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DIGITALISE TO INDUSTRIALISE

Egypt, Morocco, Tunisia, and the Africa–Europe Partnership

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7.1 Introduction

Since the mid-2010s, North African countries have been pursuing what some observers have called a "return to Africa" (Dworkin, 2020). Egypt, Morocco, and Tunisia have attempted to position themselves as major components of Europe-Mediterranean-Africa infrastructure and supply chains corridors (Tanchum, 2020). The three countries are trying to act as bridges between Africa and Europe amid discussions on the evolution of the partnership between the African Union (AU) and the European Union (EU). These efforts have taken place in a global context marked by a "rebirth of industrial policy" (Aiginger & Rodrik, 2020). Discussions around industrial policy, nearshoring, and reshoring have intensified as a result of the COVID-19 pandemic, which is presented as not only an economic challenge, but also as an opportunity for industrialisation on both sides of the Mediterranean.

In recent years, the official agendas of the AU and the EU have prioritised digital, innovation, and industrialisation – as both continents focus on deepening economic progress. Against this backdrop, Egypt, Morocco, and Tunisia have attempted, with varying levels of success, to refine their digital ecosystems, innovation policies, and industrial strategies. In particular, the digitalisation of the manufacturing sector and Industry 4.0 (I4.0) increasingly appears in official discourses. The digital revolution is indeed bringing fresh transformations and challenges to the industrial sector with the emergence of new transformative technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), robotics, and additive manufacturing (3D printing). Manufacturing processes and the organisation of production, notably within Global Value Chains (GVCs), are already experiencing changes. For example, digitalisation has increased both the participation of small and medium enterprises (SMEs) in

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GVCs (Lanz et al., 2018) and the share of services embodied in manufactured goods (Görlich, 2021).

In light of strong competition from Asia and the probable further concentration of industrial production that the Fourth Industrial Revolution (4IR) could bring (Schwab, 2016); the digital revolution constitutes both an opportunity and a potential threat for Egypt, Morocco, and Tunisia. Digitalisation can help industries increase their productivity and better respond to emerging trends and clients' needs through the improvement of their own processes. If North African industries reach higher degrees of digitalisation, they can strengthen their competitiveness and the favourable position they already enjoy for exporting and value chains participation in view of their geographic proximity to the EU market and manufacturing fabric.

Digital matters are one of the five key partnership areas proposed in the EU's Comprehensive Strategy with Africa (EC, 2020). Nevertheless, the fact that the AU–EU Digital Economy Task Force barely mentions manufacturing as an area of potential collaboration (EU–AU DETF, 2019) shows that the focus on the intersection between digitalisation and the manufacturing sector is still minimal in Union-to-Union digital-related discussions. The AU's Digital Transformation Strategy for Africa 2020–2030 (DTS) provides greater emphasis on topics such as the 4IR, 3D printing, and AI (AU, 2020).

In this chapter, we argue that the digitalisation of the manufacturing sector should be further prioritised both within Egypt, Morocco, and Tunisia and in discussions between the EU and its African partners. Industrialisation – which is the avenue favoured by the three North African nations to ensure structural transformation – should be supported by smart digital and industrial policies. To this end, there is a need for a greater emphasis on the digital sector. An industrial policy can be defined as "any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity towards sectors, technologies or tasks" (Warwick, 2013). Across the world, such policies now need to be refined to embrace the challenges brought by new technologies. Policies should encourage further digitalisation of the industrial private sector. EU support to its Southern Neighbourhood's manufacturing sector has already materialised in the past, but should be deepened, expanded, and refined, particularly when it comes to digitalisation. On the African level and in the framework of the AU–EU partnership, we advocate stronger synergies between the various levels of engagement to support the establishment and reinforcement of Regional Value Chains (RVCs).

First, we assess the current levels of industrialisation in Egypt, Morocco, and Tunisia as well as the policies these countries have implemented in relation to industrialisation. This is required to understand how digitalisation can help consolidate the existing capabilities accumulated in the three countries.

