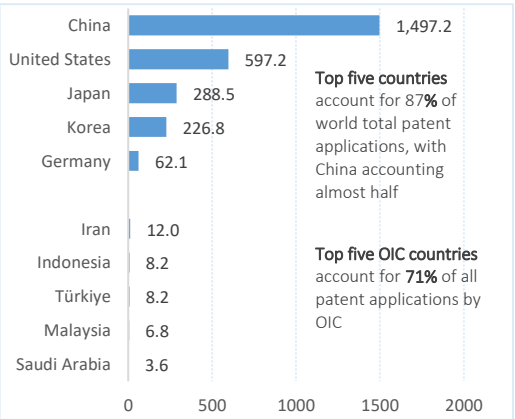
Overall, analyses in this section signal significant challenges for transforming economies, indicating collectively a lack of innovation capacity, which is critical in the digital age. Without skilled workers, innovative ideas, and investments in research and development, countries are likely to struggle to keep pace with technological advancements, hindering their ability to compete in the global digital economy. To adapt to digitalization successfully, OIC countries must

Figure 4.20a: Patent Applications, Residents and Non-residents (by group, 2020 or LYA)



Source: World Development Indicators, World Bank.

Figure 4.20b: Patent Applications, Residents and Non-residents (in thousands, 2020 or LYA)



Source: World Development Indicators, World Bank.

prioritize education, innovation, and technology investment to build the necessary foundations for economic transformation in the digital era.

4.4 Assessing the Preparedness for Industry 4.0

The above discussions highlight important opportunities as well as challenges for OIC countries in adapting to the changing nature of work in association with digitalization and automation. Significant disparities exist across OIC countries in terms of availability, accessibility, quality and reliability of digital infrastructure and services. There are OIC countries with well-advanced infrastructure and better readiness for future economic transformation, but on aggregate, OIC countries fall behind the world average performances in many indicators. This requires closer collaboration among OIC countries to facilitate knowledge sharing and capacity development.

In general, countries with robust manufacturing sectors embracing Industry 4.0 technologies are likely to see substantial productivity gains, while skilled workers stand better positioned for the transition, potentially mitigating labour market disruptions. Economies excelling in high-skill, technology-intensive exports and high-skill employment are poised to benefit initially, but the extent to which these technologies reduce or exacerbate global inequalities will hinge on factors like access to resources, adaptability, and investment in technology (UNCTAD, 2022). This requires policymakers to address disparities and facilitate a more equitable global transition to Industry 4.0.

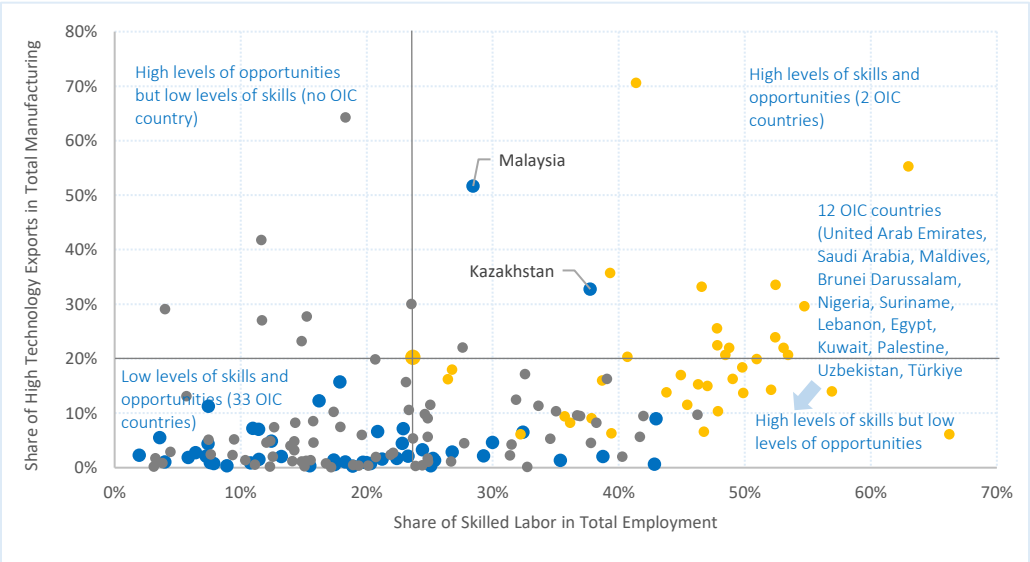
Figure 4.21 shows a simplified version of this analysis based on UNCTAD (2022), considering how countries perform in high-skill and technology-intensive manufacturing exports (as a share of total exports) and high-skill employment (as a share of the working population), thereby dividing countries into four groups. One group of economies, including two OIC countries (Kazakhstan and Malaysia) and many advanced economies in North America, Europe and South-East Asia, comprises economies with high levels of opportunity for the diffusion of industry 4.0 technologies, due to their specialization in high-skill and technology-intensive manufacturing, and with large shares of high-skill employment. These economies are more likely to benefit the most from industry 4.0 in manufacturing relative to their populations and exports.

