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North African Countries and SDG 9 of the United Nations 2030 Agenda: The Way Forward

Contents

* ECA/SRO-NA/ICSOE/36/1

Executive Summary

1. Although North African countries (NACs) post the best performance in SDG achievement among Africa's subregions, significant challenges remain. This report assesses the state of play of NACs in attaining SDG9, which aims to build resilient infrastructure, promote sustainable industrialization and foster innovation. Several NACs are performing well on SDG 9, albeit with vast variations in levels of performance between countries. SDG 9 index shows that both Tunisia and Morocco are at the same level as the group of emerging industrial countries (EICs), Egypt also being close. This being said, the three countries are only nearly half the level of that of industrialized economies. Algeria, Libya, Mauritania and Sudan have a relatively smaller industrial sector. NACs have very low levels of inclusion and share of medium-high and high-tech manufacturing value added in total value-added compared with EICs. The manufacturing and modern services value-added must increase if NACs are to reach the per capita levels of industrialized nations. Redirecting public spending towards human capital will remain a central policy recommendation to improve innovation, technical capacity and sophistication of the countries' manufacturing production structure.

2. NACs suffer from a substantial infrastructure deficit, especially in passenger and freight volumes by various modes of transport. Except Morocco and Tunisia, NACs are performing poorly in inclusiveness and market access of small-scale industries. Industrialization and diversification call for an efficient railway system that help overcome geographic distances. NACs also need to introduce regulatory reforms of public utilities such as the railway system and the telecommunications sector, to reduce concentration in the banking sector, to improve bank inclusion strategies and to adopt adequate monetary and fiscal policies, thereby promoting financial inclusion of small industries.

3. Despite the relatively low contribution of North Africa to the global greenhouse emissions, failing adaptation and mitigation, the subregion would face severe consequences of climate change. And yet, because of their heavy reliance on oil, Libya and Algeria are currently heavy polluters. The rest of the NACs are fairing worse than the industrialized countries on pollution efficiency, on account of the more traditional technologies they use and lower share of services in production. On a positive note, Morocco is home to the largest concentrated solar power facility in the world, a proof that transition to cleaner energy is feasible. Further steps can be taken, given North Africa's abundance of renewable energy sources and additional room for more energy efficiency. COVID-19 pandemic has accelerated the shift towards digitalization and increased awareness of the environmental damage caused by rampant industrialization. A cleaner future is possible by embracing Technology 4.0 and being an actor in the Circular Economy.

I. Introduction to SDG 9

4. Industrial development in Africa implies structural economic transformation from traditional sectors such as agriculture to modern manufacturing and services fueled by innovation and technology. Such transformation can provide jobs, generate income, and reduce poverty. This being said however, the share of manufacturing (in terms of value added and employment) in the economy is declining in most North African countries (NACs) while the share of agriculture remains stable[1]. This raises the question whether and to what extent these countries are undergoing premature deindustrialization.

5. The Current pandemic has exacerbated the existing vulnerabilities. North Africa was the second-worst affected region of the African continent, second to Southern Africa. Lockdown measures had a negative impact on the supply and demand sides leading to higher youth unemployment, a disruption in the region's connectivity with global value chains and dwindling revenues from exports, tourism, and remittances. Small-scale industries have been hard hit by the pandemic and many continue to cope with existential challenges. In contrast, COVID-19 crisis strengthened the role of digitalization in contributing to Africa's productive transformation as countries witnessed an increased demand for e-commerce and IT enabled services.

6. Besides the Covid-19 pandemic, climate change-related risks (particularly high levels of water stress) are looming; therefore investing in infrastructure while giving priority to future-focused climate resiliency assumes paramount importance in building forward for a North-African Green Recovery. The pandemic has also offered opportunities to rebuild stronger, all the while advancing the implementation of the 2030 Agenda for Sustainable Development. Although lost jobs will not be recovered, new employment opportunities are emerging, which are linked to the need to accelerate pharma production and joint procurement, particularly in North Africa and more generally Africa.

7. According to the 2020 Africa SDG Index and Dashboards Report, North Africa got the highest scoring regionally (:61.87 out of 100) on SDGs performance, but significant challenges remain[2]. On Sustainable Development Goal 9 (SGD 9), Egypt, Morocco and Tunisia showed moderate improvements while progress remained at a standstill in Algeria, Libya, Mauritania, and Sudan. While the COVID-19 pandemic has sparked a wave of uncertainty over the future of some infrastructure investments in North Africa as sponsors and lenders are awaiting the Covid-19 pandemic to pass, meager progress has been made towards achieving SGD 9. Egypt has leapt 55 places on communications infrastructure in one year on Oxford Insights' 2020 Government Artificial Intelligence Readiness Index, ranking 56th.

8. This report assesses the state of play of SDG9 in NACs, and underscores the need for countries to industrialize and increase the value added of their products to fully benefit from their rich natural resources. In addition, within SDG 9, policy makers need to present adequate options to attract private investors, accelerate the shift to manufacturing and industrial development while investing in the training and education of women and youth towards achieving inclusive and sustainable industrialization. SDG 9 goal therefore recognizes the new global vision of inclusive and sustainable industrial development (ISID) adopted by the Member States of the United Nations Industrial Development Organization (UNIDO) through the 2013 Lima Declaration.

[1] Regional report on Jobs and Growth in North Africa 2020.

[2] The Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network (2020): Africa SDG Index and Dashboards Report 2020. Kigali and New York: SDG Center for Africa and Sustainable Development Solutions Network.

9. This report has three sections. The first section outlines the available indicators for the NACs to provide progress on SDG 9 per country. The second section ranks countries on a global scale using the SDG 9 index. The third section provides policy recommendations towards the achievement of SDG 9.

II. Where do North African countries stand on Achieving SDG9

10. SDG 9 is about inclusive and sustainable industrial development (ISID), hence dealing primarily with 'industry, innovation and infrastructure'. It aims to build resilient infrastructures, promote sustainable industrialization and foster innovation. SDG 9 is comprised of eight targets and has 12 indicators.

11. The first target, target 9.1 *focuses on quality, reliable and sustainable infrastructure.* **Figure 1** depicts the second indicator of the target (9.1.2) as the data are not available for indicator 9.1.1.

12. The group of the 35 emerging industrial countries[3] (EICs) has performed significantly better on the infrastructures front (9.1), especially in passenger and freight volumes by various modes of transport (9.1.2, Figure 1) compared to the entire group of NACs[4].