Second, we evaluate the current levels of digitalisation in Egypt, Morocco, and Tunisia, and critically review the digital strategies that the three countries

have implemented during the past two decades. This enables us to establish on what ground we can build further policies.

Third, we examine initiatives in Egypt, Morocco, and Tunisia that relate to the digitalisation of their industry and I4.0. Many of these initiatives are still in their infancy but should be encouraged going forward.

Fourth, we explore ways that Egypt, Morocco, and Tunisia can strengthen their integration into the European industrial fabric, which could go through a better inclusion in European initiatives, programmes, and strategies that relate to infrastructure, manufacturing, and research and innovation (R&I). The digitalisation of North African industries can play a part in realising this objective.

7.2 Digitalise to Industrialise in Egypt, Morocco, and Tunisia

Awareness of the necessity to adapt to the transformations of industry, notably those caused by the digitalisation of production, has been increasing during the past three decades in Egypt, Morocco, and Tunisia. It has been further boosted during the past decade by the roles that digital technologies are playing in the global economy and, more recently, by the COVID-19 pandemic. Foreign direct investment (FDI) from, and exports to the EU, coupled with adequate industrial policies focusing on upgrading the processes of industrial companies, have helped the three countries boost their manufacturing fabric. Manufacturing is thus a key component of trade between the three North African nations and the EU. Nevertheless, incentives for industrial companies to upgrade their use of digital tools have borne limited results, and the lack of adoption of such tools could constitute a potential threat to their manufacturing sector as a whole.

Industrialisation has been a priority in Egypt, Morocco, and Tunisia since the three countries fully reclaimed their sovereignty in the 1950s, and the trade relationship with Europe was key to the industrial development of the three countries. The 1990s and 2000s marked a turning point in the intensification of industrial relations between North Africa and Europe. Two factors help explain this. First, in the wake of a global outsourcing movement, FDI from industrial economies to developing countries increased. This increase was notably made possible by the emergence of new Information and Communication Technologies (ICTs). Second, free trade agreements (FTAs) between Egypt, Morocco, Tunisia, and the EU gradually entered into force. These FTAs, which came with Association Agreements (AAs), sought to remove tariffs on industrial products. Entering into force between 1998 and 2004, the AAs pushed Egypt, Morocco, and Tunisia to enact more refined industrial strategies and pursue upgrading efforts for their production. The countries reacted by protecting their industrial fabric from European competition. They sought to help businesses take advantage of the opening of European markets and attract FDI (Bianchi et al., 2018). Consequently, from the 1990s onwards, the three countries launched a new generation of industrial strategies.

One of the priorities of these renewed strategies has been to upgrade the manufacturing fabric, notably in terms of adoption of digital technologies. This was demonstrated by the launching of the Tunisian upgrading programme (or PMN) in 1995 and of the Industrial Modernisation Centre (IMC) in 2000 in Egypt. Both instruments have included a focus on the digitalisation of manufacturing companies. Similarly, in Morocco, the National Pact for Industrial Emergence (2009–2014), an industrial strategy, created "Moussanada TI", a programme aimed at boosting the adoption of information systems by Moroccan SMEs.

7.2.1 Links with Europe

Egypt, Morocco, and Tunisia have economies that are amongst the most complex in Africa. According to the Economic Complexity Index, "economic complexity expresses the diversity and sophistication of the productive capabilities embedded in the exports of each country". (Economic Complexity Index, 2019). The EU is the first trade partner for the three countries. As Table 7.1 shows, manufacturing represents a sizeable share of this trade and the economies of the three countries, accounting for between 14 and 16% of their GDPs (World Bank,

TABLE 7.1 Trade Relations between the EU and the Three Studied Countries at a Glance