A second group of economies, including, for example, China, India, Mexico, Thailand and Viet Nam, comprises economies with high levels of opportunity given their share of high-technology exports, but shares of high-skill employment that are below the global average, indicating that the lack of skills may be an obstacle in broadly diffusing industry 4.0 technologies in manufacturing. There is no OIC country classified under this category.

A third group of economies comprises economies with shares of high-skill employment that are above the global average, indicating the potential for workers to adapt to industry 4.0 in manufacturing, but low levels of opportunity in terms of firms in high-technology sectors. These economies may find it difficult to broaden the use of industry 4.0 technologies in manufacturing beyond the pockets of high-skill and technology-intensive manufacturing sectors. There are twelve OIC countries classified under this group including United Arab Emirates, Saudi Arabia,

Maldives, Brunei Darussalam, Nigeria, Suriname, Lebanon, Egypt, Kuwait, Palestine, Uzbekistan, and Türkiye, ranked according to the levels of high skilled labour shares.

Figure 4.21: Assessing the Preparedness for Industry 4.0: High Skilled Labour vs High-Tech Exports



Source: World Bank World Development Indicators and ILO Modelled Estimates. Concept adopted from UNCTAD (2022). Note: Blue dots represent OIC countries (n=47), orange dots developed countries (n=36) and gray dots non-OIC developing countries (n=77). Solid gray lines represent the global averages. Data are for 2021 or latest year available.

A fourth group of economies, including most OIC and non-OIC developing countries, comprises economies with shares under both indicators that are below global averages; they do not have many high-technology sectors in the economic structure nor many high-skill jobs, and the diffusion of industry 4.0 technologies could therefore be slower. The remaining 33 OIC countries are classified under this category, reflecting their lack of readiness for transforming economies in the face of rising digitalization and automation.

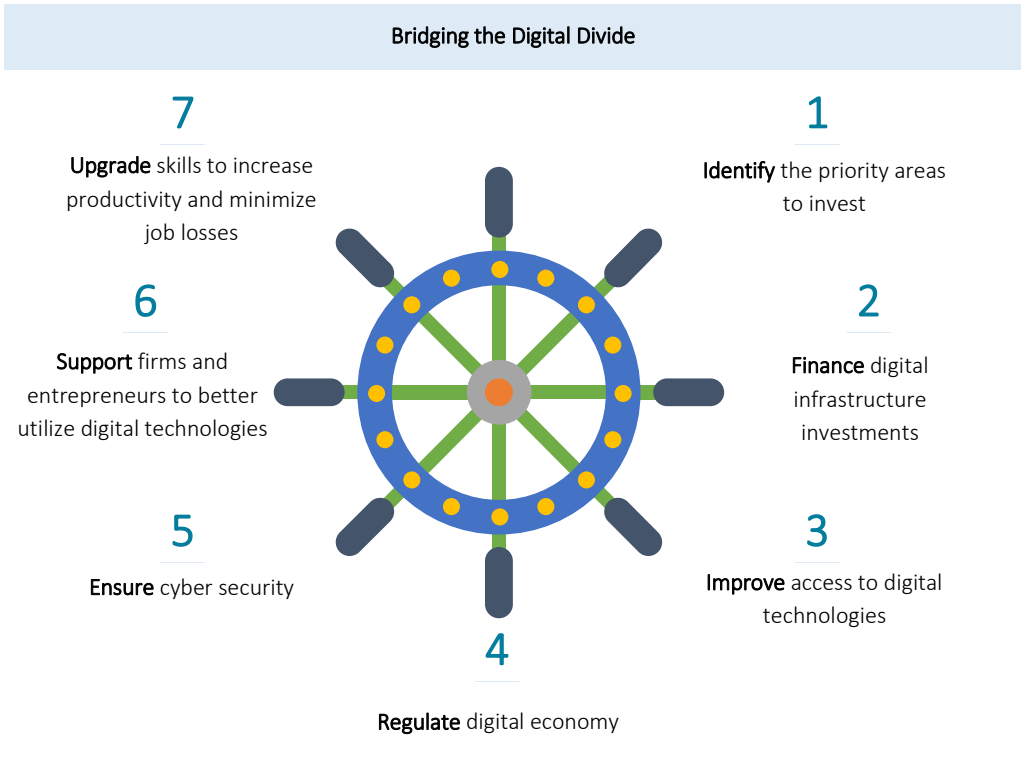
This preliminary analysis suggests that the initial diffusion of industry 4.0 technologies is more likely to widen inequalities between countries. To address this, policymakers should focus on several key policy options. First, they need to invest in digital infrastructure and provide incentives for technology adoption in underdeveloped regions. They also need to prioritize workforce training and education to ensure a skilled labour force capable of harnessing Industry 4.0 capabilities. Additionally, it is necessary to promote international collaboration and technology transfer to help less developed countries catch up. Finally, policies are needed to establish regulations that ensure responsible and equitable deployment of these technologies, preventing monopolies and exploitation while fostering fair competition. These policies can help mitigate the initial disparities and enable more balanced global benefits from Industry 4.0.