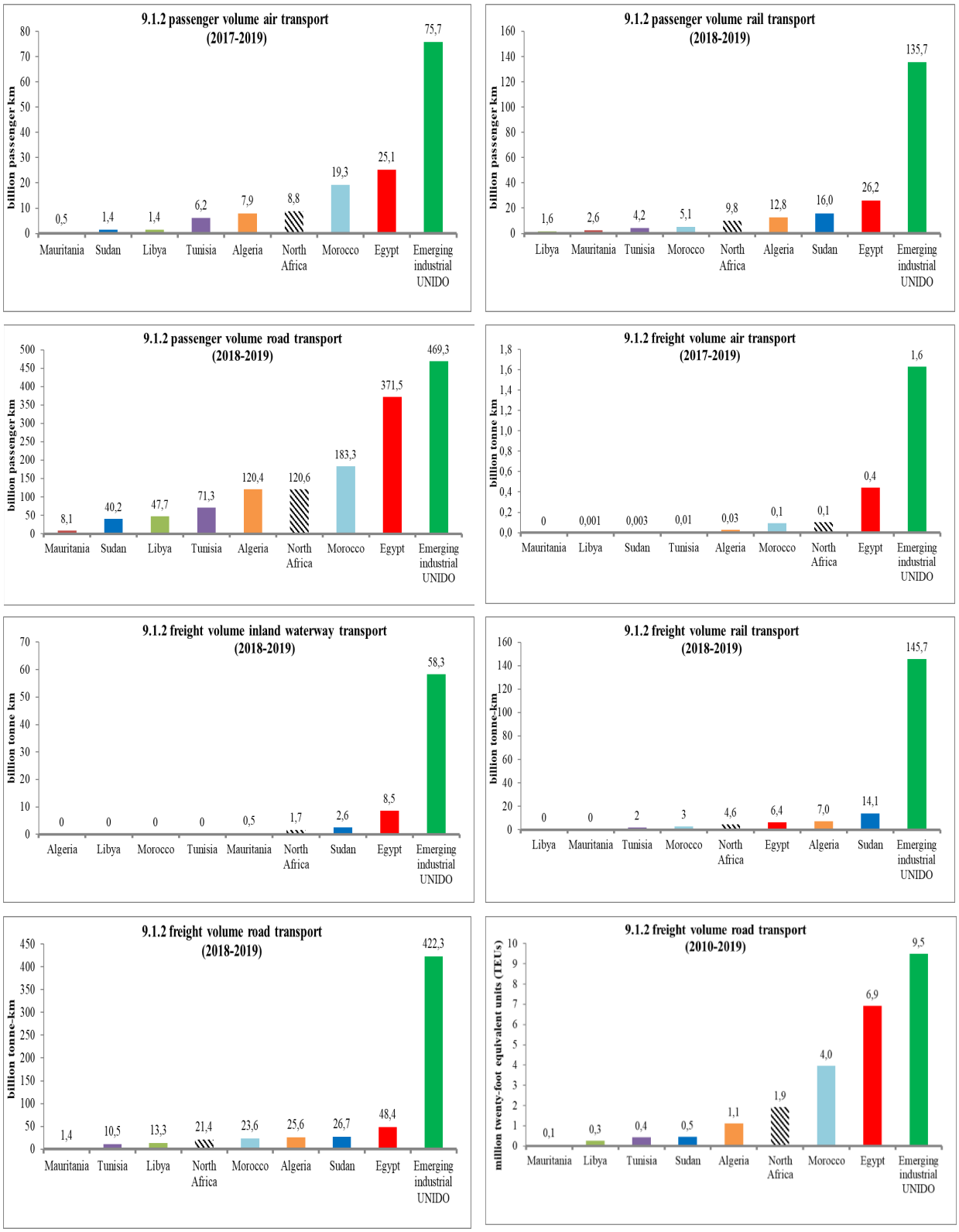
13. Industrialization and diversification call for an efficient railway system that reduces geographic distances within and between nations. In all NACs, highway road freight is more costly to maintain and manage than rail freight. An efficient railway system requires significant monetary investments, which NACs could mobilize at the multilateral, bilateral as well as the national level.

14. State provision of the railway sector has politicized this process, thereby creatring artificially depressed prices, over-employment, political manipulation of investment priorities (with all related construction contracts), in addition to a lack of managerial autonomy, technical competence and corruption in procurement (cf. El-Haddad 2015; 2017).

[3] UNIDO definition is used, covering the countries of Argentina, Bolivarian Republic of Venezuela, Brazil, Brunei Darussalam, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Egypt, Greece, India, Indonesia, Islamic Republic of Iran, Kazakhstan, Latvia, Mauritius, Mexico, North Macedonia, Oman, Peru, Poland, Romania, Saudi Arabia, Serbia, South Africa, Suriname, Thailand, Tunisia, Turkey, Ukraine, Uruguay and Venezuela.

[4] Freight volumes in other modes of transport except road are nearly nonexistent in NA - with the exception of Egypt, which fairs slightly better in waterway freight (Suez Canal) and air transport.

Figure 1: Develop sustainable, resilient, and inclusive infrastructure (9.1; 2017-2019)
(9.1.2 passenger and freight volumes, by mode of transport, available averages)



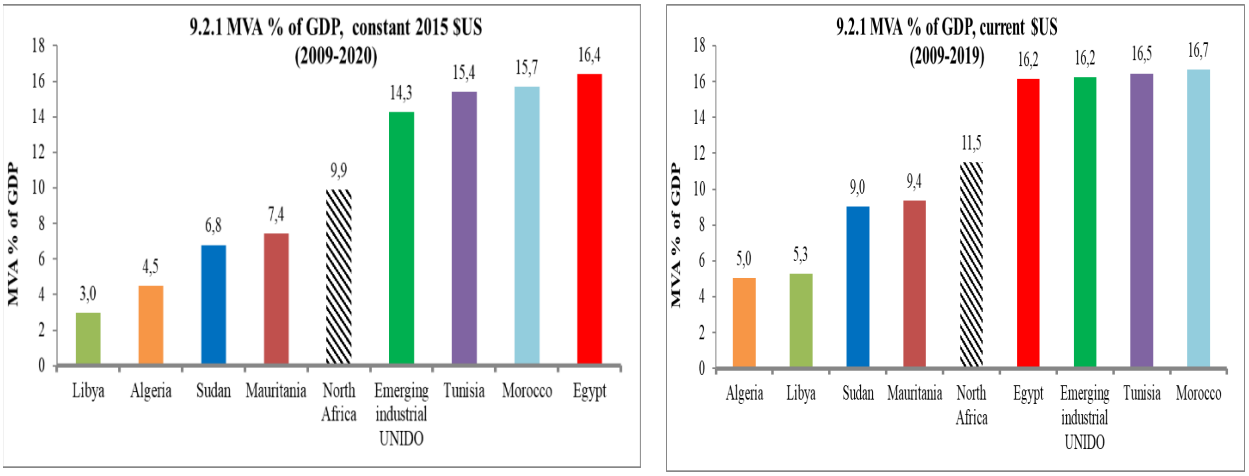
Source: United Nations Statistics Division.
Note: no data earlier than the specified periods were available; 2010, 2011 missing for Sudan in the last figure.

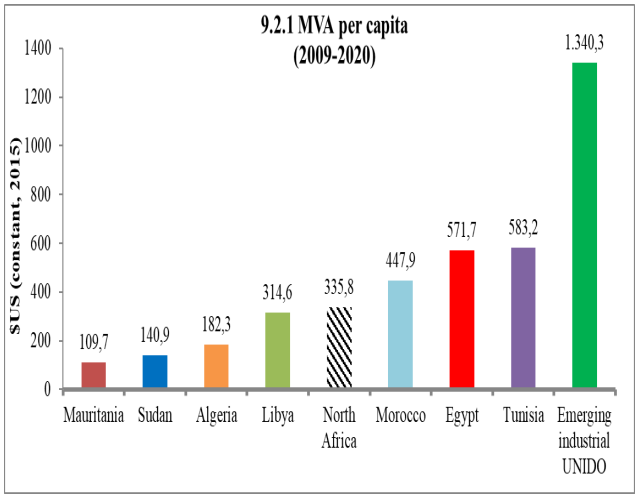
15. To address these shortcomings some reforms need to be undertaken. For example, regulatory reform aims to strengthen the framework of accountability for the railway operator, while public sector reform mainly aims to improve the railway's managerial and financial autonomy vis-à-vis the State. A number of measures can be adopted towards achieving this, including the incorporation of the railway (where it hasn't been done yet), accounting separation from public administration, conclusion of performance contracts with the executive, governance reforms to increase independence of the board, and changes in the legal status of the enterprise, i.e. through the conversion to a public limited company, thereby releasing it from public sector procurement, employment, and investment regulations. Adoption of these measures, will therefore allow NACs to aim for an efficient rail network connecting the far ends of the country, thus enhancing domestic trade and establishing stronger connections with neighboring countries for improved international trade.