	Egypt	*Morocco*	*Tunisia*
Share of manufacturing in GDP	15.9%	14.9%	14.8%
Ranking in Africa in terms of economic complexity	3rd	12th	1st
Date of signing of the FTA with the EU	2001	1996	1995
Date of entry into force of the FTA with the EU	2004	1997	2000
Subcommittees with the Association Councils dealing with industry and R&I	Industry, trade, services and investment	Industry, trade, and services Research and innovation	Industry, trade, and services Research and innovation
Date of creation of the subcommittees	2007	2003	2003
Share of total imports coming from the EU	25.8%	51%	48.3%
Share of total exports going to the EU	21.8%	64%	70.9%
Share of manufactures in exports to the EU	44.2%	71.7%	85.7%
Share of manufactures in imports from the EU	70.8%	73.8%	79.7%

Sources: based on World Bank, 2019; Economic Complexity Index, 2019; EC, 2020

2019). Manufacturing, therefore, provides a good basis on which to build cooperation on digitalisation and reinforce cross-Mediterranean RVCs.

7.3 Egypt, Morocco, and Tunisia: Reaping the Benefits of Digitalisation

North African economies appear as African leaders in terms of use of the internet both by citizens and by companies. Nevertheless, their start-up ecosystems perform more poorly than certain sub-Saharan African economies, such as Nigeria, Kenya, and South Africa, and should be reinforced. Stronger ecosystems could help provide the domestic manufacturing sectors of Egypt, Morocco, and Tunisia with adequate digital solutions to improve their performance, and introduce positive spill-over effects in terms of innovation and productivity. Overall, in spite of the fact that many positive developments can be observed in Egypt, Morocco, and Tunisia, results remain rather mixed and more should be done for the economies and societies to further reap the fruits of digitalisation.

Assessing overall digitalisation in a country is important because it shows to what extent the economy and society have adopted and use digital technologies, with possible positive spill-over effects on production. In North Africa, 4G coverage has increased dramatically, rising from 35% to about 84% of the population in five years. International internet bandwidth per internet user more than tripled in half a decade. In 2018, 57% of North Africa's formal sector companies had a website, as opposed to only 31% Africa-wide. Eighty-two per cent of formal sector firms in North Africa now use emails to interact with their clients and suppliers, while only 39% of them did five years ago (AUC/OECD, 2021).

Within North Africa, Morocco, and Tunisia are leaders in the use of the internet by companies, and their advantage is even clearer when it comes to small enterprises (see Table 7.2). Websites allow companies to target new potential customers, but many North African companies need to update their websites to ensure better impact and help enlarge their customer base.

The United Nations Conference on Trade and Development (UNCTAD) B2C E-Commerce Index confirms Morocco's and Tunisia's lead in terms of economic use of digital tools, as they are amongst the best positioned nations in terms of e-commerce (Table 7.3). Nevertheless, the Index also shows that there was no real North African advance in terms of e-commerce in 2019. As stated

TABLE 7.2 Companies and SMEs with a Website in Egypt, Morocco, and Tunisia

	Egypt	*Morocco*	*Tunisia*
Share of companies with a website	52%	69%	66%
Share of small enterprises with a website	38%	67%	59%

Source: AUC/OECD, 2021

TABLE 7.3 B2C E-Commerce Index Scores of Selected African Countries

	Côte d'Ivoire	*Egypt*	*Ghana*	*Morocco*	*Nigeria*	*Senegal*	*Tunisia*
B2C E-Commerce Index	31.3	39.4	42.8	43.4	53.2	42.7	58.1

Source: UNCTAD, 2019

above, e-commerce can be an important driver of growth as it can have positive effects on cost-reduction, sales growth, exports, and participation in GVCs, especially for SMEs (Lanz et al., 2018).

Overall, digitalisation does not constitute a tool for boosting employment yet in Egypt, Morocco, and Tunisia. According to Crunchbase, only 92 start-ups have been able to raise more than USD 100,000 in Egypt between 2011 and 2020. The figure was even lower in Morocco and Tunisia, with only 13 start-ups each reaching that target during the same period. Although employment is not the only outcome that can be expected from start-ups, it is clear these levels of funding indicate small positive spill-over effects from local start-ups to the rest of the economy (AUC/OECD, 2021).