CHAPTER FIVE

Policy Options for Bridging the Digital Divide in OIC Countries

Bridging the digital divide in OIC countries involves a multifaceted approach that begins with assessing the current digital landscape, identifying priority areas, and engaging stakeholders to understand the specific challenges faced by underserved communities. This process encompasses addressing demographic and geographic disparities, boosting digital literacy, tackling socioeconomic factors hindering digital access, and ensuring adequate digital infrastructure. Moreover, it requires reforming regulatory and policy frameworks, focusing on educational and healthcare needs, considering economic opportunities, and actively involving the public in decision-making. Through a comprehensive, data-driven strategy and collaboration with public and private sectors, countries and regions can effectively prioritize and invest in initiatives aimed at reducing the digital divide, fostering inclusive digital development, and promoting equitable access to the benefits of the digital economy.

In this connection, this report offers a set of comprehensive policy options under seven steps, as demonstrated in the chart below, for OIC countries to adapt to the growing digitalization of economic activities and benefit from its mounting importance. This includes how to identify the priority areas to invest, how to finance the digital infrastructure investments, how to improve access to digital technologies, how to regulate the digital economy, how to ensure cyber security, how to support firms and entrepreneurs to better utilize digital technologies, and how to upgrade skills to increase productivity and minimize job losses.



STEP ONE – Identify the Priority Areas to Invest

The first step in bridging the digital divide is to identify the gaps and priority areas to invest. This requires a thorough assessment of the specific needs and challenges within a given country or region. A systematic approach would help policymakers to identify the areas to make interventions and bridge the gap. In this connection, the following actions are proposed:

- **Conduct a Digital Divide Assessment:** Start by conducting a comprehensive assessment of the current state of digital access and inclusion in the country or region. This should include data on internet penetration rates, digital literacy levels, and the availability of digital infrastructure in urban and rural areas.
- **Engage Stakeholders:** Involve key stakeholders, including government agencies, local communities, non-governmental organizations, and technology providers, in the assessment process. Their insights and expertise can provide a more holistic view of the digital divide. Also, conduct public consultations and surveys to gather input from citizens and communities about their digital needs and priorities.
- **Analyse Demographics and Geographic Disparities:** Analyse demographic data to identify vulnerable populations, such as low-income households and people with disabilities. Understand their specific digital needs and barriers. Examine geographic disparities to determine which regions or areas lack adequate digital infrastructure and access.
- **Assess Digital Literacy and Skills Gaps:** Evaluate the digital literacy levels of the population. Identify gaps in digital skills and knowledge that need to be addressed through training and education programs (more specific policy options are provided in step 7).
- **Consider Socioeconomic Factors:** Analyse socioeconomic factors that contribute to the digital divide, such as income inequality, employment opportunities, and access to education and healthcare. Prioritize areas where these factors intersect with limited digital access.
- **Examine Educational and Healthcare Needs:** Assess the impact of the digital divide on education and healthcare. Prioritize areas where lack of access hinders online learning and access to critical services.
- **Evaluate Infrastructure Gaps:** Identify areas with inadequate digital infrastructure, including regions lacking reliable broadband internet connectivity or access to electricity.
- **Understand Regulatory and Policy Challenges:** Analyse existing regulatory and policy frameworks related to digital access and inclusion. Identify any regulatory barriers that hinder investment and expansion of digital infrastructure (more specific policy options are provided in step 4).

- **Consider Economic Opportunities:** Assess the potential economic benefits of bridging the digital divide. Prioritize areas where digital inclusion can stimulate economic growth and job creation.
- **Assess Cybersecurity and Data Privacy Needs:** Consider the cybersecurity and data privacy implications of expanding digital access. Prioritize areas where these concerns need to be addressed (more specific policy options are provided in step 5).
- **Prioritize Based on Impact and Feasibility:** Evaluate the potential impact of investments in different areas. Prioritize projects that have the greatest potential to reduce the digital divide and improve overall quality of life. Consider the feasibility of implementation, including cost-effectiveness, available resources, and technical feasibility.
- **Develop a Comprehensive Digital Inclusion Strategy:** Based on the assessment, create a comprehensive digital inclusion strategy that outlines specific initiatives, targets, and timelines for bridging the digital divide in priority areas. Continuously monitor the progress of digital inclusion initiatives and make adjustments as needed based on ongoing assessments and feedback.