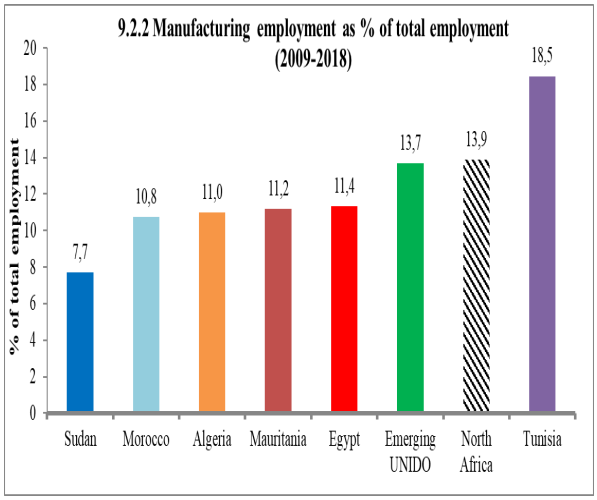
16. Egypt has introduced a series of measures in this respect. In 2018, the parliament amended the status of the state-owned Egyptian National Railways (ENR), allowing some direct participation from the private sector. This allows ENR to incorporate joint stock companies to fulfill its purpose and raise equity capital from private investors to participate in railway system projects, hence abolishing the monopoly of ownership and operation of the railway network by the State.

17. The second target, target 9.2 '*promotes inclusive and sustainable industrialization and aims, by 2030, to significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries*'.

Figure 2: 9.2.1 manufacturing value and 9.2.2 manufacturing employment (9.2; 2009-2019)







Source: United Nations Statistics Division

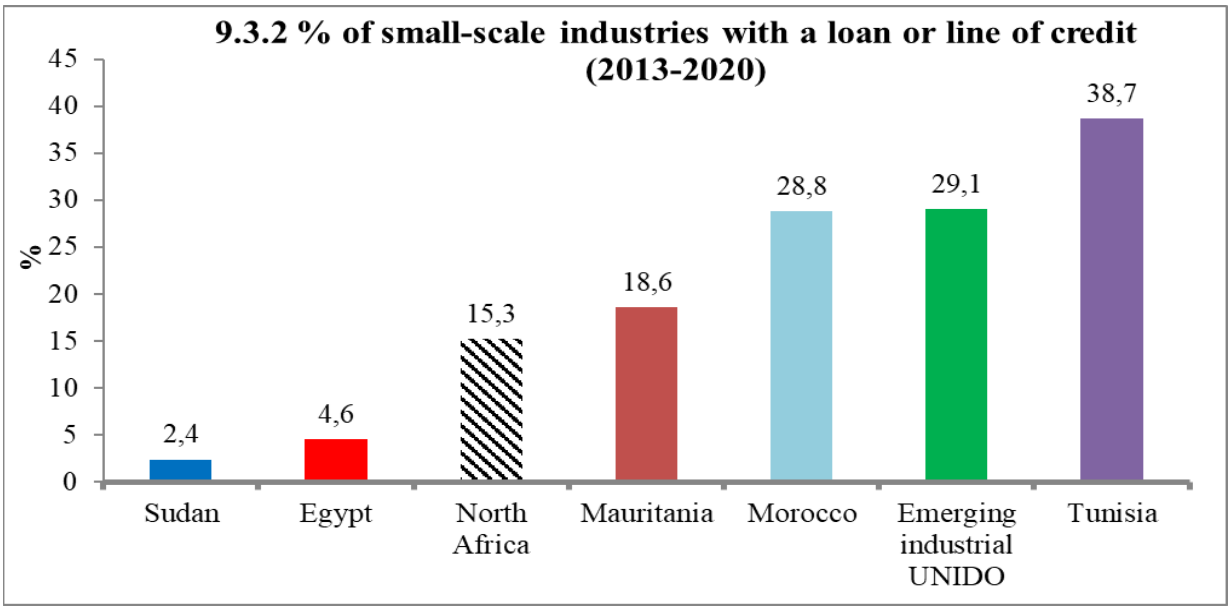
Note: *w.r.t employment 2013: Egypt, Morocco & Tunisia; 2014: Mauritania & Sudan; 2016: Egypt; 2019: Morocco; 2020: Egypt & Tunisia; w.r.t. MVA per capita, North Africa in 2009, 2010, 2013, 2015, 2016 & 2018: Egypt & Tunisia; 2011: Egypt, Sudan & Tunisia; 2012: Egypt, Morocco & Tunisia; 2014: Algeria, Egypt & Tunisia; 2017: Algeria, Egypt, Mauritania & Tunisia.*

18. The share of manufacturing value added in GDP of three countries (Egypt, Morocco and Tunisia), at about 16%, is comparable or slightly above that of the group of EICs (14.3%). In contrast, manufacturing indicators are particularly low in Libya followed by Algeria, Sudan and Mauritania. In most NACs, manufacturing employment as a percentage of total employment (9.2.2, **Figure 2)** is only slightly lower compared to the group of EICs. The exception is Tunisia with an employment share in manufacturing close to 20% (18.5%) which is significantly above that of EICs (13.7%). Finally, Sudan has the lowest employment share in manufacturing at just 7.7% of total employment, reflecting its large agricultural sector.

19. The third target, target 9.3 *focuses on access to finance by SMEs*. **Figure 3** shows that Egypt (4.6%) is performing poorly with regard to inclusiveness of small-scale industries and their access to markets compared to Mauritania (18.6), Morocco and Tunisia. Morocco's small-scale industries share in loans or lines of credit (29%) is roughly equal to that of the group of EICs, while that of Tunisia (39%) even exceeds that of this group. Sudan remains at the bottom (2.4).

Figure 3: Target 9.3: Increase access to financial services and markets (average of 2013-2020)

(9.3.2: proportion of small-scale industries with a loan or line of credit



Source: United Nations Statistics Division

20. Limited bank competition and concentration of banks in the hands of the State creates a disincentive to lend to small-scale industries perceived as higher risk. Bank competition can be improved through reduction of concentration of state banks. They also need to improve their financial inclusion strategies by further mitigating credit information asymmetry and reducing the credit risk of SME borrowers. These strategies include: 1) creation of credit bureaus; and collateral and moveable asset registries; 2) provision of credit guarantee schemes (Algeria, Morocco and Tunisia already provide these schemes) and 3) passing insolvency and bankruptcy laws along the lines of those already passed in Egypt. Related to this is the role of *fiscal and monetary policy where the government and the public sector are crowding out lending to the private sector, including that to small-scale industries.*

21. Target 9.4 *focuses on upgrading infrastructure and retrofit industries to make them* sustainable *with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities by 2030*'.