7.3.1 Government Initiatives, Interventions, Strategies, and Policy Instruments on Digitalisation

Egypt, Morocco, and Tunisia have co-developed their industrial and digital strategies. The highest authorities in each of the three states have shown keen interest in ICTs. For instance, Tunisia was the organiser of the World Summit for the Information Society in 2005, and several ministers were assigned to ICTs since the 2010–2011 revolution, reflecting awareness amongst the political elite about the importance of this matter for the Tunisian economy. Morocco started adopting digital-related strategies in the late 1990s with the 1999–2003 five-year plan, followed by "e-Maroc 2010" (2005–2010) and the "National Strategy for the Information Society and Digital economy" (2009–2013), often referred to as "Maroc Numeric 2013". As for Egypt, it has also produced multiple digital-related strategies during the past few decades. A Ministry of Communications and Information Technology was established in 1999 and national strategies include Egypt's Vision of the Information Society (2003) as well as two ICT Strategies (2007–2010 and 2014–2020). However, in the three countries, these strategies have failed to achieve the expected results. For instance, "e-Maroc 2010" was never evaluated, and a report by the Moroccan Court of Auditors reveals that "Maroc Numeric 2013" ended in a clear underperformance. Only 295 Moroccan companies benefitted from the support of "Moussanada TI" to get equipped with professional information systems, far from the 3,000 targets that "Maroc Numeric 2013" had planned for (Cour des Comptes, 2014).

7.3.2 Egypt

With regard to innovation-driven entrepreneurship ecosystems, Egypt is clearly ahead when compared to Morocco and Tunisia. This can be mainly explained by its stronger domestic customer base (the 2nd population in Africa after Ethiopia and the 14th worldwide) and close connections with the Middle East. As shown in Table 7.4, Cairo is one of the five most important start-up ecosystems on the continent (AUC/OECD, 2019).

Equity Venture Capital (VC) funding shows that Egypt is performing much better than Morocco and Tunisia in innovative entrepreneurship. Egypt was also the third largest market in the continent in terms of VC funding with USD 269 million of investments over USD 200,000 in tech and digital start-ups, marking a strong growth in recent years as equity investments stood at USD 9 million in 2017 and 59 million in 2018 (AUC/OECD, 2021).

7.3.3 Morocco

Despite adopting a number of policies to support the innovation and entrepreneurship ecosystem, Moroccan entrepreneurs face difficulties in accessing funds and in growing their businesses. In 2016, the then Moroccan Minister of Industry, Trade, and the Green and Digital Economy, Moulay Hafid El Alamy, announced a new Plan called "Maroc Digital 2020". One year later the Agency for the Development of the Digital sector (ADD) was created and placed under the authority of Mr. El Alamy's Ministry. The Agency adopted a roadmap (2020–2025) comprising 15 actions including the support to smart factories and industry 4.0, the digitalisation of SMEs, digital entrepreneurship, AI, a national programme for digital training, digital infrastructure, and the creation of a digital park. Other mechanisms were created under the purview of the Agency in charge of SMEs ("Maroc PME") such as "INCUB-IDEA" and "INCUB-STARTUP", helping entrepreneurs conceive and launch their companies. The Central Guarantee Fund also launched a dedicated vehicle called "Innov-Invest" and supported by the aforementioned PACC (about EUR 12.5 million were pledged), with the objective to fund 300 start-ups between 2017 and 2022 (170 have received support so far). That being said, one of the main challenges that remain for Moroccan entrepreneurs is a staggering lack of funding. Investment continues to be dominated by lending, with significant guarantees expected

TABLE 7.4 Share of the Total Number of Start-ups in Africa in Selected Cities

	Cairo	*Cape Town*	*Johannesburg*	*Lagos*	*Nairobi*
Share of the total number of start-ups in Africa by location	6.9%	12.5%	10.1%	10.3%	8.8%

Source: AUC/OECD, 2019

from entrepreneurs. Moroccan start-ups find it difficult to scale up and reach maturity, as most projects funded by local VC companies focus on the pre-seed, seed, and series A stages.