Tracking these steps and taking a data-driven approach would help to identify the priority areas where investments will have the most significant impact on bridging the digital divide and fostering inclusive digital development.

STEP TWO – Seek Alternative Options to Finance Digital Infrastructure Investments

After identifying the priority areas and preparing a comprehensive strategy to address the digital divide, it is important to identify potential funding sources, including government budgets, international aid, private sector investments, and public-private partnerships, to support digital divide reduction efforts and enable economies to adapt to rising digitalization. The followings are a set of traditional as well as innovative options to finance digital infrastructure investments:

- **Government Budgets:** Allocate a portion of the national budget to fund digital inclusion initiatives. Prioritize these initiatives as part of the country's development agenda.
- **Public-Private Partnerships (P-PPs):** Collaborate with private sector companies to co-finance and implement digital infrastructure projects. P-PPs can leverage private sector expertise and resources while sharing risks.
- **International Aid and Grants:** Seek financial support from international organizations, development banks, donor countries, and philanthropic organizations that support initiatives related to digital inclusion, education, and economic development.
- **Development Loans:** Secure low-interest loans or grants from international financial institutions, such as the World Bank, Islamic Development Bank or other regional development banks, for digital infrastructure projects.
- **Tax Incentives and Subsidies:** Offer tax incentives to private companies investing in digital infrastructure or providing affordable digital services in underserved areas. Also,

subsidize the cost of digital devices and internet connectivity for low-income households.

- **Digital Impact Bonds:** Explore the possibility of issuing digital impact bonds, where investors provide upfront funding for digital projects, and returns are based on the project's success in achieving specific social and economic outcomes.
- **Technology Funds and Venture Capital:** Establish technology funds or encourage venture capital firms to invest in startups and innovative digital projects that can contribute to digital inclusion and economic growth.
- **Crowdfunding and Community Financing:** Encourage crowdfunding campaigns and community-driven initiatives to raise funds for local digital infrastructure projects.
- **Earmarked Taxes or Levies:** Consider imposing small taxes or levies on digital services or transactions to generate funds specifically designated for digital inclusion initiatives.
- **Digital Ecosystem Support:** Create an enabling environment for the growth of digital industries (e.g., e-commerce, IT services) to generate economic value that can support digital inclusion efforts through increased tax revenue.
- **Revenue-Sharing Models:** Negotiate revenue-sharing agreements with telecom operators or digital service providers to allocate a portion of their earnings towards digital inclusion projects.
- **Other Innovative Financing Models:** Explore other innovative financing models, such as blockchain-based financing or social impact bonds, to attract investment for digital inclusion projects.

Benefiting from these financing sources and mechanisms can enable to access the necessary resources to invest in priority areas for bridging the digital divide and facilitating economic adaptation to digitalization. It is essential to implement policy reforms to create a favourable regulatory environment that attracts private sector investment in digital infrastructure and services. Engaging in public awareness campaigns to highlight the importance of digital inclusion may also encourage public and private sector contributions. To achieve the objectives, it is also critical to ensure transparent and accountable use of funds through effective monitoring and evaluation mechanisms to track the impact and effectiveness of digital inclusion investments.

STEP THREE – Improve Access to Digital Technologies

While developing digital infrastructure is crucial, it is also imperative to ensure that all population have access to these technologies. Improving access to digital technologies requires a multi-pronged approach that addresses infrastructure, affordability, digital literacy, and inclusion. Some policy options are the following:

- **Affordable Data Plans and Tools:** Work with telecom providers to offer affordable data plans and packages, especially for low-income individuals and families. Implement also programs that subsidize the cost of digital devices like smartphones, tablets, and computers for low-income populations.