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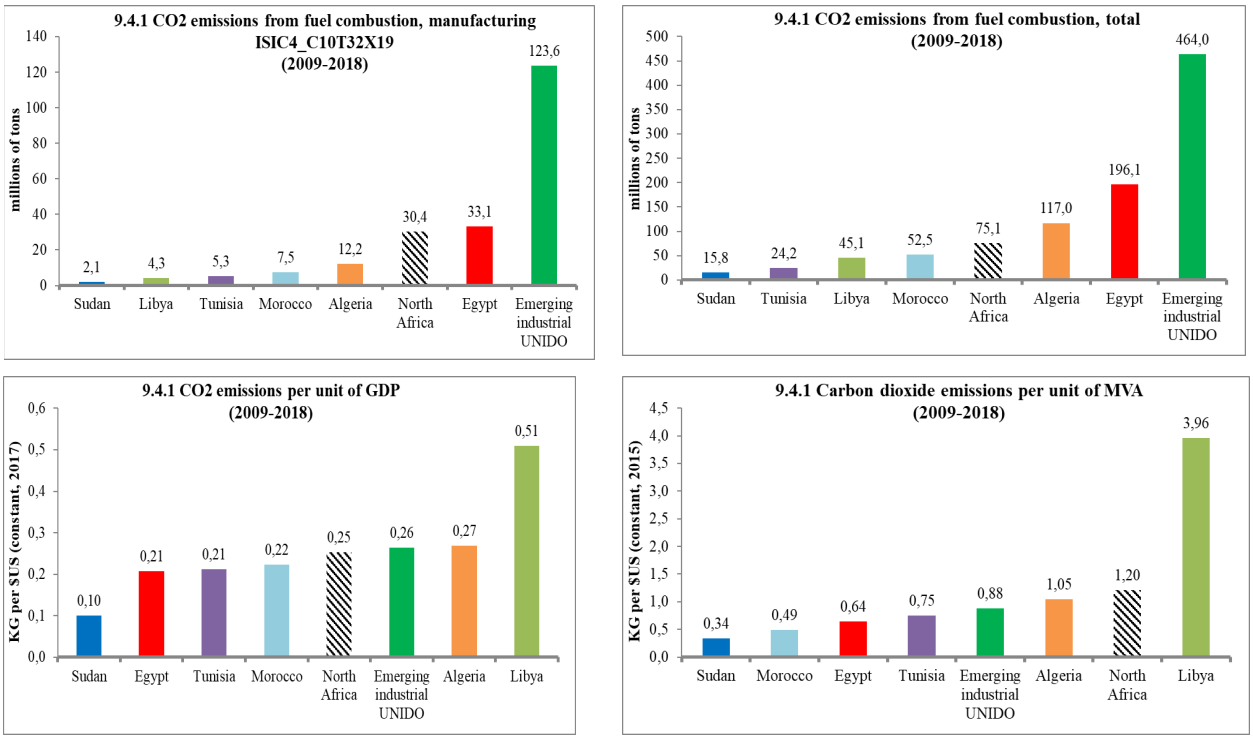
Figure 4: Upgrade all industries and infrastructure for sustainability (9.4; 2009-2018)

(9.4.1 CO2 emissions)



Source: United Nations Statistics Division.

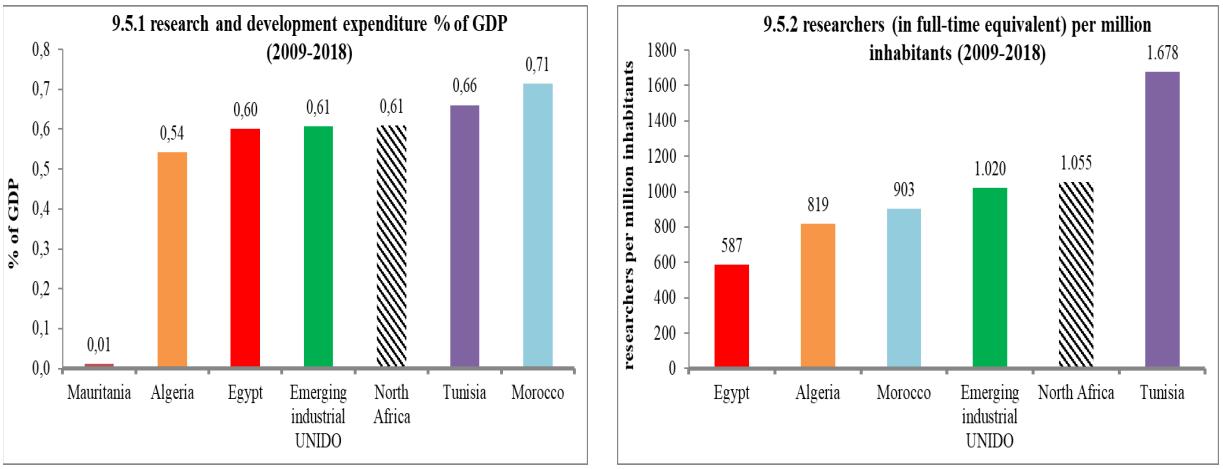
Note: ISIC4_C10T32X19: manufacturing excl. coke and refined petroleum products and repair and installation of machinery and equipment.

22. The environmental Kuznets curve (inverted U) relation indicates that at the first stages of industrialization, the efficiency of carbon emissions is poor and worsens initially, but eventually, as countries employ more advanced technologies and become more industrialized, the level of Co2 emissions per $ of GDP sinks.

23. With 6 times as much CO2 emissions as NACs (9.4.1, 464 mil of tons compared to just 75, **Figure 4**), the group of EICs is the biggest polluter. In relative terms however, Libya followed by Algeria are both the largest polluters either per unit of GDP (Libya about double that of EICs) or as CO2 emissions per unit of manufacturing value added (Libya emits about 4.5 times more the emission level of EICs) during the specified 10 years. Diversification out of oil is the only way forward if Libya and Algeria are to improve their standing on the sustainability dimension of SDG 9.

24. The fifth target 9.5, *covers innovation and research and aims to 'enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries.*

Figure 5: (9.5.1: research and development expenditure as a proportion of GDP; 9.5.2: researchers (in full-time equivalent) per million inhabitants) (9.5; 2009-2018)



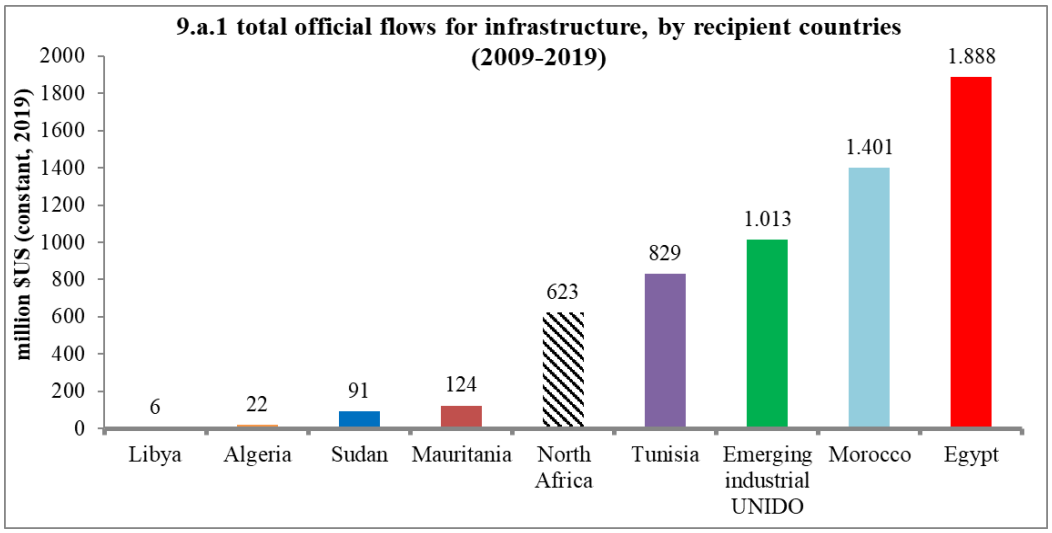
Source: *United Nations Statistics Division*

Notes: *w.r.t. North Africa in 2009, 2011-2016: Egypt and Tunisia; 2010: Egypt, Morocco and Tunisia; 2017: Algeria and Egypt; 2018: Egypt, Mauritania and Tunisia.*

25. In **figure 5**, Tunisia (0.66%) and Morocco (0.71%) outperform the group of EICs in terms of proportion of R&D spend to GDP: (0.61%, 9.5.1, Figure 5). Egypt's proportion is exactly equal to that of EICs (0.6%) and had been on the rise since 2008. But because the GDP level of NACs is lower than the group of EICs, the absolute expenditure is still inadequate. Mauritania's R&D spend is negligibly low (0.01%) whilst Algeria (0.54%) is doing significantly better – however still below the NA average. Tunisia (1678, 9.5.2, Figure 5) also stands out in terms of numbers of researchers per million inhabitants, clearly exceeding that number in EICs (1020). The rest of the countries with available data remain close to the corresponding number for the EICs, with Egypt having only about half of that number of researchers (587).