7.3.4 Tunisia

Tunisia has similarly introduced a number of measures to support its digital ecosystem, but it is still unclear if these measures have been successful, while the wider economic climate in Tunisia poses problems for entrepreneurs. In 2014, Tunisia adopted a National Strategy called "Digital Tunisia 2020" followed by a National Strategy for Numeric Transformation (2021–2025) that was announced during the Tunisia Digital Summit in October 2020. More recently, a regulation on drones was announced by the Minister of Transportation in February 2021. The Tunisian Institute for Strategic Studies, a think tank under the aegis of the Tunisian presidency of the Republic, published a report in 2018 proposing the adoption of a strategy on IoT. As for Tunisia's start-up ecosystem, it is now supported by a series of measures. The most noteworthy one was the adoption of the Startup Act in 2018. This law allows innovative companies responding to certain criteria and their founders to benefit from financial and fiscal advantages in order to develop their operations. The law is part of the Startup Tunisia National Strategy. The strategy includes two other components: Startup Invest and Startup Ecosystem.

The Startup Invest pillar notably included the launch of a "fund of funds" called ANAVA ("forward" in Tunisian Arabic). ANAVA aims to reach an investment capacity of EUR 200 million that would be injected into more than 13 VC funds dedicated to start-ups at every stage of their development (pre-seed and seed, early and late stages). ANAVA was officially launched in March 2021 and benefits from a USD 75 million investment from the World Bank. It should be complemented by an incubator for VC companies (VC Lab) and a Guarantee Fund. As for the Ecosystem Pillar, it aims at funding start-ups and entrepreneurial hubs in Tunisia through a multiplicity of financial instruments available for all the different stages of a start-up's development. Lastly, in June 2021, Tunisia's Parliament unanimously adopted a law on crowdfunding as a complement to the Startup Act.

TABLE 7.5 Total VC Funding for Deals over 200,000 USD (Million USD).

	Egypt	*Ghana*	*Kenya*	*Morocco*	*Nigeria*	*Senegal*	*South Africa*	*Tunisia*
Total VC funding for deals over 200,000 USD (million USD)	269	111	305	11.2	307	8.8	259	3.4

Source: AUC/OECD, 2021

7.4 Strengthening the Linkage between Digital and Industry in North Africa

In this section we discuss possible avenues to strengthen the linkages between digital and industry in North Africa, focusing on our three case countries: Tunisia, Egypt, and Morocco.

7.4.1 Tunisia

Tunisia has undertaken a series of policies to move to I4.0. Although the country managed to upgrade the digitalisation of its industrial companies, results reached in the adoption of advanced digital technologies have been rather mixed. The PMN has helped digitalise manufacturing companies by boosting their adoption of digital technologies by 64%. Results are even higher for manufacturing SMEs (70%), which indicates that the PMN contributed to the reduction of the digital gap between SMEs and bigger companies. Nevertheless, the adoption of advanced non-specific software tools (enterprise resource planning, knowledge management systems, customer relationship management, and supply chain management) remains low in Tunisia, and the digital gap remains strong between coastal regions and interior regions (Ben Khalifa, 2020). Public support to SMEs therefore proves to be of paramount importance to help industrial companies improve their use of ICTs. This is all the more important as companies either lack awareness of the necessity to go digital or lack the financial means to invest in this matter.

As for the start-ups ecosystem applied to industry, Tunisia has tried to integrate existing infrastructure with innovative companies. For instance, Novation City, a "cluster of competitiveness" based in Sousse (northeast) focusing on electronics and mechatronics and created in the mid-2000s, recently launched Starti4, an incubation and acceleration programme with a focus on I4.0. The project was set up in collaboration with Innov'i – EU4Innovation programme, which was launched in 2019 and received EUR 14.5 million from the EU to invest in innovative companies in 21 governorates across Tunisia during the period 2019–2024. Starti4 aims at connecting industrialists, start-ups, and academia. A growing interest in I4.0 was also demonstrated by the organisation of the "Smart Industrie" event that took place in 2017 and 2020 under the supervision of the Tunisian Agency for the Promotion of Industry and Innovation and which was specifically dedicated to the 4IR.