- **Digital Literacy Programs:** Develop comprehensive digital literacy and skills training programs for all age groups, emphasizing basic digital skills as well as advanced skills for employment. Integrate digital literacy into formal education curricula.
- **Broadband Infrastructure:** Invest in building and upgrading broadband networks, especially in underserved and rural areas. Promote the deployment of high-speed internet technologies like fiber-optic cables.
- **Mobile Connectivity:** Extend mobile network coverage to remote and rural regions. Encourage the development of affordable, low-cost smartphones to facilitate internet access.
- **Online Government Services:** Offer essential government services online, such as healthcare, education, and public welfare programs. Implement user-friendly e-government platforms for easy access to services.
- **SMEs:** Encourage digital adoption of SMEs by supporting them through subsidies and incentives. Promote digital ecosystems and industries that can generate economic value and create an environment where firms can readily access and utilize digital technologies to drive economic growth and competitiveness.
- **Competition:** Implement policies that promote competition among internet service providers to reduce costs and improve service quality.
- **Internet Access in Public Spaces:** Establish public Wi-Fi hotspots in urban areas and major public spaces, preferably free. Set up also community internet access centres equipped with computers and internet connections, particularly in underserved areas. Ensure these centres provide digital literacy training and support services.
- **Digital Inclusion Vouchers:** Provide digital inclusion vouchers or subsidies to help low-income households cover the costs of internet access, devices, and digital skills training.
- **Inclusive Content Development:** Encourage the creation of digital content and services that cater to diverse linguistic and cultural needs. Promote content that addresses local challenges and enhances digital engagement.
- **Assistive Technologies:** Ensure digital technologies are accessible to people with disabilities by incorporating accessibility features and standards, and promote the use of assistive technologies and software.

Improving access to digital technologies is a long-term effort that requires coordination among governments, private sector stakeholders, civil society, and international organizations. It is essential to address both the supply and demand sides of digital access, ensuring that people not only have access to technology but also the skills and resources to use it effectively. In this process, it is beneficial to establish metrics to monitor progress in improving access and regularly evaluate the impact of digital inclusion initiatives, and adjust strategies based on data and feedback.

STEP FOUR – Regulate Digital Economy

While implementing policies to improve access to digital technologies, governments should create a regulatory framework to manage digital transformation. Regulating the digital economy is a complex and evolving task that involves balancing innovation and economic growth with the protection of consumers, privacy, competition, and security. To begin with, it is essential to gain a deep understanding of the digital economy, including the various sectors and technologies involved, such as e-commerce, fintech, artificial intelligence, and data analytics. Following are some key considerations and strategies for regulating the digital economy:

- **Legal Frameworks:** Establish clear and comprehensive legal frameworks that address issues specific to the digital economy, including data privacy, cybersecurity, intellectual property, and online commerce. Ensure that regulations are technology-neutral and adaptable to rapid technological advancements.
- **Data Privacy and Protection:** Enact data protection laws that safeguard individuals' privacy and give them control over their personal data. Establish mechanisms for data breach notification and penalties for non-compliance.
- **Cybersecurity Regulations:** Implement cybersecurity regulations and standards to protect critical infrastructure and digital assets from cyber threats. Promote best practices for cybersecurity across industries.
- **Antitrust and Competition Regulation:** Monitor and regulate digital platforms and tech giants to prevent monopolistic practices, anti-competitive behavior, and unfair market dominance. Encourage competition and innovation in the digital marketplace.
- **Consumer Protection:** Develop consumer protection laws and regulations that address issues such as fraudulent online activities, digital product safety, and transparent pricing. Ensure platforms have mechanisms for dispute resolution and customer support.
- **Taxation and Revenue Collection:** Create a fair and effective tax framework for digital businesses to ensure they contribute to public revenues. Consider digital sales taxes or value-added taxes on digital goods and services.
- **Cross-Border Data Flow:** Establish rules and agreements for cross-border data flow while balancing privacy and security concerns. Promote international data transfer mechanisms like Standard Contractual Clauses or Binding Corporate Rules of the EU.
- **Intellectual Property Rights:** Strengthen intellectual property protection for digital innovations and content. Develop mechanisms to address copyright infringement, piracy, and counterfeiting online.
- **Regulate Platform Liability:** Define the liability and responsibility of online platforms for user-generated content. Consider intermediary liability protections that strike a balance between freedom of expression and content moderation.

- **Digital ID and Authentication:** Develop secure digital identity and authentication systems to combat online fraud and enhance digital trust. Ensure user consent and data protection in digital ID systems.
- **Regulate Emerging Technologies:** Establish guidelines and regulations for emerging technologies like artificial intelligence, blockchain, and biotechnology. Encourage responsible and ethical development and use of these technologies.
- **Transparency and Accountability:** Promote transparency in digital algorithms and decision-making processes, especially in areas like credit scoring, hiring, and content curation. Hold digital companies accountable for algorithmic bias and discriminatory practices.
- **International Collaboration:** Collaborate with other OIC as well as non-OIC countries and international organizations to develop common standards and regulations for the digital economy. Address cross-border issues, such as cybercrime and data sharing, through regional and international agreements and treaties.
- **Enforcement and Compliance:** Establish effective enforcement mechanisms and penalties for non-compliance with digital regulations. Invest in regulatory agencies' capabilities to monitor and enforce regulations effectively.