26. The sixth target, target 9.A *is concerned with the role of development cooperation in 'facilitating sustainable and resilient infrastructure development in developing countries.* **Figure 6** shows that the total official flows for infrastructure to Egypt are the highest (9.A1. Figure 6) mil $US 1888) followed by Morocco (1401), Tunisia (829), Mauritania (124), Sudan (91), Algeria (22) and finally Libya (6*).*

Figure 6: (9.A.1 development assistance for infrastructure: total official international support (official development assistance plus other official flows) to infrastructure (9.A; 2009-2019))



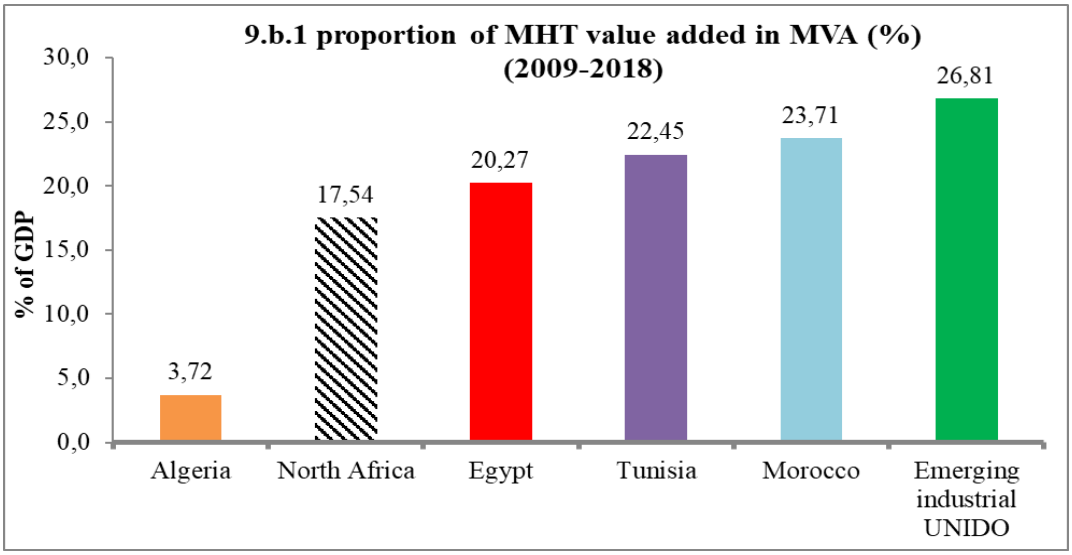
Source: United Nations Statistics Division.

27. The indicator does not distinguish the level of sustainability of the infrastructure. Additionally, official flows do not seem to be proportionately related to a country's population level. Total official flows vary significantly per capita. Tunisia is the largest recipient in 2019 ($91.4 per capita) ahead of Morocco ($42.3), Mauritania ($42.1), Egypt ($30.9). These figures drop considerably for Sudan. The country receives only $1.6 per capita in official flows for infrastructure, although it is the country most in need of this assistance compared to the other countries. Data ceased to be available in 2019 and the low flow seems to perpetuate the international community's perception of Sudan as a pariah status on account of its role in the conflict in Darfur.

28. Target number 7, target 9.B, *is concerned with 'support domestic technology development, research and innovation in developing countries.* **Figure 7** indicates that on average Morocco (24%) and Tunisia (22%) are very close to the group of EICs (27%) in terms of the proportion of medium and high-tech value added in total manufacturing value added (9.B.1, Figure 7), with Egypt still slightly behind (20%). Tunisia has been on an upward trend since 2010 and Egypt picked up again as of 2014, after a steady decline since 2000. Algeria, on the other hand averages only 3.7% following a steep decline in the aftermath of the 2011 protests, with minimal improvement ever since. A detailed discussion of policies to improve both targets five and seven is in the next section.

Figure 7: Support domestic technology development and industrial diversification (9.B; 2009-2018)

(9.B.1 proportion of medium and high-tech industry value added in total value added)



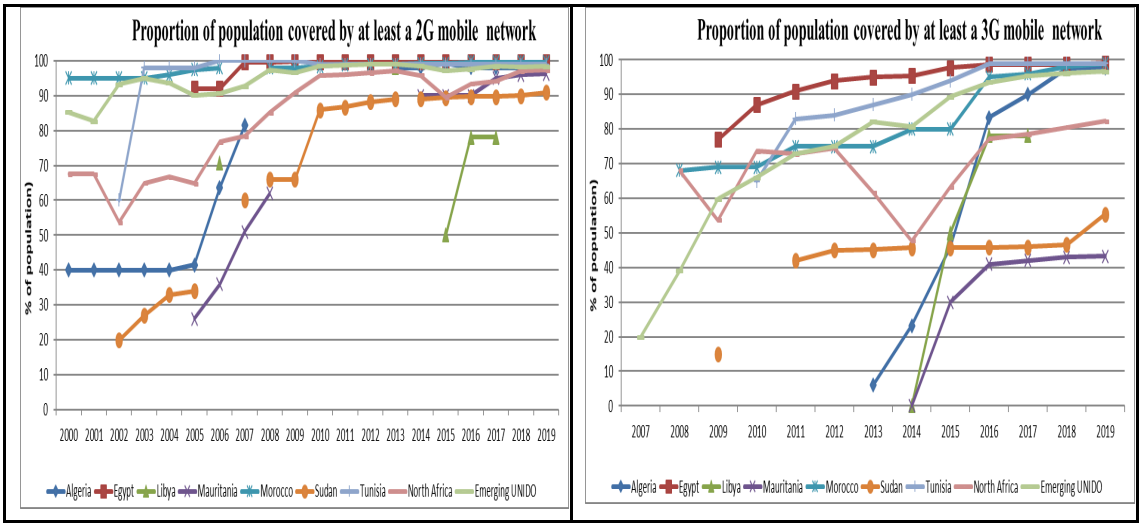
Source: United Nations Statistics Division