7.4.2 Morocco

In Morocco, the rhythm of adoption of programmes focused on the digitalisation of industrial companies has tended to increase during the past few years, and authorities are pushing the private sector, and notably SMEs to further embrace digital technologies. A particularity of Morocco is that private sector–funded

academic institutions are playing a key role in that push. Morocco also adopted mechanisms under the purview of "Maroc PME" and the ADD. These include "Tatwir Startups" which was launched in February 2021. This programme aims at supporting start-ups of relevance to the Moroccan industry and is part of the Industrial Recovery Plan (2021–2023) that was inaugurated by the Ministry of Industry to face the economic crisis induced by the COVID-19 pandemic. The University Mohammed VI Polytechnic, an academic institution with premises in different cities in Morocco and funded by the OCP Group, the first industrial group in Morocco, inaugurated in February 2021 a data centre and the most powerful supercomputer in Africa. It also hosts an Innovation Lab for Operations focusing on solutions for industrial digitalisation. Another initiative is the recent Memorandum of Understanding (MoU) between the Ministry of Industry, the ADD, the Euro-Mediterranean University in Fez (EMUF) and the Project Consortium "Fez Smart Factory" to develop I4.0 projects and encourage the digitalisation of industrial SMEs in the Fez region (centre-north). The MoU thus bridges the ADD's "Smart Factory" project and the EMUF's "Fez Smart Factory Project", seeking to create an integrated and sustainable zone for industrialists wishing to digitalise and modernise their activities in the Fez region. EMUF, which has received funding from the Union for the Mediterranean (UfM) and the EU, was also the venue chosen for the second edition of the Global Industry Conference 4.0 in 2021 (the first edition took place in 2019), an event placed under the aegis of the Ministry of Industry. Non-academic stakeholders pertaining to the sphere of professional organisations are also engaged in adapting the workforce to the digital era. Thus, the Moroccan Federation of Information Technology, Telecommunications and Offshoring is associated with the National Agency for the Promotion of Employment and Skills to create vocational training programmes in digital matters (AUC/OECD, 2021).

7.4.3 Egypt

Egypt has worked to adapt its policies, the IMC, the private sector, and international institutions to boost the digitalisation of its manufacturing fabric. Thus, the IMC launched the Digital Transformation and Technology Support Programme Action Plan 2019–2021 to support the digitalisation of production in different industries. The country's first I4.0 Innovation Centre was inaugurated in April 2021 following a MoU between the Information Technology Development Agency, the IMC, and Siemens Egypt. It will be headquartered in the Knowledge City at the New Administrative Capital. The Knowledge City was precisely designed to concentrate higher-education institutions and ensure better transfer of technology and know-how to the private sector. Like Morocco, Egypt also expressed interest in I4.0 in the framework of the Programmes for Country Partnerships (PCPs) led by the United Nations Industrial Development Organisation (UNIDO), which aim at accelerating inclusive and sustainable industrial development among member states.

To summarise, we note that for I4.0 to succeed in the three countries, several stumbling blocks would need to be addressed. First, VC vehicles tend to prioritise services, marketplaces, and Software as a Service investments over I4.0 and robotics. Second, contrary to major industrial powers, the three countries lack a strategy focusing on I4.0 per se. It is furthermore of paramount importance both to increase companies' awareness on the potential benefits of digitalisation (including industrial IoT) and to strengthen the workforce's digital skills. In general, many digital tools adopted by industrial companies do not pertain to the most advanced technologies that currently exist. Last, infrastructure, particularly the safe implementation of the 5G networks necessary to use industrial IoT, and cybersecurity represent a challenge for the years to come, as foreign industrialists wishing to invest in the three countries will expect efficiency and safety for the industrial data they might generate.