Regulating the digital economy is a constant process requiring flexibility, adaptability, and a deep understanding of the evolving technological landscape. It is important to recognize that regulations in the digital economy must evolve to keep pace with technological advancements. Striking the right balance between fostering innovation and protecting the interests of society is crucial for effective digital regulation. Governments should also involve industry experts, civil society, and academia in the regulatory process to ensure a balanced and informed approach.

STEP FIVE – Ensure Cyber Security

Ensuring cybersecurity and data privacy is essential in the digital age to protect individuals, organizations, and nations from cyber threats and data breaches. It ensures the confidentiality, integrity, and availability of information, protecting individuals, organizations, and nations from financial losses, reputation damage, and potential harm to critical infrastructure. Here are steps and best practices to help achieve this:

- **National Cybersecurity Strategy:** Develop a comprehensive national cybersecurity strategy that outlines objectives, policies, and responsibilities for cybersecurity. Continuously assess and improve cybersecurity policies and measures based on evolving threats and technologies.
- **Cybersecurity Laws and Regulations:** Enact and enforce cybersecurity laws and regulations that set standards for data protection, incident reporting, and critical infrastructure security. Enforce strict penalties for cybercriminals to deter malicious activities. Enforce data protection laws that require organizations to secure and protect personal and sensitive data.

- **Cybersecurity Agency:** Establish a dedicated national cybersecurity agency or authority responsible for coordinating cybersecurity efforts, incident response, and public awareness.
- **Secure Government Systems:** Strengthen the cybersecurity of government systems, including e-government platforms and digital services. Conduct regular cybersecurity audits and assessments of government and critical infrastructure systems.
- **Capacity Building:** Invest in cybersecurity research and development to stay ahead of evolving cyber threats. Invest also in cybersecurity education and training programs for professionals, law enforcement, and the public to enhance cybersecurity skills and awareness.
- **Critical Infrastructure Protection:** Identify and protect critical infrastructure assets, such as power grids, financial systems, and healthcare networks, from cyber threats. Develop and regularly test a national incident response plan to ensure a swift and coordinated response to cyber incidents.
- **Secure Digital Identity:** Develop secure digital identity systems to reduce identity theft and fraud. Encourage businesses to invest in cyber insurance to mitigate financial losses from cyber incidents.
- **Awareness Campaigns:** Launch public awareness campaigns to educate citizens and businesses about cybersecurity best practices and emerging threats. Promote good practices among citizens and businesses to prevent common cyber threats like phishing and malware.
- **International Cooperation:** Collaborate with other OIC countries and international partners on cybersecurity initiatives, sharing threat intelligence and cooperating on cybercrime investigations.

Consideration of these measures can help countries to establish a strong foundation for cybersecurity, allowing them to confidently engage in the digital economy and protect their digital infrastructure and assets from cyber threats. Building a culture of security and privacy awareness can be as important as implementing technical safeguards. In this process, collaboration government and the private sector to share threat intelligence, best practices, and resources can be critical.

STEP SIX – Support Firms and Entrepreneurs to Innovate and Better Utilize Digital Technologies

An integral part of digital transformation is innovation and effective participation of the private sector in this process. Supporting firms and entrepreneurs to innovate and better utilize digital technologies is crucial for integrating into global economies and achieving a competitive economy. Below are several strategies and initiatives that can be employed to encourage and facilitate innovation in the digital space:

- **Innovation Ecosystems:** Foster collaboration between startups, established firms, universities, research institutions, and government agencies to create dynamic

innovation ecosystems. Develop physical spaces, such as innovation hubs and technology parks, where entrepreneurs can work, collaborate, and access resources.

- **Incubators and Accelerators:** Establish and support incubators and accelerators that provide mentorship, resources, and funding to startups and entrepreneurs working on digital innovations and emerging technologies. Strengthen intellectual property protection to incentivize innovation and protect the rights of digital entrepreneurs and firms.
- **Access to Capital:** Ensure that startups and SMEs have access to various sources of capital, including venture capital, angel investors, and crowdfunding platforms. Provide grants, subsidies, and tax incentives for R&D activities focused on emerging technologies and solutions.
- **Export and Trade Promotion:** Support startups and firms in expanding their digital products and services to international markets through trade missions and export promotion initiatives. Support market research and analysis to help firms identify emerging trends and opportunities in the area of digital transformation of businesses and production processes.
- **Industry-Specific Initiatives:** Tailor support programs to specific industries with high potential for digital innovation, such as healthcare, agriculture, or fintech. Promote data sharing and access policies that enable firms, especially startups, to leverage data for innovation while ensuring data privacy and security.
- **Regulatory Sandboxes:** Create regulatory sandboxes that allow startups and entrepreneurs to test new digital products and services with some regulatory leniency, fostering innovation while maintaining consumer protection.
- **Public Procurement Initiatives:** Encourage public-sector organizations to procure digital solutions from startups and innovative firms, providing them with a valuable reference and initial revenue. Give preference to local startups and innovative firms when awarding government contracts, stimulating local innovation.
- **Digital Skills Training:** Offer training programs and educational resources to help entrepreneurs and employees acquire the digital skills needed for innovation and competitiveness.
- **Support for Digital Infrastructure:** Invest in digital infrastructure, such as high-speed broadband and cloud computing services, to provide the necessary foundation for digital innovation.
- **Impact Investment and Social Entrepreneurship:** Encourage impact investors to fund social entrepreneurs and firms that address critical societal challenges through digital solutions.