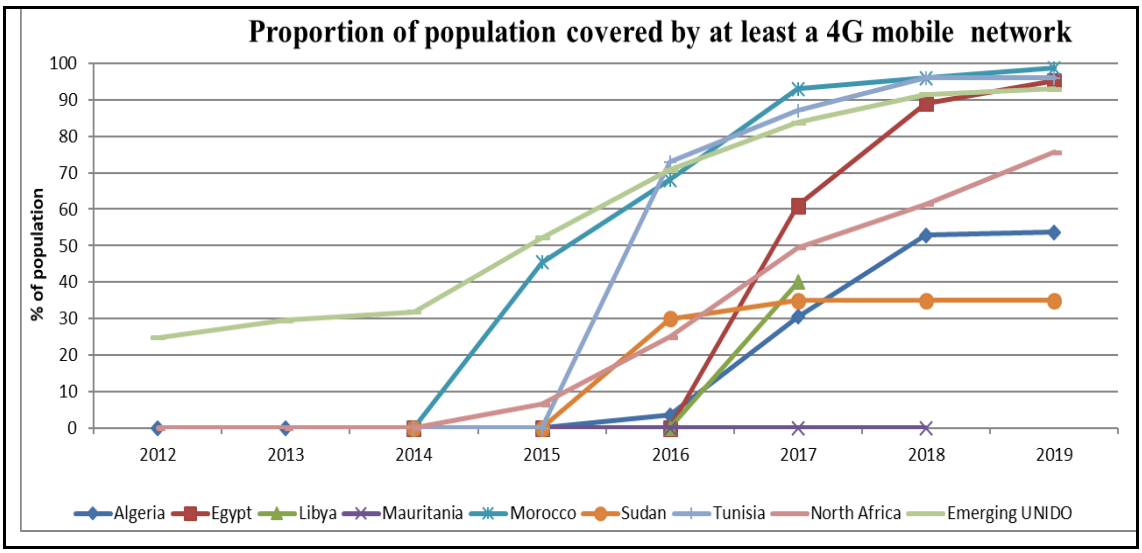
Notes: MVA: total manufacturing value added; MHT: medium-high and high-tech industry

29. Target number 8, 9.C., is concerned with '*significantly increase access to information and communications technology (ICT) and strive to provide universal and affordable access to the internet in least developed countries by 2030*'.

Figure 8: Changes in universal access to ICT (9.C; 2000-2019)

(9.c.1 proportion of population covered by a mobile network, by technology)





Source: United Nations Statistics Division

30. Tunisia, Morocco, and Egypt have near universal access to 4G networks, while both Sudan and Libya have a mere 20% population coverage, with Algeria at 50% (**Figure 8**). Mauritania has introduced 4G coverage in 2021. Almost all NA countries have a universal access to 2G networks except for Sudan and Libya with 20% and 10% of the population respectively still unserved. As regards the 3G network, both Sudan, with just half the population covered (since 2011) and Mauritania (40% since 2016) have a relatively poor coverage.

31. Despite some progress, Mauritania and Sudan are still in need of big infrastructure investments in view of the large surface area and scattered population over small towns and rural areas. This can only be achieved through the passing of regulatory and public sector reforms to the national fixed line incumbent – Sudatel in Sudan and Mauritel in Mauritania. The countries should mobilize sufficient funds from multilateral donors alongside exploring public-private partnerships. A recent UNECA report[5] argues that public private partnerships (PPPs), where appropriate reforms are met to improve their environment, could help NACs to solve issues of resource gaps and efficiency of public spending.

[5] "Leveraging Public-Private Partnerships to address the challenges of the Covid-19 crisis in North Africa", UNECA (2021) October 2021.

III. North Africa versus Emerging and Industrialized Economies: The SDG 9 Gap

32. In this section, the Sustainable Development Goal 9 index developed in a recent UNIDO report is presented[6]. The reported SDG 9 composite index 'is a measure of country progress towards achieving industry-related targets of SDG 9 and represents a comprehensive but straightforward approach to assess the extent to which countries have industrialized while promoting social inclusiveness and minimizing environmental impacts' (ibid. p.1). This section compares the performance of NACs to that of the EICs, as well as to that of industrialized economies. Analysis is reported by both the aggregate Index and its individual components.

III.1. The SDG 9 Index

33. The selection of indicators is based on the global indicator framework for the goals of the 2030 UN agenda. SDG 9 index looks into levels and growth patterns of manufacturing activities and their impact on the three dimensions of the SDG 9 (i.e. economic, social, environmental) goal represented by production, employment and the environment.

34. The indicators selected for the index[7] are manufacturing value added per capita (MVApc), manufacturing employment as a proportion of total employment (EMP), CO2 emissions from *manufacturing industries per unit of MVA (CO2) and the share of medium-high and high-tech manufacturing value added in total.*

35. The SDG 9 index could not be calculated for Libya and Mauritania since Libya lacks data for EMP or MHT and Mauritania for Co2 and MHT.

36. These results mirror the findings of the analysis of the previous section: with a worldwide rank of 58 Tunisia tops the rank of all NA countries, followed closely by Morocco (61), then Egypt with an average worldwide performance at 67. As for Algeria, it ranks 121st, sitting almost at the bottom end (Table 1).

[6] Please see Statistical Indicators of Inclusive and Sustainable Industrialization (UNIDO, 2021).

Source: *author's calculations. Data: United Nations Statistics Division; UNIDO (2021) for data on Taiwan and employment for China, Hong Kong, Gabon, Eriteria and Iraq in 2016, the value of the SDG 9 index for Angola, Cambodia, Hong Kong, Montenegro and Niger.*

Notes:

MVAsh: Manufacturing value added (current United States dollars) as a proportion of GDP (%) in 2020.
MVApc: Manufacturing value added per capita (constant 2015 United States dollars) in 2020.
EMP: Manufacturing employment as a proportion of total employment (%) in 2019).
CO2: Carbon dioxide emissions per unit of manufacturing value added (kilogrammes of CO2 per constant 2015 United States dollars) in 2018.
MHT: Proportion of medium and high-tech manufacturing value added in total value added (%) in 2018.

Table 1: The SDG 9 Index (cross country), 2021

Rank	Country	SDG-9 index	MVAsh (%)	MVApc (2015 US$)	EMP (%)	CO2 (kg/US$)	MHT (%)
58	Tunisia	0,287	14,75	518,5	18,3	0,728	27,57
61	Morocco	0,263	14,88	521,5	10,5	0,366	34,15
67	Egypt	0,252	15,94	594,9	12,5	0,719	20,94
78	South Africa	0,2'0	11,79	580,4	10,8	1,062	24,43
92	Nigeria	0,190	11,51	209,6	7,9	0,164	33,44
96	Senegal	0,176	15,15	225,2	6,2	0,319	21,65
97	Namibia	0,176	11,74	617,3	7,2	0	7,35
98	Ghana	0,171	10,44	233,4	13,7	0,336	10,84
119	Kenya	0,100	7,54	125,4	3,6	0,491	12,39
121	Algeria	0,091	4,43	190,7	10,7	1,047	2,69
122	Tanzania	0,076	8,44	88,4	3	0,39	6,47
	North Africa	0,222	12,50	456,40	13,00	0,72	21,34
	Emerging industrial excluding China, UNIDO	0,28	13,20	636	12,82	0,62	26,62
	Emerging industrial including China, UNIDO	0,29	13,64	1304,00	13,12	0,63	27,06
	Industrialized economies, UNIDO	0,46	14,14	5012,82	13,22	0,39	43,63
	Emerging market economies, IMF	0,255	12,55	1123,04	11,91	0,76	23,90

Source: author's calculations. Data: United Nations Statistics Division; UNIDO (2021) for data on Taiwan and employment for China, Hong Kong, Gabon, Eriteria and Iraq in 2016, the value of the SDG 9 index for Angola, Cambodia, Hong Kong, Montenegro and Niger.