7.5 Digital Cooperation and the Future of Manufacturing in the Mediterranean

Digitalisation can help strengthen cooperation between Europe and North Africa and foster economic growth in both regions. In light of the recent debates taking place in Brussels around the implementation of EU-wide digital, innovation, and industrial policies, and given the series of recent strategies adopted or discussed by European institutions in these matters; the question of how North African countries can benefit from digitalisation and innovation demands attention. Synergies should be further built between existing European policies prioritising the transformation of the European industrial fabric through digitalisation on the one hand, and the European Neighbourhood Policy (ENP) on the other one.

The EU has often coupled the issue of digitalisation to that of industry, as emphasised by the 2016 communication "Digitising European Industry – Reaping the full benefits of a Digital Single Market", the renewed European Industrial Policy adopted in 2017 and some of the recent strategies released by the Von der Leyen Commission such as the 2020 new industrial strategy. The European data strategy is another noteworthy case, as it mentions "non-personal industrial data" as a "potential source of growth and innovation" and the objective to create a single European market for data. The market would notably aim at giving businesses "an almost-infinite amount of high-quality industrial data". The data strategy is presented as needing to be completed by a "broader industrial strategy for the data-agile economy" (EC, 2020b).

The package that the EU has built in terms of industrial policy, and the focus on digital technologies that it contains, can constitute a potential base for future engagement with the Southern Neighbourhood, as some already existing instruments can be proposed and extended to North African nations. These tools could indeed boost the digital transformation of North African industrial companies. In terms of public strategies that could qualify as industrial policy, there are

now a variety of EU-level actions that seek structural change of the European productive fabric. These include the European Structural and Investment Funds, R&I frameworks such as the Horizon Europe programme, the SME support programme COSME, and other support vehicles such as the European Observatory for Clusters and Industrial Change (Benner, 2019). One can also mention the principle of providing public financing for Important Projects of Common European Interest on key technologies and infrastructure with potential beneficial spill-over effects on the Union's society, which was enacted in 2014. Frequent mentions of AI, IoT, 5G and 6G networks, cloud and edge computing, data centres, and supercomputers by the EC's recent communications confirm this renewed interest in technological, digital, and industrial matters.

There are now real opportunities to further integrate the industry–digitalisation nexus into the ENP. Indeed, the February 2021 "New Agenda for the Mediterranean" is the EU's joint communication on the Southern dimension of the ENP that insists on the potential of synergies between the EU and its Southern Neighbourhood in digital and industrial matters, in line with the strategies recently adopted by the Commission. The European Green Deal, the Hydrogen Strategy, the Industrial Strategy, and the SME strategy are all mentioned in the communication. The shift is justified by the "growing interdependence" recognised by the communication, which was further stressed by the COVID-19 pandemic that the communication explicitly mentions. The document therefore insists on the opportunity presented by the pandemic to further integrate "industrial supply chains between the EU and its Southern Neighbours". The communication also states the aim to replicate the ecosystems approach adopted in the framework of the communication on the new European industrial strategy by favouring the development of "Industrial clusters within the Southern Neighbourhood", which "could help economic development by connecting businesses to global and regional value chains, reducing the isolation of SMEs, promoting innovation, and generating more trade and investment" (EC & HR/VP, 2021).

As the EU refocuses on industrial policy, this is an opportunity to build a stronger industrial partnership, including a strong focus on digital industries and the digitalisation of industry. Morocco and Tunisia, in particular, are well positioned to benefit from this opportunity, as they are considered to be important partners for the EU. Since 2008, Morocco has enjoyed an "advanced status" towards the EU, while Tunisia contracted a "privileged partnership" with the Union in 2012. Tunisia was also the object of a joint communication in 2016 titled "Strengthening EU support to Tunisia", which vowed to help "mainstream the digitalisation of SMEs" (EC & HR/VP, 2016). Nevertheless, the communication did not result in major achievements. Morocco and Tunisia are now among the 18 non-EU countries associated to the Horizon Europe programme, and recent calls have been made to include them in other programmes, including the "Next Generation EU" recovery plan (El Karoui, 2021). Accession of North African countries to EU programmes in R&I, support to SMEs, digitalisation,

and training, together with the identification of key areas of industrial cooperation and increased investment in infrastructure and logistics, would help mobilise private investment in key sectors and upgrade the North African industrial fabric, notably through digitalisation. In turn, such actions would reassure firms and encourage them to invest in the EU's Southern Neighbourhood, which could benefit European industrial ecosystems through a densification of value chains.