In an increasingly digitized world, fostering innovation not only drives economic prosperity but also ensures a country's resilience and relevance in the face of rapid technological change,

ultimately improving the quality of life for its citizens. By creating a supportive ecosystem, governments can empower firms and entrepreneurs to innovate and harness the full potential of emerging technologies for economic growth and social progress.

STEP SEVEN – Upgrade Skills to Increase Productivity and Minimize Job Losses

Benefiting from rising digitalization and advanced robotics requires implementing effective policies to upgrade skills and boost productivity while minimizing job losses. This is crucial for economies to gain and maintain competitiveness in certain technologies and avoid widespread erosion and disruption of productive capacities. Here are some key policy measures that governments can adopt to this end:

- **Skills Assessment and Gap Analysis:** Conduct regular skills assessments and gap analyses to identify the specific skill shortages and surpluses within the labour market. This informs targeted skill development efforts.
- **Investment in Education and Training:** Increase funding for education and vocational training institutions to improve the quality and accessibility of learning opportunities. Promote STEM (Science, Technology, Engineering, and Mathematics) education to meet the demands of emerging industries.
- **Subsidized Training Programs:** Offer subsidies or financial incentives to individuals and businesses for participation in skill development and training programs. Also, encourage the participation of individuals in the Massive Open Online Courses (MOOCs) to acquire new skills.
- **Recognition of Prior Learning:** Establish mechanisms to formally recognize and credit prior work experience and skills gained through informal learning.
- **Skills for Emerging Technologies:** Prioritize training and education in emerging technologies like artificial intelligence, cybersecurity, and data analytics to prepare the workforce for the jobs of the future. Establish industry-specific skill councils or advisory boards to identify skill needs, develop standards, and guide training programs. Then, tailor training programs to specific industry sectors and local economic needs, ensuring that skills are relevant and in demand.
- **Apprenticeship, Certification and Credentialing:** Promote apprenticeship and internship programs, providing practical training opportunities in collaboration with employers. Develop and promote industry-recognized certifications and credentials to validate and standardize skills. Encourage individuals to pursue relevant certifications and credentials to enhance their employability.
- **Income Support and Tax Incentives:** Consider providing financial support or wage replacement for individuals participating in training programs, especially for those who face job displacement. Strengthen social safety nets to provide income support during job loss and career transitions, reducing the fear of skill development. Offer tax

incentives to businesses that invest in employee training and skill development programs.

- **Labour Market Information and Job Counselling Services:** Support individuals to determine the skills that are most relevant to their current job and industry. Provide accessible and up-to-date labour market information to help individuals make informed decisions about skill development and career choices. Offer job placement assistance and career counselling services to support individuals in their transition to new employment opportunities.
- **Lifelong Learning Culture:** Encourage a culture of lifelong learning, with policies that promote continuous skill development and retraining throughout one's career. Launch digital literacy campaigns and initiatives to ensure that citizens have the basic digital skills required for modern jobs.

Effective skill development policies require careful planning, collaboration with stakeholders, and the flexibility to adapt to evolving economic conditions. Therefore, fostering collaboration between government, educational institutions, and private sector employers is essential while designing and implementing skill development programs aligned with industry needs. A well-designed and executed skill development strategy can not only enhance productivity but also reduce the negative impacts of job losses during economic shifts. In this process, it is critical to regularly evaluate the effectiveness of skill development policies and programs and make necessary adjustments based on outcomes and feedback.