Notes:
MVAsh: Manufacturing value added (current United States dollars) as a proportion of GDP (%) in 2020
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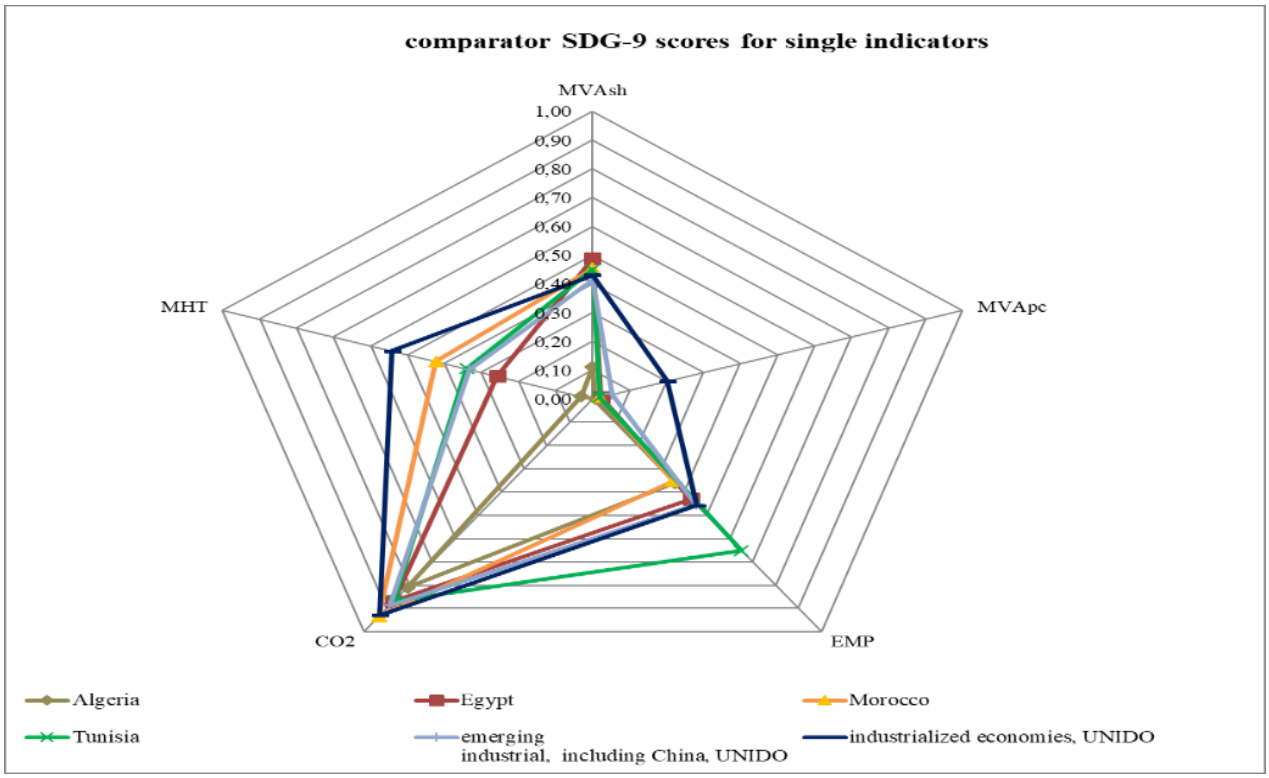
EMP: Manufacturing employment as a proportion of total employment (%) in 2019).
CO2: Carbon dioxide emissions per unit of manufacturing value added (kilogrammes of CO2 per constant 2015 United States dollars) in 2018
MHT: Proportion of medium and high-tech manufacturing value added in total value added (%) in 2018.

37. The SDG 9 index results show that both Tunisia (0.28) and Morocco (0.26) are at a similar level as the group of emerging industrial countries (0.29, including China). Egypt is also close (0.252). Still, the three countries are only nearly half the level of the group of 43 industrialized economies (0.46).

III.2. SDG 9 scores for the single indicators

38. **Figure 9** presents the scores for the single indicators and highlights the weakest dimension in the SDG 9. It indicates that the single weakest link for all three top countries concerns the economy, namely the share of medium-high and high-tech manufacturing value added in total value added (MHT). While Morocco outperforms both Tunisia and Egypt, Egypt is last on the MHT indicator. Morocco has implemented a promising industrial strategy over the last two and a half decades named the National Pact for Industrial Emergence 2005–2014 (Pacte National pour l'Emergence Industrielle, *PNEI*) and the Plan for Industrial Acceleration 2014–2020 (Plan d'Accélération Industrielle, PAI) (Cammett, 2006; Hahn & Vidican-Auktor, 2018; El-Haddad 2020).

Figure 9: Comparator SDG 9 scores for single indicators



Source: author's calculation. Notes: same as for Figure 1.

39. To enhance research, upgrade industrial capabilities and technologies through innovation (target 9.5) and support domestic technology development and industrial diversification (target 9.B), indicators such as R&D spend (9.5.1), numbers of researchers (9.5.2) and the proportion of medium-high and high-tech industry value added (9.B.1) should rise.

40. The top three NACs – Tunisia, Morocco and Egypt - are very close to the group of EICs on these dimensions with either Tunisia or Morocco leading, and Egypt slightly lagging. Hence, firstly redirecting public spending to investments in human capital should remain a central policy recommendation to improve innovation, technical capacity and the sophistication of the countries' manufacturing production structure. Other targeted vertical industrial policy interventions will be highlighted in the following section.

41. Second, since manufacturing industries are more transaction-intensive than subsistence agriculture or off-shore oil rigs, it is more dependent on strong contract enforcement, rule of law, and a generally strong business environment to protect property rights as well as provide proficient dispute resolution mechanisms (El-Haddad 2008). NACs do not perform very well on institutions. Strengthening the business environment through building strong institutions will help the NACs with their structural transformation efforts[8]

42. The next weakest link related to inclusivity but mainly for Morocco and to a much lesser extent Egypt. Tunisia outperforms the group of industrialized countries on the inclusivity indicator (i.e. share of manufacturing employment). As a matter of fact, this indicator is one Tunisia's strongest links. This indicator is more easily achievable for a small country like Tunisia. Morocco has three times the population of Tunisia and Egypt over eight times, which, to some extent, justifies the gap on this single indicator between the three countries. To create inclusive and open industrial markets the role of competition authorities and competition laws cannot be understated.

43. Algeria on the other hand has a value of zero in all economic indicators of manufacturing as a proportion of GDP (MVAsh), manufacturing value added per capita (MVApc) and in medium-high and high tech manufacturing value added (MHT). Nevertheless, on account of its heavy concentration on oil production, Algeria is a big polluter (CO2) compared to the other three NA countries. Libya is the world's biggest polluter. Mauritania on the other hand is expected to be similar with potentially a better value for the CO2 indicator, meaning less pollution since it is hardly industrialized. Algeria's index is just a third of the value of the SDG 9 index level (0.09) of emerging industrialized countries (0.26) and only a fifth of the level of the index of the group of industrialized countries (0.46). Libya (and Algeria) are both confronted to the challenge of catching up with its better-performing NA neighbours and eventually at least the group of emerging economies. It has to overcome the problem of Dutch disease in order to diversify and become more industrialized.

[8] UNECA, (2019). "Quality of institutions and structural transformation: Distortions and resource allocation in North Africa."