7.6 Conclusion and Recommendations

The importance of digitalisation in industrialisation has been demonstrated by various actors from the government to the private sector in Egypt, Morocco, and Tunisia. The countries have built experience and knowledge in designing sectorial policies, and notably industrial and digital ones. Nevertheless, these strategies are often poorly evaluated (because of a lack of data) or fail because of over-optimism or poor implementation. The prioritisation of the manufacturing sector when tackling the digital transition remains low and should be encouraged. The EU could play a role to make sure this digitalisation is placed high on the official agendas of Egypt, Morocco, and Tunisia and that appropriate follow-up and execution ensue. It should consolidate cooperation with its Southern Neighbourhood in industrial matters and give access to its various tools in R&I, infrastructure, and industrial policy.

The first issue that needs to be tackled for digitalisation to play a stronger role in the North African manufacturing sectors is the necessity to ensure better funding in this matter. Two components should be distinguished: VC and industrial policies. VC instruments should be better promoted to provide new forms of funding (away from lending) for nascent start-ups and help them gain maturity. Public investment in VC could thus be funded by entities of the European development finance architecture, with investment being channelled by private VC funds (funds of funds models) providing funding at all stages of start-ups' development. Involving North African institutions in more EU programmes, initiatives, and instruments would also be a welcome move. Moroccan and Tunisian association to the Horizon Europe programme is a first step that should be followed by similar ones, with the ultimate goal to ensure better dialogue between North African and European institutions, notably in the private and academic spheres. Better funding could also be provided by the EU to support investment in digitalisation for manufacturing companies, for instance, through North African public funds dedicated to the upgrading of industrial production. This could be a way to promote the reinforcement of cross-Mediterranean value chains. Funding could also be intensified for rationalised and clearer skilling programmes and infrastructure relating to digitalisation. Targeted fiscal advantages could also be provided by the three countries for companies digitalising their operations or training their workforce to use digital tools.

The second recommendation we make is centred on digital strategies. Technical support for their formulation and implementation could be deepened, and synergies should be sought in that regard. One possible programme with which to seek synergies could be the Jobs and Growth Compacts, an instrument created by the EU in 2012. These compacts were created to identify the most promising value chains at national and regional levels. Their aim is to make sure FDI pours into value chains with the best possible impact on job creation, notably in manufacturing and processing. Synergies between both programmes could thus be an avenue to pursue. Mechanisms allowing for regular exchanges on digital strategies and industrial policies could also be supported to reinforce cross-Mediterranean value chains. Fora gathering SMEs in North Africa, at the Mediterranean level and at African regional economic communities' level should also be multiplied for private sector entities to identify, share, and implement good practices, notably relating to digitalisation. This would ensure better ownership and efficiency in the conduct of digital policies. Strategies specifically dedicated to I4.0 and the coupling of digital and industrial strategies could also be an area to work on for North African states, and the EU could help design them.

Third, we advocate a multi-stakeholder and multi-scalar cooperation in digitalisation involving different actors from the AU and EU. The private sector is the best suited actor to drive the digital transformation of the productive fabric, and should therefore be encouraged to act more freely, which implies that measures should be taken to improve the business climate. Academic institutions should be more actively engaged by reinforcing their role in promoting the digitalisation of industrial companies. Technology parks and clusters can be tools to integrate the efforts of various stakeholders. Different public agencies (in charge of the digital economy, of vocational training, of industry and exports promotion) and professional organisations should also be engaged and contribute to policymaking and to a better understanding of digital-related issues and challenges by lawmakers. Last, synergies should be mapped between the different existing instruments provided by the Union for the Mediterranean, the EU, and the AU.

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