Annex: Country Classifications

A. Major Country Groups used in the Report

OIC Countries (57)*

Code	Name	Code	Name	Code	Name
AFG	Afghanistan	GUY	Guyana	PAK	Pakistan
ALB	Albania	IDN	Indonesia	PSE	Palestine
DZA	Algeria	IRN	Iran	QAT	Qatar
AZE	Azerbaijan	IRQ	Iraq	SAU	Saudi Arabia
BHR	Bahrain	JOR	Jordan	SEN	Senegal
BGD	Bangladesh	KAZ	Kazakhstan	SLE	Sierra Leone
BEN	Benin	KWT	Kuwait	SOM	Somalia
BRN	Brunei Darussalam	KGZ	Kyrgyz Republic	SDN	Sudan
BFA	Burkina Faso	LBN	Lebanon	SUR	Suriname
CMR	Cameroon	LBY	Libya	SYR	Syria*
TCD	Chad	MYS	Malaysia	TJK	Tajikistan
COM	Comoros	MDV	Maldives	TGO	Togo
CIV	Cote d'Ivoire	MLI	Mali	TUN	Tunisia
DJI	Djibouti	MRT	Mauritania	TUR	Türkiye
EGY	Egypt	MAR	Morocco	TKM	Turkmenistan
GAB	Gabon	MOZ	Mozambique	UGA	Uganda
GMB	Gambia	NER	Niger	ARE	United Arab Emirates
GIN	Guinea	NGA	Nigeria	UZB	Uzbekistan
GNB	Guinea-Bissau	OMN	Oman	YEM	Yemen

* Membership of Syria to the OIC is currently suspended.

Developed Countries* (41)

Andorra	France	Lithuania	Slovak Republic
Australia	Germany	Luxembourg	Slovenia
Austria	Greece	Macao SAR	Spain
Belgium	Hong Kong SAR	Malta	Sweden
Canada	Iceland	Netherlands	Switzerland
Croatia	Ireland	New Zealand	Taiwan Province of China
Cyprus	Israel	Norway	United Kingdom
Czech Republic	Italy	Portugal	United States
Denmark	Japan	Puerto Rico	
Estonia	Korea	San Marino	
Finland	Latvia	Singapore	

* Refers to "advanced economies" as classified by the IMF. Last update April 2023.

Developing Countries

Includes all countries other than those classified as developed countries.

B. Geographical Classification of OIC Countries

High Income* (8)

Bahrain	Guyana	Oman	Saudi Arabia
Brunei Darussalam	Kuwait	Qatar	United Arab Emirates

Upper Middle Income* (13)

Albania	Iraq	Maldives	Palestine
Azerbaijan	Kazakhstan	Suriname	
Gabon	Libya	Türkiye	
Indonesia	Malaysia	Turkmenistan	

Lower Middle Income* (21)

Algeria	Djibouti	Lebanon	Tajikistan
Bangladesh	Egypt	Mauritania	Tunisia
Benin	Guinea	Morocco	Uzbekistan
Cameroon	Iran	Nigeria	
Comoros	Jordan	Pakistan	
Côte d'Ivoire	Kyrgyz Republic	Senegal	

Low Income* (15)**

Afghanistan	Guinea-Bissau	Sierra Leone	Togo
Burkina Faso	Mali	Somalia	Uganda
Chad	Mozambique	Sudan	Yemen
Gambia	Niger	Syria**	

* Country grouping by income level is based on World Bank classification by GNI per capita in 2022. Accordingly;

- Low-income countries: with a GNI per capita of $1,135 or less,
- Lower middle-income countries: with a GNI per capita between $1,136 and $4,465,
- Upper middle-income countries: with a GNI per capita between $4,466 and $13,845, and
- High-income countries: with a GNI per capita of $13,846 or more.

** Membership of Syria to the OIC is currently suspended.

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Footnotes

[1] Excluding the financial centres in the Caribbean.
[2] A high employment-to-population ratio means that a large proportion of a country's working age population is employed, while a low ratio means that a large share of the population is not involved directly in market-related activities, because they are either unemployed or out of the labour force altogether.
[3] A form of FDI where a parent company starts a new venture in a foreign country by constructing new operational facilities from the ground up instead of buying an existing facility in that country. These investment types are crucial for the development of productive capacity and infrastructure and for the prospects for a sustainable recovery (UNCTAD, 2021).
[4] Total reserves comprise holdings of monetary gold, special drawing rights (SDRs), reserves of IMF members held by the IMF (reserve position in the IMF), and holdings of foreign exchange under the control of monetary authorities.
[5] A traditional indicator of reserve adequacy that shows the number of months a country can continue to support its current level of imports if all other inflows and outflows cease.
[6] Mozambique, Pakistan, Bangladesh, Morocco, Nigeria, Indonesia, Albania, and Malaysia.
[7] Maldives, Uzbekistan, Palestine, Saudi Arabia, Türkiye, Qatar, Kazakhstan, Kuwait, and Azerbaijan.
[8] The share of OIC countries in world total ODA flows (including those reported at country and regional levels as well as unspecified flows) was 38.4% as of 2021, compared with 38.1% in 2020.
[9] https://www.fortunebusinessinsights.com/military-drone-market-102181
[10] https://www.aa.com.tr/en/economy/turkish-drone-maker-baykar-exports-bayraktar-tb2-to-28-countries/2791055
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