Box 1: SDG 9 and Covid-19

Structural transformation through GOAL9 (building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation) is crucial for North African countries to transform their economies and create jobs. In addition to traditional manufacturing, industries without smokestacks (IWOSS) activities have the potential to employ large numbers of moderately skilled people and can play an important role in manufacturing export development in the post covid-19 era (Page, 2020). IWOSS activities include agroindustry and horticulture, tourism, ICT-based business services and transport and logistics. For example, the Tunisian economy has gradually shifted towards the market service sectors (44.2 % of GDP in 2019) and to a lesser extent towards the manufacturing industries, at the expense of agriculture and non-manufacturing industries (Mouley and Elbeshbishi,2020)

The industrial sector is the second highest contributor to nominal GDP with a regional average of 38.5 percent in 2019 (AfDB,2020). The impact of the COVID 19 pandemic has been severe in North Africa. In 2020, GDP dropped by -5.8 % (if we exclude Egypt) and unemployment rates rose on average by 1.3% compared to 2019. The pandemic has therefore put manufacturing production and jobs at risk. Many industrial jobs have disappeared. While it is true that the pandemic has impeded countries fast-track developmental path, affecting project execution and delaying planned projects, the pandemic has also shown that countries need to build back for all generations for an inclusive and resilient recovery. The region remains committed to their development plans and the following are needed for recovery when it comes to Goal 9:

- Development of the private manufacturing sector, as it absorbs large numbers of workers and provides them with productive and decent-paying jobs.
- Harnessing the transformative power of digital infrastructure.
- Skills development and building future industrial competencies.
- Undertaking economic reforms to attract investment in infrastructure and leveraging the African Continental Free Trade Agreement to spur intracontinental trade.
- Fostering multilateralism and international cooperation collaborations to bridge the infrastructure financing gap in the region.

IV. Concluding remarks and policy recommendations

44. Several NACs are performing well on SDG 9 but there are wide variations in performance. Tunisia, Morocco and, to a lesser extent, Egypt are more industrialized. Algeria, Libya, Mauritania and Sudan have a relatively smaller manufacturing sector. Algeria and Libya are heavily reliant on oil and gas, having detrimental consequences for their manufacturing sectors. The economies of Sudan and Mauritania are still highly agrarian-based, and are slowly shifting towards structural transformation. Libya, and to a lesser extent Sudan, are both conflict affected countries, thus impeding the success of the introduced reforms.

45. The strongest performers - Tunisia, Morocco and Egypt - are matching the performance of other emerging industrial countries. But their performance is far below that of the industrialized countries, especially with respect to the complexity of their production structures through technology development and industrial diversification (Goal 9B) and with respect to inclusion. Value added in manufacturing and sophisticated services must be enhanced if NACs are to match the per capita levels of the industrialized nations.

46. Regarding the environmental implications, in absolute terms industrialized countries are responsible for the most pollution. Libya and Algeria are heavy polluters in view of their heavy reliance on oil. Consistent with the environmental Kutznets' curve (inverted U), the rest of the NACs perform worse than industrialized countries in terms of pollution efficiency on account of the more traditional technologies they use and lower share of services in production.

V. Policy Recommendations

47. Policy recommendations are divided into horizontal and vertical industrial policy (IP). Horizontal or neutral industrial policies (IPs) promote competitiveness across the board. They are intended to reduce production costs for all firms by nurturing an efficient and competitive market environment, and to provide the necessary infrastructure and human capital to support a dynamic industrial economy. Investing in human capital and building strong, accountable and autonomous institutions, including an independent competition authority, are at the center stage of horizontal IPs. Other policies include introducing regulatory reforms to public utilities such as the railway system and telecommunications sector, reducing bank concentration, improving bank inclusion strategies and adopting adequate monetary and fiscal policies so as not to restrict financial inclusion of small industries.

48. Active, vertical or hard policies are selective interventions to increase competitiveness, such as promoting linkages between local small and medium enterprises and large international firms through Supplier Development Programs (SDPs). The governments overseeing implementation of these SDPs are playing a double role in providing temporary incentives to attract foreign direct investment and linking this investment to government programs to modernize local suppliers, thereby raising the percentage and value of the local component of foreign enterprises.

49. The top performers amongst the NACs - Tunisia and Morocco and Egypt - have instituted similar programs. Tunisia supported manufacturing industries catering for the European market. It was the first country on the southern rim of the Mediterranean to implement a free trade zone with the EU so that it can also reach markets and effect economies of scale. The government additionally launched an industrial upgrading program subsidizing investments of manufacturing firms and investing substantial amounts in training engineers and technicians. These policies helped the country embark on a successful export-driven growth path (Erdle 2011; El-Haddad 2020b).

50. With vertical policies there is a higher risk of government failure, rent seeking behaviour and policy capture from corruption, reduced government capacities coupled with the interventionist nature of such policies. Hence vertical industrial policies should be implemented with careful monitoring of 'outcome indicators' or better still of 'impact' rather than a mere reporting of activities, and possibly linked to performance targets.

51. NACs suffer to varying degrees from weak formal institutions necessary for contract enforcement, and protection of property rights. Weak institutions also mean that firms face severe financial constraints. Infrastructure is often poor, thus hindering firm efficiency. But building country-wide well-functioning institutions and providing suitable infrastructure and financial systems for industrial production is often an immensely difficult task in a context marked by economic and political obstacles.

52. Clusters or industrial parks foster the creation of 'parallel structures' that can circumvent some of the major institutional constraints, albeit in a limited geographical area. Within clusters, geographical proximity facilitates the dissemination of knowledge and the development of skilled human capital and allows the division of the production process amongst cluster firms to promote innovation and competitiveness (Zhang 2016).

53. As part of their industrial strategies, Tunisia, Morocco and Egypt have developed industrial clusters and technology parks. Sudan and Mauritania have no clusters. Indeed, Mauritania has far too little industry to cluster. Nevertheless, the Ministry of Industry in Mauritania has included a cluster strategy to start with a cluster of fish and seafood processing in Nouadhibou (Pommier 2019). Libya's connections with Tunisia may support some cluster development even though Libya's unstable political situation and uneven economic recovery do not seem to be favourable to such a development (ibid). Algerian clusters are rather recent, and are the result of a more proactive industrial policy and diversification effort. These clusters are yet to be evaluated.

54. Algeria and Libya need to make better use of their natural resource wealth through running public consultations around the management of Sovereign Wealth Funds and the adoption of a more active industrial policy along the lines of those implemented by other NACs. They also need to focus on horizontal policies to build infrastructure and create sound institutions for a healthy business environment and nurture the required industrial skills and innovation through investments in education and health. Mauritania and Sudan should gradually adopt industrial policies to move their economies towards more modern, high-value industrial and services sectors.

55. The COVID-19 pandemic has accelerated the shift towards digitalization and an increased awareness of the environmental damage caused by industrialization. The three top performers are aware of the leading role digitilazation can play in the upgrading process and that technology has become the driving force for infrastructure, education, transportation, entrepreneurship, and industry. In Egypt, the government is set on a digital transformation spanning all sectors, as the country heads towards a paperless government with a transformation towards clean energy. Tunisia and Morocco are leading similar efforts. The other countries should follow suit. A cleaner future is possible by embracing Technology 4.0 and being part of the Circular Economy.

56. The NACs are starting to realize the role African industrial development has in implementing a successful Continental Free Trade Area (CFTA). Sound industrial development will provide the underpinnings of an African Continental Free Trade Area (AfCFTA) which can foster economic growth and alleviate poverty. It is expected that the AfCFTA agreement will usher in new and dynamic opportunities by enhancing intra-African trade and fostering an environment that can unlock foreign direct investment in the continent. Hence, in order to increase the CFTA's impact, industrial policies must focus on upgrading, productivity, competition, diversification, and production structure complexity.

57. Finally, the NACs have a relatively weak statistical infrastructure, lacking regular labour force and firm surveys, even though the situation has somewhat improved in recent years. Moreover, policies, programs and other interventions should be subject to rigorous evaluation. To ensure adequate data for SDG 9 monitoring and evidence-based policymaking, NAC governments should support their national statistical offices, seek technical assistance from international organizations, and engage more with the research community.

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